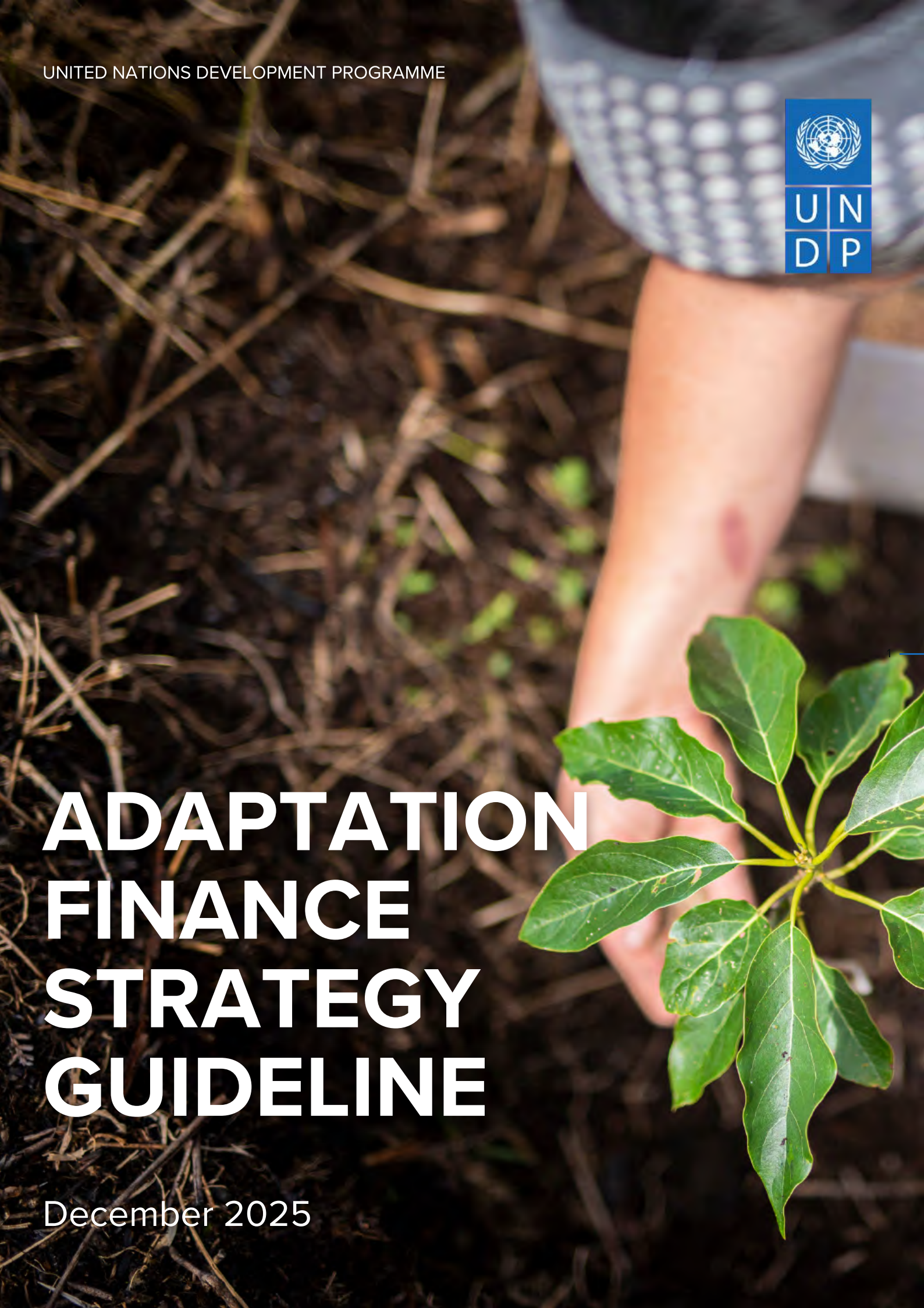
UNITED NATIONS DEVELOPMENT PROGRAMME



ADAPTATION FINANCE STRATEGY GUIDELINE

December 2025

Foreword

Climate change is no longer a distant threat—it is disrupting lives and economies today. Rising seas, prolonged droughts, destructive floods and shifting seasons are already eroding livelihoods, straining public services and reversing hard-won development gains. Cutting greenhouse gas emissions remains essential, but adaptation can no longer wait. Communities everywhere must prepare for impacts already underway.

Yet adaptation finance is far from adequate. International public flows to developing countries rose from US$22 billion in 2021 to $28 billion in 2022. However, this is only a fraction of global needs, estimated at up to $387 billion annually. The gap is stark—and growing.

The urgency is clear. By 2025, all countries are expected to have their first National Adaptation Plans (NAPs) in place, and by 2030, to be well into implementing the policies, projects and programmes identified in those plans. Stronger NAPs and the next generation of Nationally Determined Contributions (NDCs) currently being finalized must be backed by a significant increase in finance.

The *Adaptation Finance Strategy Guideline* is designed to help countries close that gap. It provides a practical, country-driven framework to translate adaptation priorities into investable strategies and financial flows.

The Guideline offers a practical framework structured around four modules to help countries translate adaptation plans into investable actions. Drawing on country experiences, proven financing approaches and capacity-building lessons, it highlights pathways to strengthen systems, align finance with priorities and scale up investment.

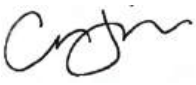
Created for flexibility, the Guideline can be applied nationally or sectorally and adapted to different capacities and contexts. The modular structure allows governments, development partners and the private sector to collaborate effectively, acting now with existing evidence while progressively addressing data and capacity gaps.

The guidance is tailored to government planners, finance and sector ministries and subnational authorities. It is equally relevant for national and regional development banks, regulators, development partners and private-sector actors, including domestic banks, insurers, pension funds, project developers and impact investors.

We thank the Governments of the United Kingdom and Sweden for their support through UNDP's Climate Finance Network, hosted by our Regional Hub in Bangkok, and all partners who contributed insights and country experiences.

We hope this Guideline accelerates the shift from plans to action—towards practical, inclusive and durable investments that protect communities and strengthen resilience.

Gerd Trogemann
Manager
Regional Programme and Global Policy Network
UNDP Bangkok Regional Hub



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About the Climate Finance Network (CFN)

The UNDP Climate Finance Network (CFN) supports countries in the Asia-Pacific region to strengthen their climate finance systems and unlock investments needed to meet national climate goals. The Network promotes peer learning, knowledge exchange, and technical assistance across ministries of finance, planning, and environment. Operating as a regional platform, CFN helps integrate climate into budget processes, improve coordination across sectors, and ensure transparency and accountability of climate finance.

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About the Sustainable Finance Hub (SFH)

The UNDP Sustainable Finance Hub brings together UNDP's financial expertise to harness public and private capital for the Sustainable Development Goals (SDGs), supporting governments, investors and businesses in reaching climate, social impact and sustainability targets. Its work drives systemic change towards a sustainable financial architecture that benefits people and the planet.

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UNDP is the leading United Nations organization fighting to end the injustice of poverty, inequality, and climate change. Working with our broad network of experts and partners in 170 countries, we help nations to build integrated, lasting solutions for people and planet. Learn more at undp.org or follow at @UNDP.

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Abbreviations

ADB	Asian Development Bank
AF	Adaptation Fund
AFCA	Adaptation Finance Coordination Agency
AFS	Adaptation Finance Strategy
BAU	business as usual
BIOFIN	Biodiversity Finance Initiative
CBA	cost–benefit analysis
CBT	climate budget tagging
CCRIF	Caribbean Catastrophe Risk Insurance Facility
CFN	Climate Finance Network
CIF	Climate Investment Fund
COP	Conference of the Parties
CRVA	Climate Risk and Vulnerability Analysis
CSO	community service obligation
CSR	corporate social responsibility
DAC	Development Assistance Committee (OECD)
DCA	Development Cooperation Agency
DRM	disaster risk management
EBRD	European Bank for Reconstruction and Development
EC	European Commission
EE	energy efficiency
EIB	European Investment Bank
EMDE	emerging market and developing economy
ESCO	energy-saving company
EU	European Union
EV	electric vehicle
FAO	Food and Agriculture Organization of the United Nations
FCDO	Foreign, Commonwealth and Development Office
FDI	foreign direct investment
FI	financial institution
FX	foreign exchange
GCF	Green Climate Fund
GDP	gross domestic product
GEF	Global Environment Facility
GESI	Gender Equality and Social Inclusion
GFCF	Green Finance Catalyst Facility
GHG	greenhouse gas
ICCTF	Indonesian Climate Change Trust Fund
IFAD	International Fund for Agricultural Development
IFC	International Finance Corporation
IFF	Investment and Financial Flows
IFI	international financial institution
IIED	International Institute for Environment and Development

IISD	International Institute for Sustainable Development
IMF	International Monetary Fund
INFF	Integrated National Financing Framework
ITMO	Internationally Transferred Mitigation Outcome
LVC	land value capture
MDB	multilateral development bank
MOA	Ministry of Agriculture
MOE	Ministry of Environment
MOF	Ministry of Finance
MRV	monitoring, reporting and verification
NAP	National Adaptation Plan
NBFI	non-bank financial institution
NCI	New Climate Institute
NDB	national development bank
NDC	Nationally Determined Contribution
NDCP	NDC Partnership
NGO	non-governmental organization
ODA	official development assistance
OECD	Organisation for Economic Co-operation and Development
PES	payment for ecosystem services
PFM	public financial management
PIM	public investment management
PPP	public–private partnership
PV	photovoltaic
RE	renewable energy
SDG	Sustainable Development Goal
SGDF	Shandong Green Development Fund
SIDS	Small Island Developing States
SMEs	small and medium-sized enterprises
SOE	state-owned enterprise
SPV	special purpose vehicle
TA	technical assistance
ULB	urban local body
UNDP	United Nations Development Programme
UNDRR	United Nations Office for Disaster Risk Reduction
UNFCCC	United Nations Framework Convention on Climate Change
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
VFM	value for money
VGF	Viability Gap Funding
WB	World Bank
WSS	water supply and sanitation
WWF	World Wildlife Fund
ZE	zero emission

Note In this report, "$" refers to United States dollars, unless otherwise stated.

Executive summary

Photo: UNDP Nepal

Purpose of the Guideline

The *Adaptation Finance Strategy Guideline* aims to support ministries and agencies in formulating a viable and inclusive Adaptation Finance Strategy (AFS) as part of their mandate to develop and implement National Adaptation Plans (NAPs). This process is carried out in partnership with the financial oversight body, typically the ministry of finance, and other key stakeholders. The AFS provides a framework for mobilizing and aligning finance for investments identified in, or implied by, a country's NAP and/or Nationally Determined Contribution (NDC).

The NAP process plays a central role in shaping the AFS by establishing the enabling conditions for adaptation investments, including the development of data, institutional arrangements and capacity. Regular updates to the NAP help strengthen ownership and improve the environment for maximizing the available finance, whether by increasing domestic resources for adaptation, attracting private sector investment or securing support from external agencies.

Outline of the AFS process

The AFS process is structured in four modular phases (see figure ES.1).

Figure ES.1: Summary of the AFS approach

Phase 1: Engagement and Data Collection

Phase 1 comprises the preparation and data collection process, which serves as the foundation for documenting adaptation investment needs and identifying potential financing sources in later phases. The approach must be inclusive and participatory, engaging a wide range of stakeholders in each of the sectors relevant to NAP implementation, specifically the sectors identified in the UAE Framework for Global Climate Resilience. The consultative process should also include subnational governments, the private sector (and industry associations), civil society and development partners involved. These diverse stakeholders should be organized into working groups that are adequately resourced and supported.

On the demand side, sector working groups should be established and have designated agency focal points to ensure continuity. Where available, sector roadmaps that include adaptation priorities should guide the development of a sector adaptation investment programme. If these are not available, focused studies and workshops can be conducted to develop preliminary investment priorities. Existing national, subnational and, where possible, private sector investment budgets are needed. Where there are likely gaps in investment budgets, the working groups should canvass preliminary options for increasing investment (including private sector investment), drawing on inputs from financial institutions and agencies, and identifying constraints to achieving these options.

On the supply side, the existing quantum and structure of financing in each NAP sector must be determined. For international flows, current levels of foreign direct investment, official development assistance and support from international financial institutions (IFIs) should be documented. For domestic flows, details are needed on investment grants from government funds and loans from government and private banks and non-bank financial institutions (NBFIs), as well as investments by domestic private companies or public–private partnerships funded by share issuances or bonds.

Photo: TCAP/UNDP

Further, the preliminary potential for improving international flows and mobilizing additional resources from domestic capital markets needs to be assessed, along with the constraints. For the latter, information on the structure of financial institutions' assets and liabilities will be needed from regulators such as the central bank, securities regulator and the ministry of finance. IFIs can often assist in such assessments. As mentioned, working groups should be established, consisting of central agencies, relevant trade promotion and development assistance coordination agencies, bank associations, NBFIs and other capital market participants.

Phase 2:
Investment Prioritization

In Phase 2, drawing on the data collected in Phase 1, each sector working group will be tasked with developing prioritized and costed sector adaptation investment priorities. Where available, sector roadmaps with an adaptation focus should guide this process; where not, focused sector adaptation needs studies and convening workshops should be undertaken. The lead role in this process will typically be taken by the government agencies overseeing the sector, but state-owned enterprises, the private sector and civil society will need to be integrally involved. As significant adaptation investments will be required from the private sector, their constraints on investment must be assessed. Where funding gaps exist, the working groups should use the options identified—while considering the potential ways to fill the gaps and constraints revealed in the data collection process—to develop business models for implementing priority programmes and projects. Many adaptation projects can be made financially viable by capturing the value of the benefits they generate. These projects may not currently have a revenue stream but do provide specific benefits to a defined group of people. Often, the cost of the project can be partially or wholly recovered from these beneficiaries. In many instances, the beneficiaries are defined geographically—for example, a drainage project that reduces flooding in a specific area may be funded through a local land tax levy or a similar mechanism.

Business models, whether for public or private projects, will generally fall into one of three categories:

1 **Projects that have significant revenue streams**

2 **Projects without current revenue streams but with options to generate them**

3 **Projects with no realistic prospect of achieving a dedicated revenue stream**

Projects in the third category must be financed from general revenue, though they may still be eligible for debt financing if the resulting obligations can be serviced through public budgets or, in the case of private sector projects, through targeted incentives or subsidies.

Photo: Shutterstock/Singapore

Many adaptation projects can be made financially viable by capturing the value of the benefits they generate. These projects may not currently have a revenue stream but do provide specific benefits to a defined group of people. Often, the cost of the project can be partially or wholly recovered from these beneficiaries. In many instances, the beneficiaries are defined geographically—for example, a drainage project that reduces flooding in a specific area may be funded through a local land tax levy or a similar mechanism.

For each programme or project in the adaptation investment plan, the recommended business model, developed in consultation with all relevant stakeholders, needs to be documented together with a description of the investment. The agency overseeing this phase must ensure that programmes and projects are uniformly documented by the sector working groups so that all necessary information is available for the cross-sectoral financing prioritization exercise in Phase 4.

Phase 3: Mapping and Matching Financing Needs and Sources

Phase 3 focuses on identifying potential sources of finance to address specific adaptation finance gaps and outlining the strategies needed to mobilize those resources. This takes place in the context of fiscal policy that prioritizes emissions reduction and resilience to the extent possible, aided by such tools as the Integrated National Financing Framework and the Investment and Financial Flows methodology. This requires identifying the sources of finance, the mechanisms needed to channel it and the instruments used within those mechanisms.

Drawing on the data collected in Phase 1 and the investment business models proposed in Phase 2, Phase 3 identifies appropriate financing sources, such as international development cooperation agencies (DCAs), IFIs, private sources (foreign direct investment and capital markets) and national sources, including banks, NBFIs and listed and private funds and stock issuances. It also explores ways to minimize financing costs through instruments like those offered by risk mitigation agencies such as the Multilateral Investment Guarantee Agency. In parallel, the phase entails defining the appropriate financing mechanisms to be deployed by each sector and market segment, recognizing that large-scale government projects may require different approaches than those suited to small and medium-sized enterprises. These mechanisms may involve institutions such as climate funds, national development banks or blended finance facilities.

The development of national capital markets is essential. Even if some developing countries are not in a position to prioritize efforts to increase domestic resources for adaptation or attract private sector investment, a phased approach will be needed to strengthen and deepen these markets. National capital markets will play a key role in scaling up adaptation finance in the longer term. Enabling frameworks can be developed to incentivize the creation of appropriate climate financing mechanisms, including private sector funds, national funds that have a national scope, subnational funds covering a particular region and national mechanisms instituted by a coalition of sub-sovereign entities.

In addition, the AFS should consider the instruments to be used by these mechanisms, as well as the enabling frameworks required for them to function effectively. For example, the use of green bonds to recapitalize a blended finance facility will need the establishment and consistent use of a bond taxonomy and perhaps incentives for the use of such bonds.

Phase 4: Operational Planning and Coordination for the AFS


Photo: Manivannan Thirugnanasambandam

Phase 4 involves translating the outputs of the previous phases into a coherent, actionable strategy. This begins with the establishment, or formal designation, of a NAP Finance Coordination Agency for implementing the AFS and coordinating financing activities across sectors.

The next step is to consolidate the priority programmes and projects identified in Phase 2 and set out a single, multi-sector investment plan. This plan should align with other national frameworks, including any parallel implementation strategies for the country's NDC. Once consolidated, the projects must be prioritized within an implementation plan, based on assessment of the fiscal space available for government capital budgets, the counterpart funding requirements of public–private partnerships and IFIs and the financing capacities of the relevant government agencies, DCAs, IFIs and the private sector.

Following prioritization, the potential sources of financing set out in Phase 3 must be matched to specific investments by sector. At the same time, ongoing financing gaps should be mapped and strategies nominated to fill them. These strategies may include making use of any unused or underused opportunities identified in Phase 3, which will involve changes to the enabling frameworks in specific sectors and the financial sector, as well as identification of the capacity development priorities.

A further task under Phase 4 is to determine the required project preparation steps to ready selected investments for financing and implementation. Although an ideal AFS should encompass all sectors covered by the NAP, these steps can also be applied to specific sectors or groups of sectors, provided that budget allocations are ringfenced accordingly.

To track and evaluate progress in financing, the AFS should establish a monitoring, reporting and verification (MRV) system. This system will also be critical in supporting engagement and negotiations with external assistance agencies, including DCAs and IFIs.

Finally, the strategy should include mechanisms for ongoing liaison with private financial institutions and international development partners. These institutions should be engaged with clearly defined priorities for capacity and project development to ensure that the strategy remains responsive and implementable over time.

Implementation considerations and the long-term outlook

The approach outlined in the AFS emphasizes several key principles. Investments should be classified by their commercial viability to help identify areas where de-risking may be necessary. It also recognizes the diversity of both public and private sector actors, with NAP coordinators positioned as key facilitators for collaboration and alignment.

A wide range of instruments must be considered, along with an assessment of their viability in national and international capital markets. Coordination with mechanisms for implementing and financing NDCs is essential, as is a strong focus on local-level action and adaptation investment, as well as how these can be funded.

Overall, the AFS process provides a strategic and practical foundation for implementing priority adaptation investments. It is designed to be an iterative process that evolves as better data, new technologies and innovative financing sources become available. Importantly, the AFS can and should proceed using the available data, while clearly identifying priorities for filling critical information gaps. Evidence-based expert estimates and short, focused studies are sufficient to provide a basis for moving forward in the absence of comprehensive information or robust modelling.

The networks and working groups established through the development of the AFS will facilitate ongoing coordination and effective investment across sectors. In the longer term, the AFS should also serve as a vehicle for the development of national capital markets, helping to expand the scope and scale of financing and the range of financing instruments available for adaptation.

Photo: Shutterstock/Adoel Putra

1. Introduction to the Adaptation Finance Strategy approach

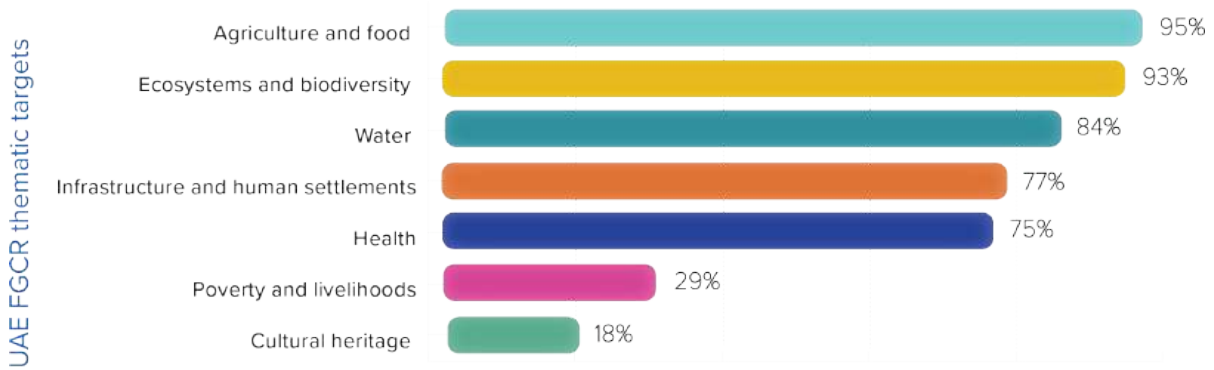
1.1 Objective

The *Adaptation Finance Strategy Guideline* aims to support ministries and agencies in formulating a viable and inclusive Adaptation Finance Strategy (AFS) as part of their mandate to develop and implement National Adaptation Plans (NAPs). This process is carried out in partnership with the financial oversight body, typically the ministry of finance, and other key stakeholders. The AFS provides a framework for mobilizing and aligning finance for investments identified in, or implied by, a country's NAP and/or Nationally Determined Contribution (NDC).

Given that adaptation financing is challenged not only by financing gaps but also by complexity and capacity constraints relating to financing, this Guideline draws on practical examples to illustrate country experiences across sectors and stages of AFS implementation. It also highlights key areas for capacity development required to implement an AFS effectively.

Although the Guideline presents a multisectoral approach to implementing an AFS aligned with the priorities of NAPs, NDCs and other relevant policies, it can also be applied to structure a financing strategy for a single sector, either in full or in part. Among submitted NAPs, the range of focus sectors encompasses the thematic areas of the UAE Framework for Global Climate Resilience.[1] However, particular emphasis is placed on agriculture and on ecosystems and biodiversity, which are priorities in over 90 percent of NAPs (figure 1).

Figure 1: Percentage of NAPs with adaptation priorities addressing the thematic targets of the UAE Framework for Global Climate Resilience

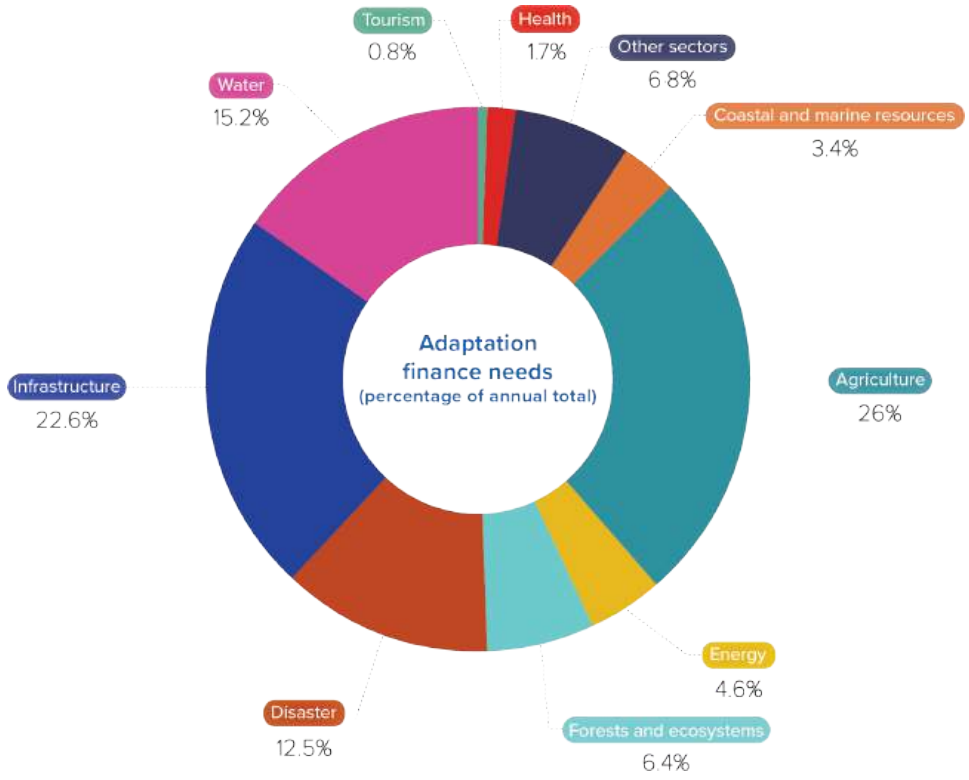


Source: United Nations Environment Programme (2024). Adaptation Gap Report 2024: Come Hell and High Water—As Fires and Floods Hit the Poor Hardest, It Is Time for the World to Step Up Adaptation Actions, Figure ES.7.

1 Paragraphs 52 and 156 of Decision 1/CMA.5 and Paragraph 18 of Decision 2/CMA.5 in the Report of the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement on its fifth session, held in the United Arab Emirates from 30 November to 13 December 2023, Addendum, Part two: Action taken by the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement at its fifth session (FCCC/PA/CMA/2023/16/Add.1).

Preliminary estimates from a survey of NAPs suggest that agriculture represents the largest identified investment need, closely followed by infrastructure and water (figure 2).[2] In contrast, investment needs for forests and ecosystems are significantly lower in monetary terms, at least based on the currently available data.

Figure 2: Adaptation finance needs by sectors based on 26 developing countries' NDCs and NAPs



Source: United Nations Environment Programme (2024). Adaptation Gap Report 2024: Come Hell and High Water—As Fires and Floods Hit the Poor Hardest, It Is Time for the World to Step Up Adaptation Actions, Figure ES.3.

According to the United Nations Environment Programme (UNEP), the adaptation finance gap remains extremely large, and bridging this gap is a priority for climate finance. International public adaptation finance flows to developing countries increased from $22 billion in 2021 to $26 billion in 2022–2023, yet these sums remain small relative to global needs, which are estimated at $365 billion annually.[3]

Almost all countries are grappling with issues of capacity in relation to financing adaptation investments, and many face considerable constraints, especially developing countries and least developed countries (LDCs). Thus, it may not be possible for all countries to implement a full AFS sequentially from start to finish, but rather they may have to address certain priority issues along the sequence of AFS preparation. The AFS is structured in modular phases. It is not necessary to produce a highly sophisticated multisectoral output of one phase before moving on to the next. Where there are data or capacity gaps, countries can proceed by making assumptions and completing the process for one or more sectors. The process is designed to be iterative, allowing countries to learn from experience and progressively build better data and analysis for each module over time.

2 United Nations Environment Programme (2024). Adaptation Gap Report 2024: Come Hell and High Water—As Fires and Floods Hit the Poor Hardest, It Is Time for the World to Step Up Adaptation Actions.

3 UNEP (2025). Adaptation Gap Report 2025: Running on Empty.

1.2 Background

1.2.1 Review of related adaptation finance initiatives

Development of the *Adaptation Finance Strategy Guideline* commenced with a review of existing initiatives related to adaptation finance to ensure complementarity with other guidance and methodologies. Several online workshops were conducted to elicit both comments on the AFS methodology and details of complementary initiatives. The key initiatives are discussed briefly in this section, with further details provided in annex 1.

The Climate Investment Planning and Mobilization Framework[4] of the NDC Partnership (NDCP) provides a step-by-step guide for the development of NDC (including adaptation) investment, covering the identification of investment needs, assessment of financing needs and sources and formulation of a finance strategy. The Guideline is not intended to duplicate the NDCP approach but rather augment it, providing greater detail and examples relating to the key stages of the framework, a more holistic perspective on financing and suggested business models for different sectors.

The Organisation for Economic Co-operation and Development (OECD) launched the Climate Adaptation Investment Framework at the 2024 United Nations Climate Change Conference (COP 29).[5] This sets out a high-level overview of the key building blocks of the enabling framework needed to unlock adaptation investment, specifically in relation to strategic planning and policy coherence, regulatory alignment, insurance and risk transfer, public finance and investment, sustainable finance and support and incentives for private investment.

The International Institute for Sustainable Development (IISD) has also produced two guides specifically related to adaptation finance (see annex 1). The guides focus more on principles for developing an AFS. Other initiatives include UNDP's Biodiversity Finance Plans,[6] now in preparation in 132 countries, Integrated National Financing Frameworks (INFFs)[7] and the Investment and Financial Flows (IFF) methodology,[8] which contribute in particular to the fiscal assessment process set out in chapter 5.

1.2.2 Interviews and stakeholder consultations

Interviews were conducted with key informants from the public and private sectors, including representatives of agencies seeking finance and financiers. The aim was to identify common constraints to scaling up adaptation finance in selected countries in Asia and the Pacific.[9] Participants included those from regional institutions and stakeholders from the Climate Finance Network countries of Indonesia, Nepal and the Philippines. The feedback highlighted opportunities and challenges faced by agencies and financiers in relation to adaptation finance, helping to inform the structure and content of the *Adaptation Finance Strategy Guideline*. Further details from the interviews are provided in annex 1. The online workshops, held to take stock of similar initiatives by development partners, also focused on seeking their inputs on approach and methodology, complementarities and implementation mechanisms.

4 The Framework, produced with the Green Climate Fund (GCF), is more general than the AFS and provides guiding approaches applicable to both NDC and NAP preparation. It is currently being updated with a supplement specifically on adaptation with inputs from the Asian Development Bank (ADB), the Adaptation Fund (AF) and Commonwealth Secretariat. See NDC Partnership (2024). Climate Investment Planning and Mobilization Framework.

5 OECD (2024). Climate Adaptation Investment Framework.

6 See Biodiversity Finance Initiative website.

7 See INFF website.

8 UNDP (2020). UNDP Methodology for Assessing Investment and Financial Flows.

9 These countries comprise those where UNDP's Climate Finance Network operates: Bangladesh, Cambodia, Fiji, India, Indonesia, Maldives, Malaysia, Nepal, the Philippines, Sri Lanka, Thailand, Tonga, Vanuatu and Viet Nam.

Photo: AB Rashid/UNDP Bangladesh

1.3 Structure of the AFS process

This AFS process, as set out in this Guideline, complements the higher-level approaches and frameworks described in the previous section but focuses on the practical steps of developing a strategy. It separates issues relating to the implementing agencies (demand side) in Phase 2 from those relating to the finance sector (supply side) in Phase 3, before bringing them together in an integrated strategy in Phase 4. This separation allows the Guideline to clearly set out business models and enabling environment reforms that are applicable to the sectoral implementing agencies. On the supply side, this structure also enables clear explanations of the financing mechanisms and instruments applicable to sectors and to different investors. Relevant examples are provided throughout.

Figure 3 summarizes the overall process, providing the structure for the AFS. It is structured in phases that describe a clear implementation approach. Phase 1 (chapter 2) describes the data collection and engagement steps to prepare for the AFS process. Phase 2 (chapter 3) sets out the requirements for the investment prioritization analysis on the demand side of the approach. Phase 3 (chapter 4) sets out the requirements for addressing financing strategy development on the supply side. Finally, Phase 4 (chapter 5) brings the identified investment programmes (demand side from Phase 2) together with the potential supply of finance (supply side from Phase 3) and sets out a financing strategy for prioritized adaptation investments.

Figure 3: Summary of the AFS approach

The process can be undertaken including all adaptation sectors, or focus on one or a few linked sectors, depending on the specific needs, available resources and the capacities of the coordinating agencies. For example, Uganda has developed an adaptation plan for the agriculture sector, for which an AFS could be prepared solely for that sector. A more comprehensive approach, incorporating local capital market considerations, can be seen in Rwanda (box 1).

Photo: UNDP Zambia

Box 1: Rwanda's Climate and Nature Finance Strategy

Rwanda's Climate and Nature Finance Strategy (CNFS) 2024–2030 aims to green existing investments and make them more climate resilient. It provides a framework for making public and private sector investments more sustainable, while unlocking new and additional investments to effectively mitigate and adapt to climate change and conserve the country's vital natural capital.

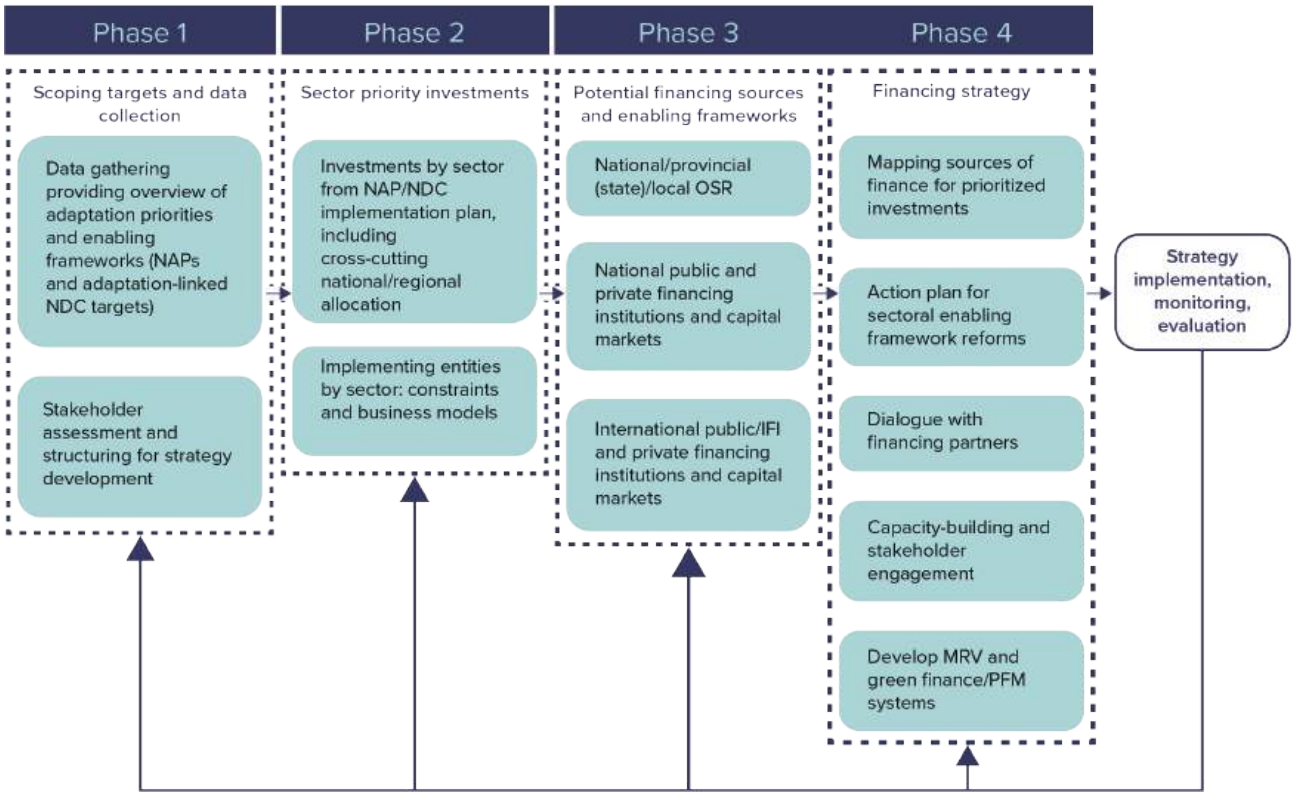
Aligned with Rwanda's development vision, the CFNS promotes targeted initiatives to expand the tax base, generate additional revenues for local and national governments, strengthen and diversify the economy, leverage existing initiatives and financial instruments and develop new partnerships and market innovations. It capitalizes on the country's successful track record of accessing climate and nature finance and adaptive management capacity to navigate changing domestic and global conditions.

The strategy identifies opportunities to tap diverse funding sources, mobilize innovative financial mechanisms and promote partnerships with various stakeholders at both the national and international levels.

Source: Ministry of Finance and Economic Planning (2023). National Climate and Nature Finance Strategy of Rwanda 2024-2030.

Figure 4 shows the key elements within each of the four phases of AFS preparation. The phases are addressed in detail in the Guideline in chapters 2–5, respectively.

Figure 4: Key elements across the phases of the AFS preparation process



IFI = international finance institution, MRV = monitoring, reporting and verification, NAP = National Adaptation Plan, NDC = Nationally Determined Contribution, OSR = own source revenue, PFM = public financial management.

The key elements of the phases can be summarized as follows.

Phase 1: Engagement and Data Collection

Phase 1 comprises the preparation and data collection process to identify adaptation investment needs and potential financing sources. It follows an inclusive, participatory approach engaging national and subnational governments, the private sector, civil society and development partners through adequately supported sector working groups. On the demand side, these groups define adaptation priorities using existing roadmaps or targeted studies, review current investment budgets and identify gaps and options to increase financing, including from private sources. On the supply side, they assess existing international and domestic financing flows—such as foreign direct investment, official development assistance, government grants, bank and non-bank lending and public–private investments—and explore opportunities to mobilize additional resources from capital markets. The process also examines key institutional and regulatory constraints, drawing on inputs from financial authorities and international financial institutions where relevant.

Phase 2: Investment Prioritization

Phase 2 describes the process of prioritizing and costing sector adaptation investments based on the data collected in Phase 1. Sector working groups, led by the relevant government agencies and involving state-owned enterprises, the private sector and civil society, identify and rank investment priorities using existing roadmaps or, where these do not exist, targeted studies and workshops. As far as possible, given the detail of NAPs and NDCs, explicit linkages with priorities identified in these documents are made, assessing the financing implications of policies and regulatory frameworks in each sector.[10] The working groups also assess investment gaps and private sector constraints and develop business models for priority programmes and projects, identifying ways to capture and reinvest the value of adaptation benefits. Each programme or project is documented with its proposed business model and investment description in a consistent format to enable cross-sector financing prioritization in later phases.

Phase 3: Mapping and Matching Financing Needs and Sources

Phase 3 outlines the mapping of financing needs and the matching of appropriate funding sources and instruments. Drawing on the investment priorities and business models developed earlier, it identifies potential domestic and international sources—including development cooperation agencies, IFIs, private investors, banks and non-bank institutions—and explores mechanisms to channel and blend these resources efficiently. The phase also examines ways to reduce financing costs through risk-mitigation instruments and defines the financing mechanisms most suitable for different project types, such as climate funds, national development banks and blended-finance facilities. Strengthening domestic capital markets is a key focus, alongside establishing enabling frameworks—such as taxonomies and incentives for green bonds—to mobilize and scale up long-term adaptation finance.

Phase 4: Operational Planning and Coordination for the AFS

Phase 4 sets out the operational planning and coordination needed to translate the Adaptation Finance Strategy into action. A National Adaptation Finance Coordination Agency is designated to consolidate sector priorities into a single, multi-sector investment plan aligned with national development and climate frameworks. Projects are prioritized according to fiscal capacity, counterpart funding requirements and the financing potential of public, private and international partners. Financing sources identified in Phase 3 are matched to specific investments, while remaining gaps and enabling-framework needs are addressed through targeted strategies and capacity development. The phase also covers project-preparation steps to ready investments for implementation and establishes a monitoring, reporting and verification (MRV) system to track progress, support engagement with development partners and ensure the strategy remains coordinated, transparent and responsive over time.

Key messages

The AFS offers an integrated and iterative approach to developing adaptation finance strategies that align investment priorities with financing opportunities. Rather than prescribing a rigid sequence of steps, it supports countries in building capacity, strengthening institutions and reforming financial systems to bridge the adaptation finance gap. Its strength lies in connecting the demand for investment with supply-side finance solutions, fostering collaboration between governments, financial institutions and development partners to scale up climate-resilient investment.

10 The details of NDCs and NAPs vary widely, which is why the involvement of sectoral agencies that can provide context, fill in gaps and prioritize investment is necessary.

2. Phase 1:
Engagement and Data Collection

Photo: UNDP Rwanda/Mucyo Serge

2.1 Approach and preparatory action

2.1.1 Guiding principles

At the outset, it is important to establish basic parameters and principles that can be applied in most countries when developing an AFS. The International Institute for Sustainable Development (IISD)[11] identifies three key principles: (i) the strategy should be country-driven and fit for purpose; (ii) it should engage ministries of finance and planning; and (iii) it should take a participatory and inclusive approach.

Be country-driven and fit for purpose

Like the adaptation planning process, the approach to preparing and implementing a financing strategy for adaptation should be determined by each country's needs, priorities, capacities and desired outcomes. Engaging in adaptation financing strategies, or any of their components, is a voluntary process. NAPs and other adaptation plans outline climate risks, adaptation needs and priorities, and prioritizing adaptation action and investments requires the engagement of a wide range of scientific and technical agencies. These actors should be actively involved in the AFS process. Securing the financing and investment needed to implement these priorities requires the engagement of diverse financial actors, who should also be involved in the AFS drafting process.

For many countries, the NAP is a critical foundation for an AFS.[12] NAPs set out governments' adaptation goals and priorities, often as activities requiring adequate financing. However, few governments currently have budget planning and investment processes that fully incorporate current and future climate risks and impacts, such as increasingly frequent and severe extreme weather events. Ideally, the macro fiscal framework[13] and the planning process should incorporate such risks and impacts, but this is not yet happening at a comprehensive level. The AFS can help relevant agencies consider the costs associated with adaptation action and potential ways to finance them.

The strategy also should be fit for purpose. The level of detail should reflect the stage of NDC and NAP implementation, the availability of data and the level of development of NDC- and NAP-related programmes and projects. It may be developed as a stand-alone strategy or as part of broader green or climate-financing initiatives (see box 2).

Increasingly, financing strategies for adaptation are moving beyond stand-alone, project-based approaches towards more programmatic approaches that involve larger, system-wide change rather than in-system change.[14] Thus, strategies could consider the policy context, institutional capabilities, capacity-building needs, alignment with national development plans, priorities for domestic budget allocation and opportunities for co-investment through international finance (climate and development) and private investment.

11 IISD (2023). Guiding Principles for the Preparation of Financing Strategies for Climate Change Adaptation in Developing Countries.

12 NAPs communicated to the UNFCCC can be found on the NAP Central website.

13 UNDP (2021). Budgeting for Climate Change: A Guidance Note for Governments to Integrate Climate Change into Budgeting.

14 UNFCCC Secretariat (2022). Navigating the Landscape of Support for the Process to Formulate and Implement National Adaptation Plans: 2022 Overview.

Photo: UNDP Nepal

Box 2: Peru's strategy for financing adaptation: Integration with a broader approach to climate finance

Peru's strategy for financing adaptation comprises many elements, recognizing that a strategy document is only one aspect of a broader approach to scaling up finance for adaptation priorities. The Government of Peru, led by the Ministry of Finance with inputs from the Ministry of Environment (MINAM), prepared a national climate finance strategy in 2023. This strategy included estimates of the financing needed to implement the country's 2020 updated NDC, including adaptation actions. Each sector is expected to identify available sources of finance for its priority adaptation actions.

The climate finance strategy was informed by the chapter on finance in the 2021 NAP, which estimated the costs of implementing the priority adaptation actions, calculated the financing gap and identified potential sources of finance for these adaptation actions, including the national budget, bilateral and multilateral providers and the private sector. Other work has included economic assessments of adaptation measures and the preparation of guidelines for the strategic and complementary use of international climate funds, including reporting requirements.

Sources: Calero and Lahud (2022); Government of Peru (2018); MINAM (2021); personal communication with a MINAM official, 4 July 2023—all as cited in IISD (2023). Guiding Principles for the Preparation of Financing Strategies for Climate Change Adaptation in Developing Countries.

Engage ministries of finance and planning

The preparation and implementation of a financing strategy for adaptation should take a whole-of-government approach, whereby it is agreed, prepared and implemented through a coordinated approach across the relevant ministries and subnational governments. Such an approach requires sufficient resources and financing, which points to the critical role of finance and planning ministries in the development and implementation of financing strategies for adaptation. It is important that these ministries have focal points who understand climate investment needs and the modalities of climate finance. If such capacities are not present, the focal point ministry or ministries should be strengthened accordingly.

Active engagement of finance and planning ministries helps ensure that public expenditures are consistent with national adaptation goals, economic and fiscal policy tools are used to incentivize action on adaptation, finance for adaptation is mobilized from various sources and adaptation is mainstreamed in plans and budgets. Support for the development and dissemination of the needed capacities and tools is available. For example, the Coalition of Finance Ministers for Climate Action has an adaptation workstream (box 3).

Photo: UNDP Nigeria

Box 3: Coalition of Finance Ministers for Climate Action

The Coalition of Finance Ministers for Climate Action (CFMCA) brings together fiscal and economic policymakers from over 90 countries to drive sustainable economic growth by integrating climate considerations into economic and financial decision-making.

Its adaptation workstream supports finance ministries in adopting a whole-of-government approach to climate resilience by integrating adaptation into macro-fiscal planning, securing financing, and facilitating private sector participation. It focuses on managing climate risks through stronger fiscal policy, adequate contingency space and a focus on equity, especially for vulnerable and marginalized communities.

UNDP is an institutional partner of the CFMCA and contributes, among others, to its adaptation workstream.

Source: The Coalition of Finance Ministers for Climate Action.

In addition, these ministries often serve as the custodians of the Integrated National Financing Framework (INFF)[15] or equivalent, where it exists. Any AFS should refer to and align with such a framework. The INFF process is highly relevant both for identifying investment needs (since processes that identify projects related to the Sustainable Development Goals (SDGs) may pick up many adaptation investments) and in terms of financing sources and mechanisms. The AFS should refer to potential linkages where appropriate.

Ministries of finance, planning and climate change, as well as financial regulators such as central banks, can be instrumental in translating climate policies and plans into costed adaptation strategies. They can help identify sources of finance for priority actions and establish enabling frameworks to encourage private sector investment. Emerging evidence shows that the engagement of finance ministries in the development of these strategies leads to stronger linkages with national planning and budgeting processes,[16] as well as with providers of international finance, such as multilateral development banks (MDBs).

Take a participatory and inclusive approach

An AFS should be prepared and implemented using a participatory and inclusive approach that includes representation from across government, the private sector, development partners and civil society, including women's groups and vulnerable communities. A participatory and inclusive approach can increase buy-in across stakeholder groups and help the government to mobilize resources to implement its adaptation priorities. Adaptation-related sectors should be involved in the deliberations.

Subnational governments and communities need to be involved, as most adaptation investments will be local in nature. Adaptation benefits mainly fall on local communities. Because of this concentration, both available funds and applicable financing instruments and mechanisms may be limited. There are also competing priorities. With this in mind, the participation of local small- and medium-sized enterprises (SMEs) is important as they stand to benefit and may be more willing to fund investments. Local governments may have plans, such as Green City Action Plans, that identify climate investments, including adaptation investments.[17] Many communities are proactive, using approaches such as those set out in the World Resources Institute's principles for locally led adaptation, and also have clear ideas about what their adaptation priorities should be.[18]

In Bhutan, the NAP was developed through a highly participatory approach that not only involved all relevant line ministries but also groups including subnational governments, academia, the private sector and consultations undertaken in most districts throughout the country.[19] These groups also facilitate vertical engagement, ensuring that local governments and community groups can participate and access adaptation finance. Emphasizing "co-benefits", the non-climate benefits of climate investment, such as disease control from flood control), will be especially important for engaging a wider range of stakeholders.

15 See INFF website.
16 IISD (2023). Guiding Principles for the Preparation of Financing Strategies for Climate Change Adaptation in Developing Countries.
17 See EBRD Green Cities website.
18 World Resources Institute. Locally Led Adaptation.
19 UNDP. GCF National Adaptation Plan Project in Bhutan.

2.1.2 Coalition-building and structuring the organization for AFS formulation and implementation

Coordination mechanisms

In addition to the three principles outlined in section 2.1.1, it is equally important to build a coalition and establish a formal mechanism for the formulation and implementation of the AFS. Depending on the "core agency" chosen for the process, the ministry of finance (MOF) or another agency will need to collaborate with the NAP focal point (often the ministry of environment (MOE) or a ministry/agency for climate change). This coalition should be formalized through an instrument such as a memorandum of understanding (MoU) or other formal collaboration instrument or mandate, such as a directive from the executive. This is essential because, while the MOF brings the financial perspective, the investment programmes fall under the mandates of line agencies, requiring a "NAP authority"[20] to coalesce and provide access to data relating to the investment programmes. Some countries, such as Cambodia and Montenegro, have established National Councils for Sustainable Development (or similar), with a mandate from the Prime Minister and Environment Minister as the Chair to oversee, coordinate and facilitate climate-related actions and response, including the development of policy and legal framework, data availability and reporting.

It is important to establish, or preferably work through, an existing overarching body to oversee and provide guidance on the preparation, implementation and monitoring of the financing strategy. For example, in the Marshall Islands, the Climate Finance Task Force includes representatives of key central agencies. The oversight body could include representatives of government agencies at a range of levels, development partners (including MDBs), private sector financial institutions (including national development banks), private sector associations and civil society organizations. Its operation could be supported by development partners. Whether or not the MOF chairs this body, it is important that it plays a key advisory role in it, providing information on the fiscal situation and flows, supporting the development of a sustainable national financing system that will be critical to mobilizing the financing required for adaptation investment, identifying and assessing fiscal risks from climate change impacts and using the information available to the peak body to assist with the prioritization of adaptation investments for the financing strategy.

These bodies should also serve as long-term governance mechanisms during NAP implementation, and coordination remains important beyond the development of a financing strategy. They are essential during the implementation plan for monitoring and evaluating implementation and for internalizing the learnings from evaluation into the iterative development of a new strategy. These bodies can either complement or be an alternative to the country platforms that are being proposed by different forums for improved policy coherence and coordinated implementation.

Where no formal NAP authority exists, the MOF should coordinate with existing institutional coordination mechanisms that relate to adaptation decision-making in that country or with designated focal points for adaptation within line ministries. Nevertheless, a central clearing-house mechanism established in an agency appropriate for the country's circumstances should be mandated by the government. Given this mandate, the critical implementation agencies can be identified, and they can be formally brought into the AFS process.

20 Where there is no designated central NAP authority, the AFS will need a designated system of NAP focal points that are empowered to provide access to data relating to investment programmes. Where data do not exist, the NAP focal points would need to be empowered to seek support for data.

Further, given that not all relevant agencies can be represented by the focal point ministry or coordinating body, it may be necessary to have a coordinating forum or working group of implementing agencies established under that body. This could potentially meet more regularly than the necessarily high-level representation on the coordinating body will allow.

National government stakeholders

The critical implementation agencies will be those related to the sectors nominated under the UAE Framework for Global Climate Resilience (discussed in chapter 1) under UNFCCC CMA[21] 16 2023,[22] which provides the following functions:

- Significantly reducing climate-induced water scarcity and enhancing climate resilience to water-related hazards towards a climate-resilient water supply, climate-resilient sanitation and access to safe and affordable potable water for all;
- Attaining climate-resilient food and agricultural production and supply and distribution of food, as well as increasing sustainable and regenerative production and equitable access to adequate food and nutrition for all;
- Attaining resilience against climate change-related health impacts, promoting climate-resilient health services and significantly reducing climate-related morbidity and mortality, particularly in the most vulnerable communities;
- Reducing climate impacts on ecosystems and biodiversity and accelerating the use of ecosystem-based adaptation and nature-based solutions, including through their management, enhancement, restoration and conservation and the protection of terrestrial, inland water, mountain, marine and coastal ecosystems;
- Increasing the resilience of infrastructure and human settlements to climate change impacts to ensure basic and continuous essential services for all, and minimizing climate-related impacts on infrastructure and human settlements;
- Substantially reducing the adverse effects of climate change on poverty eradication and livelihoods, in particular by promoting the use of adaptive social protection measures for all; and
- Protecting cultural heritage from the impacts of climate-related risks by developing adaptive strategies for preserving cultural practices and heritage sites and by designing climate-resilient infrastructure, guided by traditional knowledge, Indigenous peoples' knowledge and local knowledge systems.

Many of these actions require coordinated action across sectoral agencies. In particular, critical capacities for data collection and climate and fiscal risk assessments will be needed to address action under UNFCCC CMA 16 2023 (paragraphs 10a–10d). This includes implementation of the adaptation policy cycle/NAPs and the establishment of early warnings systems and monitoring, evaluation and learning systems. These capacities also provide essential data for assessing investment needs to be financed under the AFS (see annex 2 for details on data requirements).

The relevant agencies differ widely between countries but will typically include the following in relation to primary adaptation priorities:

- Water resource and water supply agencies covering the water and sanitation sectors;
- Ministries and agencies of agriculture, forestry, irrigation and fisheries;
- Ministries of health and local and provincial/state government health units;
- Local and provincial/state and national agencies dealing with flood control (such as ministries of public works and infrastructure),

21 UNFCCC. Conference of the Parties Serving as the Meeting of the Parties to the Paris Agreement (CMA).

22 FCCC/PA/CMA/2023/16/Add.1

as well as urban planning and development agencies/ministries of the interior and local government, to ensure development does not happen in areas vulnerable to climate impacts and to plan for adaptation investments; and

- Agencies engaged in the development of culturally or economically vulnerable groups.

In any given sector, multiple agencies may contribute data on climate impacts and investment needs. However, the process is most effective when coordinated by a single agency that can manage and align the work of all involved entities.

Agencies that have relevant data must also be engaged. Meteorological agencies, statistical offices and economic policy institutions are usually vital stakeholders.

There are often overlaps between areas of investment, creating opportunities for synergies. The examples that follow in subsequent chapters will illustrate these issues.

Infrastructure and human settlement agencies also play a critical role, as almost all ministries and agencies, not just those directly involved in direct adaptation, will need to adapt future infrastructure investments and retrofit existing facilities to respond to the impacts of climate change and reduce vulnerabilities.

Specifically, major investment will be needed in:

- Energy generation;
- Energy efficiency;
- Transport;
- Water treatment and distribution;
- Solid waste; and
- Agricultural supply chains.

Many of these areas of investment have potential mitigation benefits, creating opportunities for dual-benefit programmes and projects that both aid mitigation and generate additional revenue streams. These opportunities will be addressed and highlighted throughout the Guideline.

Subnational, private and civil society stakeholders

Across all adaptation sectors, private sector developers, suppliers and financiers have key roles to play. In sectors such as urban development, for example, the private sector may have a central role in adaptation investment and resources to implement relevant policy mechanisms, and the associated incentives will be critical elements in the AFS. As discussed earlier, subnational governments and communities need to be fully engaged. In some cases, the coordinating bodies of subnational governments and non-governmental organizations (NGOs) or community-based organizations may need to play an important role in the process.

Formal and/or informal groupings, involving stakeholders such as NGOs, civil society and industry groupings, can be built around this core.[23] It is recommended that such stakeholders be organized into Thematic Working Groups anchored within specific sector agencies and other coalitions, as appropriate. Examples include cross-cutting private sector issues involving the chamber of commerce or cross-cutting issues involving women.

Ownership of both the overall process (with the lead agency for the AFS) and of the relevant sectoral coordination processes, input plans and implementing plans (with the relevant lead agencies of the TWCs and the contributing agencies) needs to be formally acknowledged and performance monitored

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23 To ensure effective engagement, a stakeholder mapping process should be undertaken—see the Initiative for Climate Action Transparency Stakeholder Participation Guide.

Central banks and financial institutions

Another important thematic group is central banks and financial institutions. Central banks can help foster an enabling environment and may provide incentives to commercial and public banks to increase financing for adaptation. The role of financial institutions is evolving and increasingly important in developing adaptation-focused financing products, working with central banks and regulatory entities to hedge financial risks, and engaging with both the private sector and government to build a base of bankable projects. The inputs of central banks and financial institutions are therefore critical to identifying challenges and opportunities in tapping finance for adaptation.

Development partners

The AFS preparation process should formally engage development partners. Establishing a dedicated "development partner forum" can be a way to maximize their involvement. Many countries already have more or less formal gatherings of development partners, so establishing a climate-focused subgroup should not be a significant extra effort. Examples include country platforms for climate action[24] in Egypt and Bangladesh, which have more of an adaptation focus. In the Lao People's Democratic Republic, a similar approach was taken as part of the Climate Finance Landscape preparation process. Development partners, including MDBs, the Green Climate Fund (GCF) and the Global Environment Facility (GEF), can provide resources for the diagnostics needed to identify required investments, prepare roadmaps and assess the potential of the financial system for adaptation investment. Once engaged in the strategy, their inputs on potential enabling environment reforms and financing mechanisms will be important.

Development partners should be encouraged to align their country strategies with government-determined adaptation financing needs, integrate adaptation into their investment portfolios and create greater coordination and coherence across the projects and programmes of various partners. Their engagement can help identify potential flows of grant and concessional finance, which are critically important for meeting the needs of vulnerable communities, addressing climate disasters and implement adaptation action at the local level. Involving them early may also increase their potential to provide technical and financial assistance for programmes or project proposals developed under the strategy.

24 Hadley, S., et al. (2022). Country Platforms for Climate Action. ODI.

Photo: Rabik Ubadhyay/UNDP Nepal

2.2 Data collection processes

2.2.1 AFS data collection issues

In the process of data collection for an AFS, it is necessary to document:

- The investment needs stated in, or implied by, the NAP, NDCs and other adaptation-focused strategies by sector (demand side); and
- The key national and international actors involved in the national capital and public investment markets and their potential for adaptation finance (supply side).

The data collection process is important as, in general, adaptation investment is typically under-reported. Efforts are required to identify actual expenditures—often by going back to the base data and reviewing capital expenditures and specific loan portfolios, for example to establish the actual base case. In particular, data on the role of the private sector as both a potential investor and financier need to be canvassed. The risk of using inaccurate data due to the necessity of using multiple, independent sources of data needs to be addressed. Ideally, the data collection process should be guided by a commonly agreed framework and set of definitions that promote interoperability among agencies, enabling databases to be merged at a central institution or maintained as complementary repositories of information.

Data at this stage can be derived either from national budgets or from a range of international agencies that can support upstream activities. In cases where countries do not have adequate primary data, the AFS should identify which donor partner can help with the data collection or costing. If this is not possible, it should point to resources explaining how to estimate needs.

The data collection process also provides the opportunity to raise awareness among a wide range of stakeholders about investment priorities, processes and financing needs. Given that NAP preparation processes are conducted by technical experts having knowledge of the required sector planning and programming, and that public and private financing experts rarely interact with such processes, the data collection process can begin to bring these two fields of expertise together.

Photo: UNDP Lao PDR

It is particularly important to integrate gender and inclusion considerations. Experts from ministries responsible for gender or social inclusion, as well as a wide range of civil society organizations such as women-led, feminist, youth and Indigenous groups, should be involved throughout the process. Their participation is critical at key stages, including setting appraisal criteria, prioritizing investment packages and reviewing advanced drafts of the strategy. Enhancing skills and capacities on gender-responsive and socially inclusive investment planning will help ensure these priorities are considered throughout the process.

2.2.2 Demand-side data

Costing estimates in climate plans

It is important to use the existing NAP and NDC processes to develop a common understanding of adaptation finance needs and what is needed at various levels of government to scale up this finance.

Financing strategies for adaptation should be built on, and informed by, available information and previous work, such as NAPs, NDCs, climate change action plans and related policies and laws, as well as data on climate finance, cost and economic assessments of adaptation options and climate risk assessments.[25]

Some NAPs already offer detailed costing and prioritization. For example, Bangladesh's National Adaptation Plan (2023–2050)[26] sets out six adaptation goals in eight priority sectors, linked to 28 adaptation strategies and 113 interventions for the medium (2030s) to long term (2050s). These interventions are ranked by priority, include cost estimates and private sector engagement potential and together indicate a total investment need of around $230 billion.

In addition, assessments undertaken by development partners and research institutions can provide valuable information. For example, Tajikistan's NDC Implementation Plan contains lists of priority mitigation and adaptation projects. Although initial cost estimates were absent, the Asian Development Bank (ADB) and the Tajikistan government subsequently estimated capital costs with inputs from relevant agencies. Similarly, with extensive World Bank assistance, the Marshall Islands' NAP[27] estimated the cost of adaptation to sea level rise, and these figures were then integrated into an ADB-supported Climate Finance Strategy for the country. Ideally, each sector should have a roadmap that sets out investment needs in the context of climate change. Annex 2 contains a possible format for such a roadmap.

Investment targets, which form the basis of the financing strategy, may be available from NDCs and NAPs, but in general these documents have only very broad sectoral or programmatic cost estimates made using generic costs of highly aggregated investment types. For example, the installed cost per kilometre of needed coastal protection can be estimated from international comparisons, but circumstances can vary greatly among countries and even across different regions within the same country. Estimates of both needs and costs are often very preliminary. Even at the aggregate level, whether these investments actually achieve the projected climate outcomes, such as GHG emissions reductions or reductions in vulnerability, is often open to question. If resources permit, the level of investment needed and the costing assumptions made in NDCs and NAPs should be considered during the development of the adaptation financing strategy.

In some countries, NDC implementation plans, and in some cases NAP implementation plans, will be available. These may have other names, such as NDC Action Plans. Such plans typically contain lists of programmes and projects by sector (or at least NDC category), which are usually costed. Again, where resources permit, whether or not these investments actually achieve the projected climate outcomes and costings should be verified. This review should also include a "reality check" in consultation with sectoral agencies in terms of the likely available budgets and absorptive capacity.

25 While many NDCs and NAPs contain some costings for investment needs, these are often preliminary and need to be updated. Especially for sectors which comprise a large proportion of adaptation investment needs, additional work on costing may be needed. For a review of the different approaches, see World Bank (2024). Climate Adaptation Costing in a Changing World.

26 Ministry of Environment, Forest and Climate Change, Government of the People's Republic of Bangladesh (2022). National Adaptation Plan of Bangladesh (2023-2050).

27 Republic of the Marshall Islands (2023). National Adaptation Plan.

For adaptation investment in particular, downscaling poses a major challenge. Climate impacts are, by definition, locally determined. The geographic location, topography, built environment, and existing structures and assets have a major determining influence on how severe climate impacts are on local human populations, crops, biodiversity and ecosystems. Understanding these impacts, determining the local investments required and then aggregating them to the national level, and thus determining the damage avoided by investments, are generally beyond the resources available during the preparation of a NAP, and even more so for an AFS. This makes the engagement of subnational governments and communities essential (see box 4). These actors are best placed to establish the needs at the local level and the tools available to put structures in place to assist subnational governments in tracking expenditures.

Photo: UNDP Indonesia

Box 4: Indonesia's Integrated National Financing Framework and climate budget tagging

Indonesia's INFF highlights climate budget tagging (CBT) as part of the country's strategy to strengthen budgeting for the SDGs—of climate expenditures and revenues, in particular—which can provide data to complement those from the NAP and NDCs. Since 2020, Indonesia has expanded its CBT programme to subnational governments through the piloting of regional CBT implemented in 22 regions across multiple provinces, cities and agencies. This has enabled the identification of local government efforts for achieving national climate targets. Preliminary findings indicate climate budgets at the subnational levels are heavily dominated by adaptation.

Source: Simanjuntak, K.U. and S. Mufida (2023). Indonesian Local Government's Participation to Achieve National Climate Target. 6 November. UNDP Indonesia.

Other sources of sectoral data for adaptation investments can be drawn from such sources as the INFF investment needs analysis and from national infrastructure plans, such as Nepal's assessment of SDG financing needs conducted under its INFF[28] and Fiji's National Infrastructure Investment Plan.[29] While these documents may not cover the whole scope of adaptation investments, they are often a solid base from which to build a more comprehensive assessment of adaptation investment needs.

Sectoral data

Sectoral agencies will need to be closely involved in the AFS process. Many of the key agencies and departments referred to in section 2.1.2 will have sectoral plans or master plans. These plans need to be assessed and, if they have not taken climate risk into account, added effort is needed to identify the impact of climate risk on the proposed investment programmes. Where climate investments are proposed but not sufficiently identified as adaptation, there is a risk of missing out on adaptation funding. The challenge is to obtain data and estimates from the provincial/state and local levels, to disaggregate climate (adaptation, mitigation and cross-cutting) flows versus other expenditure and capital versus routine operation and maintenance expenditures (not always done, even by international agencies/NGOs) and to aggregate the data meaningfully. In this regard, sector working groups under the peak body play a vital role.

The data collection process is labour-intensive and requires considerable agency cooperation. Around 20 countries have undertaken detailed assessments of particular sectors using UNDP methodology,[30] and these should be updated and incorporated into the data collection process.

Given the lack of mainstreamed adaptation focus, it is likely that sectoral plans unrelated to adaptation needs will have to serve as the basis of data collection. In this case, a process of working through the practical implications of available Climate Risk and Vulnerability Analysis (CRVA) with sector agencies will be necessary. Some national meteorological and climate agencies, such as the Philippine Atmospheric, Geophysical and Astronomical Services Administration,[31] produce and disseminate national climate models and projections, but sector agencies often require resources to interpret these. Access to downscaled models is advantageous for planning local adaptation actions. However, where these are not available, planners can refer to modelling done for NDCs and/or National Communications to the UNFCCC. A climate risk-informed planning process provides a stronger foundation for adaptation investment.

Sectors involving the upgrading of future infrastructure against climate impacts or retrofitting existing facilities present difficulties. Changing design standards and extrapolating the additional costs caused by such changes require significant technical expertise, and small differences in standards can have large cost implications. Canada, for example, is undertaking a thorough review of its building and infrastructure codes to increase resilience to climate impacts.[32] The implications of these new codes will flow through to the budgeting process, where differing standards increase the costs of provision, at least in the short term. These measures will, of course, likely reduce the lifetime costs for infrastructure, but in the short term, agency budgets will need to be adjusted. This may involve legislative and regulatory changes and may take some time. Until such standards are mainstreamed, the most appropriate method for gauging additional costs

28 Government of Nepal National Planning Commission (2018). Needs Assessment, Costing and Financing Strategy for Sustainable Development Goals.

29 Pacific Region Infrastructure Facility (2023). Fiji National Infrastructure Investment Plan 2023–2034.

30 UNDP (2020). Results of Domestic Finance Assessments.

31 Philippine Atmospheric, Geophysical and Astronomical Services Administration. Cli Map

32 Government of Canada. Developing Climate Resilient Standards and Codes.

at the national level will be to adopt a specific percentage increment to existing unit rates, as advised by sectoral agencies.[33]

Ultimately, demand-side data collection should set out costed investments by sector. Where possible, these should be phased and prioritized using the budget planning, project appraisal and ranking methodologies set out in annex 2. Existing sectoral capital budgets (including estimated private investment) should also be documented. The gap between needs and existing budgets is the climate financing requirement. These data, together with information the on implementing entities and constraints, will feed into Phases 3 and 4 of the AFS.

Given the type and scale of aggregate investment, it is important to identify the actual investing entity, which could include national and state/provincial governments; national and state/provincial sector agencies and other entities; and at the local level, local governments and urban institutions (such as utilities), which are often state/provincial entities. Subnational and community entities should, as discussed above, have an important role in data collection, and the process of assigning implementation responsibility should encourage them to begin considering the most suitable business models for implementation (see section 3.3). The European Bank for Reconstruction and Development (EBRD), for example, supports local governments in undertaking a Green Cities Action Plan (including adaptation investments) under its Green Cities programme.[34]

Other major adaptive investments will need to be made by the private sector. This category can be divided into large-scale formal enterprises, SMEs and households (formal and informal). Each has different needs and incentives, and thus financing structures will need to be designed appropriately. For example, SMEs will often not be able to provide collateral for loans and have uncertain long-term cash flows, so financing may need to be incremental and less collateral-based, even if the cost of finance (interest rate) is somewhat higher.

Finally, within each sector, the agencies, private sector participants and communities will all have insights into the specific constraints limiting necessary investment. Documenting these constraints will form the basis of proposed sector reforms to the enabling environment, such as legislative and regulatory changes, that should be proposed as part of the AFS. These reforms will be necessary to maximize potential financing for adaptation investment and minimize investment needs. The sector Thematic Working Groups discussed above have an important role in producing these inputs for the AFS.

33 The World Bank suggests large adaptation economic benefits from a 3% increment in project costs. See World Bank (2019). Strengthening New Infrastructure Assets: A Cost-bene t Analysis.

34 See EBRD Green Cities website.

Photo: Rabik Upadhyay/UNDP Nepal

2.2.3 Supply-side data

Sources of finance

Demand for climate finance is constrained by the significant gap between adaptation needs—shaped by evolving policy priorities and investment targets—and the resources currently available in budgets. The main sources of funds include the following:

- Government budgets sourced from taxes and various charges. At the subnational level, there is a distinction between own-source revenues and inter-governmental fiscal transfers.
- The balance sheets and budgets of state-owned enterprises (SOEs), usually consisting of user charges and government transfers.
- Private enterprises, both domestic and international, through borrowing on their balance sheets and equity investment; as well as household balance sheets and budgets on a commercial basis, expecting a financial return for their investment, or through the provision of a grant or grant-equivalent for philanthropic reasons, such as the concessional component of a concessional loan.
- Financing provided by domestic public and private financial institutions and international financial institutions, for which future government and private sector budgets will have to pay.
- International transfers, including grants and concessional lending from development cooperation agencies (DCAs), international financial institutions (IFIs) and philanthropy.

As the investment grows, the resources used to fund that investment, from some or all of these sources, needs to also expand.

The objective of the supply-side data collection is to establish existing flows and potentials as the basis for estimating the capacity of these various funding sources to grow their capacity to fund adaptation investments over time (Phases 3 and 4 of the AFS).

Data sources

As with investment needs, strategies for supplying the required finance for adaptation need to be built on and informed by available information and work to date. In relation to finance, this can include a wide range of documents, from a Sustainable Finance Framework, such as in Mongolia[35] supported by the International Finance Corporation (IFC), which sets out a roadmap for a green financial sector and documents the current status, to more routine public finance and financial sector assessments carried out by MDBs. The International Monetary Fund (IMF) Article IV Consultations are also very useful in relation to both external and internal financial balances. These documents give an overall view of the public and private financial system and its strengths and weaknesses and often contain useful data describing the funding sources and applications of institutions comprising the system, although they can be dated. The financial components of NAPs, NDCs, climate change action plans and climate change policies and laws tend to be very general and are useful only insofar as they describe policy, institutional structure and financing mechanisms, both existing and envisaged. These should nevertheless be reviewed and the relevant information extracted and documented.

35 UNEP, International Finance Corporation and Mongolian Sustainable Finance Association (2018). National Sustainable Finance Roadmap of Mongolia.

As with the demand-side assessments, the most useful and up-to-date data will often come directly from ministries, regulatory institutions, industry associations and academic or research institutions. The key agencies involved are the ministry of finance, the central bank, the NBFI regulator, the securities agency or stock exchange, the banking association and any microfinance agencies or associations. Development partners, such as UN agencies, the IMF, MDBs, and the OECD can also be important and very useful sources of data.

The ministry of finance will be able to provide government and agency budgets. In some cases, the budgets of SOEs will also be available, although these may be managed by a separate regulator. Increasingly it is possible to distinguish between capital and recurrent expenditure, and the AFS should be focused on the former. Where climate budget tagging is being implemented, as in countries that introduced Climate Fiscal Frameworks with UNDP support or that completed a Climate Public Expenditure Review and Institutional Review, such as Bangladesh, Cambodia, Indonesia and the Philippines,[36] it is possible to identify adaptation investments directly from the budget (see box 5). Otherwise, the task is to analyse capital budgets, categorizing projects to ascertain current adaptation investment flows. These flows should, in theory, correspond to the estimates of adaptation investment expenditure obtained from the demand-side sectoral implementing agencies.

Box 5: Bangladesh's Climate Public Finance Tracking Methodology

Bangladesh uses the Climate Public Finance Tracking Methodology, also known as climate budget tagging, to track climate allocations and expenditures across 25 climate-relevant ministries, departments and agencies. In fiscal year (FY) 2023/2024, the climate-relevant allocation as percentage of the total budget for these entities rose to 8.99 percent from the previous year's 8.56 percent, with 78 percent of climate relevant allocations directed towards adaptation. Despite being an LDC, Bangladesh allocated $3.4 billion for adaptation in its FY 2023/2024 budget.

Source: Ministry of Finance of the Government of the People's Republic of Bangladesh (2023). Climate Financing for Sustainable Development: Budget Report 2023-2024.

Photo: LoGIC Project/UNDP Bangladesh

36 UNDP (2015). Climate Public Expenditure and Institutional Review (CPEIR) – Methodological Note.

The challenge of attributing subnational flows is often significant. Although circumstances vary widely across countries, in many cases, subnational governments do not report capital expenditures in sufficient detail, and the use of intergovernmental fiscal transfers is often unclear. In some cases, the structure of these transfers may hinder categorization. For example, transfers for disaster risk reduction may contribute to adaptation outcomes, but their treatment in budgets needs to be clearly defined so that such expenditures can be captured without double counting. Where governments account for a significant share of adaptation capital expenditure, every effort should be made to determine the amount of funds used specifically for adaptation investment within overall government capital expenditure.

The central bank will be able to provide information on the assets and liabilities of banks, and usually on the use of loans (assets to the bank) and the sources of deposits (liabilities). If it also regulates NBFIs, then the same information will be available for these institutions. In Mongolia, for example, NBFIs are regulated by the Financial Regulatory Commission.[37] National development banks may also have their own regulatory arrangements, but similar information should be available. Where the central bank has commenced the implementation of a sustainable finance initiative, as in Mongolia,[38] or another programme for greening the financial system, such as the establishment of a climate or adaptation taxonomy,[39] climate tagging will be in place.[40] In this case, it may be possible to identify adaptation investments, depending on the detail and consistency of application of the taxonomy in question. Even where tagging is not in place, it is still possible to estimate, from the categorization of loans, which investments are likely to be partly or wholly related to adaptation.

The securities agency and stock exchange will have data on the capital of listed companies, new share issues and their business purpose. Key industry bodies and associations can often provide anecdotal evidence on spending to avoid or recover from climate impacts, and IMF Article IV data contain private sector investment aggregates. FDI flows are also generally available from trade ministries, and the OECD tracks FDI flows to and from member states.[41] Both share issuance and FDI flows can be assessed for relevance to adaptation or resilience. For example, a desalination plant may contribute to water source resilience, and a comprehensively developed area designed with “sponge city”[42] concepts may support flood control.

Securities agencies and stock exchanges will also have data on bonds outstanding, issuers and recently issued bonds and their purpose. Some interpretation may be necessary to estimate adaptation-related flows. In theory governments at all levels can issue bonds, but in many countries, national governments restrict this or do not have the appropriate regulation or implementing guidelines in place. Where a taxonomy is available and recognized, green or sustainability bonds may be issued. For example, Indonesia has issued green Islamic bonds (Sukuk).[43] General obligation green bonds may cover both mitigation and adaptation investments, and some assumptions on the use of proceeds may be necessary if these are not documented. In any case it should be possible to estimate the scale of adaptation investment financed by the capital markets, if any.

37 See Financial Regulatory Commission of Mongolia website.

38 Sustainable Banking and Finance Network (2022). Mongolia Country Progress Report, April 2022.

39 See, for example, the Climate Bonds Initiative Taxonomy.

40 See for example, the use of climate budget tagging under the INFF methodology in INFF (2019). Knowing What You Spend: A Guidance Note for Governments to Track Climate Change Finance in Their Budgets.

41 OECD. FDI Flows.

42 Harrisbert, K. (2022). What Are ‘Sponge Cities’ and How Can They Prevent Floods? 30 March. World Economic Forum.

43 Republic of Indonesia. Green Bond and Green Sukuk Framework.

In addition, development partner aid flows need to be documented. The OECD categorizes the flows of its Development Assistance Committee (DAC)-reporting countries and IFIs as adaptation, mitigation or cross-cutting.[44] These transfers are generally reported at the time of approval, so the actual disbursement in a particular year may have to be interpolated.

It is also important to consult with banking associations, some large banks and any major microfinance agencies or NBFIs, as well as their associations if they exist. The experience of large, medium and small enterprises providing services in sectors relevant to adaptation, and of any community or civil society associations formed around these sectors, is also important. As with the demand side, such consultations with private sector participants and communities can elicit information about the specific constraints that are holding back financing for the investments needed in the sector. Documenting these constraints forms the basis for proposed sector reforms to the financial enabling environment, such as legislation or regulation, that should be proposed as part of the AFS. As noted above, these reforms will be necessary to maximize potential financing for adaptation investment. The financial sector Thematic Working Group established for Tajikistan's Climate Finance Plan is an important example.

The endpoint of the supply-side data collection should be the ability to map existing flows to adaptation-related investments from each source: government budgets at the national, state or provincial and local levels where possible; private banks to public and private projects and to households; capital markets in the form of bonds to governments, SOEs and the private sector; capital markets in the form of equity to the private sector or SOEs; PPPs, including special purpose vehicles); and NBFIs to enterprises and households. It is also important to institutionalize this exercise so that there is capacity to update the financial flow mapping over time.

Key messages

Phase 1 of the AFS, focusing on engagement and data collection, should be inclusive and participatory, involving a wide range of stakeholders across sectors relevant to the UAE Framework for Global Climate Resilience. These include sectoral agencies, subnational governments, the private sector, financial institutions, civil society and development partners. Stakeholders should be organized into resource-supported working groups.

On the demand side, sector-specific working groups with designated agency focal points should be formed. These groups will use available sector roadmaps with adaptation priorities to guide the development of sector adaptation investment programmes. Where no roadmaps exist, studies and workshops should be used to identify investment priorities. Existing national, subnational, and private sector budgets should be drawn upon, and the working groups should explore ways to increase investments, including from the private sector and financial institutions.

On the supply side, the current financing in each NAP sector should be assessed. This should include documenting international funding flows, such as FDI, ODA and IFI support, as well as domestic financing, such as government grants, loans and private company investments. Preliminary assessments should be made of the potential and constraints in international flows and domestic capital markets, drawing on inputs from financial institutions, regulators and working groups of relevant stakeholders.

44 OECD. Development Finance for Climate and Environment.

3. Phase 2: Investment Prioritization

Photo: Nuria Angeles Tapia/UNDP Peru

3.1 Overview

The next step in the AFS, Phase 2, is to assess the data collected from existing sources and synthesize these into an agreed Adaptation Investment Plan.[45] As discussed, many NAPs, and NDC sections on adaptation, are very general and do not estimate actual sector investment needs in terms of the cost per major project or programme per sector per year). Ideally, these investments would be detailed in a comprehensive sector roadmap (see annex 2) based on a detailed Climate Risk and Vulnerability Assessment (CRVA) for the sector. If this is not available, broad estimates are usually possible with the help of the national implementing or investing agencies. These will include agencies responsible for agriculture and forestry, water resources, and public works and infrastructure, such as drainage, flood control, coastal protection, road upgrades and waste management. Other agencies providing infrastructure and other services affected by climate change will also need to be involved. This process will, by necessity, be approximate. The critical issue is to establish systems for analysis that can be updated as better data become available.

The agreed Investment Plan will need to identify, assess and prioritize investment projects. This section of the Guideline will focus on potential implementation modalities and business models to be considered when designing and prioritizing the adaptation pipeline. While project appraisal is typically undertaken in the process of preparing sectoral investment roadmaps (see annex 2), the objective of introducing such models is to provide options that can maximize the potential for mobilizing finance from non-traditional sources. This allows for maximizing the investments made and the impact of the Adaptation Investment Plan.

In summary, the key steps under this phase are: (i) assess the data collected, including priorities contained in NAPs, sector investment roadmaps, if available, and their costs; (ii) prepare sectoral roadmaps, if they do not exist, and compile them; (iii) assess investments in roadmaps for potential business model options that will maximize financial viability where possible; and (iv) compile an Adaptation Investment Plan.

The resources required for this activity will depend on: (i) the level of detail, assessment and prioritization efforts already completed and reported during the data collection phase; (ii) the extent of project design and structuring, including the implementation modality or business model, and the detail of assessment carried out; and (iii) the scope of the prioritization process. Financing for this stage can come from national budgets or from international agencies that support such analytical activities. As with the stages below which can be bundled with this stage, such analysis is often more attractive to IFIs because it identifies investments and investment roadmaps that provide investment opportunities for their involvement.

In undertaking the investment assessment, it is important to develop CRVAs and other assessments and roadmaps using an approach that is sensitive to gender equality and social inclusion (GESI) issues.[46] Where relevant and appropriate, gender-disaggregated data and analysis should be used to identify potential increased impacts on vulnerable groups. Any additional risk assessments should be gender-responsive and socially inclusive. GESI considerations should also be included when developing business models for the adaptation pipeline, with GESI criteria included when prioritizing investments. Where possible, this should include support for women-led businesses in adaptation investments.

45 While the format and composition of such a plan is up to the government to define, ideally it would contain all adaptation sectors and the best current estimates and costing of the needed investments in each sector, whether they have been included in the NDC or not. Investments in this context would include capital expenditure on systems and other institutional strengthening activities as defined in the sector roadmap (see annex 2).

46 Dazé, A. (2020). Unpacking Gender-responsive Adaptation Finance: Key Issues and the Way Forward. 6 March. NAP Global Network.

3.2 Investing entities

The AFS process will need to engage with investing entities with differing characteristics. The structure and mandates of these entities frame the financing potential for adaptation projects and, in turn, the business models available. The key entities are discussed in the following subsections.

National, state/provincial, and local governments and government agencies

These entities can generally raise revenue through a variety of taxes and charges. Even under existing mandates, it is not uncommon for them to have the capacity to levy additional taxes or raise rates.[47] National entities, in addition to regular budget funds, may also have access to special funds and to risk and guarantee funds and facilities. A similar situation applies to fees, where in some cases, significant additional revenue can be generated by simply collecting due taxes and fees at the applicable rate. Sub-sovereign entities often have revenue streams deriving from higher levels of government. The capacity to maximize these streams and use them efficiently is therefore an important issue. Other potential revenue streams may require legislative changes, but the precedent for such changes has been set in comparator countries, and even within the country. Examples of novel revenue mobilization models will be discussed later.

Such entities also usually have the mandate to undertake financing, although the financing volume can be limited and restricted to a few financial institutions, especially at the sub-sovereign level. The financing instruments available usually include loans and the issuance of bonds. They also potentially have access to more sophisticated financing mechanisms, such as debt-for-nature swaps. State, provincial and local governments are often hampered in their ability to finance projects because of low or non-existent credit ratings and the small size of projects, both of which lead to higher financing costs. Business models that can overcome these constraints, as well as financial mechanisms and instruments that address these issues, will be discussed in sections 3.4 and 4.3, respectively. While national entities generally have access to international concessional financing for adaptation through DCAs and IFIs, subnational governments and communities may face restrictions on such access.

Private sector

The private sector, which includes larger scale or formal enterprises, SMEs, informal enterprises and households, typically allocates capital expenditures for key initiatives in the coming years as part of its financial planning process. Within this process, companies may assess and analyse potential investments that enhance resilience, such as strengthening supply chains or investing in climate-resilient infrastructure. These investments often align with business continuity objectives, but they may also provide tax incentives, which are an important means for governments to incentivize private sector participation in resilience-building activities.

Most larger scale private sector entities and many SMEs are set up as corporations, which means that in addition to funding investment from revenues and savings and securing financing from financial institutions, they can raise equity by selling shares in the business. They can also take equity stakes in other corporate entities.

Private sector entities have a broad range of ways to make adaptation investments. This includes direct investment in an infrastructure project, participation in a PPP such as corporate equity in a public transport concession and private financing of government, PPP and direct private sector projects. These three types of private sector investment modalities are referred to extensively throughout the Guideline (see table 1).

47 See, for example, Bachas, P., F. Kondylis and J. Loeser (2021). Increasing Tax Revenue in Developing Countries. 1 February. World Bank Blogs. Major recommended measures are those to maximize yields from existing taxes. This applies at the local level as well, where, for example, Quezon City in the Philippines moved from bankruptcy to a healthy surplus by simply collecting the taxes owed. See Chanco, B. (2004). Good Governance Boosts Quezon City. 8 March. Philstar Global.

Table 1: Private sector investment modalities

Investment modality	Description	Enabling framework
Direct private sector investment	Much private sector investment will be in ensuring business continuity, typically involving building resilience for the private sector's own assets, supply chains and, in some cases, key customers. Other investment will be in specific revenue/profit generating projects that have climate benefits.	The objective of the government would be to incentivize resilience in new investments and in retrofitting. For example, for climate-resilient housing, many of the instruments that facilitate such investment are under the control of, or are influenced by, urban institutions—including local governments, urban utilities, etc. that cover setting or incentivizing the use of green standards through the use of floor space ratio bonuses or exemptions from certain types of taxes or levies for complying development. For private sector investment in public infrastructure, appropriate enabling environments are needed that provide contractual certainty and allow the use of private equity and debt.
Public–private partnership (PPP)	There are many different options for structuring a PPP. A typical arrangement will see the establishment of a corporate entity to implement the project, into which private sector investment and financing can flow. This can take many forms but is often a joint venture company or a special purpose vehicle.	Implementing PPPs often involves building capacity within the public sector, for example the ability to conduct value for money assessments. The public sector component of a PPP can include a wide range of financial tools, such as providing capital or operating subsidies through a Viability Gap Funding mechanism, making availability payments—those to a private entity when making a facility or service available—over or in lieu of user charges, linking land value capture revenues to the implementing entity, and payment of community service obligations, where the government determines lower or zero charges to be paid by specific consumer groups instead of the full cost of the service. An example is when school children travel free on public transport.
Private sector financing	Financing for adaptation initiatives can take various forms, including different instruments that provide the financing of a wide range of projects of various sizes and cost. These aggregation mechanisms may involve issuing a general obligation bond or a green bond in the case of almost all sustainable urban infrastructure, leasing arrangements, etc. There are also examples that involve the private sector in financing water funds/environmental trust funds.	The government may have to structure financing vehicles that can accept private sector financing, such as infrastructure (such as water) funds/environmental trust funds. Payment for ecosystem services mechanisms established by governments can also attract private sector financing to investment by providing a revenue stream that forms the basis of the repayment of financing. Attracting such financing will generally be contingent on the quality of governance and the structure of the funds.

Households can also form groups that take a restricted corporate form, such as a residents' association. For example, Rwandan farmers pool their resources together through cooperatives and Village Savings and Loan Associations to increase productivity, but increasingly there is a need to ensure that livelihoods will be resilient to the future impacts of climate change. The Urwego Bank, one of Opportunity International UK's local partners in a development project funded by the Scottish Government, provided microcredit loans to 8,500 smallholder farmers to support investments that reduce rural residents' vulnerability to climate impacts.[48] In Indonesia, the Ministry of Public Works has engaged with community associations at the kampung level (a village, which may also be an urban village) to carry out joint community upgrading works.[49]

Depending on the applicable legislation, some forms of financing may be available to these entities, although they will usually not be able to issue equity. Business models and financial mechanisms and instruments to maximize the use of these potentials will be discussed in later sections.

State-owned enterprises

SOEs have public service mandates that enable them to prioritize adaptation projects that private sector entities may overlook due to limited profitability. They are a hybrid of the above entity types. Many SOEs are not able to issue equity, but this is not universal. As long as the government in question retains 51 percent of the equity, the entity is considered state-owned. SOEs are formed by governments at all levels because of their flexibility in certain areas, whether in terms of geographic coverage (such as water districts covering several smaller cities or solid waste companies serving a metropolitan area comprised of many local governments), the ability to attract and retain managers by avoiding public service renumeration constraints or flexibility in financing structures, for example through the ability to enter into SPVs.

3.3 Choice of business model

Adaptation business models must be designed to reflect project characteristics that determine whether costs can be recovered through identifiable beneficiaries, or whether climate resilience benefits are predominantly public goods requiring taxation or transfers. As such, the structure of this section will cover the investment type and revenue model, enabling environment requirements by sector, and guidance by sector.

This guidance is structured to cover two distinct sets of investments related to climate-proofing and adaptation (see figure 5).

The first is financing for climate-proofing projects, which may span a wide range of sectors, classified as Type 1 under the MDB common definitions.[50, 51]

For example, climate-proofing cost-recoverable infrastructure such as water supply can, in principle, be financed through an increment in user charges. Climate-proofing non-cost-recovery infrastructure will instead depend on direct indirect revenue sources, such as "betterment taxes", or the incorporation of revenue-generating elements into the upgrade.

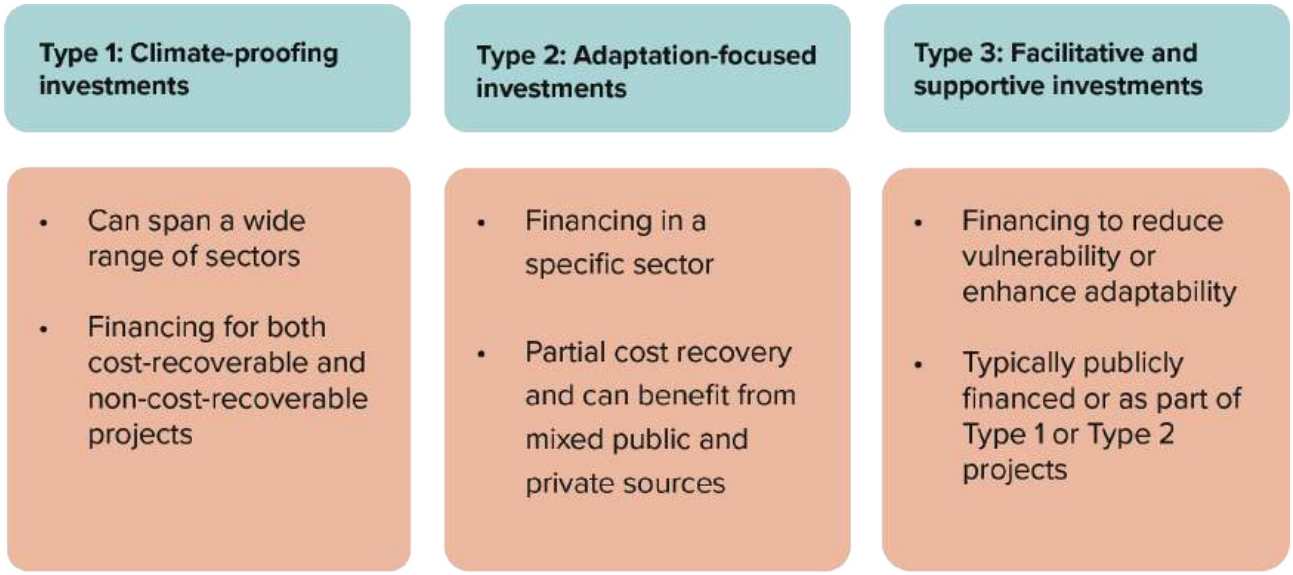
48 Helwig, K., et al. (2020). The Role of Microfinance in Climate Change Adaptation: Evidence from Rural Rwanda. Glasgow Caledonian University.

49 ADB. Indonesia: Neighborhood Upgrading and Shelter Sector Project.

50 See the joint methodology paper: Joint Methodology for Tracking Climate Change Adaptation Finance. See the indicators used: Common Approach to Measuring Climate Results: Update on Indicators.

51 MDB definition: Activities that integrate measures to manage physical climate risks and ensure that the project's intended objectives are realized despite these risks.

Figure 5: Types of adaptation-related investments



The second set of investments refers to financing adaptation-focused projects by sector, known as Type 2 under the MDB common definitions.[52]

In addition, there are other important activities that contribute to reducing the underlying causes of vulnerability to climate change or removing barriers to adaptation (Type 3 under the MDB common definitions).[53] These activities are generally financed either directly from government budgets or as part of activities associated with Type 1 or Type 2 investment projects.

Business model considerations

The choice of business model will depend on the characteristics of the project in question, but some general guidelines are possible. It is necessary to make a distinction between the real, or economic, benefits of a project and the money revenue it generates. A project such as a flood control project may offer significant real benefits to the community but there will be no direct revenue deriving from the investment. These benefits are not monetized. Given their widespread and long-lasting benefits, there is a strong justification to finance them from taxation. Such projects can be assessed for viability using cost–benefit analysis (CBA) (see annex 2), but this is distinct from the financing business model, which is based on money expenditures and revenues.

Many adaptation projects can be made financially viable by capturing the value of the benefits they generate. In many instances, these benefits have not traditionally been attributed to a specific project but have been funded through general taxation. However, many adaptation projects provide specific benefits for a particular group of people, and the cost of the project can be partially or wholly recovered from them. Often, it is an area of land that defines the beneficiaries. For example, a drainage project that reduces flooding in a specific area benefits properties in that

52 MDB definition: Activities that directly reduce physical climate risk and build the adaptive capacity of the system within which the activity takes place.

53 MDB definition: Activities that contribute to reducing the underlying causes of vulnerability to climate change at the systemic level and/or removing knowledge, capacity, technological and other barriers to adaptation.

location. Local governments in many countries have long applied instruments equivalent to a local land tax levy.

The use of such a levy or tax provides an income stream that can be used to repay the capital cost of a project, either by building accumulated revenue or servicing a particular financing arrangement, such as a loan. This principle can be extended to larger areas through measures such as tax increment financing or land value capture (LVC), where increases in property values due to investments and resulting increases in taxes are specifically earmarked for the repayment of finance. These revenue streams lay the basis for a viable business model. Similar principles can be applied to other area-based financing models. Payment for ecosystem services (PES) models pay a defined community for a particular service, for example, a forest community for conserving the water catchment of a city's water supply.

Key considerations in the design of the business model include the following aspects:

- The corporate structure of the implementing entity defines which financing modalities are available to it. For example, if it is an SPV, it will have the potential for almost the full range of financing options, including debt, equity and user charges. At the other end of the spectrum is a government agency, which cannot of its own volition determine tax rates or the entities subject to taxation or user charges. In other cases, the choice of implementing structure may reflect institutional capacities. PPP contract forms can be designed to avoid "build–neglect–rebuild" cycles in situations with limited capacity, such as in the Pacific.54
- In respect of revenue options, the range is potentially wide. These can include taxes of various types, some linked to environmental impacts, such as pollution levies, which can also incentivize the reduction of negative environmental impacts. User charges can be structured to protect vulnerable groups, for example through "lifeline tariffs", while also encouraging the efficient use of scarce resources, such as water tariffs that rise per unit of consumption. Other options include transfers between levels of government, corporate social responsibility (CSR) and philanthropy.
- Whether a project should be funded from current revenue or financed in some form depends on its size and on the type of project. Large infrastructure projects with a long lifespan should typically be financed, as future generations will benefit from them and should contribute to their costs (see annexes 2 and 6 for investment planning and fiscal implications).

Photo: UNDP Namibia

54 World Bank (2017). Public-private Partnerships: Reference Guide, Version 3.

Table 2 summarizes some examples of revenue types vis-à-vis their adaptation scope across the types per MDB classification. Due to the temporal nature and geographic focus of climate-proofing assets, these are often direct and localized support and often rely on commercial revenue-generating mechanisms. Type 2 projects have partial cost recovery and can benefit from mixed public and private sources and mechanisms, while Type 3 projects remain absolute public goods. The table also explicitly distinguishes cost-recovery potential and fiscal dependence, which are foundational to adaptation business model design.

Table 2: Investment scope and common revenue models

Category	MDB classification	Benefit and nature	Common revenue model	Primary financing basis
Climate-proofing cost-recovery assets	Type 1	Direct, localized	User fees, tariffs, private contracts	Commercial finance aligned with tariffs or offtake
Adaptation projects with partial cost-recovery	Type 2	Mixed public and private	Land value capture, local levies, blended tariffs, PES	Blended finance models
Public-good resilience	Type 3	Broad, non-monetizable	Tax revenue, transfers, insurance premium savings	Fiscal and grant finance

3.4 Business models by sector

This section of the Guideline is structured according to the adaptation sector categorization set out by the UNFCCC discussed in chapter 2.[55] Within each sector, the Guideline will provide an overview of financing potential, and, in annex 3, more detailed examples of potential investments and business models are given.

The overview of sector models is set out below to provide examples of the most common investments types, briefly describe the key features of the needed enabling environment (including issues relating to access to finance) and set out the main elements of business models applicable in the sector.

3.4.1 Water resources

Investments

Adaptation investments in this sector focus on reducing climate risks such as increased drought, which reduce resilience. They include developing new sources of water supply and increasing the yield and resilience of existing sources. Various forms of rainwater capture and extraction in both urban and rural areas are important. Tapping new sources, such as groundwater, needs to take into account sustainable recharge. Reuse and recycling of water at a range of quality levels, with a consequent range of investment requirements, is also integral to resilience. In certain circumstances, desalination solutions are needed and appropriate. These investments can be undertaken on a large scale, such as regional projects, and at the community level. Increasing

55 Ref. UNFCCC CMA 16 2023 Add.1

the resilience of existing sources can range from demand management through pricing, to measures that avoid waste through leakage prevention and more efficient irrigation, to protecting water resource recharge areas, such as forests. Investment and Financial Flows (IFF) methodologies for national macro-level investment planning in the sector are available to support the scoping and prioritization of investment.[56]

Enabling frameworks

Investments in resilient water resources can involve a wide range of potential implementing entities, including large-scale government bodies and agencies, SOEs (often utilities), private investors and community groups. Private sector investment ranges from large projects, PPPs or direct investments in surface water capture, water treatment and desalination, through to small-scale rainwater capture and water-saving measures by households and SMEs. Enabling environments for enhancing financing options vary according to the scale of investment. Frameworks that facilitate large-scale investments need to provide opportunities for a wide range of potential investors to suggest options for increasing water source quantity and resilience (including PPP frameworks) and to ensure appropriate public and private financing. Systems to assess whether public involvement is needed, and to what extent, are important. For community-level investments, enabling frameworks to support collective action and provide appropriate financing, such as PES systems and microfinance, are needed.

Business models

Business models will also vary by scale. Large-scale water resource projects supplying relatively wealthy urban areas can often be structured as a fully cost-recoverable PPP where the water offtaker pays a commercial fee for water provided. Similarly, opportunities to reduce and benefit from non-revenue water can be cost recoverable.[57] At the other end of the spectrum, community water resilience schemes can be at least partly financed by community contributions, although poor and vulnerable communities may need capital costs subsidized by users with more resources through differential tariffs and cross-subsidies. Between these extremes, models of blended finance, where there is partial government financing and partial cost recovery (and thus potential private sector involvement), are possible. Examples of the various types of models are given in annex 3, section A.3.1.

In summary, for investments in water resources, the primary model would be a full cost-recovery PPP for major urban supply. A second option would be blended models with cross-subsidies for peri-urban and rural areas. A third option would be community water finance with micro-capital and PES for recharge protection.

56 UNDP (2020). Assessment of Investment & Financial Flows for Adaptation in the Water Management Sector.

57 Aquatech (2023). Manila Water Surpasses Global Benchmarks in Water Loss Reduction.

3.4.2 Agriculture and fisheries

Investments

Investments in sustainable agriculture, aquaculture and fisheries and forestry can bolster resilience (often while sequestering or reducing emissions) by reducing the impact of climate-related disasters and stresses on production and livelihoods. These typically involve better food production solutions and measures to reduce food loss and waste. Diversifying food production sources to reduce reliance on specific crops or regions that are vulnerable to climate impacts can also be important. Such investments can involve a wide range of supply chain facilities and infrastructure. Halting deforestation and restoring degraded woodlands and wetlands improves air quality, increases water supply, boosts biodiversity, bolsters food security and improves rural economies. New technologies, such as vertical farming and hydroponics solutions in cities, can reduce emissions and bolster resilience. These innovations have often been pioneered by the private sector or research institutions. IFF methodologies for national macro-level investment planning in these sectors are available to support the scoping and prioritization of investment.[58, 59, 60]

Enabling environment

Investing entities include national, state or provincial and local governments and their agencies (such as forestry agencies, agricultural ministries and irrigation system SOEs) as well as other entities. Private enterprises are active in markets and supply chains, including food processing, cold store, logistics and machinery, as well as in sustainable forestry and tourism. Finance from original equipment manufacturers (such as for pumps or drip irrigation systems) and export–import finance are also possible.

The private sector has invested in supply chains and infrastructure that support afforestation and sustainable agriculture, as well as in farms and forests themselves. Private sector financing has been provided to a wide range of implementing entities, from large-scale government entities to private investors in farming, forestry, irrigation and supply chains. Models have also been developed to include and empower small-scale farming households (see examples in annex 3). The enabling environments for these investments vary widely from country to country.

Given the variety of potential configurations of financing across these subsectors, the general principle for developing a more conducive enabling framework is similar to that adopted

Photo: UNDP Costa Rica

58 UNDP (2020). Assessment of Investment & Financial Flows for Adaptation in the Agriculture Sector.
59 UNDP (2020). Assessment of Investment & Financial Flows for Adaptation in the Fisheries Sector.
60 UNDP (2020). Assessment of Investment & Financial Flows for Adaptation in the Forest Sector.

in water resources. A variety of financing solutions will be necessary, matched to the scale of investment, the pattern and reliability of revenues and the uncertainty of costs, including climate impacts. This includes PPPs and joint ventures for potential use in large-scale investments, and regulatory and technical support to households, small-scale enterprises and microfinance institutions to address smaller-scale resilience investments.

Business models

Much larger-scale agricultural and forestry investment is commercially viable, with well-established business models. The key is ensuring that incentives are in place for investors to incorporate resilience into their investments in supply chains and infrastructure. There is significant potential for dual-benefit projects with mitigation advantages, where energy cost reductions and carbon credits, either from reducing process energy or from carbon sequestration, can provide additional or increased revenue streams. Smaller-scale business models will require support for community organizations to receive transfers, collect fees and manage both capital and operating expenditures, as well as support to design and implement resilience investments. Examples are given in annex 3, section A.3.2.

In summary, for investments in agriculture and fisheries, a primary option would be commercial models in supply chains and forestry. A second option would be blended or performance-based payments for smallholders (PES or carbon credits) as input finance linked to resilient production.

3.4.3 Health

Investments

The need to strengthen resilience and reduce the risks associated with climate change is evident in many aspects of health care. While there is ongoing debate at the international level about the specific adaptation impacts of investments in health, there is broad agreement that healthier individuals, communities and societies are better equipped to absorb and adapt to climate risks, thereby contributing to resilience-building efforts.

In general, human health is impacted by climate in two main ways: (i) increasing temperatures impact cities and other urban areas through heat island effects, increasing heat-related illness; and (ii) changes in precipitation and temperature may increase the prevalence of specific diseases. Indirectly, nutrition can be adversely affected when climate change alters crop growth patterns and impacts animal health.

These impacts point to several investment priorities. First, there is a need for hospitals, clinics, and diagnostic centres that provide medical services; pharmaceutical companies that develop and distribute drugs and medical supplies; and cooling centres and other measures to combat excessive heat. Second, health insurance schemes can provide coverage to individuals and organizations, managing risk, pooling resources and negotiating with health care providers. Third, investments in medical research, medicine development, technology and innovation can improve diagnostics, treatment and overall health care delivery.

Enabling environment

National, state or provincial governments, and sometimes city governments, fund hospitals. Local governments typically fund local clinics and cooling initiatives, including cooling centres. The private sector also provides hospitals and clinics in most countries, but often only for higher

income groups. It also usually provides medical waste disposal.

For private sector involvement, the key enabling environment issues include the ability of relevant agencies to form and regulate PPPs, and to offer availability payments based on an agreed return or bid (CSOs may be used to reduce the cost for some or all end users). They also need equal access to health insurance payments. The enabling framework must address all of these issues, ensuring sufficient revenue for the public component of the health service and its investment needs, while allowing finance to be raised from a variety of sources, including the private sector. It must also ensure that services are provided uniformly across income groups and regions. Leaving one component out will mean that some groups risk "falling between the cracks".

Business models

Health business models are, almost by definition, hybrid public–private models. Health care is a merit good that should be available to all, with substantial positive external benefits,[61] so the public sector will always need to subsidize some groups. In relation to health services, there is limited potential for dual-benefit projects. Limited mitigation benefits and associated energy cost reductions and/or carbon credits can be derived from reducing energy used in facilities. Measures to reduce water usage can add to the resilience of a facility and save costs. However, the majority of the revenue required to cover capital expenditure will still come from user charges and subsidies. Examples are given in annex 3, section A.3.3.

In summary, for investments in health, a primary option would be hybrid public–private service provision. A second option would be insurance-linked revenue streams. A third option would be facility-level cost savings monetized, though generally insufficient for full capital expenditure recovery.

3.4.4 Ecosystems and biodiversity

Investments

Many ecosystems, and the services they provide to communities, are at risk because they are vulnerable to elevated levels of climate impact. Investments in ecosystems and biodiversity deliver substantial adaptation benefits by leveraging the natural resilience of ecosystems to mitigate climate risks and enhance the adaptive capacity of communities. These investments range from acquiring and maintaining specific areas of land to prevent exploitation or degradation, to supporting communities that live in harmony with ecosystems so that they can preserve them and the services they provide, to developing ecologically appropriate tourism.

IFF methodologies for national macro-level investment planning in these sectors are available to support the scoping and prioritization of investment.[62,63,64] By linking ecosystem protection objectives with national budgeting and planning processes, these methodologies help identify priority interventions, estimate financing needs and align public and private resources towards ecosystem-based adaptation.

61 Benefits that accrue to the community as a whole that are not paid for.
62 UNDP (2020). Assessment of Investment & Financial Flows for Adaptation in the Biodiversity Sector.
63 UNDP (2020). Assessment of Investment & Financial Flows for Adaptation in the Coastal Zones Sector.
64 UNDP (2020). Assessment of Investment & Financial Flows for Adaptation in the Tourism Sector.

Enabling environment

Investment in biodiversity and conservation often requires balancing commercial and community interests and can involve the establishment of new forms of revenue mobilization, such as the PES systems discussed above. Addressing the needs of coastal zone management, ecotourism and developers and corporations involved in the sustainable exploitation of fisheries and forest products, while also ensuring the needs of remote communities that safeguard biological heritage, requires significant government capacity and potentially investment, for example in infrastructure provision and monitoring systems over widely divergent geographies.

National, state/provincial and local governments and agencies all have catalytic roles and roles to safeguard local communities in the context of development. The private sector plays a key role in financing the sustainable use of sensitive ecosystems in ecotourism.

The enabling framework for this sector needs to provide clear regulation and performance criteria in relation to what is expected or required to receive a stream of payments (in the case of PES schemes) or tax concessions or licences (in the case of developers). It must also include the capacity to monitor the actual performance of the implementing entity.

Business models

Given the range of habitats and circumstances even within a small area, a holistic approach to a business case is needed—one that encompasses the needs of the ecosystem, the community involved and any external investors, such as developers and their clients. All stakeholders need to be adequately compensated for losses and share in the potential benefits. Corporate structures for this can be relatively complex, and there is a need for transparency. Of particular complexity is the case of Small Island Developing States (SIDS), where forest, freshwater and coastal ecosystems coexist and are integrally embedded In the livelihoods of island communities. Viable "ridge to reef" programmes, as piloted in Tuvalu with assistance from UNDP,[65] address this challenge.

In relation to boosting revenues from tourism within a business case, some mitigation dual benefits are likely available and can be monetized through such mechanisms as REDD+. Examples are given in annex 3, section A.3.4.

In summary, for investments in ecosystems and biodiversity, a primary option would be PES and ecotourism-linked revenue. A secondary option would be concessional co-financing for public-good protection. If possible, a third option would be REDD+, where mitigation co-benefits are quantifiable.

3.4.5 Livelihoods and industries

Investments

Investments in livelihoods and industries have the potential to create jobs and generate stable incomes, contributing to the economic resilience of individuals and communities. By providing reliable employment opportunities and fostering entrepreneurship, such investments enable households to build financial security and accumulate savings. From a climate adaptation perspective, increased household savings play a critical role in enhancing climate risk absorption capacity. Financially secure households are better equipped to invest in adaptive measures such as improving housing resilience, diversifying income streams or accessing insurance products. Additionally, savings provide a financial buffer, enabling families to recover more quickly from climate shocks such as floods, droughts or extreme weather events.

65 UNESCAP (2018). Implementing a "Ridge to Reef" Approach to Protect Biodiversity and Ecosystem Functions in Tuvalu (R2R Tuvalu).

Investments in climate-resilient industries and livelihoods, such as sustainable agriculture, renewable energy and eco-tourism (discussed in other chapters), can create a dual impact by reducing climate vulnerabilities and fostering long-term economic stability. These sectors not only build local adaptive capacity but also contribute to national and regional resilience against climate risks.

Many types of industry are vulnerable to climate-related disruptions, and managing these risks is essential. Businesses can increase their resilience by investing in measures to minimize climate impacts, including local drainage, flood control and coastal protection, and by increasing energy and water self-sufficiency. These measures also reduce emissions when they use passive or renewable-energy-based heating and cooling systems, and improve process energy efficiency. Incentives or inducements may be required to accelerate uptake.

Enabling environment

National, state/provincial and local governments and agencies and SOEs have an investment role, but significant costs can be passed wholly or partially to the private sector. For the enabling environment, the key is to clearly define the responsibilities of developers and owners of industrial estates, factories and other production sites, and of business owners, in relation to investing in resilient development. The challenge is that, as in many cases involving adaptation, the benefit of such investment occurs at an indeterminate time in the future, whereas the funds must be paid upfront from current cash flow.

Mechanisms to spread the cost of such investments over time, such as financing capital expenditure, are often not available to everyone and can be complex to access even if they are available. Catalysing such financing mechanisms is an important role for governments. Another approach is market-based, involving differentiation in insurance premiums according to the level of resilience a property or business is assessed as having. Regulations guiding insurance companies in this direction are also important.

Business models

Resilience investments in industry are often part of a "green building" approach to development, which combines adaptation and mitigation investment. Aside from long-term savings on climate impacts and reductions in insurance premiums, there is significant potential for mitigation-related revenue streams. In this respect, energy-saving company (ESCO) systems can be important—these companies invest in energy-saving measures and keep a proportion of the savings. Such savings can also form part of a utility's business model for energy resilience, reducing the demand for energy (especially at peak times). Utilities may, therefore, wish to promote investment by their customers by providing incentives. Examples are given in annex 3, section A.3.5.

In summary, for investments in livelihoods and industry, a primary option would be ESCO-type models for energy and water efficiency. Insurance-linked incentives would also be a good secondary option, while public co-financing, where resilience benefits accrue broadly, comes third.

3.4.6 Cultural heritage

Investments

Climate risks can manifest in ways that have very different impacts depending on the circumstances of communities. In many countries, historic areas are often run down and relatively inexpensive, providing shelter for the poor and vulnerable. Investments in upgrading these areas, restoring their historic significance and improving access to the broader community will require a wide range of infrastructure investments that need to be made resilient to future climate impacts. However, these investments need to be undertaken with careful consideration of the potential effects on vulnerable communities.[66] Redevelopment of the built form also needs to be inclusive of these communities.

While new local infrastructure is needed, especially drainage and reliable power and lighting, there is also a need to preserve community resilience, which is a multi-faceted issue involving the continuation of livelihoods. Providing appropriate working capital and a basis for livelihoods will therefore be important.

Enabling environment

While national and state/provincial government programmes often provide resources, local governments and NGOs often have a pivotal role in providing services to vulnerable groups (see examples in annex 3). Local governments should provide appropriate zoning incentives for inclusive redevelopment by the private sector. National programmes that provide the infrastructure and livelihood support described above must be reliably funded, and the programmed interventions need to be designed taking account the potential future impacts on the communities in question.

66 UN Habitat (2008). Best Practices on Social Sustainability in Historic Districts.

Photo: AB Rashid/UNDP Bangladesh

Business models

The business models for such projects usually revolve around the value of the land in historic areas which, in cities, are often in central areas with access to urban amenities. Support to vulnerable groups will depend greatly on governmental transfers, even if the community contributes in cash or kind. The case for these support projects is primarily economic, based on the avoidance of future costs incurred from a climate-related disaster. There is limited dual-benefit potential, although the built environment in redeveloped areas can be made low carbon, and low-carbon public transport can be introduced. Annex 3, section A.3.6 provides an example of a business model for this sector.

In summary, for cultural heritage adaptation, a primary option would be public-good resilience investments financed through transfers and LVC. A secondary option would be project-level livelihood support to reduce displacement risks.

3.4.7 Human settlements and infrastructure

Investments

Human settlements are often built on flood plains and rivers which, while historically excellent locations for trade, are now highly vulnerable to climate change impacts. This is particularly true for poorer communities. Many climate impacts are water-related, either leading to a shortage of water or to an excess over a short time frame, such as from heavy rainfall or storm surge (see examples in annex 3).

Buildings also account for an increasing share of energy-related emissions and, along with the infrastructure on which they depend, are increasingly being affected by climate change-induced events. Climate-resilient housing will require building homes with improved cooling or heating and better insulation. Incentives for resilient building, as well as economic activity involving investments in green building and sustainably sourced products, will generally be incorporated in the measures addressed earlier in relation to resilience but may require new approaches to regulating and incentivizing developers and building systems providers (see examples in annex 3).

Enabling environment

A central element in implementing investments in new, resilient building structures and infrastructure, and in upgrading existing ones, will be strengthening the systems and capacities of subnational governments, which have the largest share of responsibility for regulating such development. This requires a range of institutional strengthening, including changes to national codes and training local governments on their application, enabling local governments to structure appropriate incentives for resilient development, increasing the scale and scope of funding and financing sources, adapting PPP legislation for local government use and supporting its implementation.

Mechanisms to address the challenge of upfront cost versus indeterminate long-term benefits are needed. For example, a major issue is that potential buyers of houses generally seek the lowest price possible, while developers do not get the long-term benefits of low-carbon and resilience investments once they sell the property. This disincentivizes resilient construction, except for developers targeting environmentally conscious buyers. The problem can only be fully addressed through mandatory codes applicable across all jurisdictions and categories of housing, combined with appropriate incentives.

Business models

Adaptation investments at the subnational level will almost always affect land use. The challenge is to develop structures in which the beneficiaries of resilience investments, particularly in infrastructure, can contribute to the capital expenditure of the investment. Numerous mechanisms exist, such as LVC.

At the level of individual developers, incentives are crucial. For example, floor space ratio bonuses, which allow developers to build more units on a site, can be offered for resilient development. This sector offers significant dual-benefit potential (see annex 3, section A.3.7 for examples).

In summary, for investments in human settlements and infrastructure, a primary option would be LVC and area-based levies to capture land value uplift. A secondary option would be incentives for developers, such as floor space ratio bonuses. A third option would be mandatory resilient building codes to ensure long-term viability.

3.4.8 New and hybrid models of climate adaptation finance

Humanitarian assistance and loss and damage

As climate-related disasters increase, the need for funding emergency responses is growing. For example, it is estimated that climate-related displacements of communities are now greater than those generated by conflict.[67] The resultant need for investment in rebuilding the livelihoods of displaced communities will be substantial. The importance of including effective adaptation measures in such response is therefore growing. However, implementing agencies in many countries struggle to access adaptation finance and instead rely on emergency response funding to cope with hazards. Only 1 in 10 post-disaster reconstruction projects are reported as being designed and delivered with adaptation and resilience objectives in mind.[68]

In using loss and damage resources, a balance must be struck between emergency response and more long-term adaptation needs. A commitment to build back better should be mainstreamed across all reconstruction projects, ensuring resilience is embedded and maladaptation is avoided. At the same time, re-evaluating eligibility requirements for accessing international adaptation funding could help unlock much-needed finance for these highly vulnerable states.

Stakeholders in the emerging loss and damage finance agenda can learn from both the humanitarian sector's experience in pre-deploying rapid response funding to ameliorate the impact of climate-related disasters and from structures established for the longer-term deployment of adaptation finance, such as those discussed above. Examples of funding structures include:

- Country-based pooled funds managed by the Office for the United Nations Coordination of Humanitarian Affairs, which take contributions from public donors, as well as some private sector actors, and collecting them into a single fund to later support high-priority projects as set out in Humanitarian Response Plans.
- Forecast-based financing, such as the Red Cross initiative in Bangladesh in 2023. Based on a forecast of a major cyclone, the Red Cross disbursed cash grants to affected populations prior to the storm hitting, and also provided them with infrastructure to protect their belongings and store clean water for later use.
- Humanitarian insurance, which has not yet been deployed, but could be more cost-efficient. Purchasing insurance to cover large, unpredictable costs that do not occur often is more efficient than holding funds in reserve and forgoing their use.

In summary, actors working on loss and damage can therefore learn from these established funding mechanisms with a view to replicating them in a climate finance context.

67 ADB (2024). Disasters Trigger More Displacements than Conflicts, Says New ADB-IDMC Report.

68 CPI and Global Centre on Adaptation (2024). State and Trends in Climate Adaptation Finance 2023.

To summarize, the ability to match capital sources with business models depends on the following enabling-environment requirements:

- Corporate form of the implementing entities (SOEs, PPP SPVs, cooperatives, community organizations);
- Regulatory frameworks for tariffs, insurance, land development and environmental compliance;
- Policy signals that support climate-risk pricing, including differentiated water tariffs, insurance incentives and carbon/sequestration credits;
- Capacity enhancements at the subnational level to structure LVC mechanisms, PPPs and manage asset performance; and
- Mechanisms to bridge upfront costs and long-term resilience benefits through capital financing,guaranteesorconcessionalelements.

The business models, together with the enabling requirements, must also identify the most suitable revenue source and specify how each model intends to achieve investment outcomes. Table 3 outlines several key business-model archetypes and how each can be relevant to adaptation finance.

Table 3: Summary of guidance by sector

Model archetype	Common business models	Revenue source	Relevance
Full cost-recovery commercial PPP	Urban utilities, industrial services	User fees	High Type 1 alignment
Blended finance with targeted subsidies	Rural utilities, agriculture extension	Tariffs and transfers	Enables equitable access
Area-based public finance	Flood control, settlements, cultural heritage	Betterment taxes, LVC, special levies	Captures localized benefits
Performance-based ecosystem finance	PES, REDD+, watershed management	Ecosystem service payments and grants	Monetizes resilience co-benefits
Insurance-linked resilience investment	Industry, infrastructure	Premium differentiation and avoided-loss value	Aligns incentives with resilience
Community-driven revolving or microfinance models	Smallholder agriculture, community water	Member contributions and small fees	Highly scalable, pro-poor

Key messages

Drawing on the data collected in the previous phase, each sector working group—using sector roadmaps with an adaptation focus (see annex 2) where available, or undertaking focused sector adaptation needs studies and convening workshops—will be tasked with developing prioritized and costed sector adaptation investment priorities. The lead role in this process should usually be taken by government agencies overseeing the sector, but SOEs, the private sector and civil society will need to be integrally involved.

Where a funding gap exists, using the options elicited and taking account of the potential ways to fill the gaps and constraints identified in the data collection process, the working groups should develop business models for the implementation of priority programmes and projects.

Business models will generally fall into one of three types: (i) projects that have significant revenue streams; (ii) projects that currently have no revenue streams but have options to generate them; and (iii) projects that have no realistic prospect of a dedicated revenue stream and must be financed from general revenue (such projects could still be debt-financed, but the debt would need to be serviced from general revenue).

Many adaptation projects can be made financially viable by capturing the value of the benefits they generate. These projects may not currently have a revenue stream but do provide specific benefits for a defined group of people. Often, the cost of the project can be partially or wholly recovered from these beneficiaries. In many cases, an area of land defines the beneficiaries. For example, a drainage project that reduces flooding in a specific area may be financed through a local land tax levy or equivalent.

For each programme or project in the adaptation investment plan, the recommended business model, developed in consultation with all relevant stakeholders, needs to be documented together with a description of the investment.

The agency overseeing this phase should ensure that programmes and projects are documented uniformly by the sector working groups so that all the information required for a cross-sectoral financing prioritization exercise in Phase 4 (chapter 5 and annex 6) is available.

Photo: Sara Madkour

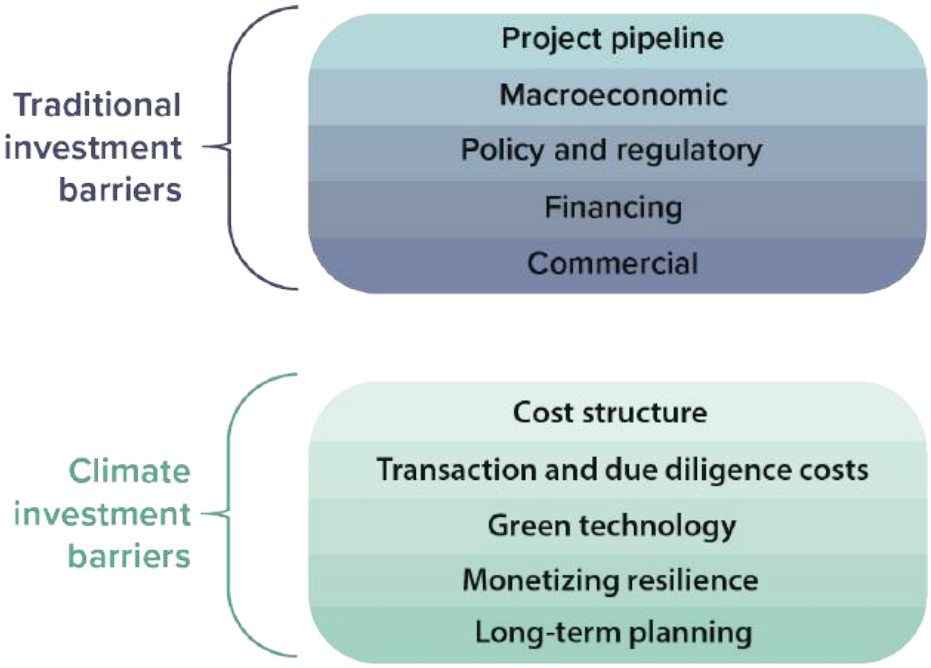
4. Phase 3: Mapping and Matching Financing Needs and Sources

Photo: UNDP Pakistan

4.1 Constraints to investment financing and how to address them

Financing the business models set out in the previous chapter requires overcoming some key constraints. Ideally, the ministry of finance would coordinate the process of addressing these through an Adaptation Finance Coordination Agency or similar. Typical constraints are illustrated in figure 6 and detailed below.

Figure 6: Typical constraints to climate adaptation investment



Source: Adapted from UNDP, World Bank Group and G20 Global Infrastructure Hub (2020). Catalysing Private Sector Investment in Climate Smart Cities.

Throughout interviews conducted in preparation for the development of this Guideline, and as reflected in almost all texts on financing climate investments, the **lack of a well-prepared project pipeline** has been highlighted as a major problem. This creates a particular need to provide, channel or partner with an institution, group or project that has the skills to develop viable climate projects. This need exists even for fully public projects but becomes far more acute for projects financed by or invested in by private sector institutions.

Project development facilities exist at a national level and international levels. For example, the Philippines' PPP Center has a project development fund,[69] and the C40 City Finance Facility operates internationally.[70] Very few facilities focus on financing the development of climate projects—the GCF's Project Preparation Facility[71] is perhaps the largest. Only a small number, such as the Adaptation Fund[72] and ADB's Community Resilience Partnership Program,[73] focus exclusively on adaptation. The Philippines has a Project Development Facility known as the People's Survival Fund Project Development Grant (PDG), a component of the Philippines' People's Survival Fund, which provides funding and technical assistance to local government units and community organizations for preparing detailed proposals for climate change adaptation projects. The PDG helps proponents by covering costs for activities like Climate Risk Assessments, developing project concept notes and other essential preparation steps. This is unusual for stand-alone national adaptation finance facilities in in emerging market and developing economies (EMDEs) that finance adaptation project development, although Australia has such schemes.[74] None of these facilities has the resources to develop full project pipelines.

Macroeconomic risks are always present in one form or another. The key risks are foreign exchange (FX) risk, inflation that is not offset by corresponding revenue increases and interest rate risks. All of these risks have been addressed before in EMDEs, and appropriate financial responses are possible, however climate change is likely to exacerbate them.

Mechanisms to counter FX risk are common. The practice known as "hedging" can, for a price, protect a lender against currency fluctuations. Another tactic used, especially by MDBs, is "local currency lending", where an international financial institution will borrow in the local capital market to re-lend in that market—this is restricted to EMDEs with fairly deep capital markets. Inflation is usually dealt with contractually. PPP contracts may include provisions for user charge adjustments tied to an exchange-rate adjusted index. This can, however, result in rapid price adjustments if the national currency devalues. Interest rates are an expense to the service provider and, unless specifically dealt with in a contract, increases can be passed on to consumers through increases in user charges, usually an undesirable outcome. Clear contracts specifying how to handle such changes in the macroeconomic environment are essential.

Policy and regulatory risks include a lack of alignment across levels of government and across agencies; limited capacity to control policies and regulations impacting private investment, including well-designed concessions, well-regulated tariffs and consistent technical standards; a lack of strong, efficient impartial domestic regulation and dispute resolution systems; and currency convertibility, transferability, expropriation and regulatory risks. These frameworks are, in addition, often less effective as climate change impacts the macro conditions of economies, increasing macroeconomic risks.

69 Public-private Partnership Center of the Philippines. Project Development and Management.

70 See C40 Cities Finance Facility website.

71 Green Climate Fund. Project Preparation Facility.

72 See Adaptation Fund website.

73 ADB (2023). Community Resilience Partnership Program.

74 See, for example, Department of Climate Change, Energy, the Environment and Water, Australian Government. Sustainable Communities Program.

While less of an issue for national institutions, these issues are significant for international financiers. Contracts are of limited utility if a government is determined not to enforce them. Where such issues are a concern, and the party receiving finance is a subnational government entity or a private enterprise, obtaining some form of assurance from the national government can be effective (see the example of the Indonesian Infrastructure Guarantee Facility below). For national governments, resorting to international arbitration is possible.[75] Alternatively, co-investing with an MDB can benefit from a "halo" effect, as defaults to these entities have serious implications for a country's international financial standing.

Financing risks include limited direct access to climate funds and development finance that could reduce private investment risk; lack of creditworthiness of potential investees; limited capacity to raise debt or taxes to finance projects; limited access to affordable, concessional co-financing, especially in local currency; underdeveloped capital markets (notably corporate bond markets); limited access to financing mechanisms that allow for more effective management of risks, such as first-loss financing or junior tranche equity; and lack of standardized term sheets, which limits portfolio financing. Appropriate structuring of financing mechanisms, particularly blended finance facilities,[76] can address most of these issues (see the example of the Shandong Green Development Fund in annex 4).

Commercial risks include consumer demand, including stability and growth prospects for infrastructure services and the competitive environment; local developer and contractor capabilities, particularly with regard to construction and operation; and the overall size of the market (stability and growth prospects) limiting the size of the project or investment and the ability to replicate or expand. These factors may change with climate impacts on markets. Private sector investors in EMDEs have encountered these issues before and have developed coping mechanisms by undertaking extensive due diligence and ensuring counterparts have "skin in the game", working only with trusted contractors and sizing projects appropriately.

Issues with **cost structure** are also important. Many climate projects, including renewable energy and water resource resilience, have higher upfront capital expenditures than conventional alternatives but lower operating and overall costs. Financing mechanisms to address this problem for investing agencies/entities exist and will be discussed below. These mechanisms generally enable the term of financing to be extended to cover the period when the benefits of the resilience investment manifest—some are structured as blended finance facilities, as discussed above.

Low-emission and climate resilient urban infrastructure can incur high **transaction[77] and due diligence costs**, which reduce returns and increase projects costs, deterring critical investment by both government and private sector investors. The design of financing mechanisms to reduce such costs is therefore important. This reinforces the importance of dedicated and resourced project development entities, preferably at the national level. In the absence of such facilities, the development of climate-focused sectoral plans is important (see annex 2).

Green technology risk also needs to be addressed. Many of the green technologies that agencies and enterprises are looking to utilize, including battery storage for energy resilience, water recycling and waste-to-energy projects, have not run through their projected lifespan in the country concerned, so there is insufficient

75 International Chamber of Commerce. ICC International Court of Arbitration.

76 OECD (2018). OECD DAC Blended Finance Principles.

77 UNDP, World Bank Group and G20 Global Infrastructure Hub (2020). Catalysing Private Sector Investment in Climate Smart Cities.

data covering performance over the asset lifespan. Financing and project development mechanisms need to address this issue. The Climate Investment Funds' Clean Technology Fund, mostly for mitigation technology, and the Adaptation Fund Climate Innovation Accelerator,[78] which provides grants to develop and implement new technologies for climate change adaptation, are two dedicate technology development funds. However, they are insufficiently resourced to support project preparation for financing. Sensitizing potential borrowers to the possibilities and benefits of green technology is a labour-intensive activity for a financing entity. Mongolia's XacBank[79] has trained its lending officers to foster the adoption of such technology, but it is supported by lower cost funds from international sources.[80]

Monetization of resilience remains difficult. While examples of business models where this is done are available (see below and annex 4), the issue remains important and again needs to be addressed by project design and structuring. These projects can involve complex methodologies for quantifying the value of natural capital, such as coral reefs and mangroves, both in mitigating the effects of hydrometeorological and other natural hazards exacerbated by the compounding effects of climate change, and in providing carbon sequestration benefits. This challenge is made more complex because it involves multiple metrics and because benefits vary widely by location, as do prices. A recent study[81] identified four specific constraints and ways to address them, which can be summarized as follows:

- Challenges in quantifying the financial implications of physical risks and adaptation, to be addressed by effective planning, better information and evidence on impacts, and comprehensive and enforced standards;
- Lack of market recognition for resilience in valuations, to be addressed by government regulation that requires certain levels of risks be addressed in project design;
- Difficulties in cost-sharing when adaptation benefits are spread across stakeholders, requiring regulation setting out clear definitions and mechanisms for allocating costs; and
- Asset-level resilience normally being insufficient to protect value of whole-of-system resilience, requiring effective CRVA be undertaken by local jurisdictions so as to plan and programme cross-sectoral responses that will provide assurance that whole-of-system issues are being addressed.

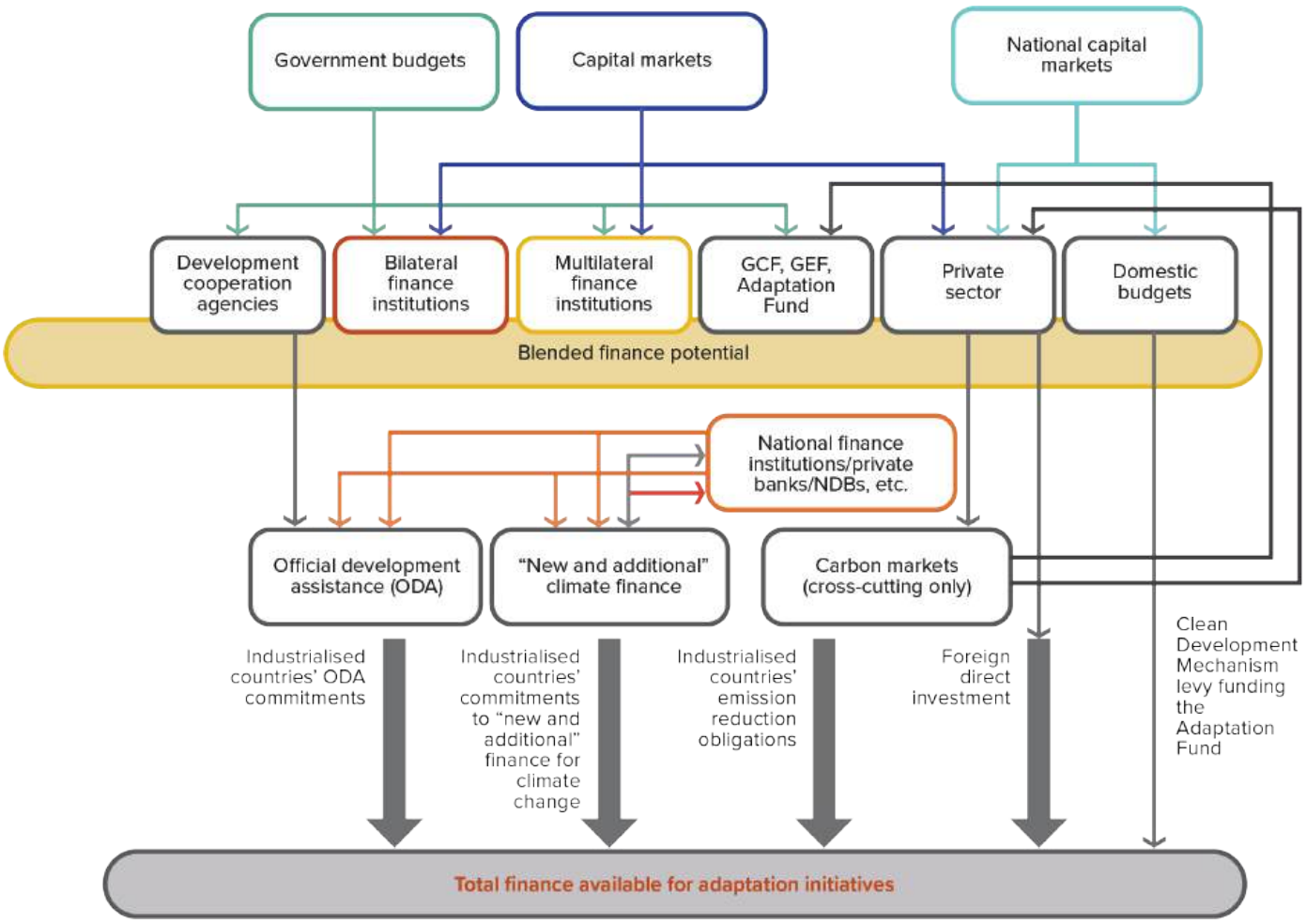
There is also a lack of capacity to deliver sound, **long-term climate, spatial and economic planning** for physical geographies and infrastructure sectors due to the need to (i) account for the effect, and growing uncertainty, of long-term climate trends; (ii) build in flexibility to harness new clean technology innovations; and (iii) use cross-sectoral, systems-based approaches. As discussed above, there is a pressing need for sectoral planning (see annex 2) and, in addition, a need to integrate across these plans and adapt them to, and sequence implementation at, a local level. The following section and annex 4 will give examples of financing sources and mechanisms that address these issues.

78 Adaptation Fund. Adaptation Fund Climate Innovation Accelerator.
79 Shurenchimeg, B. (2023). XacBank, the First Green Bank in Mongolia. 26 May. Mongolian Economy.
80 Green Climate Fund. XacBank JSC (Mongolia).
81 Investor Group on Climate Change (2024). Activating Private Capital for Climate Adaptation. 6 November.

4.2 Financing sources

In this phase of the AFS, the first step is to identify the potential sources of finance available to the country. This will include both international and national sources, along with considerations of ways to minimize the cost of that finance, such as through risk mitigation. The range of financing sources available for adaptation is shown in figure 7. It is important to note that, as referred to in this Guideline, adaptation finance includes any financing sourced by implementing agencies that finances adaptation—whether it is dedicated adaptation, climate finance or otherwise. Most sources of finance for adaptation are not categorized as dedicated climate financing agencies.

Figure 7: Overview of financing sources



Source: Adapted from Atteridge, A., et al. (2009). Adaptation Finance Under a Copenhagen Agreed Outcome. Stockholm Environment Institute.

The key actors in the international and domestic climate adaptation financing space can be categorized as follows:

- **International financial institutions (IFIs).** MDBs and bilateral development finance institutions and agencies, such as KfW and the Japan International Cooperation Agency, provide the most concessional resources at the international level. Their programmes are increasingly shifting to focus on climate issues.[82] These entities offer a wide range of support, from grants through concessional and near-commercial loans, guarantees and other forms of risk mitigation, to support with issuing bonds (including green bonds) and equity. The role of IFIs in fostering private sector investment will be examined below.
- **OECD Development Assistance Committee (DAC) members[83] and non-DAC development assistance providers (collectively, development cooperation agencies (DCAs)).** In theory, these have substantial amounts of finance available and, in particular, their financing can be grant-based or highly concessional. Again, they are increasingly focusing on climate-related issues and on adaptation. However, tapping these funds, whether channelled through their own agencies or through other multilateral agencies, such as UNDP, requires addressing the critical constraints to investment and meeting strict eligibility criteria. The role of development partners in fostering private sector investment will also be examined below.
- **Multilateral development cooperation agencies.** UNDP and other elements of the UN system have significant catalytic funds available for supporting the establishment of financing channels and, in the case of the United Nations Capital Development Fund, limited capital financing capacity. Generally, UN agencies channel and consolidate multilateral and bilateral funding, providing a higher level of impact than smaller, stand-alone projects. Also significant are other multilateral groupings, in particular the European Union (EU), which has very significant funds in its own right (in addition to member states).[84] These agencies mostly use grant financing which, if deployed strategically, can either fund much-needed policy and systems development or be used to leverage financing from other sources.
- **Dedicated climate funds.** The largest sources of approved funding for adaptation projects are currently the Green Climate Fund (GCF), the Least Developed Countries Fund (LDCF) administered by the Global Environment Facility (GEF), the Pilot Program for Climate Resilience of the World Bank's Climate Investment Funds and the Adaptation Fund.[85] They have significant resources but often require partnering with an intermediary in order to access funding, which can be difficult for many intermediaries. GCF and the Adaptation Fund strongly encourage national institutions (both public and private) to apply for direct access to their funds, but these institutions must first become accredited. Some of these institutions (such as GCF) can provide a wide range of financing modalities, as with IFIs; others are grant-focused with limited resources. These institutions also have a role in fostering private sector investment, which will be examined below.
- **International private sector and private sector financiers.**[86] As discussed in the previous chapter, mobilizing private sector finance requires the use of project structures that allow participation—for example, PPP structures—and/or the use of financing instruments appropriate for private sector finance (such as green bonds). Many implementing agencies struggle to develop projects of the scale that can attract such finance, but significant financing can be available from, or arranged through, original equipment manufacturers and other private sector vendors, management companies, international banks, dedicated debt and equity funds catering to EMDEs and sometimes direct investment by institutions such as pension funds.

82 World Bank Group (2024). Multilateral Development Banks to Boost Climate Finance. 12 November.
83 OECD. Development Assistance Committee (DAC).
84 European Council. Global Climate Action.
85 Watson, C., L. Schalatek and A. Evéquoz (2024). Climate Finance Thematic Briefing: Adaptation Finance. Climate Funds Update.
86 Connolly, J., et al. (2024). Tracking and Mobilizing Private Sector Climate Adaptation Finance. 25 September. Climate Policy Initiative.

- Of particular interest is the potential of OECD institutional investors and non-OECD and OECD sovereign wealth funds. These institutions have huge resources but very specific requirements for mobilizing them. Individual institutions are moving to finance climate-related investments—for example, the Danish Climate Fund, established by two of Denmark's pension funds, finances investments in climate, including adaptation.[87] However, to move resources at scale as envisaged by the initiatives announced at COP 26, OECD institutions need to be able to tap into a liquid pool of products that meet the criteria and credit ratings established in their major asset allocation strategies, which are in turn based on qualifying projects or corporate investments.

Key to increasing institutional investor allocation to climate-related investment is ensuring that these investments compete on a risk-return basis over different time horizons, because institutional investors have varying risk appetites, investment preferences and constraints. Pension funds and insurers have to invest in accordance with the "prudent person principle" to achieve the required security, profitability, liquidity and quality.

In addition to these issues, to achieve higher allocations to low-carbon solutions, many sovereign funds would also need to undertake major investments in capacity-building at the board, management and staff levels and across several areas. This includes improving the capacity to engage with portfolio companies on climate-related issues, the capacity to select and monitor asset managers based on their climate-related performance and, for stronger sovereign funds, the capacity to invest directly in low-carbon infrastructure.

- **National and subnational governments.** These are still the dominant funders of infrastructure (over 75 percent globally), but implementing entities vary widely in their political and fiscal position to access such finance. Governments have a wide range of options as to financing vehicles for adaptation projects, ranging from "on budget" finance from revenue and accumulated funds, dedicated national climate funds national development banks (NDBs) (some with dedicated climate financing windows) to supporting national entities to issue bonds (including green bonds). Even where dedicated financing institutions are established to direct finance to such entities, they can be constrained by their inability to formulate bankable projects.

  In addition, many adaptation projects are not traditional "hard" infrastructure. "Soft" investments such as early warning systems and community disaster-response training are equally important. The challenge is to prioritize such expenditures in competition with more high-profile projects. The role of government agencies and financing entities in fostering private sector investment is significant, as shown in the business models discussed in the previous chapter, where governments had a pivotal role in establishing the enabling environments and, in many cases, providing counterpart funding.

- **National households, enterprises and private sector financial institutions.** Many, if not most, investment decisions concerning adaptation will be taken by households and enterprises, particularly SMEs.[88] Awareness of appropriate action and financing mechanisms accessible to a wide range of households and enterprise types and sizes are needed. Governments need to provide frameworks that incentivize financial institutions and national institutions, such as pension funds, to support these investments, for example through sustainable finance initiatives. Risk mitigation (guarantees and insurance) will also be important. National private enterprises can be good partners for government, as they are familiar and often comfortable with the scale and general fiscal and regulatory context of projects, but they are often constrained by government processes of project formulation and implementation and by

87 Impact Investing Institute. Danish Climate Fund.

88 For example, smallholder farmers invest much more than the international community in adaptation: International Institute for Environment and Development (2023). Smallholder Farmers Worldwide Spending $368bn Annually Adapting to Climate Change, Nature Loss. 14 November.

politics. At the community level, neighbourhood revolving funds and crowd-sourcing can be important for some investments. Supplementing private finance is national philanthropy, such as corporate social responsibility and foundation-backed funds, which can provide significant funds for specific projects but varies significantly among countries.

- **NGOs and philanthropy.** Previously a niche actor in the private sector, international NGOs such as the World Resources Institute and philanthropic funds such as the Gates Foundation have become important financiers in particular development assistance areas. Philanthropy is slowly starting to pay more attention to climate, including for adaptation.[89] Application processes can be similar to bilateral agencies. National philanthropic funds have also become significant. In the Philippines, the NGO Philippine Business for Social Progress channels CSR donations from corporations, and the National Resilience Council convenes public and private sectors to provide philanthropic funds and technical advisory to subnational governments to increase climate resilience.

A brief overview of international financing institutions that can support adaptation investment is set out in annex 5.

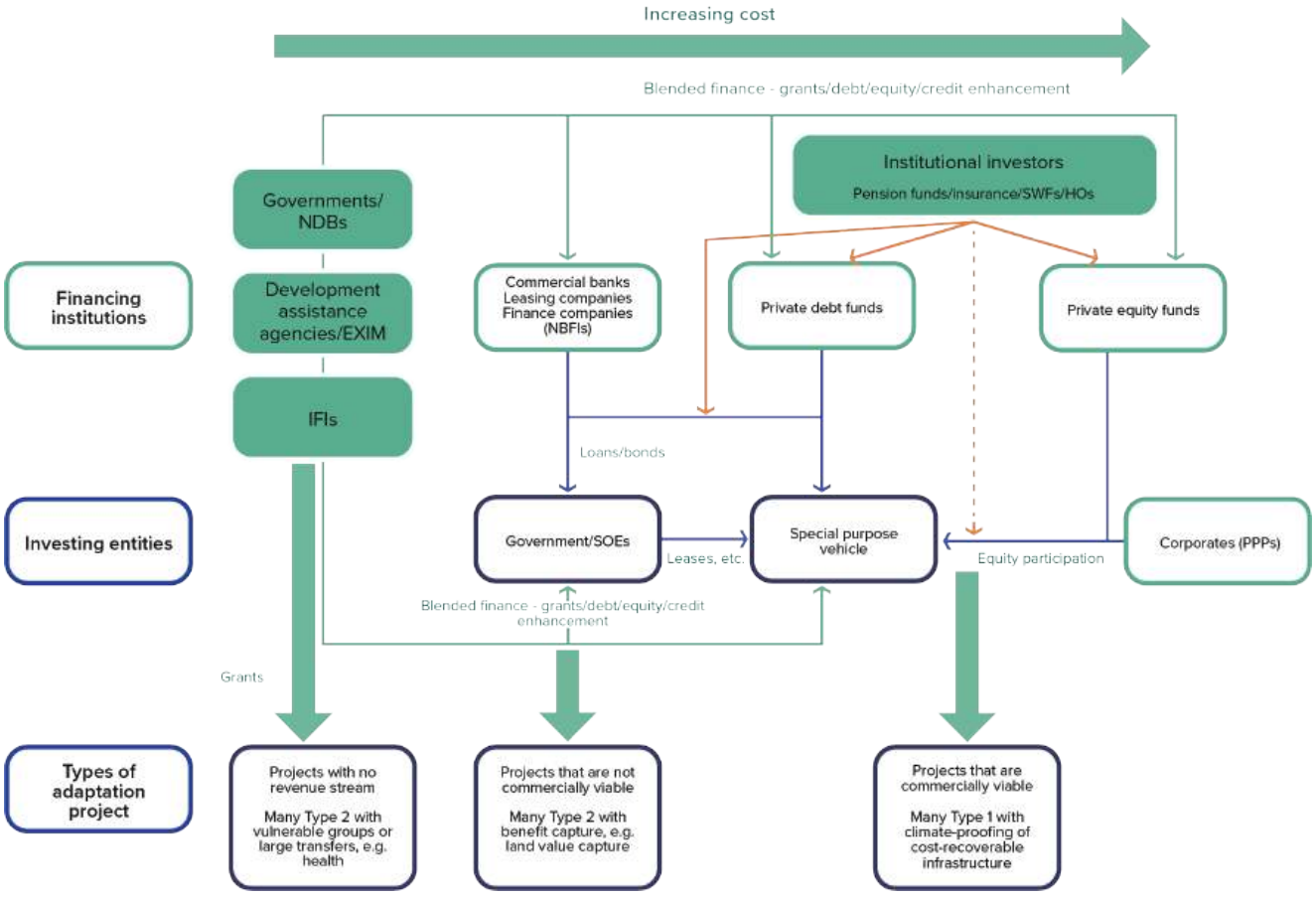
89 See the COP 28 Call to Action on Investing in Adaptation.

Photo: UNDP Thailand

4.3 National financing mechanisms

The types of financing structures suited to particular adaptation sectors in a given country will depend on both the type of project and the capacity of the national capital market. Figure 8 provides a stylized representation of a national capital market.

Figure 8: National financing options for adaptation



As capital markets become more sophisticated, there is an increasing role for private debt and equity funds and for other institutions, such as pension funds and insurance companies. Participation can either be through funds or direct debt and equity investment, as these entities become larger in relation to the economy and as projects become larger, where increased transaction costs are less important than the amount and overall cost of funding. To tap these funds, appropriate corporate structures, such as SPVs, are needed to allow the channelling of private finance.

There is an important role for IFIs and DCAs to help enhance national capital markets. These entities offer a wide range of support, ranging from grants through concessional and near-commercial loans, guarantees and other forms of risk mitigation, to support with bond flotation, (including green bonds) and equity which can be channelled through local financial institutions (see box 6).

There are many potential options for adaptation project bond financing that tap private funds from both national and international capital markets—both social impact and green bonds.[90] The role of IFIs in fostering private sector investment through support to financing mechanisms that crowd in the private sector is important. The issue for entities developing adaptation projects is that direct access to international finance requires that they meet credit requirements and have projects of sufficient size. Access via local financial institutions that channel IFI and other international finance can both overcome these problems and help develop local capital markets. While the first level of support is usually the banking and NBFI (especially microfinance) sectors, as with the ACT Fund (discussed below), such support can extend to developing the fund management industry within an economy.

Photo: TCAP / UNDP

Box 6: UNDP's Biodiversity Finance Initiative: Development partner support for capital markets and the enabling environment

UNDP's Biodiversity Finance Initiative (BIOFIN) in Zambia collaborated with financial sector regulators, including the Securities and Exchange Commission, to establish Zambia's Green Bond Guidelines, a framework that laid the enabling regulatory environment to facilitate green bond issuances. BIOFIN supported the Lusaka Securities Exchange in developing the Green Bonds Listing Rules, providing an avenue for the listing of green bonds on the exchange. Following further measures to enhance the attractiveness of green bond issuances, Zambia's Copperbelt Energy Corporation Renewables issued the country's first ever green bond in 2023, valued at $53.5, and a second tranche valued at $96.7 million in 2024. The bond contributes to increasing the share of renewable energy and enhancing energy security while reducing deforestation.

Source: BIOFIN (2024). BIOFIN Zambia's Strategic Role. UNDP.

90 United Nations Office for Disaster Risk Reduction. 100 Investments for Adaptation and Resilience.

DCAs from within the OECD, such as the United Kingdom's Foreign, Commonwealth and Development Office (FCDO), and non-OECD national development assistance institutions can also provide support to the development of local capital markets. For example, China, India and Thailand have agencies that provide aid, usually in their immediate sphere of influence or in support of their economic interests, and have substantial amounts of finance available, often as grants or other highly concessional financing. These partners are increasingly focusing on climate-related issues and on adaptation. In the lead is FCDO, which has implemented the £276 million Climate Action for a Resilient Asia project. Among its initiatives is the UNDP Climate Finance Network, which builds capacity for national financing.[91] However, tapping such funds, whether channelled through their own agencies or through other multilateral agencies, such as UNDP, requires meeting eligibility criteria, which can be challenging for some institutions. Increasingly, DCAs recognize the importance of fostering private sector investment. Bilateral DCAs often work in concert with their export–import agencies, which can help finance specific projects, usually with concessional finance.

Many governments have established national climate funds or climate windows within their NDBs to channel and manage resources dedicated to climate action, including adaptation. These often participate in capital markets by raising equity or selling bonds and can deepen such linkages over time. These funds and windows often consolidate domestic and international climate finance, enabling governments to pool resources, prioritize investments and co-finance adaptation projects with private and multilateral partners. National climate funds can also facilitate access to international dedicated adaptation funds, such as the Adaptation Fund, GCF or LDCF, which provide targeted financing for resilience-building initiatives.

NDBs and capital market investors—such as pension funds and insurance companies—are playing an increasingly prominent role as sustainability finance worldwide becomes more relevant. One example is how NDBs catalyze investment by financing PPPs—for example, Banobras in Mexico's transport PPPs[92] that mobilizes private capital as second-tier lenders supporting private institutions to invest in city projects. This support is further strengthened by national government institutions that increasingly leverage private investment through regulations and programmes—such as payments for watershed services—currently operating in Bolivia, Costa Rica, Ecuador, India, Mexico, South Africa and the United States. NDBs can also support city-level entities in project preparation. National governments are further fostering the issuance of green financing instruments, such as green bonds, with Indonesia providing a notable example (see box 7).

91 FCDO. Climate Action for a Resilient Asia.

92 World Bank (2010). Project Information Document (PID): Appraisal Stage.

Box 7: Indonesia's Sustainable Government Securities Framework

Indonesia's Sustainable Government Securities Framework[93] builds on the Green Bond and Green Sukuk[94] Framework introduced in 2017.[95] Under the Government Securities Framework, the selection procedures for green Sukuk projects follow the climate budget tagging (CBT) mechanism. The CBT system has been embedded into the government's national budget system and was established to track and identify ministry expenditures and projects that contribute towards climate change mitigation and adaptation, in accordance with Indonesia's climate targets.

Between 2018 and 2022, the cumulative green Sukuk value reached $6.9 billion (through four issuances). Data from 2022 reveal that around 28 percent of the 2018–2022 green Sukuk funds were allocated towards climate resilience projects, including flood control and coastal protection structures. In addition, projects that have adaptation benefits, such as those improving water and drought management, forest and land rehabilitation and agriculture, have been financed through green Sukuk proceeds.

Source: Ministry of Finance, Republic of Indonesia. Indonesia's Green Bond & Green Sukuk Initiative.

93 Republic of Indonesia (2025). Sustainable Government Securities Framework.

94 A Sukuk is an Islamic financial certificate that functions similarly to a bond but adheres to Shariah principles.

95 In 2025, the Government of Indonesia introduced the Republic of Indonesia Sustainable Government Securities Framework as the updated framework for sovereign thematic debt instruments.

Photo: UNDP Cambodia

National institutions can also use government or international funds to capitalize guarantee funds that support adaptation investments. For example, the Indonesia Infrastructure Guarantee Fund was created in 2009 by the Indonesian Ministry of Finance as an SOE to improve the creditworthiness and quality of PPP for infrastructure projects. The fund provides guarantees for one or more financial obligations of a public contracting agency participating in a PPP consortium.[96]

National adaptation financing mechanisms, covering a broad range of sectors and levels of government, are expected to be an increasingly important mechanism in adaptation finance. Many of these funds will also finance mitigation investment and, thus, the scope for dual-benefit projects will increase. These mechanisms can be highly flexible and can foster private sector investment if they can lend to enterprises and/or take equity stakes in enterprises.

Government fund mechanisms fall into the following categories:

- National funds that have a national scope;
- Subnational funds covering a particular region;
- National funds that foster sub-sovereign activity; and
- National mechanisms instituted by a coalition of sub-sovereign entities.

Detailed examples of these mechanisms are set out in annex 4, section A.4.1.

National capital markets also offer a wide range of instruments, and their suitability for financing adaptation investments depends on project revenue characteristics of a project, market depth and sophistication and institutional arrangements in the financial sector. Various examples have been referred to in the financing models set out above and in annex 4. These instruments[97] include:

- Subsidies to support good agricultural practices;
- Disaster risk insurance;
- Green bonds, with potential for blue, sustainability and resilience bond options;
- Green loans;
- Payments for ecosystem services and other revenues from sustainable use of or entrance fees to preserved habitats (e.g. sustainable tourism);
- Green revolving funds capitalized by a dedicated revenue source or tax;
- PPPs for climate initiatives;
- Nature swaps focused on energy, water and agriculture; and
- Carbon credits.

When selecting an instrument, factors to consider include the following:

- How appropriate the instrument is for the project and the project's objectives—and whether it is tailored to the capacities and needs of those groups that will undertake the investment.
- The quantum of financing and whether it is sufficient for the expected size of the project.
- The timeframe for application and approval.
- The maturity of the product in the existing financial system and for the sector concerned.
- Potential partners that may augment resources through participation.

96 International Institute for Sustainable Development. Indonesia Infrastructure Guarantee Fund.

97 These instruments are described in more detail in the context of Cabinet Paper No.25/1633/804/196, a Memorandum dated 2025-08-24 by the Minister of Finance, Planning, and Economic Development on "National Climate Finance Strategy of Sri Lanka – 2025-2030". The Memorandum and the National Climate Finance Strategy of Sri Lanka 2025-2030 attached as Annex-I thereto, were considered by the Cabinet. After discussion, it was decided to grant approval to the National Climate Finance Strategy or Sri Lanka 2025-2030 and to publish, promote and implement the Strategy.

National carbon markets

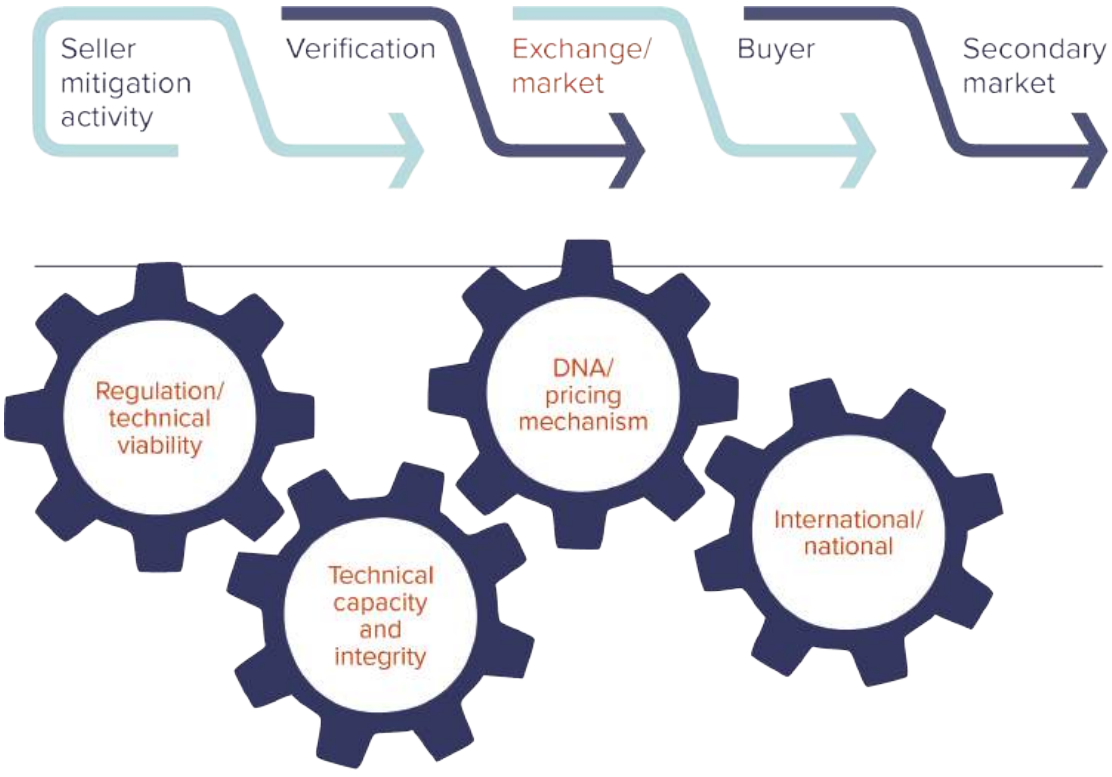
Although carbon credits are primarily mitigation instruments, many adaptation projects, particularly in sustainable agriculture, can also sequester carbon or reduce carbon emissions. There are broadly two types of carbon markets, both of which depend on national systems:

- **Compliance.** Under Article 6 of the Paris Agreement, compliance markets are created as a result of national, regional or international policy or regulatory requirements.
- **Voluntary.** Also under Article 6 and other arrangements, voluntary carbon markets operate at the national and international levels. These involve the issuance, purchase and sale of carbon credits on a voluntary basis. The current supply of voluntary carbon credits comes mostly from private entities that develop carbon projects, or from governments that develop programmes certified by carbon standards that generate emission reductions and/or removals.

Emissions credits (or emissions reductions) can be exchanged between entities. In theory, as the total amount of emissions traded in the market is controlled, it does not matter for the climate who buys or sells them.

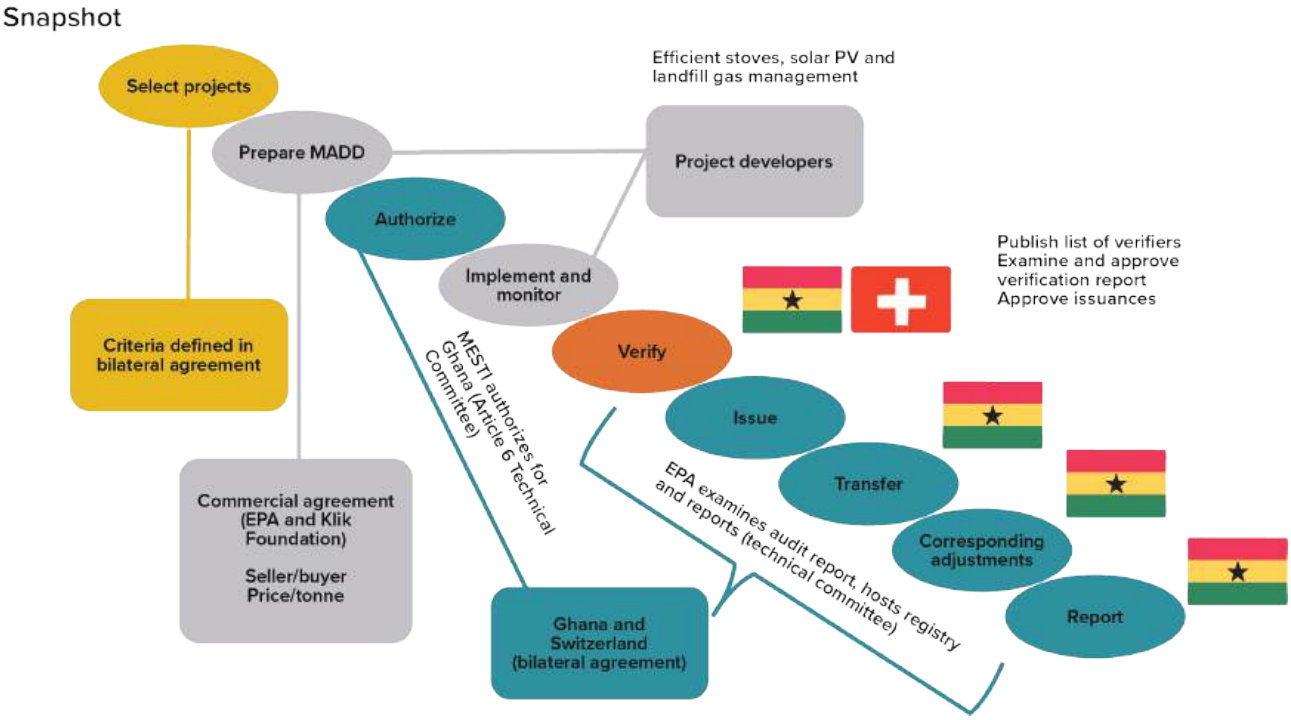
For example, under an Article 6 compliance regime, if a country has committed to reducing its emissions by 100 tonnes of carbon dioxide-equivalent but actually reduces it by 110 tonnes of carbon dioxide-equivalent, it would be able to sell the surplus to another country that has not managed to meet its own target. These traded credits are called Internationally Transferred Mitigation Outcomes (ITMOs). The structure of carbon markets is shown in figure 9.

Figure 9: Structure of carbon markets



With the assistance of the Swiss Economic Cooperation Organisation, Ghana has issued ITMOs (see figure 10).

Figure 10: Elements of Ghana's Internationally Transferred Mitigation Outcomes



Source: UNDP (2020). Advancing the Paris Agreement through Cooperative Approaches.

4.4 Financing mechanisms by sector

The second step in Phase 3 of the AFS is to define appropriate financing mechanisms to be deployed by sector and market segment, and to identify the institutions most likely to implement them. Large government projects will require different financing mechanisms from those suitable for SMEs. For example, a blended finance facility may involve a DCA, a climate fund such as GCF, an IFI and a national development bank. It is often the case that the largest sources of investment finance are targeted for development in major sectors like water, urban, irrigation and flood control, which are highly relevant for adaptation. However, financing often focuses on general development issues and does not focus on adaptation or addressing climate risk. Reforms may therefore be needed to incorporate adaptation considerations into both sector programming (see annex 2) and the structure of financing.

Critical to the analysis of potential financing sources and mechanisms will be a segmentation of the finance market by the implementing entity. Financing sources need to be tailored to the needs of the entities (including households) that will actually undertake the adaptation investment (or not if financing is inappropriate). The potential financing mechanisms should also match the needs of the potential client groups to help them overcome investment barriers.

Adaptation projects and business models generally fall into three categories:

- **Dual-benefit projects with mitigation benefits (renewable energy, etc.).** These can, in principle, often be funded through cost recovery as they can save energy, although this depends on the prevailing pricing policy, as discussed earlier. Climate-proofing such projects (Type 1 under the climate MDB categorization) can also be financed by an increment on user charges. In addition, dedicated international financing agencies exist that cover both mitigation- and adaptation-related investment, which can also have a significant impact on attracting private finance.
- **Focused-adaptation projects (Type 2) that have a significant revenue stream.** Many agriculture resilience projects have such a revenue stream and, if structured correctly, can be commercially financed. In some instances, the issue with these projects is that many actors have to be organized in order to make investment and financing efficient.
- **Focused-adaptation projects that lack a clear revenue stream.** In numerous cases there are ways to remedy the lack of revenue scheme, but this depends on identifying, implementing and ringfencing appropriate cost recovery mechanisms and monetizing adaptation benefits, either through taxing the benefits of landowners and developers and/or monetizing the environmental benefits, such as through payment for ecosystem services (PES).

Financing mechanisms can and do address these project types and the various stakeholders that need financing under the business models identified. Financing therefore varies substantially by sector. Under some government initiatives, interest rate subsidies are introduced for "green" investments. Other more direct subsidies are often provided in specific sectors.

Viability Gap Funding facilities have long been established to compensate for unmonetized public benefits and can be used for adaptation projects. Tied capital grants (inter-governmental fiscal transfers) have also long been provided by higher levels of government to lower levels for the same reason. Although attractive in having a clear and immediate incentive impact, if the subsidy is significant, the issues of market distortion and sustainability need to be addressed and justified by clear climate and other benefits. Subsidies need to be designed so as to only be available to entities producing goods or services with economic value but which, for a variety of reasons, are less financially attractive. The risk is that producers will become dependent on subsidies and have no incentive to innovate. For this reason, subsidies should be tightly targeted, cover only the viability gap and be time bound in a way that they scale down or stop over time. This is particularly the case if such subsidies are expected to be provided by private sector financial institutions. Again, each of these instruments will often vary by sector.

When structuring government, or potentially private sector, financing mechanisms for a particular adaptation sector, the approach will depend on the client groups to be financed and their viable business models. Where the client group consists of many diverse and small-scale individual enterprises or households, such as agricultural smallholders, the financing mechanism will need to have the ability and be willing to bear the transaction costs of outreach to these entities, as financial institutions like XacBank in Mongolia[98] have done. Where the entities are of intermediate size and need help in project formulation and aggregation, such as secondary cities, an NDB like FINDETER in Colombia may be appropriate. Where clients are large and relatively high-capacity, such as an irrigation-focused SOE, and capital markets are relatively deep, a private fund such as the ACT Fund can be developed to service investment needs. Regardless of scale, it will be important to review funder requirements for alignment with GESI policies.

98 International Finance Corporation. SEF XAC-Microstart Mongolia.

Examples of financing projects and facilities targeted at adaptation in specific sectors are further set out in annex 4, section 4.2.

Key messages

Phase 3 of the AFS focuses on mapping and matching financing needs and sources. Building on the data from Phase 1 and the recommended business models from Phase 2, it develops a strategy that considers potential sources of finance, the mechanisms required to channel them and the most relevant instruments. This includes identifying both international sources such as DCAs, IFIs and private FDI/capital markets, and national sources such as banks, NBFIs, listed and private funds and stock issuance, along with ways to minimize financing costs through measures like risk mitigation agencies.

The analysis should define appropriate mechanisms for each sector and market segment, recognizing that large government projects will require different financing mechanisms than those used for SMEs, and identifying the institutions most likely to implement these mechanisms. Strengthening and deepening national capital markets is essential, both as a conduit and for the origination of finance. Mechanisms may include private sector funds, national funds with a national scope, subnational funds covering a particular region and national mechanisms instituted by a coalition of sub-sovereign entities. Examples of these are set out in annex 4

In addition, the AFS should consider the instruments that will be used by these mechanisms and the enabling frameworks that are necessary to allow them to function effectively. For example, the use of green bonds to recapitalize a blended finance facility will need the establishment and consistent use of a bond taxonomy and perhaps incentives for the use of such bonds.

Photo: UNDP Sri Lanka

5. Phase 4: Operational Planning and Coordination for the AFS

Photo: UNDP Indonesia

5.1 Overview of AFS preparation

The final step in the process is to utilize the information gathered in earlier phases to formulate an implementable strategy. This strategy should synthesize investment needs and financing possibilities into a series of actions aimed at securing as much of the needed adaptation investment programme as possible. Phase 4 draws on the adaptation investment needs documented in Phase 2 and the financing options identified in Phase 3. Phase 4 will also describe the structure of the Implementation Plan, which emerges from combining these investment needs with financing opportunities.

5.2 Preparing the strategy: Framework for synthesis of the demand and supply sides

5.2.1 Overview

The first step is to establish or mandate a NAP Adaptation Finance Coordination Agency (AFCA), which may be an existing agency or a new entity (likely the same as that designated for NDC/NAP finance coordination). This agency should consolidate the priority projects identified in Phase 2 into a consolidated multi-sector investment plan,[99] aligned with any parallel NDC or NAP implementation plans—common sources of funds/finance will be in play, and a significant number of projects are cross-cutting, involving both mitigation and adaptation action. The plan should be a rolling plan, with priorities updated as new information, changing impacts and project developments emerge.

Within the available fiscal space and in consideration of government capital budgets, PPP arrangements, IFI and other development assistance counterpart funding requirements and financing potential of government agencies, the strategy should prioritize projects for inclusion in the implementation plan. These priorities should be supported by projections of private sector financing, based on current enabling frameworks or frameworks where reforms are currently under way, as outlined in sector investment roadmaps (see annex 2).

The potential financing sources identified in Phase 3 should be matched to investments by sector, starting with the allocation of the lowest-cost financing to high-priority, non-commercial projects. The remaining financing gaps should be mapped and strategies developed to close them by drawing on unused or underused potential sources identified in Phase 3. This may involve changes to the enabling frameworks in specific sectors and in the financial sector itself and may involve the use of risk mitigation instruments. It is important that GESI issues are embedded in the strategy documents.

The strategy should also identify the required project preparation steps for nominated investments and financing for the project preparation and structuring processes.

5.2.2 Fiscal space analysis

Building on the data collected on the government's overall fiscal position (see section 2.2.3), base projections of near-term revenues and expenditures and any IFF analysis conducted for national macro-level investment planning,[100] the key elements of this analysis are the following:

- Assessing the existing fiscal space and the likely impact of climate change on it. This involves the identification of risks, quantification of risks (choosing a metric) and undertaking climate fiscal risk modelling;

99 For example, the Tajikistan NDC Implementation Plan—including both mitigation and adaptation actions—undertaken by UNDP, see: NDC Partnership. Tajikistan.

100 UNDP (2009). Methodology Guidebook for the Assessment of Investment and Financial Flows to Address Climate Change.

- Devising a programme for climate fiscal risk management and its expected fiscal outcomes to be used for investment planning; and
- Feeding the results of the analysis into the AFS.

Establishing the existing and potential fiscal space available for adaptation investment is critical to the AFS process. This will normally not be carved out of the normal government budgetary process but needs to become an important consideration in determining budgetary priorities. The budgetary process focuses on recognizing adaptation needs and translating them into dedicated line agency budgets. The process of establishing priorities through the roadmap process (see annex 2) provides the basis for allocating resources. UNDP has set out how this should generally be achieved in the budgetary process.[101]

Government budgets are crucial for several reasons. First, despite the widening range of revenue mobilization mechanisms, some adaptation projects have no financing options other than government budgets, as they have no intrinsic revenue stream. Second, government budgets are important for incentivizing implementing entities to undertake novel revenue mobilization schemes. Finally, government budgets are important in leveraging private sector finance, such as through equity contributions to PPPs, guarantees for SOE borrowing or catalyst investments into funds.

Annex 6 provides an overview of how fiscal analysis and public investment management processes feed into the AFS through the allocation of funds available for investment, with further guidance available also from UNDP and ADB.[102]

5.2.3 AFS implementation plan

It is important to describe the critical streams of work related to implementing the strategy. The implementation of the strategy will require the constant review of investments and financing sources in the context of an evolving fiscal space. The process begins with establishing appropriate coordination and implementation support systems related to climate investment and formulating a set of priority capacity-building and strengthening actions for coordinating organizations.

A comprehensive assessment should then be made of the capacity and readiness of the national financing system to access adaptation finance instruments and mechanisms. Countries may be in very different places in respect to these issues, but often they will be aiming to develop or implement a Sustainable Finance Roadmap for the financial sector. This ensures that adaptation finance is integrated into broader financial sector development planning and supports the implementation of green public financial management in the government sector to track adaptation investments and the ongoing costs of maintaining them. Depending on the current fiscal situation, including international and national borrowing headroom, and any IMF conditionalities, the financing mechanisms and instruments needed for the AFS should be identified. In some cases, this may involve a review of inter-governmental fiscal relations with respect to the resources needed for adaptation at subnational levels.

In parallel, data collection should commence across NDC/NAP sectors as a basis for the justification for climate finance, such as forest cover inventories for REDD, GHG profiles and vulnerability assessments for cities. AFS sector investment roadmaps should be prepared and updated to set out and cost priority investments and their implications for reduced vulnerability

101 UNDP (2021). Budgeting for Climate Change: A Guidance Note for Governments to Integrate Climate Change Into Budgeting.
102 ADB (2024). A Governance Framework for Climate-Relevant Public Investment Management.

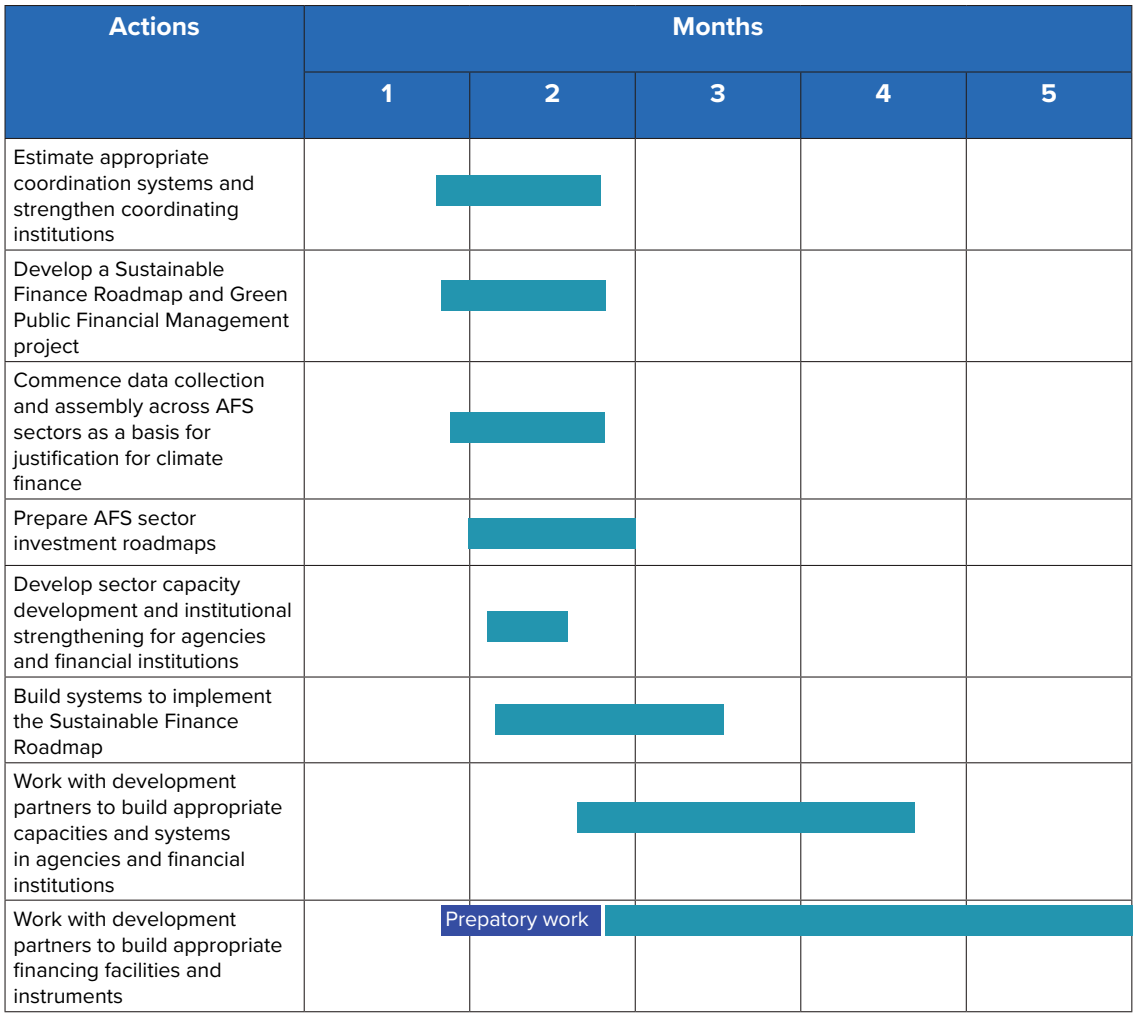
and increased resilience and, for dual-benefit projects, reductions in carbon emissions. The opportunities for attracting both public and private sector finance for each investment in each sector (linked to the business models discussed in chapter 3) should also be detailed.

Based on these roadmaps, a programme of capacity development, institutional strengthening and reforms should be designed to create a more conducive enabling environment for regulatory and implementing agencies, as well as financial institutions. Systems identified in the Sustainable Finance Roadmap and Green Public Finance Management plan, such as taxonomies, green labelling systems and regulations and MRV systems, should be developed and operationalized. Development partners should be engaged to support capacity development and institutional strengthening activities to build the appropriate capacities and systems.

Development partners should be engaged to build appropriate financing mechanisms and/or facilities and to develop instruments (green bonds and others) that will support the implementation of the Sustainable Finance Roadmap.

While it is challenging to provide a list of detailed actions within the AFS sectors due to the status of development plans within implementation agencies and the state of green finance systems, it is feasible to prioritize the broader elements of the AFS set out above in consultation with the coordination agencies. Ideally sectoral roadmaps and action plans should sequence investments in their own field, but in terms of broader actions, the sequencing is likely to follow that shown in figure 11.

Figure 11: Example timeline of key actions under the AFS



5.2.4 Financial systems and sector-specific action

A critical element in implementing the AFS is strengthening the supply side of the climate adaptation finance market and achieving more robust coordination in the climate finance area, including critical areas of reform impacting the enabling frameworks for maximizing the range of available financing options.

In addition to the need to develop a Sustainable Finance Roadmap and a green public financial management project, the AFS will provide an overview of potential financing sources, as well as suggest sources and modalities for specific sectors—for example, ESCOs for energy efficiency. In coordination with the NAP lead agency, the MOF and the central bank, the AFS should also suggest which development partners can provide the support to put these in place.

In many instances, owing to the different needs of investing agents, a range of financing institutions should play a lead role in AFS sectors. In particular, there is often a clear distinction between smaller-scale investments and those for larger projects. Smaller-scale and decentralized investments by households and SMEs may be best channelled through commercial banks and NBFIs, with measures to widen their scope and scale of operations. These modalities need to specifically cater to the needs of women and women-headed households, Indigenous peoples and other vulnerable groups. In contrast, large-scale, systemic projects are typically undertaken by government agencies and large-scale private sector enterprises.

These market segments sometimes cut across sectors and, thus, separate arrangements are not needed in each sector. In the agriculture sector, for example, key decentralized resilience investments—such as for rooftop solar or improved animal shelters—are typically made by households and SMEs, while large-scale investments, such as seed development, banking and dissemination and irrigation and processing facilities, are more likely to be undertaken by government agencies or large private PPP partners.

To ensure alignment, the AFS should set out clear, coordination actions. Table 4 provides a summary of these actions based on the previous phases.

Photo: UNDP REDD Programme

Table 4: AFS coordination and sector actions

Action area	Lead and support agencies	Sample recommendations
Strengthening coordination		
High-level coordination	NAP finance coordination agency, NAP focal, MOF, ministry of planning	Establish a coordinating mechanism under the national executive.
Secretariat	NAP finance	Build capacity to support CICC and line agencies with the data, costing, project development, and MRV needs and the capacity to coordinate outreach to public and private financing institutions.
Implementing agencies	NAP coordination agencies, key line agencies	Establish formal climate focal in all central and line agencies—with input to the establishment of agency investment priorities in the case of line agencies.
Sector-enabling frameworks		
• Agriculture	NAP coordination agencies, relevant line agencies	Develop Sector Investment Roadmap, including: • Priority adaptation investments by crop or animal, farming mode and region, project costings, potential for integration of RE and EE or other mitigation actions; • Regulatory reforms to foster efficient investment in agriculture/animal production and value chains and in infrastructure provision, including PPPs, and regulations relating to such activities as PES and enterprises in value chains; • Priorities for development assistance; • Capacity-building for implementing agencies. Undertake actions for regulatory reform and implementation of the Roadmap (outreach to producer groups and bilateral assistance) and outreach to potential investors in production and to IFIs for investment.
• Forestry	As above	Develop Sector Investment Roadmap, including: • Baseline forest quantity and quality (baseline for REDD+); • Priority adaptation investments by region, project costings, potential for integration of RE and other mitigation investments; • Potential for ecotourism; • Potential for PES application; • Regulatory reforms to foster efficient investment in forestry, value chains, infrastructure provision and value-added services, such as ecotourism using PPP structures, as a basis for PES mechanisms; • Priorities for development assistance; • Capacity-building for implementing agencies. Undertake baseline work and actions for regulatory reforms and for implementation of the Roadmap (outreach to community groups and bilateral assistance) and outreach to potential investors and to IFIs for investment.

Action area	Lead and support agencies	Sample recommendations
• Water	As above	Develop Sector Investment Roadmap, including: • Priority adaptation investments by key investment areas (urban water supplies, bulk water, wastewater treatment or recycling, agricultural water, flood control), project costings, potential for integration of RE or EE investments and other mitigation investments; • Regulatory reform for potential PPPs in low-carbon water resilience and wastewater processing; • Potential for PES mechanisms Undertake actions for regulatory reforms and implementation of the Roadmap (outreach to bilateral assistance) and outreach to potential investors and to IFIs for investment.
• Infrastructure adaptation – Energy – EE – Transport – Industrial processes and product use – Waste	As above	• Prepare sector investment roadmaps for climate-proofing • Undertake actions for regulatory reforms and implementation of roadmaps • Outreach to relevant bilateral agencies, private investors, finance agencies and IFIs

5.3 Capacity development actions

A critical issue for decision-makers is determining the institutional structure for coordinating climate investment implementation. Key questions include the extent to which the process should be embedded within government and the necessity to create new institutions. Because no one institution will be able to undertake all the activities required, and some will be entirely novel, a broad-based approach to building capacities across institutions is needed. Each country will start from a different place in terms of its existing institutions and will have a different coordination structure and consequent capacity development needs.

Whatever structure is chosen, it must deliver on the following functions:

- Coordination of policy, strategies and institutional bases for financial planning involving the ability to identify needs and priorities and recognize barriers; the capacity to formulate projects, programmes and sector-wide approaches for national needs; the ability to develop a project pipeline; and the capacity to identify policy mix and sources of financing, including the private sector. This project development capacity will include enhancing capacities to estimate the climate mitigation and adaptation benefits of proposed projects.
- Capacity to access finance, make applications, and blend and combine finance.
- The ability to deliver and implement, based on the need to be able to procure, implement and execute project, programme and sector-wide approaches using standard environmental and social guidelines.[103] It is necessary to build a local supply of expertise and skills and coordinate implementation.
- Financial management, audit and MRV competences. The need to monitor, verify and report from a database and administer or oversee performance-based payments will also be required.
- Capacity to manage stakeholder forums and engage civil society—particularly women's groups and other vulnerable groups—to ensure equitable access to, and benefits from, climate finance.

To function effectively as a coordination mechanism for a centralized process discussing climate change issues, prioritizing actions, accessing external funding and reporting, it will be necessary to convene regular dialogues that bring together different departments and other stakeholders. This role can be undertaken by a coordinating body acting under the mandate of the national executive. It is important to consider how this coordination process can be sustained over time, including changes in political administrations, since the AFS process is iterative and needs to be revisited periodically.

In order to develop quality proposals, the means for preparing technically sound project proposals needs to be available to line agencies and, where appropriate, private sector proponents. This expertise and/or resources to procure it, can rest in one or more bodies, including financial institutions.

103 For example, the UNDP Social and Environmental Standards Toolkit and IFC's Performance Standards on Environmental and Social Sustainability.

While climate change expertise (on adaptation, in particular) can certainly be used to strengthen government and community proposals for funding, another question is what group should act as a funnel for funding requests—whether an existing body that is probably performing the same role for mitigation projects or a new body, which may involve additional administrative complexity. To be able to do this, key coordinating agencies, such as the NAP focal point and the central bank, will need capacity and resources for the following actions:

- Expand outreach to implementing agencies, local governments and non-government stakeholders;
- Take a more proactive role in project coordination and integrated programme planning;
- Integrate advisory functions into NAP implementation;
- Strengthened technical capacity and the capacity for substantive "thought leadership";
- Improve systems for data collection for projects and financing from all involved agencies and financial institutions (such as through a common information technology platform) and better support climate information and knowledge management, as well as monitoring and evaluation (see box 8); and
- Build capacity, together with the MOF, to facilitate access to external climate finance to support the development of viable funding proposals from across government and the private sector.

Photo: UNDP Cambodia

Box 8: Adaptation knowledge platforms

As part of their adaptation planning processes, several countries are developing online knowledge portals with various functions. For example Viet Nam's portal focuses on the Climate Risk Index and an online monitoring and evaluation system, while Ecuador's portal emphasizes adaptation communication and awareness raising. With additional systems in place for data collection and dissemination, these platforms can also enhance transparency in climate and adaptation finance. South Africa's National Climate Change Information System, for instance, includes information on adaptation and mitigation action, including details of financial support.

Sources: UNDP, Viet Nam's Climate Risk Index; Government of Viet Nam, Department of Climate Change; UNDP, Readiness for the National Adaptation Plan Process in Ecuador; Republic of South Africa, National Climate Change Information System.

Table 5: Responsibilities for ensuring and coordinating information exchange

Function requirements	Coordinating agencies	Key inputs from
Thought leadership, information and knowledge management and learning Climate mitigation technologies and business models Climate data and analysis/risk assessment and use of models Project development support in estimating climate mitigation and adaptation benefits of proposed projects Climate finance best practices Outreach for stakeholder engagement and awareness raising	Adaptation Finance Coordination Agency (AFCA), NAP focal	National executive Educational institutions Meteorological agency National statistics agency Ministry of construction/works—to provide estimates of loss and damage Central bank, national banking associations, international banks, IFIs, NGOs
Integrated programme planning, project coordination and oversight and effective implementation Coordination across sector investment roadmaps Comprehensive tracking of adaptation investment flows by NAP sector Project formulation support for adaptation and dual-benefit projects Monitoring, reporting and verification systems for implementation Enforcement of regulations	AFCA, NAP focal MOF, ministry of planning/economy	Line agencies and local governments Central bank Public and private banks/NBFIs Community-based organizations or civil society Private sector associations
International climate change relations and accessing external resources	AFCA, NAP focal, MOF, ministry of planning/economy, ministry of foreign affairs	Development assistance agencies IFIs
Capacity-building for the above functions	NAP focal, central bank	Public service commission Educational institutions

An example of such an approach was fostered under UNDP's "Enhancing Research and Policy Linkages to Advance National Adaptation Planning in Guinea" project, designed to increase Guinea's adaptive capacity to cope with climate change impacts. The project established research to support informed decision-making and capture opportunities that arise both from public funding and the private sector. In addition to the main project implementing partner, the Ministry of Environment, Water and Forests, other project partners reflected the range of information and expertise needed for NAP implementation. These included the Ministry of Economy and Finance, the National Directorate of the Environment/current National Directorate of Pollution, Nuisance and Climate Change, sectoral Strategy and Development Offices, various research institutes, the Center for Observation, Monitoring and Environmental Information, the National Institute of Statistics, the Fund for the Environment and Natural Capital, the Bauxite Environment Network, Guinea-Ecology, civil society organizations and municipalities.[104]

5.4 Recommendations for development partner support

The AFS should include recommendations on how engagement with development partners can provide support in the following areas:

- **Coordination.** Establish a climate working group within the Development Partners Group to liaise with the AFCA and, as far as possible, develop mechanisms to reduce reporting costs to government.
- **Development of sector-enabling frameworks.** Support roadmap development and implementation, including establishing data baselines, conducting capacity assessments, implementing capacity development, supporting project development and structuring and financing investments.
- **Financial sector action.** Support the development or strengthening of a sustainable finance initiative or roadmap with an adaptation focus; implement a green public financial management project with adaptation tracking; assist the NAP focal and central bank in the development of a taxonomy, standards for taxonomy sectors and the institutionalization of these across the financial sector and with project sponsors, specifically government agencies; build an enabling framework for climate adaptation-friendly finance instruments in the capital market and a demand base thereof; support financial institutions and specific blended finance catalytic facilities in integrating with the above enabling framework and servicing the resultant pipeline of projects; and develop mechanisms to leverage private investment in adaptation projects.

The AFS should also nominate the agencies responsible for leading liaison with the development partners on these issues.

5.5 Monitoring, reporting and verification

5.5.1 Context

Transparency is a crucial element for the successful implementation of the Paris Agreement under the UNFCCC. The Enhanced Transparency Framework (ETF) for action and support, established under Article 13, requires parties (under Article 13.7) to provide information on their emission inventories as well as information necessary to track progress in implementing and achieving their NDCs. Where adaptation is included in NDCs, there is an established voluntary process for reporting progress, but not explicitly in relation to finance.

104 Global Support Programme. UNDP/UNEP Global Support Programmes.

Critical to achieving these commitments is the financial MRV ecosystem, an inter-related set of data tracking systems, preferably coordinated through a central node acting as the "one source of truth". MRV is important for the AFS because it supports transparency, strengthens coordination and helps track progress and performance (see box 9).

In addition to the ETF requirements, and potentially on a separate track, COP 26 requested information from the constituted bodies and UNFCCC programmes on activities relevant to the formulation and implementation of NAPs. This information is to be included in an annual NAP progress report submitted to the UNFCCC, which should be integrated into the MRV ecosystem.

Under the ETF, the modalities, procedures and guidelines for the ETF as contained in Decision 18/CMA.1 will supersede the current reporting arrangements, including biennial reports and biennial update reports, the international assessment and review and international consultation and analysis processes with biennial transparency reports. These reports and assessments will help identify key topics for reporting that are relevant to the AFS and thus for inclusion in this section.

The MRV systems will form the basis of compliance with the draft supplementary guidance for voluntary use by parties in communicating information in accordance with the possible elements of an adaptation communication (FCCC/SB/2022/5/Add.1).[105] The ETF Manual[106] is very general, leaving the details up to each country.

The Initiative for Climate Action Transparency has developed a Climate Finance Transparency Guide[107] that deals with both mitigation and adaptation finance. Countries can choose to adopt this methodology and include it in their reporting under the ETF. A full exposition of reporting frameworks is beyond the scope of this document.


Photo: UNDP Viet Nam

105 UNFCCC (2022). Report of the Adaptation Committee. Addendum.
106 UNFCCC. Reference Manual for the Enhanced Transparency Framework under the Paris Agreement.
107 Initiative for Climate Action Transparency (2024). Climate Finance Transparency Guide.

Box 9: Colombia's climate finance monitoring, reporting and verification system

Colombia's comprehensive monitoring, reporting and verification (MRV) framework tracks climate finance from public, private and international sources. MRV for climate finance is embedded within the broader MRV system under the National Climate Change System (Sistema Nacional de Cambio Climático—SISCLIMA).[108]

The objectives of MRV for climate finance are to:

- Compile and consolidate information on climate finance;
- Identify funding gaps and opportunities to encourage more efficient resource use and support decision-making processes for climate finance;
- Present trends in the development of climate finance;
- Facilitate access to information via a user-friendly digital platform; and
- Enable better understanding of the sources and uses of climate finance.

Data collection

For public climate finance at the national level, the system draws data from the general public budget and revenue system. For private climate finance at the national level, the system uses the Industrial Environmental Survey of the National Statistics Department, which regularly collects data from large companies in Colombia's major industrial sectors. For public climate finance at the international level, the system uses data from CÍCLOPE, a system that registers projects financed through international cooperation.

Data classification

Colombia developed a methodological guide, including a taxonomy for climate finance MRV, that specifies what qualifies as climate finance in the national context. The taxonomy specifies 249 climate finance activities within 12 sectors and 35 subsectors and establishes criteria for activities to be included in climate finance MRV. The taxonomy also classifies activities according to their impacts on mitigation, adaptation or both.

Source: Initiative for Climate Action Transparency (2024). Climate Finance Transparency Guide.

108 Pacific Alliance (2020). Experience Spotlight: Colombia. Implementing a Climate Finance System.

5.5.2 MRV in adaptation finance

For climate financing, three levels of monitoring and reporting are required:

- **Monitoring climate adaptation-linked public and private finance mobilized by sector and investment type** (such as coastal defences), along with associated performance metrics. The metrics selected will vary by the type of investment and financing source—for instance, revenue mobilized, amounts disbursed, number of people less vulnerable, damage avoided or kilometres of sea wall constructed.
- **Monitoring climate response and reporting by financed entities**, comprising the entities implementing the investments. A range of standards and guidelines are available,[109] and financial regulators should choose an appropriate one—likely as part of implementing a sustainable financing roadmap.
- **Monitoring and reporting by financial institutions of facilities participating in the financing**. Different approaches exist, but the use of attribution factors, which disaggregate the financing of aggregated instruments such as funds, according to different instruments is a sound practice. The Partnership for Carbon Accounting Financials[110] provides such a standard. For facilities established with IFI financing, projects financed will also need to be categorized and documented as one of three levels:[111] (i) those with additional costs due to adaptation to climate impacts; (ii) those with both adaptation and development goals; and (iii) those solely providing adaptation support.

Examples of indicators across these three levels are provided in table 6.

109 For example, the Climate Disclosure Board Standards.
110 Partnership for Carbon Accounting Financials. Shaping the Climate Action Journey for Financial Institutions.
111 See the Joint Methodology for Tracking Climate Change Adaptation Finance.

Photo: Cedric Jancloes/UNDP Cambodia

Table 6: Example indicator types for AFS MRV

Indicator type	Description	Direct financing achieved	Investments of financed entities	IFI financing
Output	Results of activities measured by the number of tangible, immediate products	Government revenue mobilized/ for adaptation investment	Total value of adaptation/ resilience investments e.g. coastal defences built	Green financial instruments used % for adaptation
Process	Indicators that demonstrate the progress of the strategy between initiation and completion	% of target investment achieved	% of total sector constructed	Green instruments as % of lending/ financing portfolio
Outcome	Achievement of specific pre-defined benefits/objectives	Number of beneficiaries/ damage avoided	Resilience investments made as % of total investment	% of sector resilience investments needed that are financed
Impact	Larger developmental changes, transformational changes, long-term impacts	Reduced vulnerability benefiting economic development	Contribution to progress towards sector adaptation targets	Contribution to enhanced economic development

Indicators for financing can be developed for three different approaches to monitoring finance: (i) financing achieved in a particular sector investment type; (ii) actual financing received by investing entities, such as SOEs or private enterprises; and (iii) financing provided by financial institutions. These indicators can be categorized as output, process, outcome or impact, with examples shown in Table 6. The AFS should specify the approach to indicator selection and data collection, and outline the steps needed to implement it.

5.5.3 Approach to putting MRV systems in place

The approach suggested by Subproject 3 of NDC Advance[112] is embodied in an MRV improvement plan, which serves as a central framework for reviewing existing activities and prioritizing future MRV development so it can better serve stakeholders and inform decision-making. The improvement plan used in the NDC Advance project is not specific to finance, but the steps to establish such an MRV system for finance will need to address the key actions identified and include all aspects of the MRV system, including data gathering, analysis, reporting and engagement activities. These systems need to be structured to maximize opportunities for learning from experience and for informing the decision-making process.

The actions required fall under five categories:

- Improving governance;
- Expanding expertise;
- Defining data flows;
- Building systems and tools; and
- Increasing stakeholder engagement.

Further elaboration on these categories is beyond the scope of this document, as they are highly dependent on the national context, with no operational use in a generalized context. The AFS should therefore identify key actions in relation to the needs in each of these categories given the prevailing circumstances in the national financial system.

Key messages

Phase 4 involves establishing or mandating an AFCA to implement the AFS. It also requires consolidating the priority projects identified in Phase 2 into a multi-sector investment plan, which should be coordinated with any parallel plans for NDC implementation and other national investment plans. Within the context of an assessment of the fiscal space available for government capital budgets (see annex 6), as well as PPP, IFI and other development assistance counterpart funding requirements and the financing potential of government agencies, DCAs, IFIs and the private sector, the AFS should prioritize projects in an implementation plan and match the potential financing sources identified in Phase 3 to investments by sector (see annex 6)

It is also essential to map ongoing gaps and nominate strategies to fill those gaps, utilizing the unused or underused potential identified in Phase 3. This will involve changes to the enabling frameworks in specific sectors and in the financial sector itself, as well as determining the capacity development priorities. The required steps for project preparation should be clearly defined.

While an AFS should ideally cover all NAP sectors, these measures can also be undertaken for a specific sector or number of sectors, provided that budgets can be ringfenced their use. In addition the AFS should establish an MRV system to monitor and evaluate progress in financing, which can serve as a strong basis for negotiations with external assistance agencies, such as DCAs and IFIs.

As part of the AFS process, ongoing mechanisms should be established for liaison with private sector financial institutions and DCAs/IFIs. Engagement with the latter should focus on clear priorities for capacity development and project development.

112 ADB (2024). Supporting the Implementation of ADB's Climate Change Operational Framework 2017–2030 – Establishing Mechanisms to Measure, Monitor, and Report on Commitments Made Under the Paris Agreement (Subproject 3). Draft Study on Tajikistan: Monitoring, Reporting.

Conclusion

The AFS process plays a central role in charting a viable way forward for the implementation of priority adaptation investments. It should be an iterative process that evolves as better data, new technologies and new financing sources emerge. It should not be held hostage to a lack of high-quality data. Evidence-based expert estimates and short, focused studies are sufficient to provide a basis for moving forward in the absence of complete information or highly certain modelling.

The networks and working groups established through the preparation process can facilitate effective investment across many sectors in the future. Furthermore, the AFS should serve as a vehicle for developing national capital markets and expanding the scope and scale of financing and the range of financing instruments offered.

Photo: Andrés Estefan / UNDP Colombia

Glossary

Adaptation (investment)

Actions that help reduce vulnerability to the current or expected impacts of climate change, such as weather extremes and disasters, sea-level rise, biodiversity loss or food and water insecurity.

Adaptation finance (typology under MDB common definitions)

Type 1 is financing for climate-proofing projects. Type 2 is financing for adaptation-focused projects. Type 3 is financing of other important activities that contribute to reducing the underlying causes of vulnerability to climate change or removing barriers to adaptation.

Aggregation

Combining a number of projects into one package for the purpose of accessing lower cost financing.

Availability payment

A revenue stream derived from other sources, such as taxation used in public–private partnership (PPP) arrangements to bridge the gap between commercial revenues, such as fees and charges and the expenditures. It refers to a payment to the PPP entity to ensure that the required service or infrastructure will be "available" for use by the designated users at the agreed levels of provision/ performance.

Balance sheet

The net of the liabilities (obligations to pay others) and assets (the value of physical and intellectual property, financial assets and obligations by others to pay). The difference is an enterprise's "equity" and a household's "net wealth".

Bonds/Green bonds

Bonds are financial debt securities issued by a government or corporate entity. They enable the issuer to borrow an amount of money on the promise to pay back the principal at a given time (maturity) and to pay a stream of payments (coupon payments) until that time.

Green bonds are bonds issued by governments or corporations that promise to use the proceeds of the bonds for specified climate- or environment-related purposes. To prove that this is the case, the issuer commits to a monitoring, reporting and verification regime.

Business as usual (BAU)

A BAU scenario for climate change is a model that assumes no additional action is taken to reduce greenhouse gas emissions. It is used to predict the future effects of climate change on the environment and society.

Business model

A plan that sets out how the initial capital expenditure and operating expenditure will be paid over the lifetime of an investment—that is, what revenues will be available to pay for expenditures and when they will materialize.

Revenues may not be derived from commercial sources, such as fees and charges, but may be derived from subsidies and transfers, such as from taxation.

Capital expenditure (CAPEX)

The expenditure needed to initially build or put in place a capital asset, such as a bridge or computer system.

Capital markets

Part of the financial system that provides financing for long-term investments (requiring financing terms of over one year) by raising funds (capital) through the issuing of shares, bonds and other long-term instruments (including loans).

Carbon markets and carbon credits

Carbon markets are trading schemes that create financial incentives for activities that reduce or remove greenhouse gas emissions. In these schemes, emissions are quantified into carbon credits that can be bought and sold. One tradable carbon credit equals 1 tonne of carbon dioxide, or the equivalent amount of a different greenhouse gas reduced, sequestered or avoided.

Carbon credits can be bought by countries as part of their Nationally Determined Contribution strategy, by corporations with sustainability targets and by private individuals that want to compensate for their carbon footprint.

The supply of carbon credits comes from private entities or governments that develop programmes to reduce or remove emissions. These programmes are certified by a third party and registered under a carbon market standard.

Climate finance

Financial resources and instruments that are used to support action on climate change. Climate finance is critical to addressing climate change because of the large-scale investments that are needed to transition to a low-carbon global economy and to help societies build resilience and adapt to the impacts of climate change.

Climate finance can come from different sources, public or private, national or international, bilateral or multilateral. It can employ different instruments, such as grants and donations, green bonds, debt swaps, guarantees and concessional loans. It can also be used for different activities, including mitigation, adaptation and resilience-building.

Climate Risk and Vulnerability Assessment (CRVA)

A CRVA evaluates the potential impacts of climate change on a community or infrastructure project. It also identifies ways to improve climate resilience.

Community service obligation (CSO)

A payment by the government to reduce the user charge to a given category of user below that agreed as a base level charge accruing to the operating entity (generally of a PPP), for example providing school children with free transport on school days. See also public service obligation.

Concession

An agreement between a government and a private service provider to deliver a given service for a period of time (the concession period). The agreement defines the duties of the parties to the agreement, for example land acquisition or the payment of an availability payment by the government and the delivery of the service to a given level of performance by the private parties. It also defines the rights and remedies of each party, for example the rights of “step in” by the government if performance goals are not achieved and the right of the private sector to collect user charges and adjust these charges according to an agreed process.

Concessional financing

Financing provided at a cost below "market" rate, meaning the cost of financing provided by existing financial institutions sourcing their loanable funds from competitive markets.

Corporate social responsibility (CSR) financing

CSR financing is the contribution to some form of philanthropic endeavour or community purpose undertaken by a company or companies in concert.

Cost–benefit analysis (CBA)

A method of assessment used to indicate the viability of an investment that compares the costs of an investment (CAPEX and OPEX—sometimes adjusted to reflect unmonetized issues associated with the investment, such as carbon emissions) in relation to the benefits of the investment (which may not be the revenues derived from the investment—benefits may, for example, be savings to the community derived from a reduction in disease as a consequence of the investment). CBA also uses "discounting" of costs and benefits to take into account the diminishing value of future costs and returns over time.

Counterpart financing

A financing contribution by the recipient of the (usually concessional) financing, required by development financing institutions as a condition of providing the balance of the (usually CAPEX) finance.

Debt financing

Financing provided by loans or by bonds.

Demand side (of the adaptation financing market)

Markets must have both buyers and sellers. Various buyers (see investing entities) "buy" the finance from financial institutions that supply finance. Thus, the demand side of the adaptation finance market is constituted by the range of investing entities that oversee the provision of an adaptation investment.

Development finance institution (DFI)

An institution that finances a project—generally larger infrastructure or social development projects—that fosters the economic and social development of a nation or other community as a whole. DFIs may be international, such as international financial institutions, or domestic, such as national development banks.

Development partner

Development partners include DFIs but also multilateral and bilateral development assistance agencies that generally do not provide investment finance but mostly provide funds for technical assistance for various types of capacity-building and institutional strengthening.

Direct access (to a financing institution)

Direct access entities are those that may, without approval by higher authorities, apply for finance to a financial institution. Restrictions on such access may come from higher authorities or from the financial institution itself (for example the Green Climate Fund maintains a registry of accredited direct access entities—other entities may only apply for financing through national or international accredited entities).

Domestic financing

Financing sourced through the capital markets of the country in which the investment is being made.

Dual-benefit investment

An investment that has both adaptation and mitigation benefits.

Enabling framework

A set of laws, regulations, systems and processes that determine whether and how an investment is planned, financed and implemented.

Energy-saving company (ESCO)

A company that undertakes to invest in an energy-saving technology in return for a share of the savings in energy costs that will accrue from the investment.

Enhanced Transparency Framework (ETF)

A set of guidelines that countries use to report on their progress towards the goals of the Paris Agreement. The ETF is a key part of the Paris Agreement and is designed to promote trust and effective implementation.

Equity finance

Financing provided by purchasing shares of a corporation, for example in a special purpose vehicle of a PPP. It is also used to denote the ownership interest in a company. Equity is measured for accounting purposes by subtracting liabilities (including debt) from the value of the assets owned.

Financial mechanism

Some form of financial arrangement established by a government or financial institution that provides financing for a specific purpose, for example a financing window at a national development bank focused on providing concessional loans for community adaptation investments.

Financing instrument

The means by which a financing institution provides or facilitates financing to an investing entity, such as through loans, bonds or guarantees.

Fiscal capacity

A government's ability to raise revenue from various mechanisms, such as taxes and user charges.

Fiscal space

For a government, the difference between total revenue projected and projected future claims on that revenue (expenditure) from the sum of ongoing OPEX, new and programmed CAPEX and debt service.

Foreign direct investment (FDI)

FDI occurs when an individual or entity based outside a country establishes a new business or acquires an interest in a national enterprise or asset and so has some control over its operations. Common examples include the establishment of branches of multinational companies or joint ventures between national enterprises and foreign companies.

Foreign exchange (FX) risk

FX risk occurs when an entity raises capital in one currency to invest but receives returns in another currency. This risk can apply to both demand and supply sides of the market. Investing entities borrowing in foreign currency can be adversely impacted if they must repay in the foreign currency but the value of the domestic currency in which they are receiving returns on the investment depreciates. Conversely, financial institutions raising capital in one currency and lending in another can be adversely impacted if the currency in which they are receiving repayments depreciates. These risks can be offset by various forms of "hedging", but this adds to the cost of finance.

Funds (equity/debt)

Financial entities established in the capital markets to invest in public or private companies, supplying equity or debt. There are many forms of such funds. Some invest only in their domestic market while others invest in other countries as well.

Greenhouse gas (GHG)

Gases that trap heat from the sun in our planet's atmosphere, keeping it warm. Since the industrial era began, human activities have led to the release of dangerous levels of GHGs, causing global warming and climate change.

The main GHGs released by human activities are carbon dioxide, methane, nitrous oxide and fluorinated gases used for cooling and refrigeration. Carbon dioxide is the primary GHG resulting from human activities, particularly from burning fossil fuels, deforestation and changing the way land is used.

Guarantee

A contractual undertaking where one party assumes responsibility for the debt, or performance obligations, of another party should that other party default on performance in some way. Guarantees can apply to many different types of transactions. They can apply to the returns expected by financial institutions, to payments promised by governments and corporations or to levels of service performance, etc. They can be useful in reducing the cost of financing by reducing the risk to the financing institution(s).

Hard currency

A currency that is generally issued by developed countries, globally traded and seen as politically and economically stable.

Heat island effect

The heat island effect occurs where an area—generally a city or urban area—has a higher average temperature than the surrounding areas. It is caused by a higher predominance of dark surfaces like roads, roofs and parking lots that absorb heat from the sun; the use of concrete, which also heats up quickly and retains heat; and limited greenery, and therefore fewer trees and other plants to provide shade and cool the air.

Hedging

Use of a variety of financial instruments to offset a financial risk—often used in respect to FX risk. It is a risk management strategy that involves taking an opposite position in a related asset to offset losses in an investment. It is a way to reduce the risk of loss from price fluctuations

Integrated National Financing Framework (INFF)

A tool that helps countries finance their climate and sustainable development goals and priorities. It outlines how a country will finance and implement its national strategies, helps identify and manage risks and provides a basis for encouraging increased investment. It provides assessment and diagnostics on the efficiency and effectiveness of existing fiscal arrangements; a financing strategy to guide the design of financing policies and reforms that can mobilize additional financing in line with national priorities and all dimensions of sustainability; systems for monitoring and review to track progress and facilitate transparency, accountability and learning; and recommendations for improved fiscal governance and coordination.

International financial institutions (IFIs)

International public finance institutions, either multilateral development banks or bilateral development banks (sponsored by a government, such as KfW, sponsored by Germany), that finance projects—generally larger infrastructure or social development projects—which foster the economic and social development of a nation or other community as a whole.

International financing

Financing sourced through the capital markets of countries other than that in which the investment is being made.

Investible surplus

Within the fiscal space available to the government, the level of resources that can be dedicated either to fund CAPEX directly, to provide payments for new service investments or to service debt.

Investing entities

National, state/provincial and local governments; national, state/provincial and local sector agencies and other entities (for example state owned enterprises and utilities); and private corporations investing in resilience.

Land value capture (LVC)

Capture of part of the value of land added by public investment, for example the cost of a drainage system that prevents flooding in a certain area can be recouped by a surcharge levied on the owners of properties in the area.

Loss and damage

There is no agreed definition of "loss and damage" in international climate negotiations. However, the term can refer to the unavoidable impacts of climate change that occur despite, or in the absence of, mitigation and adaptation. Importantly, it highlights that there are limits to what adaptation can accomplish; when tipping point thresholds are crossed, climate change impacts can become unavoidable.

Loss and damage can refer to both economic and non-economic losses. Economic loss and damage can include aspects like the costs of rebuilding infrastructure that has repeatedly been damaged due to cyclones or floods, or the loss of coastline land (and homes and businesses) due to sea-level rise and coastal erosion.

Non-economic loss and damage include negative impacts that cannot be easily assigned a monetary value. This can include aspects such as trauma from experiencing a climate-related disaster, loss of life, the displacement of communities, loss of history and culture or loss of biodiversity.

Microfinance institution

An institution that offers very small, small and sometimes medium-size loans that are structured so that lower-income communities and households can have access to finance for the investments they need to make.

Mitigation (investment)

Any investment made by governments, businesses, or people to reduce or prevent GHG emissions or to enhance carbon sinks that remove these gases from the atmosphere.

Reducing or preventing greenhouse gas emissions can be achieved by transitioning to renewable energy sources like wind and solar, using energy more efficiently, adopting low-carbon or carbon-free transportation modalities, promoting sustainable agriculture and land use and changing production and consumption models and diet behaviours. Enhancing carbon sinks can be achieved by restoring forests, wetlands and marshlands, maintaining soil health and protecting terrestrial and marine ecosystems.

Monetization

Making explicit in money terms the value of previously unpriced goods and services, for example the value of the maintenance of forests for preserving water quality and availability.

Monitoring, reporting and verification (MRV)

As green financial instruments derive both their impact and, often, their reduced pricing on the achievement of specific climate impacts warranted by a project proponent in order to access such financing, it is necessary for the proponent to have in places systems to monitor promised impacts, to report these impacts to financiers and have some means of verifying (perhaps through the engagement of third party verifiers) that the reported impacts have actually happened.

Multilateral development bank (MDB)

An international public bank focusing on financing with capital subscribed by member governments.

Multisectoral investment

Many adaptation investments require the financing of a set of related investments across a number of sectors. For example, a coastal protection project may require investments by a public works agency to build seaward defences, by a transport agency to make access resilient to climate impacts and by a local government to build new and upgraded drainage and private sector developers to finance appropriate urban development (housing/industrial estates) in the area protected.

National Adaptation Plan (NAP)

NAPs help countries plan and implement actions to reduce vulnerability to the impacts of climate change and strengthen adaptive capacity and resilience. NAPs link to Nationally Determined Contributions and other national and sectoral policies and programmes.

National development bank (NDB)

A national financial institution that focuses on financing projects—generally larger infrastructure or social development projects—that foster the economic and social development of a nation or other community as a whole.

Nationally Determined Contribution (NDC)

Climate pledges and action plans that each country is required to develop in line with the Paris Agreement goal of limiting global warming to 1.5° C. NDCs represent short- to medium-term plans that are updated every five years with higher climate ambitions.

NDCs outline the mitigation and adaptation priorities a country will pursue to reduce GHG emissions, build resilience and adapt to climate change, as well as financing strategies and monitoring and verification approaches. In 2023, the first in a series of global “stock takes” concluded for assessing progress on the implementation of NDCs and Paris Agreement goals.

Non bank financial institution (NBFI)

Financial institutions offering consumer and other credit (loans)—usually small and medium-size credits—that do not take deposits like a bank but that fund themselves by raising capital on the capital markets.

Operational expenditure (OPEX)

The expenditure needed to operate and maintain a capital asset so that it delivers an agreed service at an agreed level of performance, for example the maintenance of a bridge structure and energy for lighting a roadway.

Original equipment manufacturer (OEM) credit

The manufacturer of a component of an infrastructure project, for example the rolling stock of a metro project, may be able to source lower-cost finance either directly or through the agencies of its home government.

Payment for ecosystem services (PES)

A market-based mechanism that rewards people or communities for their actions that improve the environment. PES programmes can involve direct transactions between buyers and sellers, or indirect payments from beneficiaries to providers. Such systems involve incentives to encourage people to change their behaviour; payments that can be subsidies or direct payments to the provider of the service; and intermediaries that help design payment mechanisms, collect data and facilitate negotiations.

Programmatic approach

A programmatic planning and pipelining approach that is recommended for use by sectoral agencies planning and implementing adaptation-related investments, both relating to their own investments and to coordinated investments with other agencies. It avoids a project-by-project consideration of investments but builds a pipeline of related investments, such as a coordinated approach to investments in flood control under increased climate variability, so as to achieve synergies among projects and potential cost savings.

Public financial management (PFM)

PFM is the process of managing a government's resources, including how they are collected, spent and accounted for. It is a key part of government administration and is essential for providing quality public services. It includes the budgeting process—creating and executing a budget; revenue collection through taxation, fees and borrowing; expenditure management; asset and liability management; accounting and reporting; and audit practices to effectively review a government's financial information for accuracy.

Public investment management (PIM)

The process by which governments manage their spending on physical assets—such as roads, schools and hospitals—and on other assets, such as human capital investments in education and health. It involves selecting efficient and effective projects to achieve government priorities and meet the needs of the public; constructing projects on time and to required standards; maintaining projects over time; integrating these projects into the budget; allocating resources to the most productive sectors; and improving efficiency, ensuring that projects are delivered in a cost-efficient manner.

Public–private partnership (PPP)

PPPs come in a wide range of configurations regarding how public and private equity and debt financing is arranged. A typical arrangement will see the establishment of a corporate entity to implement the project into which private sector investment and financing can flow. This can take many forms but is often a joint venture company or a special purpose vehicle, or in the case of energy efficiency investments, an ESCO. Implementing PPPs often involves special vetting processes to be established, which include a value for money assessment.

Public service obligation

The payment by a government to reduce the user charge to a given category of user below that agreed as a base-level charge accruing to the operating entity (generally of a PPP), for example providing school children with free transport on school days (see also community service obligation).

Public works

Investments in a broad range of infrastructure. Sectors that fall within this definition vary among countries but potentially include roads, drainage, flood control, transport and even housing.

REDD+

REDD stands for “reducing emissions from deforestation and forest degradation”. The “+” signifies the role of conservation, sustainable management of forests and enhancement of forest carbon stocks.

Forest conservation and restoration can provide more than a quarter of the GHG emissions reductions needed to avoid the worst impacts of climate change. REDD+ is a framework agreed by countries in international climate negotiations that aims to curb climate change by reducing deforestation and forest degradation and sustainably managing and conserving forests in developing countries.

Resilience

Climate resilience is the capacity of a community or environment to anticipate and manage climate impacts, minimize their damage and recover and transform as needed after the initial shock.

To best safeguard societal wellbeing, economic activity and the environment, people, communities and governments need to be equipped to deal with the unavoidable impacts of climate change. This can be done by training people to obtain new skills and diversify the sources of their household income, building more robust disaster response and recovery capacities, enhancing climate information and early warning systems and working on long-term planning, among others.

Risk mitigation (in finance)

Financial risk mitigation is a process that helps organizations identify and reduce the impact of potential financial risks. It helps prepare for and minimize the effects of threats to their revenues and expenditures. The process involves: identifying potential financial risks; evaluating the impact of those risks; and implementing strategies to reduce or eliminate the risks. Some key strategies are risk avoidance—avoiding actions that could lead to unnecessary risk; risk reduction—reducing the likelihood of a risk occurring or the severity of its consequences; and risk transfer—shifting potential risks to third parties through contractual agreements, guarantees, insurance policies or outsourcing. The mechanisms of risk transfer may well be part of an Adaptation Finance Strategy.

Sector investment roadmap

For any given adaptation-related sector, a medium-term set of investments should be identified and prioritized. The sector investment roadmap documents this pipeline. The sector plan should also examine options for financing of the projects it contains.

Securities agency/financial regulator

The securities agency is distinct from the central bank (which typically regulates deposit-taking institutions) and is the agency (or agencies) in charge of regulating the issuance of securities, such as bonds and shares, and the establishment and operation of institutions that deal in such securities. In particular, these agencies regulate the stock exchange. They should be involved in the formulation and implementation of an Adaptation Finance Strategy.

Special purpose vehicle (SPV)

SPVs are often used as the entity for the implementation of a PPP. They have the potential for almost the full range of financing options—debt, equity and user charges. As a corporate entity, they have the ability to enter into contractual arrangements with other parties, such as governments, suppliers and community organizations.

State-owned enterprise (SOE)

A corporation that is fully or majority government-owned. Many SOEs are not able to issue equity, but this is not universal—as long as the government in question retains 51 percent of the equity, they are "state-owned". SOEs are formed by governments at all levels because of their flexibility in relation to their operation in some dimension—whether it be geographic coverage (as with water districts covering several smaller cities or solid waste companies covering a metropolitan area comprised of many local governments), capacity to attract and retain managers by avoiding public service renumeration constraints, or flexibility in financing structures (for example, their ability to enter into SPVs).

Stock exchange

The market where shares in companies are bought and sold. Bonds and participation in various types of funds may also be traded within the exchange or adjacent entities.

Subordinated debt

Debt owed to an unsecured creditor that, in the event of a liquidation of the company, can only be paid after the claims of secured creditors have been met. Subordinated debt ranks above equity in the event of liquidation. The presence of such debt in the financing structure of a project may reduce the perceived risk of the project being considered lower by secured creditors and result in lower financing costs.

Sub-sovereign entity

Any entity that is not intrinsically guaranteed by the national government—state/provincial governments and their agencies and SOEs, local governments and their agencies and SOEs and private sector corporations. These entities can sometimes request national government (sovereign) guarantees.

Supply chain

The logistics system and intermediate processing facilities that convert raw materials into finished products and distribute them to end users—consumers, governments and enterprises. When considering an adaptation investment, such as improving the resilience of dairy pastureland, it may be necessary to consider and potentially invest in other elements of the supply chain, such as dairy product manufacturing.

Supply side (of the adaptation financing market)

Markets must have both buyers and sellers. Buyers of different types (see investing entities) "buy" the finance from financial institutions that supply finance. Thus, the supply side of the adaptation finance market is constituted by the range of financial institutions (such as banks and NBFIs) that provide financing for adaptation investment and their regulatory agencies.

Sustainable finance framework/roadmap

A sustainable finance framework is a plan to strengthen the institutions, mechanisms and instruments of the financial sector to more effectively and efficiently finance green investments and to upscale such investments.

Taxonomy (green, climate and adaptation)

A taxonomy defines qualifying investments for a given financing objective, for example climate projects in general, adaptation projects in particular or projects qualifying under the implementation of the Sustainable Development Goals.

Transaction costs (financing)

Costs incurred as part of the process of obtaining finance that are additional to the actual cost of finance (i.e. generally the interest paid)—for example, the registration, legal, rating, printing, underwriting, brokerage and clearance fees, and the MRV costs of a green bond.

Value for money

Definitions of "value for money" vary. The UK Treasury, for example, defines the concept as "the optimum combination of whole-of-life costs and quality (or fitness for purpose) of the good or service to meet the user's requirements". Broadly speaking, a PPP may provide value for money compared to traditional procurement models if the advantages of risk transfer combined with private sector incentives, experience and innovation—in improved service delivery or efficiencies over the project lifetime—outweigh the increased costs of contracting and financing. Detailed guidelines on value for money analysis are readily accessible.[113]

Viability Gap Funding

Viability Gap Funding typically applies to projects that generate revenue in their operation but not at a level sufficient to yield a viable return. In such cases, if the project is eligible under the rules of the financing mechanism, the gap between the expected and viable revenue streams is covered by grant or concessional financing from a Viability Gap Funding scheme.

113 Martin, H.M. (2013). Value for Money Analysis, Practices and Challenges: How Governments Choose When to Use PPP to Deliver Public Infrastructure and Services. World Bank.

Annex 1.
Context of the Guideline: A review of other similar guides, strategies and approaches

A.1.1 The NDC Partnership Investment Planning and Mobilization Framework

The *Adaptation Finance Strategy Guideline* is designed to be used as a complement to the Climate Investment Planning and Mobilisation Framework[114] of the NDC Partnership (NDCP). The Guideline and framework provide a generic format for the development of NDC (including adaptation) investment and take a step-by-step approach to identifying investment needs, assessing financing needs and sources and formulating a finance strategy to be used by coordinating agencies incorporating sectoral inputs based on the frameworks provided.[115] The adaptation focus is currently being strengthened by the production of a dedicated supplement.

The Guideline seeks to focus on the demand (investing) side of the financing market, on providing business models for agencies and the private sector investing in adaptation, and on the supply (financing) side on providing public, private and blended-finance models for such investments using both aggregating models and sector-specific models and instruments. It aims to be as operational and practical as possible, using country examples in order to be accessible to managers of implementing agencies.

The NDCP also produces the NDC 3.0 Navigator tool,[116] an interactive resource for those working on NDC 3.0 updates in countries. It helps them identify opportunities through different routes to raise their ambitions. One such route focuses on unlocking finance, providing useful inputs for the AFS process.

Photo: Leandra Flor/UNDP Pacific

114 The framework, produced with GCF, is more general and provides guiding approaches, while the Guideline provides a more structured set of steps, but the two are consistent. Both will be referenced in the present Guideline for context.

115 NDC Partnership (2024). Climate Investment Planning and Mobilization Framework.

116 NDC 3.0 Navigator. Explore Routes to Ambitious and Implementable NDCs.

A.1.2 Other adaptation finance initiatives

The OECD launched the Climate Adaptation Investment Framework at COP 29.[117] The framework gives a high-level overview of the key building blocks of the enabling framework needed to unlock adaptation investment. It aims to identify barriers to public and private investment in adaptation; identify the core policies and measures needed to implement a strategic approach to unlocking investment in adaptation; facilitate complementary initiatives, such as private sector-led disclosure; and support dialogue with countries and experts on good practices for scaling-up investment in climate change adaptation. The key building blocks of the framework are strategic planning and policy coherence, regulatory alignment, insurance and risk transfer, public finance and investment, sustainable finance and support and incentives for private investment. The AFS addresses all of the OECD building blocks insofar as they pertain to formulating a strategy for finance mobilization in the medium term. Forthcoming is a compendium of good practices on investment in climate adaptation, showing examples of projects and processes with clear evidence of success.

There are two other extant guides specifically related to general adaptation finance, produced by the International Institute for Sustainable Development (IISD).[118, 119] While very useful, the Guiding Principles document, as its title suggests, is quite high level. The approach it sets out is generally adopted under the present Guideline, but our objective is to be more implementation-oriented in general and sector-focused in particular. The earlier Guidance Note is more detailed but does not address sectoral issues in a structured way. IISD is also documenting examples of the use of non-traditional sources and instruments, which will be useful additions to those cited in the AFS.

For the private sector, the Guide for Adaptation and Resilience Finance by Standard Chartered, KPMG and the United Nations Office for Disaster Risk Reduction (UNDRR),[120] sets out a list of investable activities and financing instruments for the private sector, building on the work by the Climate Bonds Initiative and the UNDRR White Paper on a Taxonomy for Adaptation and Resilience Finance.[121]

Another group of documents addresses issues specific to adaptation finance. These mostly focus on the enabling environment for financing, as well as mechanisms (such as blended finance) and de-risking approaches that help catalyse the upscaling of adaptation finance.[122, 123, 124] Issues relating to the enabling environment and potential financing mechanisms are addressed in the Guideline in some detail in relation to each sector and both the supply and demand sides of the market.

There is also a range of specifically urban-focused documents relating to adaptation finance.[125, 126, 127] These are important as they focus on the issues faced by subnational entities, which will undertake a large proportion of adaptation investments. These issues are reflected in particular in the demand-side section of the Guideline relating to implementing entities.

117 OECD (2024). Climate Adaptation Investment Framework.

118 IISD (2023). Guiding Principles for the Preparation of Financing Strategies for Climate Change Adaptation in Developing Countries.

119 NAP Global Network (2017). Financing National Adaptation Plan (NAP) Processes: Contributing to the Achievement of Nationally Determined Contribution (NDC) Adaptation Goals: Guidance Note.

120 Standard Chartered, KPMG and the United Nations Office for Disaster Risk Reduction (UNDRR) (2024). Guide for Adaptation and Resilience Finance.

121 UNDRR (2023). UNDRR and Climate Bonds Begin an Ambitious Journey into Climate Resilience Finance.

122 UNEP (2019). Driving Finance Today for the Climate Resilient Society of Tomorrow.

123 One Planet Lab (2021). Blended Finance for Scaling Up Climate and Nature Investment.

124 World Bank Group and the Global Facility for Disaster Reduction and Recovery (GFDRR) (2023). Enabling Private Investment in Climate Adaptation & Resilience: Current Status, Barriers to Investment and Blueprint for Action. World Bank.

125 CCFLA (2022). How to Increase Financing for Urban Climate Adaptation and Resilience: 7 Key Actions for National Governments to Take.

126 Power, K., et al. (2018). Adaptation Actions in Cities: What Works? AECOM and Sniffer.

127 European Environment Agency (2017). Financing Urban Adaptation to Climate Change. EEA Report No 2/2017.

There is also a need to incorporate learnings from other ongoing activities related to climate investment finance. ADB's NDC Advance project[128, 129, 130] prepares Climate Finance Landscapes and Plans for its developing member countries, outlining financing options for NDC investments. In all cases, these documents address adaptation finance issues. The approach taken in these studies is focused on what IFIs and other development partners can do to support governments in climate financing, broadly in line with the NDCP methodology. In addition, the NDC Advance approach integrates financing as a subproject, with resources for technical assessment of investment needs on the one hand and monitoring, reporting and verification (MRV) mechanisms on the other. This linkage is also referenced in the present Guideline. The NDCP has also published an adaptation financing supplement to the CIPMF.[131] Progress on this initiative has been monitored and incorporated into the Guideline as appropriate.

The World Bank and International Public Sector Accounting Standards Board's forthcoming sustainability reporting standards should be incorporated into AFS implementation. The NAP Global Network has also produced documentation[132] offering a clear understanding of how to fund a climate change adaptation investment plan. This includes sources of finance and types of financial instruments that could be considered in adaptation investment planning processes; strategies for increasing domestic resource mobilization as part of adaptation investment planning through international sources of finance and engaging the private sector; financial instruments, including innovative options that countries can use to fund priority adaptation investment plans; and approaches for integrating gender equality and social inclusion into the adaptation investment planning process. The network has also developed a useful NAP costing tool[133] to provide an accurate cost estimate of adaptation investments. This Excel-based tool has been piloted in Albania, Fiji and Pakistan.

Further, parallel UNDP initiatives, such as the Financing Strategies for Climate Change Adaptation work, can be incorporated into the approach. In particular, reference may be made to UNDP's Biodiversity Finance Plans,[134] currently being prepared in 132 countries, as well as the Integrated National Financing Framework (INFF)[135] and Investment and Financial Flows (IFF) methodology.[136]

128 ADB (2019). Regional Technical Assistance on Supporting Ambitious Climate Action Through Implementation of Developing Member Countries' Nationally Determined Contributions (Subproject 1).

129 ADB (2023). Regional Technical Assistance on Enhancing Financial Mechanisms to Develop Climate Actions of Developing Member (Subproject 2).

130 ADB (2025). Regional Technical Assistance on Establishing Mechanisms to Measure, Monitor, and Report on Commitments Made Under the Paris Agreement (Subproject 3).

131 Climate Investment Planning and Mobilization Framework. Accelerating Adaptation Finance: Moving from Strategic Plans to Actionable Investments. Adaptation Financing Climate Investment Planning and Mobilization Framework. https://ndcpartnership.org/sites/default/files/2025-10/cipmf-adaptation-financing-supplement.pdf

132 Hernández, M. and A. Ceinos (2025). Climate Change Adaptation Investment Plans: Frequently Asked Questions. 12 March. NAP Global Network.

133 Government of Fiji (2020). Costing Methodology for Fiji's National Adaptation Plan. Government of Fiji and NAP Global Network/ International Institute for Sustainable Development (IISD).

134 See BIOFIN website.

135 See INFF website.

136 For an overview and introduction, see UNDP, Investment and Financial Flows Assessments. For the methodology, see UNDP (2020), UNDP Methodology for Assessing Investment and Financial Flows (update forthcoming). For results from countries, see UNDP (2020), Results of Domestic Finance Assessments; and UNDP (2020), UNDP Methodology for Assessing Investment and Financial Flows.

A.1.3 Interviews and stakeholder consultations

A.1.3.1 Overview of issues raised by key respondents

Interviews were conducted with key informants from the public and private sectors, as well as representatives of agencies requiring both finance and financiers. The interviews sought to identify common constraints to upscaling adaptation finance in CFN countries. The interviewees included representatives from regional institutions and from the CFN countries of Indonesia, Nepal and the Philippines.

The core topics raised by public sector participants were shortfalls in:

- Capacity—insufficient technical and financial knowledge and staffing shortfalls for project development;
- Data—lack of climate and sector investment data for the substantiation of projects;
- Aggregation mechanisms—many projects lack scale to be bankable on their own;
- Clear revenue streams—need for blending mechanisms and capacity to provide sustainable community service obligation/ subsidy payments; and
- Access to concessional funds—high transaction costs and the difficulty of structuring projects to attract necessary private sector finance.

The core topics raised by private financiers were a lack of:

- Investment roadmaps—absence of realistic, context-grounded plans providing a clear scale of the potential market for private investors and a lack of public sector capacity to develop projects suitable for private sector participation;
- Effective enabling frameworks for private investment—lack of clarity for investors, especially in pricing; and
- Access to concessional funds or incentives—some adaptation projects do not meet expected commercial risk-weighted returns.

Among both government entities and potential private investors, there is often poor understanding of the potential business models relevant for adaptation projects. There is a need for concrete examples of such models and for projects illustrating how climate finance can work for adaptation, whether from public, private or blended sources.

These issues are specifically addressed in the Guideline, with suggested actions to tackle constraints and capacity shortfalls.

A.1.3.2 Detailed issues by topic

Feedback from public institutions

Demand side

From the viewpoint of agencies seeking to foster investments in adaptation, a number of recurring issues were raised during the interviews:

- **Capacity limitations.** These refer to the difficulty of producing good, timely proposals for financial institutions, particularly in attracting the needed private sector finance. This issue is particularly a problem at the local level, where many, if not most, adaptation investments are going to be implemented (in Nepal, some 80 percent of investments will be at the local level).[137] This is understandable in light of the fact that climate impacts are highly variable, depending on local geographic features and spatial position in relation to global weather systems. Key capacity limitations (and the corresponding high cost of mobilizing staff with the requisite knowledge) relate to the analysis of climate impacts (e.g. conducting local CRVAs), the structuring of appropriate financial arrangements for projects and the ability to undertake outreach to engage with the appropriate regulatory and financing institutions.

137 UNDP AFS Team interview with the Nepal Planning Commission, October 2024.

- **Data availability.** Baseline data are lacking on climate impacts. These data are often required by funders as a rigorous basis for the approval of project funding. In addition, data or mapping on the current state of investments and capital in a particular sector (e.g. extent of forest cover) are not available and expensive to obtain. Even ongoing investments are not documented as they are not "tagged" (see below). Even more difficult to obtain are estimates of the cost of the BAU scenario under likely climate change. This data gap is compounded by a lack of clarity in investment targets implied by NDC/NAP documents, which often do not nominate specific programmes or projects or provide disaggregated costings.
- **Coordination.** This refers to both horizontal coordination—in which the sharing and integration of investments across siloed government agencies is often difficult—and to vertical coordination across national, provincial and local levels. This is important as many adaptation projects require both horizontal and vertical coordination to implement effective investments (for example the need for a provincial forest agency to coordinate with a local authority works agency in order to implement a flood control project using nature-based solutions).
- **Limited size of many adaptation projects.** The cost of arranging the financing of a small project is often not significantly different from a large project. Many governments, particularly smaller local governments, struggle to achieve a critical level of aggregation of investments to make the cost of arranging finance, particularly private sector finance, worthwhile.
- **Tagging of adaptation investments.** Many governments are beginning to undertake budget tagging for climate expenditures, but in many instances, the tagging does not distinguish between mitigation, adaptation and dual-benefit (cross-cutting) expenditure. When governments tag for SDGs, the issue of identifying adaptation investments is even more complex. Another issue is the need to separate out capital expenditures from recurrent expenditures. Lack of such tagging prevents governments from claiming expenditure they are already making on adaptation as, for example, counterpart financing for IFI projects.
- **Pipeline development.** The lack of sector investment roadmaps for the range of sectors relevant to the NAP or the adaptation components of the NDC, except in certain sectors attractive to IFIs, for example in energy, water and sometimes forests, means that the preliminary work to define specific adaptation projects is often not done and financing/funding agencies cannot get a clear picture of the investments required and their state of readiness. Further, such roadmaps should set out the financing mechanisms, business models and enabling framework of investments relevant to private financing/investment.
- **Limited absorbative capacity.** Even when project pipelines are developed and financing is forthcoming, the capacity of many agencies is limited in relation to their throughput. Limitations may relate to staffing, skills, processing capacity or counterpart financing.

Supply side

From the viewpoint of government financing entities seeking to fund investments in adaptation, the following issues were repeatedly mentioned in the interviews:

- **Difficulty accessing vertical funds.** For agencies already facing capacity constraints, accessing sources such as the GCF may be particularly demanding, given the level of data and analysis required—especially for adaptation projects that have limited options for cost recovery. As a result, fewer investments are made. There is also a widespread sense that a more coordinated approach is needed to secure funding from the variety of international agencies supplying support in this area.
- **Limited size of national funds in relation to adaptation investment needs.** While agencies would like to expand their support, they face limited options for resource mobilization and have difficulty accessing external funds, as noted above. As a result, the "rationing" process for available resources is technically and politically challenging.

- **Affordability of financing.** Much of the climate impact will be borne by lower income households and local governments. Therefore, in many instances, lower cost financing or capital grants are needed to ensure that likely revenues will achieve a viable rate of return to the investing entity. The cost and capacity requirements of establishing blended finance facilities are thus major issues for fostering adaptation investment.
- **Risk mitigation.** Various options are available to mitigate credit and other risks associated with adaptation investment but require technical and financial capacity to put in place. These range from first-loss mechanisms within funds, to guarantees applied to various parts of the financing chain, insurances, intercepts and legal ring-fencing of existing revenue streams. The appropriate choice needs to be established in relation to a specific financing exercise.
- **Regulatory capacity.** Central banks are generally aware of the macroprudential risks that climate change poses to the balance sheets of financial institutions, and many support sustainable finance initiatives. However, the detailed requirements for implementing a more climate-positive approach to the regulation of the financial sector are often not clear to them, and resources are scarce. There is a need to define the capacity to estimate and design appropriate incentives to mitigate risk, to design the categorization of particular investment types (the application of green taxonomies) and the appropriate incentives to encourage investments (particularly adaptation investments), and the capacity needs and mandates of compliance teams. The issue of supporting financing institutions, particularly smaller banks and NBFIs, in utilizing green instruments is also important to regulators.

Feedback from private sector institutions

Private sector investment in adaptation

In relation to corporate entities seeking to fund investments in adaptation, the following issues were identified:

- For large companies, these entities have the technical capacities required to assess potential impacts on their business and to finance appropriate risk-mitigating investments (and often have the pricing power to pass on these costs). They also have the capacity to consider their potential impacts on the areas surrounding their facilities and work with governments to implement works that will benefit the wider community, as well as the financial capacity to take on additional expenditure benefiting the wider community as a CSR expense. One entity improved the drainage in the area surrounding its facility over and above that needed for the facility itself.
- Small companies rarely have the breadth of expertise needed nor the financial space needed to buy the required capacity and tailor financing to address climate risks, so must pool resources and collaborate. Such collaborative activity can come in several forms. Enterprises can form a bespoke NGO to address both their own issues and undertake CSR investments—for example, Philippine Business for Social Progress—or by institutionalizing such support in an industry association.
- In terms of investing in adaptation infrastructure, private sector investors are hampered by a lack of capacity on the part of the public sector to structure projects for private sector participation/PPPs, a lack of clear definitions as to what constitutes adaptation investment and the resultant lack of clarity on access to concessional funds. Other critical constraints, discussed above, are the lack of investment roadmaps and appropriate enabling frameworks. Potential investors may also be hampered by skills and data shortfalls as they put together their projects.
- Finally, there is often, on the part of entrepreneurs, a poor understanding of potential business models for adaptation projects—there is a need for examples of such models and projects to help them grasp how climate finance works for adaptation, whether from public, private or blended sources.

Private financing for adaptation investments

In relation to financial institutions seeking to fund investments in adaptation, the following issues were identified:

- Central banks are becoming more proactive in encouraging climate investments in general, and adaptation investments specifically, by private sector financiers.
- Given this context, financial institutions interviewed had established green facilities and were actively seeking to finance investments under these.
- The lack of pipeline and roadmaps by sector constrains consistency and scale of approach, meaning that pricing issues often remain unresolved.
- There is a lack of bulk financing instruments, such as green bonds. Given the smaller scale of many adaptation projects, it is important to be able to raise bulk funding that can be applied to individual projects. In capital markets where such issues are difficult, the supply of finance can be constrained.
- There are few established processes for specific adaptation investments, starting with clear criteria for what constitutes a qualifying investment. In the absence of a nationally agreed taxonomy, other recognized criteria can be used, such as the IFC criteria. Furthermore, mechanisms to address the perceived additional risks of new areas and types of investment are often lacking. The IFC and other development partners have fielded risk-sharing facilities offering a 50 percent guarantee for credit but also support for technical vetting of credits.
- There is a lack of other incentives, such as expansion of what counts in capital allocation requirements, risk weightings and tax incentives as appropriate to the sector in question.

Feedback from regional institutions and development partners

The critical issues discussed in relation to the role of these agencies were the need to:

- Help bridge the gap between public and private implementation mechanisms and mindsets;
- Add value through blending mechanisms, using concessional funds to achieve maximum leverage rather than providing unquestioned subsidies; and
- Support OECD private sector investment, which can in turn add value by providing improved technology and adding revenue streams, for example through the pre-purchase of carbon credits.

Annex 2. Sectoral adaptation investment roadmap format

A.2.1 Overview

As set out in chapter 2 relating to data collection, chapter 3 in relation to the investment needs and pipeline, chapter 4 relating to costing of the adaptation pipeline for financing and chapter 5 in relation to future programming, sectoral investment roadmaps in NAP-related sectors are an essential form of support for AFS preparation. Where available, IFF assessments, whether for the economy as a whole or for the sectors for which they are available, provide a good basis for national macro-level investment planning at the sector level.[138] Where such assessments or roadmaps do not exist, the AFS process, in consultation with sector stakeholders, will need to make some assumptions regarding the need for, potential of and constraints to adaptation investments. A robust adaptation investment roadmap[139] should adhere to a structured approach incorporating a series of core activities. The process for developing an SDG-aligned sector roadmap entails three key steps:

1. Assessing the sector's current position with respect to its performance in addressing the climate-likely impacts on the sector, its economic activities and infrastructure.
2. Identifying key investment needs to maximize an effective response to these impacts, costing and prioritizing these investments and identifying the entities that will need to undertake this investment.
3. Setting out an action plan to implement these investments, including enabling environment reforms, institutional and systems development and capacity-building requirements—again costed and prioritized.

Photo: UNDP Nepal

138 UNDP (2020). UNDP Methodology for Assessing Investment and Financial Flows.

139 This roadmap will be part of a larger sector roadmap that will include mitigation and non-climate priority projects and form the overall investment trajectory for the sector. It will provide the basis of capital bids to be forwarded to the MOF (see chapter 5).

The objectives, main activities and desired outcomes under each of these three steps are summarized in table A.2.1.

Table A.2.1: Roadmap approach

	Assess current position	Investment needs and priorities	Action planning
Objective	Understand the sector's performance in addressing climate likely impacts on the sector	Document the sector investment programme that will most effectively meet adaptation needs	Document an action plan to implement these investments
Main activities	1. Use CRVA techniques to establish climate impacts on the sector, differentiated by region and by the impacts on key stakeholders, if possible[140, 141] 2. Identify and engage with stakeholders to further assess likely impacts and potential strategies to address them 3. Recommend and cost[142] investment programmes to operationalize effective strategies and identify constraints to implementation	1. Identify key viable adaptation investment opportunities 2. Using clear criteria and prioritize investments 3. Set out options for implementation, including the public and private sectors and PPPs 4. Identify and document needed system and capacity enhancements to implement the proposed pipeline of investment	1. Identify costed and prioritized actions by specific entities to undertake: • enabling environment reforms; • institutional and systems development; and • capacity-building. 2. Identify financing options given preferred implementation modalities 3. Monitor, measure and report progress
Outcome	Priority interventions for the sector	Key investments and enabling environment reforms	Action plan for the sector

Important issues to be considered in developing the roadmap include:

- Commercial. Commercial alignment and optimization drive industry financial sustainability and enable innovation.
- Innovation. Delivery integration and innovative techniques enable increased productivity.
- Systems. Managing and planning infrastructure as a system drives more informed decision-making, leading to higher quality, faster and cheaper infrastructure solutions that better align with the needs of people and places. Digital systems will drive productivity and innovation in infrastructure deliverability.
- Collaboration. Collaboration and integration across the ecosystem will drive a financially sustainable and high-performing infrastructure industry.
- People. People's well-being and resilience form the foundation of a thriving infrastructure sector.

140 UNDP (2015). Mapping Climate Change Vulnerability.

141 UNDP (2017). Social Vulnerability Assessment Tools for Climate Change and DRR Programming.

142 While many NDCs and NAPs contain some costings for investment needs, these are often preliminary and need to be updated. Especially for sectors which comprise a large proportion of adaptation investment needs, additional work on costing may be needed. For a review of the different approaches, see World Bank (2024). Climate Adaptation Costing in a Changing World.

In the process of identifying investment needs and preparing the action plan, agencies should, as far as is practicable, adopt a programmatic planning and pipelining approach to adaptation-related investments, both relating to their own investments and to coordinated investments with other agencies. This approach avoids a project-by-project consideration of investments and instead builds a pipeline of related investments, such as a coordinated approach to investments in flood control under increased climate variability, so as to achieve synergies among projects and potential cost savings.

In their preparation, investment roadmaps need to take into account:[143]

- Institutional capacity. Institutions must be properly established with the appropriate powers and responsibilities. Institutions need to equip themselves with the authority, expertise and resources to develop and implement the policies and initiatives within their mandates.
- Whole-of-government coordination. Integrated processes are established to enable coordination and knowledge transfer between agencies that interface with each other. Climate change is a cross-cutting issue that requires cooperation and information sharing among government agencies. In particular, finance ministries are essential for ensuring the fiscal sustainability of climate investments and integrating climate considerations into macroeconomic planning (see chapter 5 and annex 6).
- Standardized criteria for evaluating investment projects. Evaluation processes should involve appropriate and relevant considerations that are weighted appropriately. This includes considerations of GHG emissions reductions, climate resilience, cost-effectiveness and alignment with sustainable development goals. This assessment should apply not only to projects funded by the budget but to all projects including climate investments funded by donors and the private sector—recognizing that application may be limited by data availability.
- Transparency and accountability. Transparent and accountable processes build public trust and are essential for climate-informed public financial management (PFM) and public investment management (PIM) (see Chapter 5 and annex 6). Openness in decision-making processes, budget allocations and project selection fosters public trust and confidence in government actions. This transparency also enables stakeholders to monitor the implementation of climate-related initiatives and ensure that resources are effectively used to address climate challenges.
- Stakeholder participation. The public and private sectors and civil society bear significant risks from climate change. These actors should, thus, be involved in assessing projects and building investment roadmaps, creating the need for transparency, accountability, and stakeholder engagement. Engaging stakeholders with diverse perspectives to elicit feedback is critical throughout the PIM process. This promotes ownership of climate initiatives, strengthens alignment with societal needs and increases the chances of achieving sustainable outcomes.
- Independent scrutiny. Processes incorporating levels of independent scrutiny—such as external evaluations, audits and third-party reviews, including reviews by finance ministries to ensure fiscal sustainability—will play a vital role in assessing the effectiveness and efficiency of climate-related policies and projects.
- Consistency and predictability. Ensuring consistent application of rules and procedures is essential to avoid arbitrariness and promote fairness and efficiency in climate-informed PIM. It also provides clarity to stakeholders, improving predictability and enhancing trust in the system.

143 ADB (2024). A Governance Framework for Climate-Relevant Public Investment Management.

A2.2 Process

Effective stakeholder consultation is critical to the first phase of the process. While the detailed steps required to establish, implement and assimilate the learnings from these consultations are beyond the scope of this annex, they have been well documented, including specialized climate-related consultations.[144] Stakeholder consultations should include:

- Sector ministries and associated agencies, together with counterparts at the state/provincial level;
- State-owned enterprises active in, or relevant to (such as transport agencies), the sector;
- Key central agencies, such as the ministry of finance, planning agency and ministry of environment;
- Relevant local government agencies or corporations and local government representatives (such as local government associations);
- Key private sector enterprises or industry representatives—both direct participants and those in the supply chain;
- Micro, small and medium-sized enterprises, smallholders and their representatives/relevant civil society organizations, including women's organizations and representatives of vulnerable groups;
- Agencies holding relevant data, such as meteorological agencies;
- Relevant academic institutions;
- Relevant national financing institutions; and
- Key donor and financing agencies.

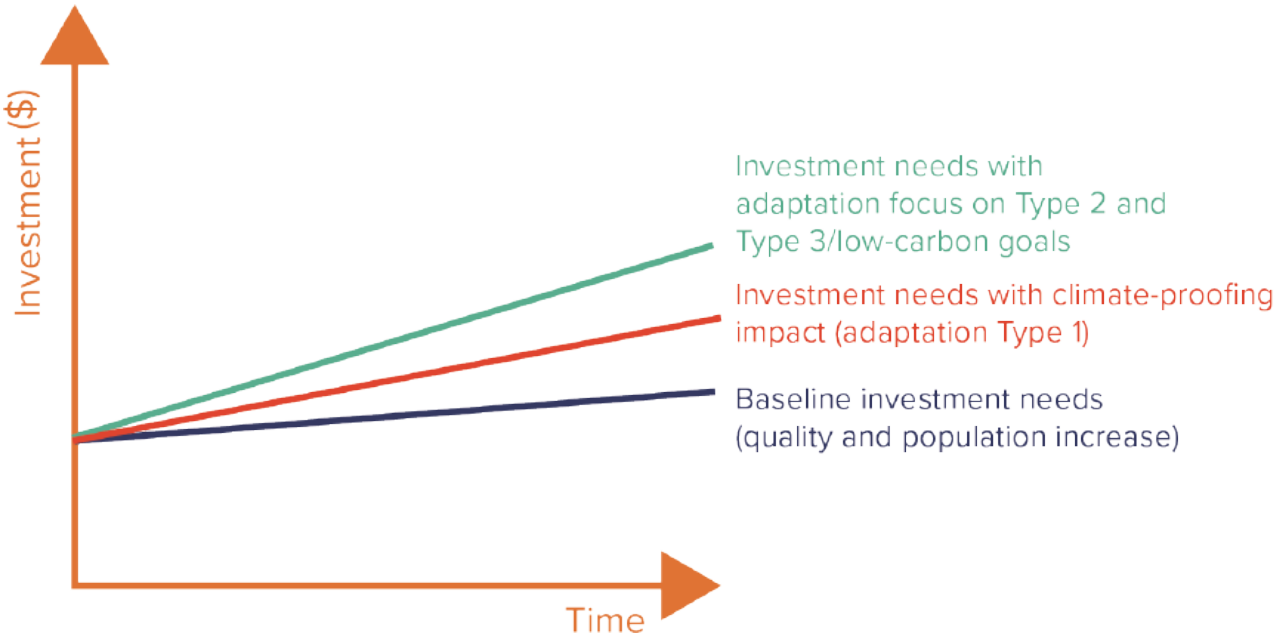
While the investment needs assessment can be complex if a high degree of detail and accuracy is required, sector experts often have sufficient knowledge to estimate investments needs approximately but adequately for the purpose of forward planning. These estimates can be refined as data and resources permit.

There are several levels to this adaptation investment assessment, however. As shown in figure A.2.1, there is a baseline level of investment needed to meet evolving quality standards and the demands of population growth. Onto this, the extra cost of climate-proofing economic activities and infrastructure within the sector must be added (adaptation investment Type 1 of the MDB categorization). These estimates are based on modelling of the likely climate impacts and the consequences of these impacts. Economic analysis techniques (see below) are available to compare the cost of such investment with its benefits. Lastly, the costs of decarbonizing production and supply chains—Scopes 1, 2 and 3 emissions—and the cost of adapting to climate change and reducing supply chain vulnerabilities (adaptation investment Types 2 and 3) can be estimated.

144 Initiative for Climate Action Transparency (2020). Stakeholder Participation Guide.

Photo: Jaquelino Magno/UNDP Timor-Leste

Figure A.2.1: Adaptation investments over time



The process of developing the investment pipeline for the roadmap has three main activities:

- Understand the national targets for the sector, if any, and assess the technology options. The first step involves thoroughly examining the country's national plans and policies related to climate and the sector. For adaptation, these may be many and various and relate, for example, to disaster risk management, food self-sufficiency or climate resilience. Ideally, a nominated agency should compile and integrate these plans and ensure they are adequately costed, but this may only happen within the AFS process itself.
- Analyse the total investment needed to fund the most effective technologies. In this step, a comprehensive analysis is needed to assess projects and calculate the total investment needed to undertake the investment required. This analysis encompasses the assessment of both the capital expenditure (CAPEX) and operational expenditure (OPEX) associated with the projects. Information regarding CAPEX and OPEX for the technologies involved can be sourced from a variety of sources, but in the worst case, previous projects can be used as the basis of costing proposed investments.
- Determine the level or degree of public finance and other support required by the investments. This step involves assessing what proportion of financing can be undertaken by the private sector, considering foreseeable improvements to the enabling environment (from consultations with industry associations) and the role of government funding, subsidies, incentives and grants in supporting clean energy initiatives. It requires understanding of the government's commitment to financing the sector and flexibility in considering alternative implementation mechanisms, such as PPPs. The level of government involvement may change as technologies are established and become standardized over time. Required capacity development and the changes in the regulatory framework to implement the project will also need to be documented.

In relation to action planning, three further activities are required:

- Identify strategic opportunities and key actions, including potential initiatives and pilots as actionable items. In this fourth step, the focus is on identifying strategic opportunities and key actions to accelerate progress towards adaptation objectives. An effective consultation process with relevant stakeholders identified in the steps above will determine priority interventions. It may be necessary to devise initiatives to kickstart progress with seed funding and pilot projects.
- Identify finance mechanisms and investor types that can help achieve the pathways, considering their needs (e.g. risk and return profiles) and investment expectations. This step involves identifying the different finance mechanisms and investor categories that can contribute to achieving the adaptation goals of the sector. This includes assessing the risk and return profiles of various investors, such as private sector entities, financial institutions and international organizations. Understanding these factors helps tailor financing strategies to attract diverse sources of funding.
- Lay out the strategy and timeline for how investment and financing can be scaled up, and by whom, and define which financing mechanisms are to be developed and used where and for which investment type. The final step involves formulating a comprehensive strategy for scaling up investment and financing. This includes segmenting the market on the demand side and, in each market segment, defining how financing could be expanded and by whom.

A good example of an adaptation investment at the national level is Brazil's Agriculture Sector Adaptation Roadmap.[145]

A2.3 Project appraisal[146]

Strengthening governance for climate-responsive public investment requires a particular focus on climate analysis in project appraisal and selection. The significance of investment efficiency cannot be overstated, especially for fiscally constrained governments. Selecting the most economically efficient adaptation projects can have large economic benefits. Estimates of cost–benefit ratios for adaptation projects range from 2:1 up to 10:1. Investing $1.8 trillion globally in five areas during 2020–2030 could generate $7.1 trillion in total net benefits. Countries need to prioritize which adaptation investments they undertake because not all climate sector risks can be eliminated, and some investments may not be economically beneficial or fiscally sustainable.

Governments need to ensure evaluation criteria enable proper costing and prioritization of climate projects. Economic appraisal—applying cost–benefit analysis (CBA) methodology—assesses the economic costs and benefits of climate action, and hence provides the justification for the use of limited public resources. CBA is a well-developed methodological approach to assessing the economic costs and benefits of projects relative to a baseline. However, its application to climate action is less developed, and careful thought needs to be given to the quantification of the costs and benefits of climate action. Specifically, countries must ensure that the following three cost types are incorporated in the evaluation of all projects and programmes:

- Cost impacts of climate hazards on a project. This includes the direct and indirect losses resulting from operational disruptions, which may include structural damage. It is essential to assess the cost of recovering from such disruptions and factor in the probability and timing of their occurrence.
- Costs of implementing climate mitigation options and adaptation measures. This

145 Climate Bonds Initiative (2020). Unlocking Brazil's Green Investment Potential for Agriculture.
146 ADB (2024). A Governance Framework for Climate-relevant Public Investment Management.

involves considering the expenses associated with developing structural capital works that protect against climate hazards.

- Indirect costs or externalities associated with operational disruptions caused by climate hazards. These costs could include disruptions to businesses because of road closures arising from flooding or the suspension of industrial production resulting from power shortages caused by extreme weather events. The expected value of these costs should reflect the impact and probability of occurrence throughout the project's lifespan.

Economic analysis of infrastructure investments should also include identification and quantification of the associated benefits resulting from climate mitigation and adaptation features. These benefits can go beyond the project or programme's original objectives and include risk reductions resulting from climate-related measures, such as reductions in GHG emissions. In many respects, this mirrors the first and third cost categories discussed above: the benefit associated with avoided losses arising from investments that mitigate or adapt to climate hazards.

The economic analysis should evaluate socio-environmental co-benefits, such as the protection of ecosystems, avoidance of travel disruptions and their costs, increased land value, the safety of users by avoiding power shortages and the benefits of induced employment. It should also assess socio-economic benefits, such as the impact on food security, health, human settlements and poverty. These benefits may occur throughout the investment life cycle, including the decommissioning phase, rather than solely during the period of operations. Other benefits can include an increased operating lifespan and increased residual project value due to resilience against climate hazards. Other important issues relating to the use of climate-related CBA have been addressed by UNDP and others.[147]

Calculating the costs and benefits from mitigation investments is typically more straightforward as it requires only a carbon price to determine the benefits, while adaptation investments require an estimate of climate-related losses avoided, for which the estimation process can be data and resource intensive.[148] The Green Climate Fund uses estimates of the number of beneficiaries as a metric in its cost effectiveness analysis rather than insisting on monetary values required under CBA.

Economic appraisal should also be used to assess options for reducing climate risk. This includes risk reduction through mitigation or adaptation investment,[149] transferring risk via contract (e.g. insurance), and retaining and provisioning for residual risk that is not reduced or transferred. There is no singular approach to determining where to use each option. Countries can consider three key issues in developing policy options for a fit-for-purpose approach: the strength of the evidence base to determine the best strategic option for assessing risks based on a climate impact assessment; the degree of efficiency to reduce costs without hindering investment outputs and quality; and the adaptability of an investment to new and evolving climate-related risks.

147 UNDP (2023). Guidelines: Gender-responsive and Socially Inclusive Climate Cost-benefit Analysis.

148 EBRD (2024). Implementing the Green Economy Transition.

149 Including early warning systems that have a very high economic benefit—reliable and accurate early warning systems create benefits worth at least ten times their cost of implementation, saving lives and assets. See PreventionWeb. Business Case for DRR: Why Investing in DRR Makes Sense.

A.2.4 Prioritization[150]

Armenia is an example of a country that has updated its PIM framework to take account of climate change and disaster risk management.[151] Armenia's PIM Decree, issued in October 2021, prescribes the process for evaluating and determining the priority of public investment projects with projected costs greater than Armenian dram 1 billion (approximately $2.6 million) and rising to Armenian dram 3 billion (approximately $7.7 million) in 2024. Because CBA uses different measurements of benefits across different project types, it cannot be relied upon as the sole determinate of priority. For this, multi-criteria analysis is used. The six evaluation criteria of public investment projects are:

- The impact on human capital;
- The public importance of the infrastructure, including urgency and necessity;
- The extent of compliance with the strategy;
- The impact of the project on climate change;
- The project risk, including exposure to climate and disaster risks, and risk management approach; and
- The economic internal rate of return.

The Decree encompasses projects that facilitate adaptation to—or mitigation of—climate change, or which are designed with climate proofing in mind. Guidance materials that provide methodologies for including these elements in investment appraisal are under development.

150 ADB (2024). A Governance Framework for Climate-Relevant Public Investment Management
151 Ibid., p. 21.

Photo: UNDP Europe and Central Asia

Annex 3.
Examples of sectoral business models

Chapter 3 set out the general characteristics of business models relating to NAP sectors with some brief examples. This annex will provide more detailed sector examples. Within each sector business modality example, it will describe:

- The type and structure of the implementing entities; and
- The financing structure, including any dual-benefit/cross-cutting revenue streams.

A.3.1 Water resources

Subsectors

Surface water capture

Surface water capture covers a wide spectrum of potential investments. There is significant potential for dual-benefit projects. Mitigation benefits from reductions in energy emissions through the generation of hydropower and energy cost reductions and/or carbon credits can be derived from reducing the energy used in pumping and from measures to preserve water resources, such as reforestation of surface water catchments.

Decentralized surface water capture is being increasingly practiced. Because of their lower environmental impacts and local relevance, such projects can provide a relatively quick increase in local water supply resilience. In this case, owing to local benefits, local landowners may cooperate in facilitating the investment.

Project: On-farm Emergency Water Infrastructure Rebate Scheme, Australia

Adaptation outcome: The scheme has helped 13,000 Australian farm businesses to build resilience and cope with the impacts of climate change.

Proponent: Department of Climate Change, Energy, the Environment and Water

Main funders: National government and private landowners

Project structure/instrument(s): Eligible primary producers or horticulture farmers could claim up to 25 percent of the cost of approved critical infrastructure, up to a maximum total rebate of $25,000. Rebates under the scheme to improve drought resilience were valued at $67 million for pipes, tanks, pumps, bores and small dams.

Procurement: Application to the Department

Source: Department of Climate Change, Energy, the Environment and Water, Australian Government. On-farm Emergency Water Infrastructure Rebate Scheme.

Project: Water-Smart Landscapes, United States

Adaptation outcome: Water savings and potential for distributed water harvesting on private property

Proponent: Southern Nevada Water Authority

Main funder: State government bonds

Project structure/instrument(s): The water authority rebates customers $2 per square foot of grass removed and replaced with desert landscaping up to the first 5,000 square feet converted per property per year. To satisfy the legal requirement to maintain control of the "financed asset", a conservation easement is recorded against the property if the converted landscape is funded by bond funds. This type of "climate-aligned bond" can also be used to contribute to/pay for distributed water harvesting infrastructure.

Procurement: Agency advertisement

Source: Lazurko, A. and H.D. Venema (2017). Financing High Performance Climate Adaptation in Agriculture: Climate Bonds for Multi-Functional Water Harvesting Infrastructure on the Canadian Prairies. Sustainability, 9(7), 1237.

Large-scale dams are increasingly difficult to construct but in some cases still needed. These are initiated by the public sector, which must also secure the site. Private financing can and does play a role in the actual construction and operation, especially if there are related hydroelectricity revenue streams.

Project: Convento Viejo Etapa II and Las Palmas Dams, Chile

Adaptation outcome: The two dams allow increased irrigation security for 67,000 hectares of high-value agricultural land with capacities to supply irrigation needs of over 290 million cubic metres.

Proponent: Chilean Ministry of Public Works

Main funders: National government and the private sector

Project structure/instrument(s): A public works concessions mechanism is used to support construction. Under this plan, the state finances a part of the total cost, private investors build, use and maintain the dam, and the end users pay the licence-holder for water stored.

Procurement: Ministry of Public Works PPP open tender

Source: OECD (2018). Reforming Water Policies in Agriculture.

Another important area of investment is the bolstering of groundwater resources. Systems to recharge groundwater by channelling surface water or wastewater can be funded by surcharges on water bills, and such recharge limits future capital spend and increases resilience. Depending on the size and placement, these projects can also be funded by philanthropy.

Project: Recharge Ponds in District Mahendragarh, India

Adaptation outcome: Surface water collection and recharge of groundwater, which was depleting rapidly, by rehabilitating disused johads (communal ponds) in the villages of Sarelli and Panchnota.

Proponent: S M Sehgal Foundation

Main funders: S M Sehgal Foundation and HDFC Bank

Project structure/instrument(s): Philanthropy funded construction in consultation with the local community

Procurement: Tendered to local contractors

Source: Sehgal Foundation (2021). Public-private Partnerships – The Way Forward for Safe Water in Rural India. 25 November.

Desalination

Desalination remains a last resort option but is increasingly needed in the face of climate-induced droughts and increasing urban populations. It has been very energy intensive, but with increasing energy efficiency, the plants are being partly or fully powered by renewables, particularly solar PV. Original equipment manufacturer (OEM) and EXIM finance is possible if PPP models are used.

Project: Wonthaggi Renewables-powered Desalination Project, Victoria, Australia

Adaptation outcome: Water security was enhanced after a record-breaking drought brought surface water resources to a critical point, with the plant, powered by a 63-megawatt wind farm, supplying up 150 gigalitres of water a year.

Proponent: VicWater (SOE)

Main funders: Victorian Government, a concessionaire and private financiers: 12 major banks supplied debt financing of $3.67 billion, while seven institutions, including the concessionaire, supplied $646 million and export credit supplied $252 million.

Project structure/instrument(s): Aquasure SPV: 30-year concession (including construction period), with a debt–equity ratio of 84:16. The debt was subsequently syndicated by the main banks.

Procurement: Selective competitive bidding

Source: Porter, K. (2010). Victorian Desalination PPP. 4 March. IJGlobal.

Water and wastewater treatment

Reducing water and energy scarcity can be achieved through the use of low-carbon, energy-efficient technologies. Financing can be by OEMs and EXIM finance, but IFIs and NDBs play a large role in many countries.

Similar models as those for desalination can be used. They are smaller in capital cost per unit treated, and some technologies—for example anaerobic treatment—have high potential for generating renewable power from biogas. Wastewater treatment can also supplement water resources. Depending on the capital spending involved, such systems can either provide potable water or replace potable water in industrial and other non-critical uses. There is, thus, significant potential for dual-benefit projects, with mitigation benefits and associated energy cost reductions and/or carbon credits that can be derived through reduced process energy use.

Household rainwater capture and water saving

A combination of regulation (and enforcement) of standards for household fittings (such as rainwater tanks and shower fittings) and appliances (such as toilets) and incentives is needed. Incentives such as rebates on water bills for installing such items or, where water use is not metered at the household level, the installation of meters and charging for use, can have a dramatic impact on projected capital spend on bulk water sources and treatment. The use of decentralized water storage also adds to resilience in the face of climate impacts on centralized infrastructure.

Project: Guelph's Rainwater Harvesting Rebate Program, Ontario, Canada

Adaptation outcome: Encouraging sustainable water use and savings

Proponent: Guelph city government

Main funders: City government and private households

Project structure/instrument(s): The local government offers financial incentives to residents installing rainwater harvesting systems. Eligible for rebates are two types of systems: seasonal and all-season. The seasonal system, typically used in spring and summer, is eligible for up to a $2,000 rebate, calculated at $0.50 per litre of tank capacity, with a minimum required capacity of 500 litres and other specific design criteria. The all-season system, usable throughout the year, also offers a $2,000 rebate and additionally provides Blue Built Home certification, contingent on compliance with the Ontario Building Code.

Procurement: Application to the city government

Source: Brears, R. (2023). Rainwater Harvesting: A Sustainable Approach to Water Management. 13 December. Medium.

A.3.2 Agriculture and fisheries

Subsectors

Dryland agriculture

Investments in this area include seeds, machinery and supply chain facilities designed to maximize resilience to the changing climate. There is potential for carbon credits linked to sequestration from low-tillage cropping, energy savings in supply chains and other innovations.

Project: DryGro, United Kingdom and Kenya

Adaptation outcome: Controlled-environment water lentil production technology reducing water dependence

Proponent: DryGro

Main funders: A broad range of public and private investors, including the European Space Agency, Innovate UK, EIT Climate KIC, EIT Food, United Kingdom venture capital firm Sustainable Ventures and the Becht Family Charitable Trust. A total of $5.8 million has been raised.

Project structure/instrument(s): DryGro is a limited company. It also has the DryGro Foundation, which is conducting initial testing on the use of cacti for fodder in dry areas.
Procurement: Equity contributions

Source: Burwood-Taylor, L., S. Devermann and D. Zook. Climate Capital: Financing Adaptation Pathways for Smallholder Farmers. ISF and AgFunder.

Project: Zamseed, Zambia

Adaptation outcome: Zamseed is the country's first seed company with a broad seed product portfolio, including maize, beans, pigeon peas, sorghum, millet, sunflower, vegetables, soya beans, wheat, groundnuts, rice, cowpeas and other crops. Zamseed products are specifically focused on the needs of smallholder farmers with traits like drought and disease-tolerance, as well as yield enhancement.

Proponent: Zamseed

Main funders: SilverStreet Capital, an investment advisor managing two of Africa's largest agriculture funds with some $500 million in assets under management and an investor base of United States and European pension funds

Project structure/instrument(s): Equity investment in African multinationals (Zambia plus Tanzania, Botswana and Namibia)

Procurement: Equity investment

Source: Burwood-Taylor, L., S. Devermann and D. Zook. Climate Capital: Financing Adaptation Pathways for Smallholder Farmers. ISF and AgFunder.

Irrigation

Investment in irrigation systems can be an efficient means of bolstering both water and energy resilience. As a key element in such schemes is often energy-efficient pumping systems, these projects can have dual benefits. There are also opportunities to develop energy-efficient and low-carbon supply chains linked to these investments.

Project: West Delta Project, Egypt

Adaptation outcome: The rehabilitation and upgrading of approximately 79,800 hectares of degraded irrigated land in the southern part of the West Delta.

Proponent: Ministry of Water Resources and Irrigation

Main funders: World Bank, Government of Egypt, bilateral partners and private investors

Project structure/instrument(s): The PPP for the West Delta Project is designed as a hybrid scheme based largely on the design–build–operate model. The transaction essentially involves contracting a private operator to take over a concession area consisting of around 79,800 hectares in the southern part of the West Delta, to design and construct the system and to assume full operational responsibility for 30 years, including the associated demand and commercial risks. The project strongly involves users, incorporating a water user council. Through consultations, it was agreed that users would pay a two-part tariff: an annual fixed fee based on the land area connected and a volumetric fee based on the amount of water use.

Procurement: Competitive bidding

Source: World Bank Group. PPPs in Irrigation.

Sustainable pastoralism

Investments in this area include breeding stock services, machinery and supply chain facilities. There is potential for carbon credits linked to sequestration from improved pasture management practices and supply chain process efficiencies. In addition, where traditional landholders play an important part in the pastoral system, payment for ecosystem services (PES) mechanisms can be used.

Project: Mainstreaming Sustainable Cattle Ranching, Colombia

Adaptation outcome: The project rehabilitated 61,500 hectares of previously degraded land to biodiversity-friendly cattle ranching production and conservation use, including 4,000 new kilometres of forests, live fences and watershed corridors; built value-added elements of the supply chain; and improved water quality in project intervention zones by using PES mechanisms to increase tree cover.

Proponents: The national cattle ranching association (Fedegan), FINAGRO (an NDB) and the Ministries of Environment and Agriculture

Main funders: World Bank, FINAGRO, Global Environment Facility (GEF) and the Government of Colombia

Project structure/instrument(s): IFI loan with GEF grant support

Procurement: Open international tender

Source: GEF. Payment for Ecosystem Services.

Forests

Forests play a key role in resilience. They help mitigate temperature and ameliorate the impacts of heavy rainfall on river systems. They are also significant sources of livelihood through sustainable timber harvesting and tourism. Traditional landholders can play an important part in maintaining forests, and PES models have been widely used for this purpose. Mitigation benefits from carbon sequestration can be monetized through REDD+ schemes.

Project: Payments for Environmental Services Program (FONAFIFO), Costa Rica

Adaptation outcome: GEF supported Costa Rica's national PES scheme through the Ecomarkets project implemented by the World Bank. This project compensates landowners for activities that have been identified as contributing to a sustainable environment, including the conservation of natural forests, reforestation through sustainable plantations and agro-forestry.

Proponents: Ministry of Environment and Energy, the National Forestry Financing Fund (FONAFIFO) and the National System of Conservation Areas

Main funders: World Bank, GEF and the Government of Costa Rica

Project structure/instrument(s): IFI loan and international grants (blended finance). Funding sources for this programme are obtained from a fuel tax (80 percent of funds), revenues from a forestry tax and a World Bank loan, and grants from the Government of Germany (for forest protection), the Government of Norway (for carbon sequestration) and GEF.

Procurement: Contracts with private forest owners and communities through FONAFIFO

Source: UNFCCC. Payments for Environmental Services Program: Costa Rica.

Aquaculture

Investments in this area include the production of fingerlings, fish farming facilities and machinery and supply chain facilities (such as processing, cold storage and logistics) designed to maximize resilience to the changing climate. There is potential for carbon credits linked to sequestration of seaweed and algae, energy savings in supply chains and other innovations. The private sector is involved across the spectrum of these activities. Particularly in Small Island Developing States (SIDS), traditional communities may play an important role in these investments and also benefit from them.

Project: Chicoa Fish Farms, Mozambique

Adaptation outcome: The project increases the efficiency and sustainability of Mvuvi's Chicoa tilapia farm with innovations in feed stock, data and carrying-capacity processes and analyses. It also facilitates the expansion of the aquaculture sector by partnering with the Government of Mozambique and establishing an out-grower programme and third-party fish farming.

Proponent: Mvuvi Holdings, Mozambique

Main funders: IDH (international non-governmental organization) and Mvuvi Holdings

Project structure/instrument(s): IDH provided a grant amounting to €202,873, and Mvuvi Holdings invested €368,929 in the project.

Procurement: IDH negotiation

Source: IDH (2021). Investment Guide for Sustainable Aquaculture.

Coastal fisheries

Investments in the coastal fisheries supply chain include energy-efficient/zero-emission boats, machinery and supply chain facilities (such as processing, cold storage, wharves and other logistics) designed to maximize resilience to the changing climate. There is potential for carbon credits linked to the energy savings of vessels and in supply chains and other innovations. The private sector is involved across the spectrum of these activities, but many small communities are dependent on such fisheries, particularly in SIDS, and models are available to ensure they benefit from investments.

Project: Sustainable Coastal Fisheries in Madang Province, Papua New Guinea, and the Central Western Province, Solomon Islands

Adaptation outcome: The project works with local fishers and community leaders on better ways for them to estimate and manage fish stocks with the new Spawning Potential Survey and supports the use of inshore fish aggregating devices as a sustainable means of diverting activity away from reef fishing to more sustainable locations.

Proponent: World Wildlife Fund (WWF) and the Governments of Papua New Guinea and Solomon Islands

Main funder: WWF

Project Structure/Instrument(s): Grants to local communities

Procurement: WWF

Source: WWF Australia. Sustainable Coastal Fisheries.

Insurance

Insurance for agriculture may be provided either to individual farmers or groups of farmers, or to agricultural communities through such mechanisms as government-provided parametric insurance.

Agricultural insurance is available for installations, agricultural products, production factors and consumable supplies such as livestock feed, fertilizers and pesticides, products harvested on the farm such as milk, eggs, the various products reaped from the land (cereals, vegetables, fruits, flowers, etc.), pedigree livestock and animals, forests, machines and equipment owned or rented by the farmer: engines, machines, tools and equipment that are used in the agricultural operations carried out on the farm, and agricultural installations and premises.[152]

Parametric insurance[153] is of necessity government organized and usually fully paid by the government in question. Climate crop insurance offers an opportunity for small farmers to mitigate these risks by pooling and transferring them to those better capable of managing them. Parametric insurance is used to facilitate rapid disbursement, minimising the disruption of climate-induced impacts, which rely on pre-defined parameters to trigger payout. This helps overcome the shortcomings of indemnity-based insurance by directly linking the compensation to specific parameters rather than farmers' actual loss. The results are reduced transaction costs, greater transparency and a faster processing time.

152 Atlas Magazine (2017). Agricultural Insurance: Products and Schemes.
153 Le, L.N. and T. Panella (2022). Here's How Better Crop Insurance Can Help Asia's Farmers Survive Climate Change. 12 September. Asian Development Blog.

A.3.3 Health

Subsectors

Hospitals

National, state/provincial governments usually fund hospitals. The capital outlay, especially for major hospitals, is usually beyond the capacity of local governments. As discussed above, where the private sector provides hospitals, they often cater for higher income groups or offer a specialist service not well provided by government hospitals. Private participation in government-funded health provision is also widespread using PPP models usually having a revenue model based on some mix of an availability payment from the government, some user fees and health insurance payments. There are two models—one where the operator provides building only and the other where the operator provides the building and also manages the hospital's operation including contracting the doctor, nurses and other staff (see following example).

Project: The Bendigo Hospital Project, Victoria, Australia

Adaptation outcome: The new hospital expands health resilience and also makes investments in energy self-sufficiency, with a large PV installation that supplies much of the building's electrical needs, an energy efficient plant (especially chillers) and the ability to adapt to changing sources of energy.

Proponent: Victorian Health Building Authority

Main funders: The Victorian government and the private sector—the Exemplar Health consortium, which consists of Capella Capital as a sponsor, Lend Lease as the builder and provider of equity, Downer as the facilities and non-clinical services manager and Siemens as the equity provider.

Project structure/instrument(s): The project was delivered as a PPP under the state government's Partnerships Victoria policy, through which the government contracts with a private sector consortium to design, build and finance state infrastructure as well as maintain that infrastructure and provide other ancillary services. The PPP also included provisions for the consortium to invest in ancillary revenue-generating services, such as a hotel and both public (government-funded) and private (cost-recovery) clinics and community health facilities offering specialist and high-end services.

Procurement: Selective bidding for a 25-year contract to deliver the facility and operate it, providing non-clinical services

Source: Bendigo Health. Public Private Partnership.

Cooling centres

There is a large overlap between cooling facilities and city policies to reduce the heat island effect on the city as a whole—city greening. City greening will be discussed below in relation to Human Settlements. Specific interventions in relation to cooling are now becoming necessary, however. They are funded by local governments and philanthropy (see following example).

Project: Jodhpur Cooling Station, India

Adaptation outcome: As part of Jodhpur's Heat Action Plan a net-zero emissions cooling station for 40 people was developed. This included mist sprinkler fans and cooling curtains for effective reductions in temperature; solar panels that power lights, fans and sprinklers; a wind tower that utilizes natural airflow to expel hot air and usher in cooler air; the provision of cool drinking water and first-aid kit facilities; a transparent façade for safety and visual connection with the surroundings; and sturdy modular panels.

Proponent: Jodhpur local government

Main funders: Jodhpur local government and the Mahila Housing Trust

Project structure/instrument(s): Local government budget

Procurement: Local government

Source: Limaye, V. (2024). Jodhpur, India Unveils a Net-zero Public Cooling Station. 7 June. NRDC.

A.3.4 Ecosystems and biodiversity

Project: EcoDRR Project, Port Salut, Haiti

Adaptation outcome: The ecosystem-based interventions in Port Salut were designed to deliver multiple livelihood benefits in addition to disaster risk reduction and climate change adaptation. In the uplands, more sustainable vetiver cultivation is promoted, increasing quality and producing higher incomes. At the coast, natural coastal buffers were created through the re-vegetation of coastal areas (river mouths and shorelines). For coastal fisheries, the project promoted resilient and sustainable fishing through strengthening the fishers' association in Port Salut and building capacity to reduce nearshore fishing. The project also established a Marine Protected Areas Unit within the Departmental Directorate of the Ministry of Environment and a Fisheries Management Unit within the Departmental Directorate for Agriculture.

Proponent: UNEP, the Netherlands Red Cross, Haitian Red Cross and local and regional government authorities.

Main funders: Directorate General for International Partnerships of the European Commission and Port Salut Municipality

Project structure/instrument(s): Grant technical assistance and capital grants

Procurement: Haitian Red Cross

Source: UNEP. Haiti.

Subsectors

Forest systems

Forest development models including PES have been discussed above but a specific example is set out below. More remote forest systems will need to depend more on philanthropic funds.

Project: Bees and Barbed Wire for Water, Los Negros, Bolivia

Adaptation outcome: The scheme has established PES deals with upstream landowners, who receive an artificial beehive and training in honey production for every 10 hectares of cloud rainforest conserved over a year. The project also focused on clarifying property rights (delineated by barbed wire).

Proponent: Fundación Natura Bolivia

Main funders: Fundación Natura Bolivia and the local municipality of Pampagrande, which is contributing to the payment scheme to improve water management on behalf of downstream water users, who would likely suffer severe economic losses from reduced waterflow.
Project structure/instrument(s): Philanthropic grants coursed through a national NGO

Procurement: Fundación Natura Bolivia

Sources: Forest Trends, the Katoomba Group and UNEP (2008). Payments for Ecosystem Services: Getting Started: A Primer. For more information, see a video and related documents at World Land Trust and Asquith, K. (2022). Bees and Barbed Wire for Water. Kinship Fellows.

Marine ecosystems

Aquaculture development models including PES have been discussed above but a specific example relating to a more remote area catalysed by an NGO is set out below.

Project: Chumbe Island Coral Park Project, Zanzibar

Adaptation outcome: The project involved exterminating non-native rats and restoring the island's natural environment. It constructed environmentally low-impact tourism facilities built from local materials. Although the fishing ban resulted in a loss of income for nearby villages, CICP hired former fishermen to patrol the reef. This and other tourism-related revenues have increased incomes.

Proponent: Chumbe Island Coral Park Ltd. (an environmental NGO)

Main funder: CICP

Project structure/instrument(s): The government entered into a PPP whereby it granted CICP long-term concessions to the island and reef and banned fishing in the reef area. CICP assumed all responsibility for funding the project, including the capital investment, raising $1.2 million in initial capital.

Procurement: CICP

Sources: Smith, A.L. Public-Private Partnerships (PPPs) for Sustainable Tourism. OAS; Panorama. Ridge to Reef Approach.

A.3.5 Livelihoods and industries

Subsectors

A comprehensive approach to greenfield development

Project: Amata Green City Chonburi, Thailand

Adaptation outcome: The project will foster investments, either from the developer or from industries located in the estate, in green spaces, green buildings and renewable energy, smart manufacturing and data infrastructure, green and smart transportation, smart water management, smart waste management, industrial symbiosis, community enhancement and upgraded regional infrastructure, all building resilience in the area. The project's KPIs are shown in table A.3.1.

Source: Amata Corporation. 2018. Green and Smart Industrial Estate Model: Case Study of AMATA City Chonburi, Thailand.

Table A.3.1: Amata City Chonburi key performance indicators

KPI		Endline 2040	
Item	**Indicator**	**Area A (brownfield)**	**Area B (greenfield)**
1. Achieving sustainability through zero emissions	Waste-to-energy electricity generation	40 MW	
	Energy self-reliance with smart grid management	100%	100%
	Renewable energy utilization rate	20%	20%
	Wastewater utilization rate	100%	100%
2. Providing easy access and effective mobility	Public transportation utilization rate for commuters	50%	50%
	Green vehicle (hybrid, electric) utilization rate	20%	20%
3. Enhancing quality of life and sustainable environment	Tenant occupancy rate	100%	100%
	Create walkable city, increase recreational walkway length	30%	
	Increase per capita public green space	20%	
4. Linking top-level education with innovation	No. of educational facilities	10	15
	No. of R&D facilities	10	10
	% of skilled labour	30%	
5. Fostering innovative technology-based industry	Companies in 10 target industries	30%	50%
	Services network coverage (4G+FTTX)	100%	100%
	Use of smart factory application	50%	50%
6. Exhibiting health lifestyles for all ages	Employees having a periodical medical-check up	100%	100%
	People working after 60 years old (% of senior executive levels)	10%	10%

Source: Amata Corporation. 2018. Green and Smart Industrial Estate Model: Case Study of AMATA City Chonburi, Thailand.

Proponent: Amata Corporation

Main funder: Amata Corporation

Project structure/instrument(s): Private capital but driven by tax privileges awarded by the Thailand Board of Investment for industries locating within the estate.

Retrofitting the development of industry

Investments include those in local water management through industrial estate infrastructure, particularly flood control and drainage; process efficiency improvements by industry through specialized ESCOs (mainly energy but also local suppliers); and local energy self-sufficiency, such as decentralized generation and mini-grids for increasing resilience, including through wind/PV/hydropower, often requiring agreement on feed-in tariffs.

These investments are potentially private-sector financed, but especially in developing countries, there may be a gap between what is financially viable for these companies and what is desirable for societal good. This financial gap needs to be filled by governments and/or the international community.

Project: Sialkot Tannery Zone Project, Pakistan

Adaptation outcome: The project involves the relocation of 230–250 tanneries, located in and around the city of Sialkot in 10 clusters, to a dedicated Tannery Zone in a centralized location that provides a common effluent treatment plant, a chrome recovery plant, a solid waste disposal site and a common effluent collection system. The zone also has a separated and upgraded conveyance system for sewerage, storm water and the tanneries' effluent channels and sewerage. It is designed to support the integration of the climate change adaptation considerations of Punjab's Urban Development Plan.

Proponent: Sialkot Tannery Association (Guarantee) Ltd.

Main funders: A collaboration between the Government of Punjab and the Sialkot Chamber of Commerce and Industries, with international development assistance grant support

Project structure/instrument(s): The Sialkot Tannery Association (Guarantee) Ltd. coordinates and lobbies for investments by the Punjab government and international development partners Procurement: Sialkot Tannery Association (Guarantee) Ltd.

Source: Sialkot Tannery Zone website.

A.3.6 Cultural heritage (including displacement/migration)

Subsectors

City centre rehabilitation

Project: Paramaribo Urban Rehabilitation Program (PURP), Suriname

Adaptation outcome: The project consists of three components: investments to improve infrastructure and public areas; the rehabilitation of selected buildings; and strengthening of the institutions managing the historic area. It includes actions aimed at increasing Paramaribo's resilience, mitigation and adaptation to climate change through the establishment of energy and water efficiency standards in buildings undergoing restoration. Furthermore, complementing the efforts financed under the Climate Change Adaptation Investments for Paramaribo's Resilience project to protect the Paramaribo World Heritage Site against climate change-induced flooding, PURP II incorporates nature-based solutions—such as rain gardens—for the improvement of public spaces. Moreover, the programme strategy follows an inclusive approach. It enhances women's safety in public spaces by improving the pedestrian infrastructure of the historic centre, developing wayfinding and public lighting strategies, ensuring proper maintenance and promoting greater activity throughout the day.

Proponent: Government of Suriname

Main funders: Inter-American Development Bank and the Government of Suriname

Project structure/instrument(s): Sovereign loan to the Government of Suriname granted to a fund managed by the Paramaribo World Heritage Site under the Ministry of Education, Science, and Culture

Procurement: Government of Suriname

Source: Inter-American Development Bank. Paramaribo Urban Rehabilitation Program (PURP) II.

A.3.7 Human settlements and infrastructure

Subsectors

Resilient cities

Project: Wuhan Sponge City, China

Adaptation outcome: Building climate-resilient infrastructure requires assets to be designed to withstand the impacts of climate change, thus ensuring resilience to extreme weather events. Climate-resilient infrastructure includes flood barriers and levees to protect against flooding from heavy rainfall or storm surges; green roofs to reduce heat absorption and manage stormwater; elevated roads and bridges to prevent damage from rising water levels; the use of alternative materials to counter temperature extremes; smart grids providing resilient energy distribution systems to handle disruptions; and stronger buildings and infrastructure that often require retrofitting for resilience against future earthquakes. For example, Wuhan has initiated 389 separate sponge city projects covering 38.5 square kilometres of the city. These include urban gardens, parks and green spaces designed to absorb water during regular precipitation and channel it away from urban areas during flooding.[154] Other projects feature artificial lakes that divert water from populated areas and water channels that can safely handle large volumes of water during flooding.

Proponent: Wuhan City

Main funders: National government, Wuhan City government and the private sector

Project structure/instrument(s): The central government provides special funding for selected pilot cities under the Sponge City Programme as start-up capital over three years of renminbi 500 million ($73 million) for provincial capital cities. The Wuhan government and two of its districts provided renminbi 600 million. The private sector is projected to provide renminbi 13 billion (80 percent). The central government also encouraged financial institutions, including the China Development Bank, to set up credit support for the programme. Cities that mobilize this level of funding through PPPs for sponge projects will be awarded an additional 10 percent of the initial funding from the central government as a bonus.

Procurement: Wuhan City

Source: Dai, L., H.F.M.W. van Rijswick, P.P.J. Driessen and A.M. Keessen (2018). Governance of the Sponge City Programme in China with Wuhan as a Case Study. International Journal of Water Resources Development, 34: 4, 578–596.

154 Oates, L., L. Dai, A. Sudmant and A. Gouldson (2020). Building Climate Resilience and Water Security in Cities: Lessons from the Sponge City of Wuhan, China. Coalition for Urban Transitions. Coalition for Urban Transitions.

Investments in “resilience systems”, such as warning systems for extreme weather event alerts, are also important and present further challenges. These investments are often less costly than investments in hard infrastructure, but there are very few revenue streams associated with them. Nevertheless, it is conceivable that creative solutions, such as selling advertisements on early warning apps, could be viable. Resilience systems will normally require government budget financing and/or bundling with larger investments, such as flooding early warning systems bundled with flood control infrastructure.

As part of the UN Secretary-General’s Early Warnings for All initiative, the Systematic Observations Financing Facility (SOFF) supports countries with the sustained collection and international exchange of surface-based weather and climate observations. Co-created by WMO, UNDP and UNEP, SOFF provides long-term grant-based financing and peer-to-peer technical advice, prioritizing LDCs and SIDS.

Public or community open space—any undeveloped land accessible to the public—plays a crucial role in enhancing urban liveability and resilience, providing social value and economic benefits (for example, in many cases acting as flood retention basins), and contributes to community well-being. Examples include parks, playgrounds, plazas, green areas, cemeteries, public seating areas, pedestrian spaces, nature areas, playgrounds, waterfronts, public sport facilities and other public outdoor spaces. Community space is in economic terms a public good with its use available to all. Normally these spaces are owned by public authorities, although privately owned open spaces can be used by the public, often those that are required to be open to the public under a city’s zoning ordinance or other land-use laws, including courtyards, plazas, paseos, parks and public art installations. Many open spaces are provided at the cost of the developer of the surrounding land as a condition of development approval.

Urban poor communities

Upgrading and increasing the resilience of urban poor communities requires a multi-faceted approach, not just focused on infrastructure but also on livelihoods and shelter. Financing for these programmes can come from government, the communities themselves and from the private sector if they are structured well and if the location is attractive (and some areas of the land in question can be used for higher value development that will cross-subsidize the upgrading). The typical investments needed are in local drainage/footpaths, water supply and house upgrading.

Photo: Fouad Choufany/UNDP Lebanon

Project: StepUp Project, Metro Manila, Philippines

Adaptation outcome: The project provided low-income communities with access to housing improvement funding; microenterprise support; infrastructure upgrading (roads, drainage, water supply, multi-purpose centres and access to health and sanitation); support for risk reduction and management (reducing risk from illegally hung power lines, etc.); and linking business, local government and homeowners' associations to coordinate provision. Philippine Business for Social Progress (PBSP), an NGO, provided extensive training and other support to the community associations (homeowners associations) involved, including how to administer revolving funds. Further, PBSP acted as an intermediary to enable communities to interact effectively with local governments, which are important in achieving the needed links to trunk infrastructure and ongoing support for infrastructure maintenance, service delivery and livelihood development.

Proponent: Philippine Business for Social Progress

Main funders: ADB, Metro Manila Business and the local community

Project structure/instrument(s): ADB grant funded by the Japan Fund for Poverty Reduction.

Procurement: ADB procurement

Source: ADB (2000). Grant Assistance (Financed from the Japan Fund for Poverty Reduction) to the Republic of the Philippines for Supporting the On-site Integrated Urban Upgrading for Vulnerable Slum Communities of Payatas Project.

Remote subsistence communities

These communities have basically the same needs as urban poor communities, and projects can have similar components. However, these communities often have fewer resources and/or less capacity, so the project design and investments need to be adapted accordingly. The PES mechanism, usually involving payments for watershed management, forest preservation or preservation of marine habitats, is of even more importance in this context.

In the long-term, the potential benefits[155] of such a mechanism include increased cash income for consumption or investment purposes (such as increased caloric intake for children, expanded access to education and health care, new products for sale, and improved enterprise productivity); expanded experience with external business activities through PES-related economic transactions and interactions with PES-relevant intermediaries; and increased knowledge of sustainable resource use practices through training and technical assistance associated with PES deal implementation. In the long term, the potential benefits include improved resilience of local ecosystems and flow of ecosystem services, and potential for higher productivity land due to ecosystem service investments.

As with urban groups, a significant part of the benefits of these projects depends on the effective functioning of community organizations, which may be cooperatives, other legally registered organizations or government-managed aggregation entities. Payments for watershed services currently

155 Forest Trends, the Katoomba Group and UNEP (2008). Payments for Ecosystem Services: Getting Started: A Primer.

exist in Bolivia, Costa Rica, Ecuador, India, Mexico, South Africa and the United States. In most of these cases, maximizing watershed services through payment systems has led to poverty reduction.[156, 157]

As with urban groups, a significant part of the benefits of these projects depends on the effective functioning of community organizations, which may be cooperatives, other legally registered organizations or government-managed aggregation entities. Payments for watershed services currently exist in Bolivia, Costa Rica, Ecuador, India, Mexico, South Africa and the United States. In most of these cases, maximizing watershed services through payment systems has led to poverty reduction.

Other infrastructure

Retrofitting existing infrastructure, the relocation and replacement of human settlement and infrastructure from vulnerable areas and constructing barriers and other infrastructure to protect human settlements (for example, coastal areas from storm surges and sea-level rise) are often complex and expensive but necessary in the face of increasing climate impacts. Structuring such projects to generate, institutionalize and ring-fence revenue streams to fund these investments can thus also be complex. For example, financing flood control and coastal protection investments often requires a mix of public action (such as raising taxes) and ring-fencing the resultant revenue streams—land leases, land value capture and betterment levies, among others, together with the systems to procure developers of appropriate amenities. Dual-benefit projects can be designed under this category.

Resilient economic activity will require consideration of incentives for "green building" and sustainably sourced products (reinforced by labelling codes and permitting processes). Incentives for the use of decentralized resilient renewable energy sources provided by floor area ratio bonuses, carbon credits and transfers from green taxes (e.g. pollution levies) can also be provided.

Coastal protection

Most drainage and coastal protection is provided at the sub-sovereign level—with or without national subsidies. Traditionally, these investments have been funded from general revenue, but increasingly, area-based levies are being used to defray the cost of infrastructure provided to specific communities. This is particularly the case where residents choose to live in areas subject to increasing climate impacts. For example, local governments are becoming increasingly reluctant to bear the full cost of coastal protection for people building or buying existing houses on coastal dunes—and are making this clear to potential buyers. These projects incorporate nature-based solutions and can have dual benefits, such as carbon capture through restored mangroves.

Energy generation and grid

Renewable energy generation, particularly solar PV (solar panels), is now cost-effective, and its financing can often largely be left to the private sector. However, projects dealing with SMEs and lower-income households may need specific support and multi-industrial units and multi-family dwellings can be more difficult to structure. In all cases, appropriate enabling frameworks are needed for pricing,

156 Ibid.

157 Asquith, N., et al. (2007). Global Experiences with Payments for Watershed Services: Major Challenges and Solutions. Natura Bolivia/IIED/CIFOR.

feed-in tariffs and the ability of private power producers to connect to the grid. Grid storage systems, including large-scale batteries and hydro storage, may also require support in terms of planning approvals, pricing and connections to the grid. Development assistance agencies and/or IFI support may be necessary to design and structure such systems. Governments and government agencies often have very significant real estate holdings, such as schools, that provide the area required for significant PV generation, but appropriate enabling frameworks, such as ESCO systems, are needed. There is significant potential for dual benefits in relation to energy saving, and thus GHG reduction, if renewable energy is involved. There are also opportunities for increasing resilience in other sectors as a result of investments in energy.

Project: Property Assessed Clean Energy (PACE) Initiative, United States

Adaptation outcome: A national programme supporting energy self-sufficiency in the United States, PACE allows property owners to finance energy-efficiency and renewable-energy measures in homes and commercial buildings without the need for government subsidies. The initiative enables owners to "mortgage" these improvements, paying only for the benefits they derive during the period they own the property in question.

Proponent: Department of Energy, Office of State and Community Programs

Main funders: Federal and state governments and private proponents

Project structure/instrument(s): The PACE mechanism involves the recovery of a loan paid back through an increment on the property tax. It addresses the issue that there is often a high upfront cost for property owners when they install clean-energy or energy-saving technology such as insulation. The savings made through the introduction of these technologies are only recouped by the property owner over time—in energy savings or in rent. These up-front costs are considered to be one of the most significant barriers to solar and energy-efficiency retrofits. In jurisdictions where PACE legislation is applicable, local governments (through municipal financing districts or finance companies) offer specific-purpose bonds to investors. The proceeds from the sale of such bonds are then lent to owners of both residential and commercial properties for the purpose of retrofitting these properties for energy efficiency. These loans are then repaid over the term specified (typically 15 or 20 years) through annual property-tax-bill assessments that are spread over approximately 20 years.

Procurement: State energy agencies

Source: U.S. Department of Energy website.

Project: FONAFIFO and Hydroelectric Utilities Payments for Watershed Services, Costa Rica

Adaptation outcome: The hydroelectric authority pays forest dwellers to protect the watershed on which the hydro plant is dependent. The reliability of water flow is thus enhanced, and forest cover is increased.

Proponent: FONAFIFO through local NGOs

Main funders: Private hydroelectric utilities, the Government of Costa Rica and a local NGO

Project structure/instrument(s): Payments are made by utility companies via a local NGO to landowners supplemented by government funds. Landowners who protect their forests receive $45/hectare/year; those who sustainably manage their forests receive $70/hectare/year and those who reforest their land receive $116/hectare/year.

Procurement: Local NGOs

Source: Forest Trends, the Katoomba Group and UNEP (2008). Payments for Ecosystem Services: Getting Started: A Primer.

Energy efficiency/ESCOs

Renewable energy efficiency investments almost always increase energy sustainability and the resilience of the energy system. Because they are often financially viable, there is potential to pass on the costs of making infrastructure and buildings more resilient. Such projects are dual benefit by definition. They come in various forms, including (i) low-energy street lighting, which is the direct responsibility of the local government; (ii) green buildings, which, in most countries, are mainly a private sector investment, although local governments with large building portfolios can realize significant benefits; and (iii) low-energy industrial processes (discussed above).

For street lighting, given a rational market price for energy, the use of quality products—important given past problems with low-quality LED street lights—and an established ESCO system, the involvement of the private sector is now routine. For the building sector the issue is more complex. Given that end buyers bear the energy costs and in many markets they do not want to pay more for the house/office, developers have little incentive to supply energy-efficient buildings. Incentives are often not aligned by just adjusting energy pricing. In this case, an enforced regulatory framework mandating energy efficiency and appropriate incentives, such as floor area ratio bonuses, carbon credits and transfers from green taxes, are needed. Regarding industrial processes, market pricing of energy is more effective but needs to be backed up with an effective ESCO system which, in turn, must include energy appraisers who understand the potential savings across a range of industrial sectors. Furthermore, a regulatory system that either penalizes pollution or provides incentives for its reduction would encourage a change in processes and generate significant health co-benefits and potential community support.

In general, energy efficiency investments are usually commercially viable and can be financed by private banks, but some incentives, such as transfers from green taxes (e.g. pollution levies), may be needed. Support may also be required from development cooperation agencies and/or IFIs.

Transport (public transport, air, road and rail; personal vehicles; and freight)

Transport links are particularly vulnerable to climate-induced weather events. Upgrading transport networks is thus a priority. Transport is also responsible for about one-quarter of all GHG emissions, and projections are that this will double by 2050. Many subsectors in the sustainable transport field are now mature markets with defined revenue models for private financing, especially for buses and railway rolling stock, with zero emission vehicles becoming more cost competitive despite high, but falling, up-front costs. Bundling in the costs of adaptation is thus technically feasible.

In some cases, improved enabling frameworks will be required regarding the tendering of provisions and unbundling of commercially viable components. For example, in relation to a bus rapid transit project, the busses may be supplied by the private sector and can be bundled into a separately privately financed component separated out from other components (bundles) of the project, such as the right of way for the buses (the roadway), which may be still financed directly by the government, and appropriate PPP legislation that enables SPVs. New energy-efficient buses can be purchased by a local government or a transit authority and leased to private operators, for example. The provision of electric vehicle (EV) charging stations and parking management investments that regulate private car use and/or encourage the use of lower-emissions vehicles often requires changes to the enabling environment. For EV charging infrastructure, appropriate electricity pricing, access to land and the capacity to undertake PPPs in the sector are needed.

For transport infrastructure designed to reduce emissions and/or pollution, such as passenger and freight terminals, the land development dimension can provide a potential financing source provided an appropriate SPV can be established. Again, development cooperation agencies and/or IFIs can support such efforts. Ports and airports are also relatively mature markets in many countries and are attractive for private sector investment, either directly or through concessions from government where appropriate procurement systems and PPP legislation is in place. Lower-income countries often have a greater need for government and IFI support for project structuring.

Measures to improve car management and parking and encouraging the use of low-emission vehicles are in place in many cities and involve restrictions—enforced by fines, direct charges and incentives. With direct revenue sources, these activities frequently involve private sector participation, particularly in operations and enforcement through contracting out. Parking provision can be constructed by the private sector. As above, land value-based financing of resilient infrastructure is potentially a major contributor to the revenue model.

Where investment to bolster resilience is bundled into a sustainable transport project, dual adaptation and mitigation benefits will ensue. The example below shows the use of several different types of such financing, given its importance in many sustainable transport projects.

Project: MAX Red Line Airport Light Rail, Portland, Oregon, United States

Adaptation outcome: Providing energy savings and reduced pollution by airport traffic, Portland's MAX: Red Line light rail extension is an 8.9 kilometre link that connects the MAX transit system to Portland International Airport. The development included four new stations, a large park and ride and the development of 120 acres of land that was zoned as mixed use.

Proponent: TriMet Authority, City of Portland and Portland International Airport

Main funder: Portland MAX (SPV)

Project structure/instrument(s): With a cost of $125.8 million (in 2001), the project was designed as a joint development by the regional transit agency, the airport authority and the City of Portland using a unique mix of value capture mechanisms. The first was tax increment financing through the Airport Way Urban Renewal area, which enabled the issuance of debt by the City of Portland. The second was the commercial arrangement with Bechtel, where in exchange for contributing a third of the development cost, they were given the development rights to an 120 acre land parcel along the light rail route. The last was the arrival levy charged on each passenger coming into Portland International Airport.

Procurement: MAX entity

Source: Trimet (2016). Max Red Line.

Water supply and sanitation (treatment, distribution and storage)

Water supply and sanitation (WSS) investment is generally focused on enhancing resilience (adaptation), but the sector has the potential for significant GHG reduction and energy savings. Also, because it is routinely provided on a user charge basis (even if "lifeline tariffs"—public service obligations—are used to provide a basic supply to lower-income groups), the cost of adaptation can in principle be bundled into a water tariff. Despite the need for public service obligations, the WSS sector has been the recipient of considerable private sector finance over decades, especially in large cities or regions. The need for the reduction of non-revenue water (and consequent conservation of water resources) has often driven the business case for new investment, e.g. in Manila, but key enabling frameworks are necessary for effective PPP arrangements and procurement, market pricing of water and wastewater collection, and oversight is necessary, such as in the United Kingdom, where the poor quality of government regulators has led to excessive sewage disposal into rivers. Nevertheless, the challenge now is to extend such approaches to improve water supply, wastewater and water recycling investment in smaller cities. Regional WSS companies covering a few smaller urban areas (e.g. the Philippines—see below) are one way of achieving economies of scale and providing the revenue base for private sector participation. Support from financial advisory service providers, perhaps financed by IFIs, will be critical here as significant project structuring expertise is needed, particularly in countries with limited and medium capital market optionality.

Project: Water Districts, Philippines

Adaptation outcome: A water district is a local corporate entity that operates and maintains a water supply system in one or more provincial cities or municipalities, classified as a government-owned and controlled corporation. The idea behind the law establishing water districts and their oversight and funding agency, the Local Water Utilities Administration (LWUA), was that many cities outside Metro Manila did not have the capacity to invest in and administer sustainable water agencies and that they should be given the chance to achieve economies of scale by amalgamating. With LWUA as a central point of overall guidance, issues of resilience can be uniformly addressed by water districts.

Proponents: City and municipal governments

Main funder: LWUA

Project structure/instrument(s): LWUA is both funded by the national government and channels loans from IFIs to provide four different types of loans to water districts, responding to the diverse needs of such entities.

Procurement: Water districts

Source: LWUA. About Us.

Solid waste

Solid waste infrastructure can be particularly vulnerable to climate impacts and the consequences dire. Floods inundating landfills can not only spread garbage but toxic chemicals throughout a local area. Improvements are needed in many cities and towns. Investment, particularly in collection, has been privately financed and provided for many years many countries according to fee-for-service contracts with local governments, which have been regularly bid out. More sophisticated forms of disposal, such as waste-to-energy investments, may require national or provincial agencies, IFIs and/or development partners to structure or finance. However, there are examples of privately built and operated engineered landfill disposal sites where dumping fees are paid by individuals, companies or even local governments to the developer to cover operating and capital recovery costs. In principle, the additional costs of making the solid waste system more resilient can be passed on to consumers, but in practice, unlike water, higher fees just mean that many households illegally dump rubbish. Many waste projects also are dual-benefit projects with methane gas collected from landfills being used as a low-carbon fuel for sustainable energy.

Annex 4.
Examples of financing models

Chapter 4 sets the general characteristics of financing mechanisms relating to NAP sectors, with some brief examples. This annex will provide more detailed examples of national (generally multisectoral) financing mechanisms and sector-focused mechanisms.

A.4.1 Financing structures, instruments and examples

Given the range of potential financing sources and viable business models for adaptation or dual-benefit investment set out in the previous chapter, the next step in the process is to review the potential channelling mechanisms that can link the sources to the investing entities using these business models. Embodied in these mechanisms must be design elements that address the constraints identified in chapter 4. One element is supporting the development and sustainable implementation of bankable projects that reduce climate vulnerabilities and strengthen resilience in a cost-effective way. Another element is providing support across a variety of sectors. Moreover, providing support to financing facilities that are structured for a diverse range of financing contributors at the fund and project levels (public/private) and maintain flexibility in respect to the type of support (debt/equity) and type of entity supported (local government, SOE, company and household) can be important for addressing the diverse needs of investing entities. Furthermore, providing structures to foster aggregation where investments are small can be particularly useful for many types of adaptation projects, which, particularly at the local level, tend to be small in relation to even the minimum financing level for national institutions.

These elements are common across countries, but the depth and sophistication of the interventions for each will differ according to the human and financial capacities of the investing entities. A general typology of climate finance mechanisms is outlined in table A.4.1.

Photo: UNDP Malawi / Florence Leysen

Table A.4.1: Typology of climate finance mechanisms

Type of institution	Type of financing/support mechanism	Example(s)
Development partners	Technical assistance by a development financing agency or NGO to bolster enabling frameworks, planning systems of project development activities and the contribution of resources to blended finance initiatives	UNDP/FCDO Climate Finance Network
IFI-catalysed mechanisms	IFI-catalysed facility tapping international institutional finance	GCF/Pegasus CRAFT Fund
	IFI-catalysed blended finance facility, usually at a national development bank	Shandong Green Development Fund
	IFI direct lending for specific industry sectors	Inter-American Development Bank cluster project (which addresses the sustainable development of infrastructure and SMEs in the Mendoza Project in Argentina)
	IFI sub-sovereign lending (in theory the same mechanism could be used by international private banks)	The European Bank for Reconstruction and Development's Green Cities Facility and use of public service agreements
National Initiatives	National development bank (NDB)-led (in theory, could be led by any financial institution, including private ones)	Tamil Nadu Urban Development Fund aggregation mechanism
	Tapping the private capital market	Kommuninvest aggregation mechanism
	Small-scale local finance	Al-Amal Microfinance Bank's Green Banking Initiative for sustainable agriculture (Yemen and the Middle East and North Africa and region)
	City green funds (numerous intermediary cities have environmental funds for use in local projects that could be leveraged for larger projects)	
Private sector	Private sector infrastructure funds (particularly sector-specific funds, such as for renewable energy) and energy-saving company arrangements have invested in/been used in intermediary cities, mainly in OECD countries	

Source: Author's elaboration based on OECD (2022). Intermediary Cities and Climate Change. Chapter 4.

Any of the financing structures outlined in the table can potentially (given appropriate partnerships) be augmented with GCF, GEF, CIF or development assistance finance to increase potential concessionally.[158] A given country will almost certainly need more than one type of climate financing structure to address the range of financing needs for adaptation. There are a number of examples that incorporate the above responses and mechanisms. There are also numerous international agencies and domestic agencies in some countries that can assist investing entities in various aspects of obtaining climate finance. Although not all are climate-focused, they can accommodate climate projects. For instance, TNUDF and Kommuninvest are specifically designed to aggregate smaller investments. In the former case, small-scale loans from the fund are bundled together, and their income stream is securitized as the basis for bond issuance. In the latter case, one financing entity raises capital (including through the use of green bonds) to relend to participating local governments at a cheaper rate than they would have been able to obtain on their own account.

Where the mechanisms are not specifically designed to focus on climate projects, they can be made so by applying a relevant taxonomy and changing the project-level assessment criteria to screen for quality climate-positive projects. GCF has an assessment process that is applicable at the project level. Its Investment Framework[159] takes into account both specific climate outcomes and a range of non-climate factors that are critical in ensuring that a project will actually be implemented effectively.

An example of innovative, private sector-led financing is the Climate Resilience and Adaptation Finance and Technology-transfer facility (CRAFT) fund. This fund was established with a proposed capital of $400 million by Pegasus Capital and was the first private investment fund for climate resilience and adaptation. GCF has committed up to $100 million in catalytic capital to scale up ambition in adaptation in CRAFT investment. CRAFT addresses the adaptation gap by mobilizing capital to scale up technologies for climate resilience and adaptation and applying them in developing countries using a South–South technology transfer mechanism. It employs an innovative blended finance structure, including a junior concessional layer that mitigates downside risk for senior non-concessional investors.[160]

The next step in the chain is to consider the instruments provided by these mechanisms. Table A.4.2 sets out the range of instruments available.

158 For example, the Philippines People's Survival Fund has $10 million in GCF readiness support. Gonzales, A.L. (2024). PH Set to Secure $10-M Readiness Support from Green Climate Fund. 17 May. Philippine News Agency.

159 GCF. Access Funding.

160 GCF (2021). FP181: CRAFT - Catalytic Capital for First Private Investment Fund for Adaptation Technologies in Developing Countries.

Table A.4.2: Financial instruments available for adaptation finance[161]

Category	Description	Typical use case	Example
Debt-for-swaps	Debt swap in which the debtor nation, instead of continuing to make external debt payments in a foreign currency, makes payments in local currency to finance domestic climate projects.	Countries with high climate vulnerability and significant but manageable debt levels, but no imminent liquidity crisis. Institutional capacity is required to execute.	**Belize and The Nature Conservancy debt-for-nature swap (2021).** The Nature Conservancy and the Belize Government finalized a $364 million marine conservation debt conversion, reducing Belize's debt by 12% of GDP.
Financing facilities	Debt or equity funding for a pool of projects, companies or individuals at various levels of concessionally, including subordinated debt and equity, private equity funds and other debt facilities.	Wide ranging: can support investment, which requires aggregation and coordination.	**Catalyst Climate Resilience Fund (2015–present).** The Catalyst Climate Resilience Fund is the leading impact fund and accelerator supporting pre-seed tech startups that are building a climate-resilient future in Africa.
Grants	Non-repayable or no interest rate reimbursable funding. Can include development grants, Technical Assistance funding and Project Preparation Facility.	For projects that serve a critical development objective, but where the commercial potential is low, or funding is needed to make the effort "investment ready".	**West Africa Coastal Areas Resilience Investment Project (2018–2023).** The programme is aimed at strengthening the resilience of targeted communities and areas in coastal Western Africa through bilateral support with traditional development partners for concessional and grant financing.
Guarantees	A financial safeguard where a third-party guarantor commits to repaying part or all of a loan to the lender if the borrower defaults.	When a project requires a credibility boost to secure loans, acting as a de-risking mechanism provided by a third party.	**USDA Water and Waste Disposal Loan Guarantees (2020–present).** The USDA Water and Waste Disposal Loan programme guarantees 80% of loans for rural water and waste projects, spurring private investment in essential public utility infrastructure.
Insurance	The most common form of risk transfer can include catastrophe bonds, parametric insurance and index insurance.	Cases with high climate risk. Most effective when climate data are robust, regulatory conditions are workable and there is trust in insurance payouts.	**Quintana Roo Reef Protection Parametric Insurance (2018–present).** Swiss Re and The Nature Conservancy collaborated to deploy the first insurance that funds reef restoration immediately after hurricanes, based on wind speed.

161 More details on many instruments can be found at NAP Global Network. Inventory of Innovative Financial Instruments for Climate Change Adaptation.

Category	Description	Typical use case	Example
Liquidity instruments	Grant or debt facilities that are designed to provide immediate access to capital. Most frequently, shock-responsive cash transfers, liquidity support and domestic budget reallocations.	In response to insufficient financial and technical capacity in the face of emergency situations.	**IMF Catastrophe Containment and Relief Trust(2015–present).** The trust offers debt relief grants to the poorest countries affected by major natural or public health disasters.
Local currency swaps	Long-term finance options in local currency through fixed and inflation-linked swaps designed to mitigate the dual risks of currency and interest rate fluctuations for climate investments.	Commonly deployed to support investments in emerging markets to hedge against currency and interest rate volatility.	**Long-term FX Risk Management (TCX) (2013–present).** TCX specializes in mitigating currency and interest risks for energy investments in developing nations, enabling long-term, local currency financing. It has supported the de-risking of more than $8 billion in loans since its inception.
Project finance	Direct debt or equity investments into a single/set of project(s) across commercial or concessional finance, including first-loss debt, off-taker guarantees, direct infrastructure investments and PPP financing.	Direct development and investment in an infrastructure project or for financing based on a government contract.	**Patong Desalination Investment (2020–present).** The project's primary objective is producing safe drinking water in regions with seasonal water scarcity using seawater desalination. Funded by Climate Investor Two (CI2).
Results-based finance	Debt or grant capital for a project or portfolio of projects that is contingent on the achievement of certain outcomes. Can include impact notes, climate bonds and conservation trusts.	Blended finance approach: involving favourable repayment terms or bonuses for achieving policy outcomes. Can support insufficiently bankable projects.	**European Bank for Reconstruction and Development Climate Resilience Bond (2019).** EBRD launched the first ever dedicated climate resilience bond, raising $700 million with the issuance.

Source: CPI and Global Centre on Adaptation (2024). State and Trends in Climate Adaptation Finance 2023.

It is also important to discuss the role of risk mitigation in climate finance generally and in adaptation finance in particular. The main instruments are set out in table A.4.2, being guarantees, insurance and liquidity instruments, such as catastrophe bonds. Risk mitigation instruments are used to reduce the financial risks associated with climate change impacts, like extreme weather events, by providing mechanisms to share or transfer these risks, thereby encouraging private investment in climate-related projects, particularly in areas with high vulnerability to climate risks. Although tools like insurance, catastrophe bonds and guarantees are important, they incur costs, adding to the BAU cost of projects. These costs are ultimately worthwhile in the long run to mitigate the cost of climate impacts but can nevertheless be difficult to justify in the short term. Other non-financial means of risk mitigation can also be appropriate, for example banning development in areas highly exposed to climate impacts. In addition, choosing financing partners, national climate funds and international agencies with dedicated adaptation project approaches can bring resources to design resilient projects as well as mitigate credit risks and lower financing costs, making adaptation investments more accessible and viable. In addition to the long-established development guarantee mechanisms that now facilitate climate investment, such as the Multilateral Investment Guarantee Agency,[162] there are now numerous international entities that have been established to offer, or to link vulnerable countries to providers of, parametric or indexed insurance products.[163]

An example of the use of catastrophe insurance is the **Caribbean Catastrophe Risk Insurance Facility (CCRIF).**[164] In 2007, the CCRIF was formed as the first multi-country risk pool in the world and was the first insurance instrument to successfully develop parametric policies backed by both traditional and capital markets. CCRIF was developed under the technical leadership of the World Bank and with a grant from the Government of Japan. It was capitalized through contributions to a multi-donor trust fund by the Government of Canada, the European Union, the World Bank, the Government of France, the Government of the United Kingdom, the Caribbean Development Bank, the Government of Ireland and the Government of Bermuda, as well as through membership fees paid by participating governments.

In 2014, the facility was restructured into a segregated portfolio company (SPC) to facilitate offering new products and expansion into new geographic areas and is now named CCRIF SPC. It is owned, operated and registered in the Caribbean and currently has 30 members. CCRIF SPC limits the financial impact of natural hazard events on Caribbean and Central American governments by quickly providing short-term liquidity when a policy is triggered. It offers parametric insurance policies for tropical cyclones, earthquakes, excess rainfall, the fisheries sector and the electric and water utilities sectors. As of the end of 2024, CCRIF had 78 payout events with a total disbursement of $390 million.

162 See MIGA website.
163 Global Facility for Disaster Reduction and Recovery. About Us.
164 See CCRIF SPC website.

A.4.2 National financing models

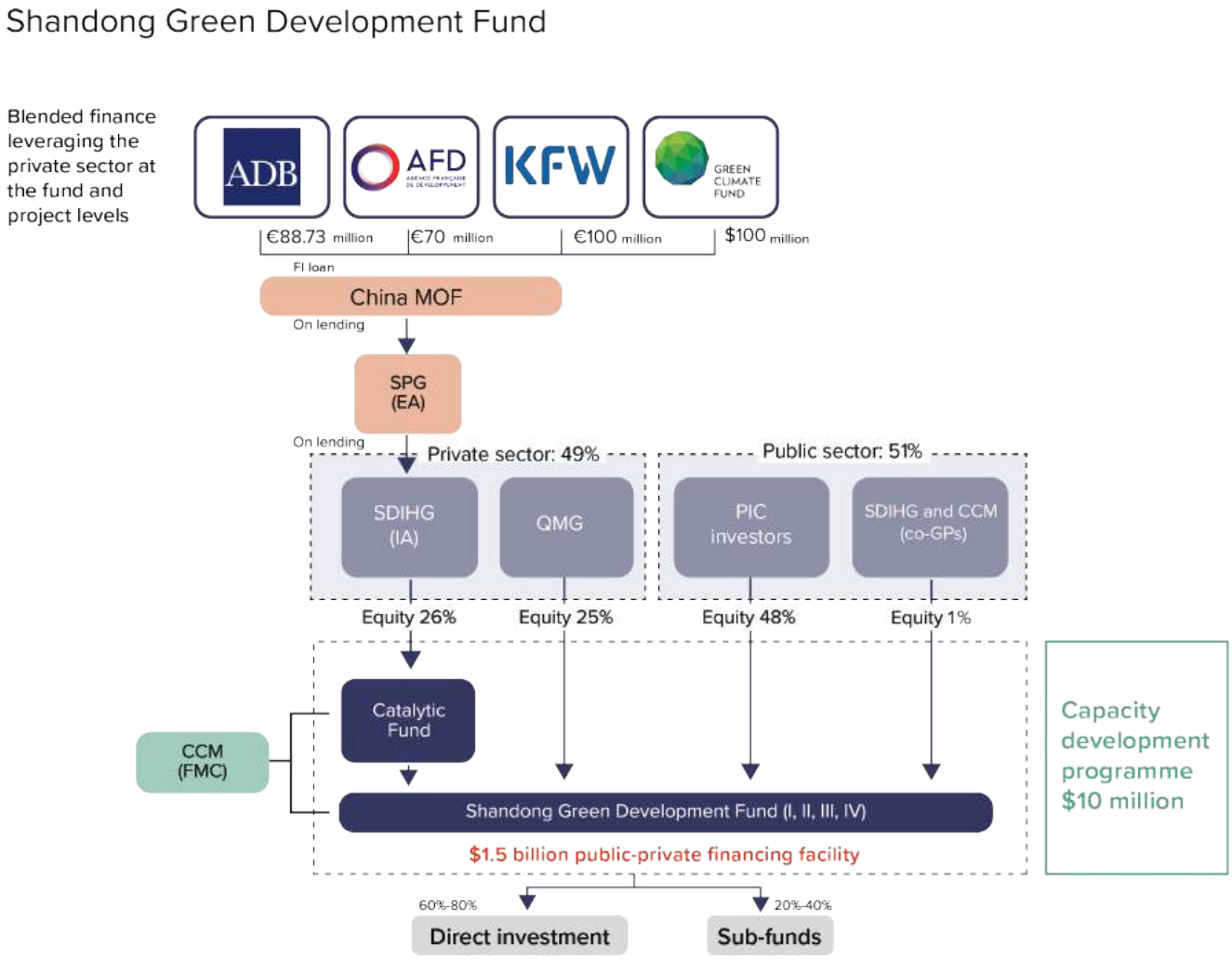
As set out in chapter 4, section 4.3, national financing mechanisms include: national funds that have a national scope; subnational funds covering a particular region; national funds that foster sub-sovereign activity; and national mechanisms instituted by a coalition of sub-sovereign entities. Examples of these are set out below.

An example of a national fund is the **Indonesia Climate Change Trust Fund (ICCTF)**.[165] Jointly launched by the Government of Indonesia, Minister of National Development Planning and the Minister of Finance in 2009, the ICCTF is designed as a national trust fund to attract, manage and mobilize financial investments in climate change mitigation and adaptation.[166] It is the first multi-donor trust fund to be managed and owned by the Government of Indonesia. It operates across four priority windows: land-based mitigation, energy, marine, and resilience and adaptation. It has an overarching investment strategy to guide projects and conform to development policies. Funds are administered by a nationally managed trustee under the National Development Planning Agency (BAPPENAS). Its objective is to achieve Indonesia's goals of a low-carbon economy and greater resilience to climate change. To enable the government to increase the effectiveness and impact of its leadership and management in addressing climate change issues, the ICCTF can receive funds sourced from development partners, PPPs, CSR, the government budget, reflows and capital markets. The eligible users and borrowers are sectoral ministries, regional and local governments, private firms acting through a PPP, NGOs and universities.

The **Shandong Green Development Fund (SGDF)** is an example of a subnational blended finance fund covering a particular region.[167] The fund was initiated with support from ADB and responds to the key challenges to climate finance in China: (i) a lack of pipelines for viable climate-positive projects, particularly new technology projects; (ii) the inability of the capital market to address higher risk profiles of climate investments and to attract private, institutional and commercial finance into such investments; and (iii) inadequate systems for defining, monitoring and evaluating climate investments. Given the scale of the problems faced in relation to green investment in Shandong Province and its previous track record with IFI financing, the Ministry of Finance approved Shandong as a pilot for the Green Finance Catalyst Facility (GFCF) concept in China and, thus, the establishment of the SGDF. Figure A.4.1 shows the structure of the SGDF.

165 ICCTF. 2018. Supporting the Indonesian Government for a Better Climate.
166 The adaptation portfolio is at: ICCTF. Adaptation Resilience.
167 ADB (2021). Catalyzing Climate Finance: Lessons Learned from the Shandong Green Development Fund.

Figure A.4.1: Structure of the Shandong Green Development Fund



CCM = CICC Capital Management Co., Ltd., EA = executing agency, FI = financial intermediation, FMC = fund management company, GP = general partner, IA = implementing agency, MOF = Ministry of Finance, PIC = private, institutional and commercial, QMG = Qingdao Municipal Government, SDIHG = Shandong Development & Investment Holding Group, SPG = Shandong Provincial Government.

Source: Adapted from ADB (2021). Catalyzing Climate Finance: Lessons Learned from the Shandong Green Development Fund.

The GFCF concept constitutes a powerful mechanism for leveraging finance for climate investments. The basic form of the concept is to establish a green window within a credible and capable national financing institution that can act as the conduit for both international concessional and private finance flows to climate projects that are "warranted" as climate positive through a robust assessment process. The capacity to include private, institutional and commercial finance into the facility itself and at the project level is critical. The concept is replicable in many different forms and may be based in a government entity, an NDB or a private sector financial institution.

There are, however, some key characteristics that need to be present for the effective operation of the GFCF concept. It requires the capacity to

blend effectively and support a variety of financial instruments as appropriate to its clients' needs. Further, project development capacity will be necessary to achieve the required scale and quality, especially in small countries or LDCs. Additionally, the facility must be able to effectively design access to concessionality (enough to compensate for external benefits) for a particular project. The facility must also be open for, and structured to be able to utilize, the range of sources of finance, including the need to achieve an appropriate credit rating if international institutional money is sought.

An example of national funds that foster sub-sovereign activity is **Kenya's Financing Locally Led Climate Action (FLLoCA) Program**,[168] which capitalizes County Climate Change Funds. The objective is to scale up finance from the national and subnational governments to address climate change priorities. County Climate Change Funds are being established in Kenya's 47 counties through the FLLoCA Program, which is led by the National Treasury and Economic Planning. The funds aim to increase finance for local adaptation actions that are identified and prioritized by communities. The establishment and implementation of the funds build on lessons learned from a previous programme in five counties that set up county funds using grant finance from bilateral development partners channelled through the Adaptation Consortium.

The FLLoCA Program aims to help the National Treasury and county governments to set up processes for sustainable and predictable finance for climate change priorities. This process includes enacting county climate fund legislation that commits subnational governments to allocate 1 percent to 2 percent of their annual development budgets to support community-prioritized adaptation and resilience initiatives.

Funded by domestic and international sources, FLLoCA is financed through contributions from subnational county governments, the national government, a World Bank concessional lending and grant finance provided by the Governments of the Netherlands, Denmark and Sweden.

An example of national mechanisms instituted by a coalition of sub-sovereign entities is **Kommuninvest in Sweden**.[169] Established by local governments, Kommuninvest has grown and is now a good example of climate-focused financing entities that can tap both local and international capital markets. Some cities can themselves issue bonds for climate projects, green bonds. These instruments allow a range of projects to be financed with one instrument. Generally, this course of action is more open to larger cities, such as Johannesburg, which has issued its own green bond. However, there is a problem that the transaction costs for such bonds are higher than loans. This has been solved in some countries, such as Sweden through Kommuninvest, where smaller local governments participate in a joint financing mechanism that issues green and conventional bonds to finance their collective portfolio through different types of loans. This is an effective way to spread the costs of issuing green financing instruments over numerous investments from a number of local governments. Figure A.4.2 shows the key characteristics of Kommuninvest green financing. Critical is the rigorous evaluation of candidate projects for their climate eligibility and strong monitoring, reporting and validation (MRV) systems in which an independent evaluator verifies and confirms that the claimed performance is achieved. These systems provide the infrastructure for the issuing of green bonds. Also of note is the wide range of eligible sectors.

168 Climate Investment Funds (2024). Transformational Climate Finance: Kenya's County Climate Change Funds.

169 OECD (2022). Intermediary Cities and Climate Change: An Opportunity for Sustainable Development.

Figure A.4.2: Characteristics of the Kommuninvest Green Bonds Framework

Kommuninvest Green Bonds Framework

Adhering to the four pillars of the Green Bond Principles

1. Use of proceeds
Investment projects undertaken by Swedish local governments that promote the transition to a low-carbon and climate-resilient society

2. Project evaluation and selection
(i) Project identification and verification by the environmental and treasury functions in Kommuninvest's member municipalities/county councils
(ii) Screening and pre-approval by Kommuninvest's lending department
(ii) Review and final approval by consensus vote in the Kommuninvest Green Bonds Environmental Committee

3. Management of proceeds
Earmarked account for proceeds
Lending to eligible projects precedes green bond issuance

4. Reporting
(i) Annual investor impact report regarding green bond issuance and eligible projects
(ii) Annual sustainability reporting

\+ Second opinion from Cicero (environmental research institute)

Eligible project categories

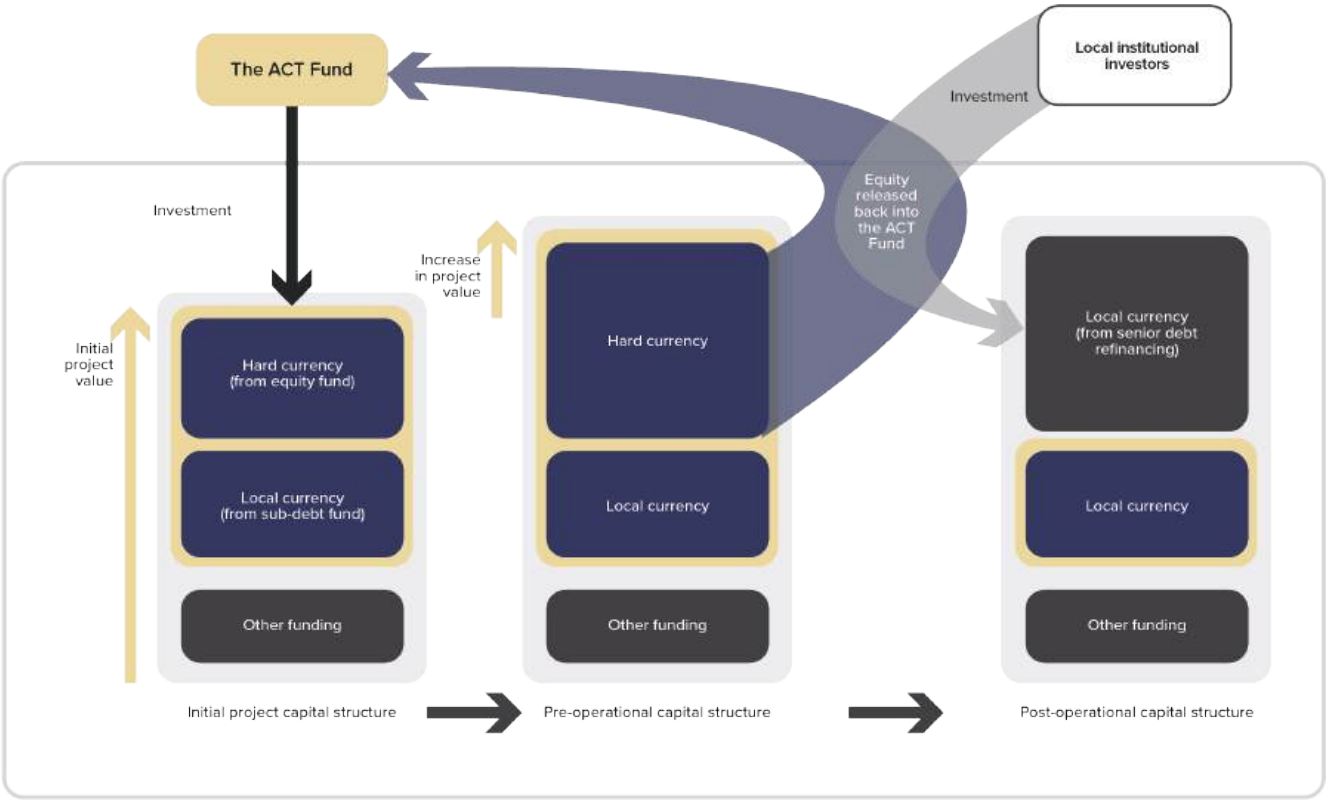
Source: Adapted from the Kommuninvest website.

Private climate financing

National private financial institutions are establishing their own facilities for climate projects that include adaptation projects. For example, Mongolia's largest commercial bank, Khan Bank, issued Mongolia's first green bond in March 2023. The proceeds of the $60 million, five-year bond will increase the bank's lending to environmental projects in sectors including renewable energy, energy efficiency and resilient/climate-smart agriculture. Khan Bank's inaugural green bond was privately placed and received $35 million from Dutch development bank FMO, $15 million from IFC and $10 million from the United States-based Microvest Capital Management. The European Bank for Reconstruction and Development (EBRD) is also organizing a financing package of up to $145 million for Khan Bank, its largest bilateral transaction with a Mongolian financial institution to date. The funding will support the introduction growth opportunities for SMEs owned or led by women.[170] Under its Sustainable Finance Roadmap, the banking sector in Mongolia is set to increase green lending to 10 percent and NBFI's lending by 5 percent of total lending by 2030 and has developed supportive green finance and sectoral regulations and guidelines to support private sector climate finance scale-up and low-carbon transition.[171]

In Africa, the Nigeria's ARM-Harith Cities & Climate Transition Fund (ACT Fund) is a model of a private sector climate fund.[172] The ACT Fund is a mid-market greenfield infrastructure fund that intends to expand the pipeline of investable sustainable infrastructure projects via a blended currency mechanism. The mechanism de-risks international equity using structured exit solutions that mobilize additional local institutional investors. This will allow the ACT fund to invest in and exit more projects than in a traditional model, developing more high-quality West African climate infrastructure projects. The progression of funding is set out in figure A.4.3.

Figure A.4.3: Structure of the ACT Fund



Source: Adapted from the Global Innovation Lab for Climate Finance. Act Fund.

170 Usov, A. (2025). EBRD Organises US$145 Million Package for Mongolia's Khan Bank. 14 May. EBRD.
171 Reuters (2023). Mongolia's Khan Bank Issues $60 Mln Green Bond, Country's First. 17 March.
172 Global Innovation Lab for Climate Finance. Act Fund.

More specifically, the ACT Fund will provide technical assistance to make projects investment-ready; deploy equity and subordinated debt funds in tandem to finance and build these projects efficiently; and arrange the exit of hard-currency equity by raising senior debt from local institutions once projects are operational and de-risked. The fund uses blended finance to overcome country FX and country risk issues.

A.4.3.1 Water resources

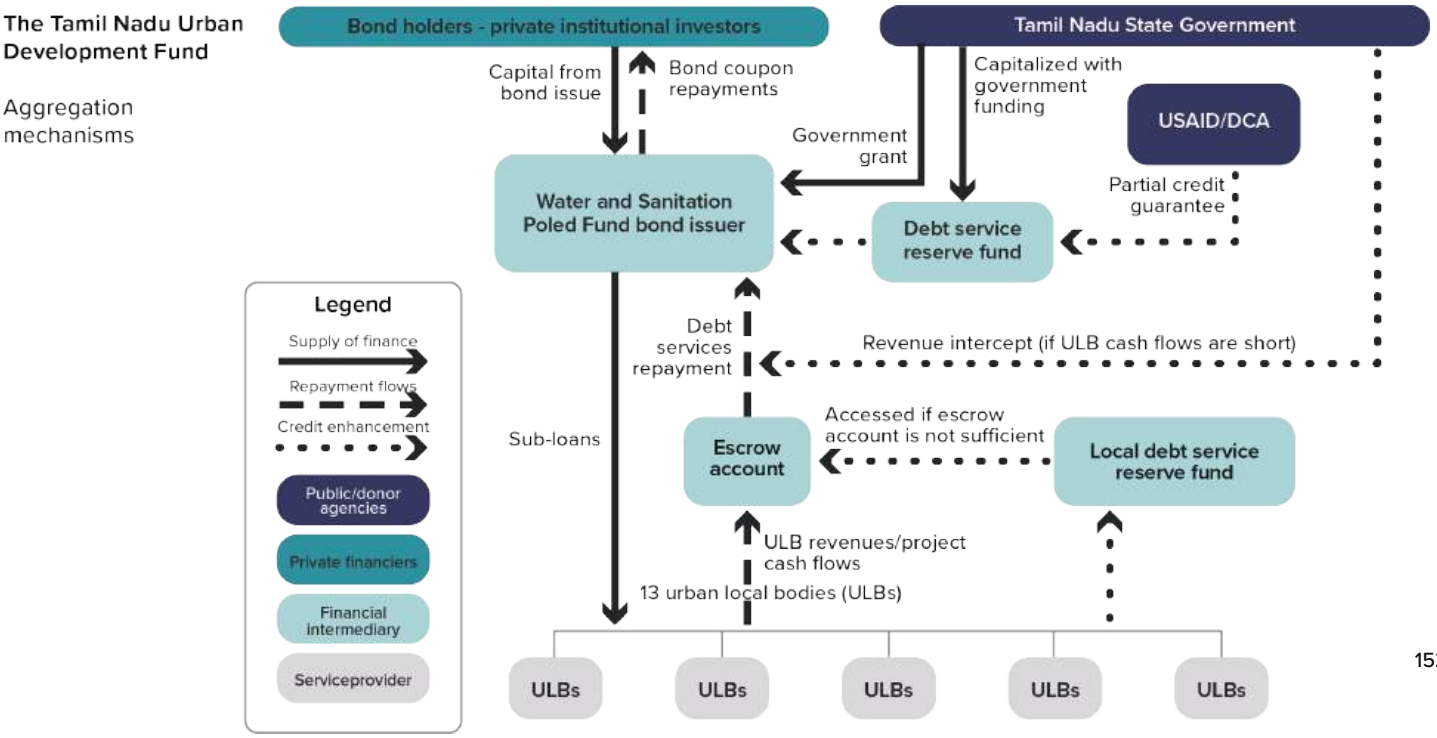
Enhancing water supply systems can help withstand climate impacts. Investments in resilient water resources can involve a wide range of potential implementing entities, from large-scale government providers and, potentially, private investors in projects such as surface water capture, water treatment and desalination, through to small-scale rainwater capture and water-saving investments by households.

The financing of water supply and sanitation (WSS) investment requires a varied approach because, as discussed above, the circumstances of large cities and those of smaller urban areas are widely divergent. Revenue streams from the reduction of non-revenue water and potentially from GHG mitigation and energy savings provide the basis of financing. Loans and corporate project bonds are likely viable instruments in the former case, while financing mechanisms that can accommodate the smaller scale and geographically diverse nature of many of investments, such as general obligation bonds and aggregated "facility" mechanisms, perhaps supported by guarantees (such as the TNUDF water bonds example below), will be required in the latter case. Support from IFIs will be critical here as significant project structuring expertise and the establishment of dedicated financing facilities is needed, particularly in countries with limited and medium capital market optionality. Two examples of approaches to financing WSS investments in smaller local governments are provided below.

Tamil Nadu Urban Development Fund (TNUDF), India: Water and Sanitation Pooled Fund. The capacity to aggregate smaller WSS investments has been developed by the TNUDF over many years. It has long had a pooled lending instrument that has provided loans to groups of smaller cities. Lending based on its balance sheet still predominates in its portfolio, but it has also set up a Water and Sanitation Pooled Fund capitalized by bond issuance taken up by Indian institutional investors. The projects were selected by 13 small and medium-sized urban local bodies (ULBs). The fund has a separate management structure managed by banks. There is a debt service reserve fund capitalized by the state government, individual ULB escrow accounts and debt service reserve funds, a state revenue intercept mechanism, and a USAID partial credit guarantee for the bonds.

Given the success of this transaction, similarly structured bonds were issued in the states of Tamil Nadu and Karnataka. In 2006, the Government of India established a central government office accountable for scaling up pooled funds across India at the state level. This office, the Pooled Finance Development Fund Scheme, was intended to provide credit enhancement facilities to ULBs based on their creditworthiness, enabling them to access market borrowings through these state-level pooled funds. Figure A.4.4 shows the structure of the TNUDF.

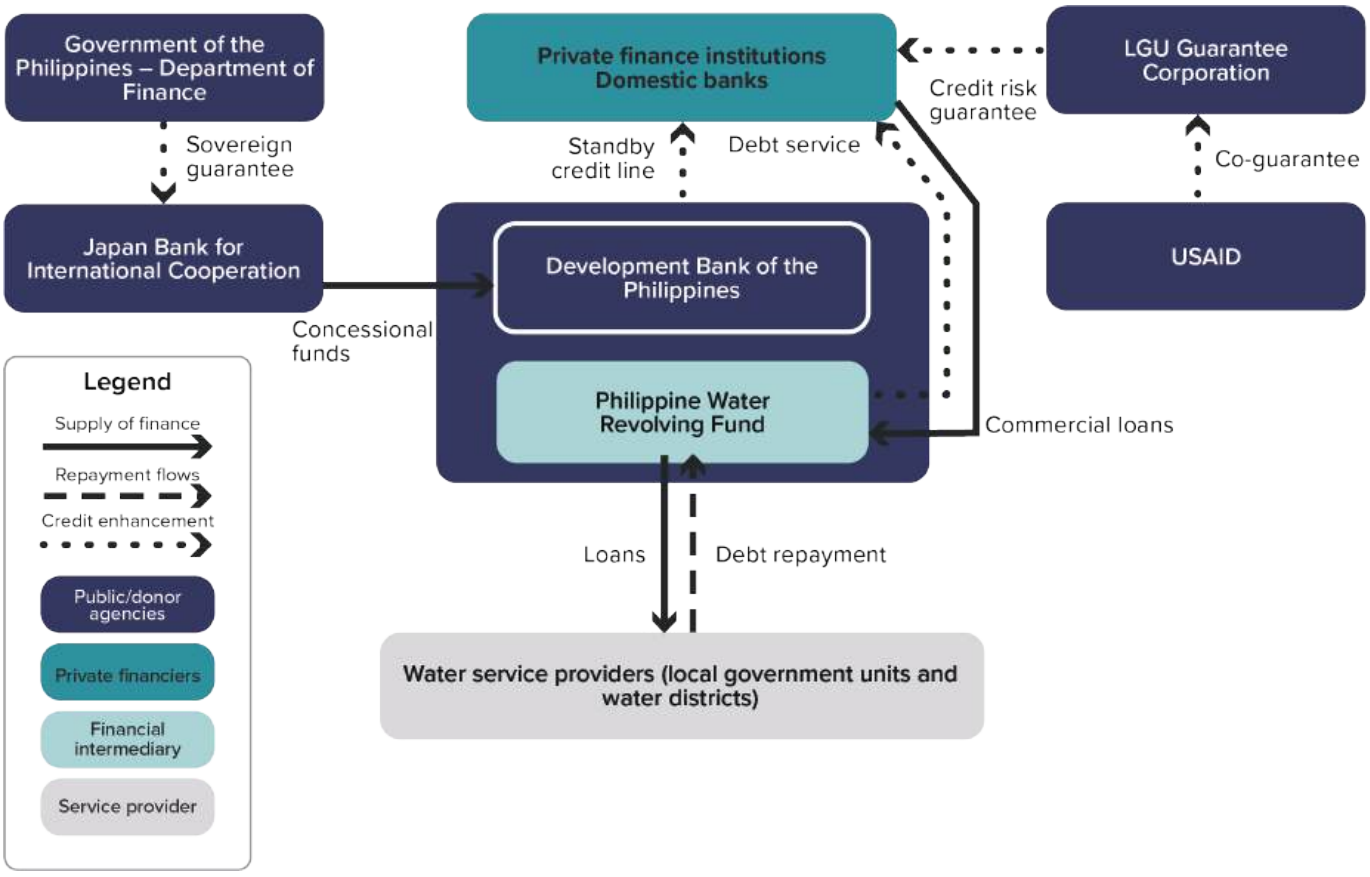
Figure A.4.4: Structure of the Tamil Nadu Urban Development Fund



Source: Adapted from FMDV (2021). Cities Climate Finance Leadership Alliance: Aggregation of Cities Climate Investments.

Philippine Water Revolving Fund. The fund lends concessional funding sourced originally from JBIC through the Development Bank of the Philippines, blending it with funds from domestic private commercial banks to be lent out in support of water projects. The average financing ratio has been about 50 percent to 75 percent from a Development Bank of the Philippines/JBIC loan, and 25 percent to 50 percent from private lenders. Again, a guarantee instrument is used to catalyse the participation of private financial institutions by mitigating credit risk (see figure A.4.5).

Figure A.4.5: Structure of the Philippine Water Revolving Fund



Source: Adapted from World Bank (2016). Case Studies in Blended Finance for Water and Sanitation: Water Revolving Fund in the Philippines.

A.4.3.2 Agriculture and fisheries

Agriculture, aquaculture/fisheries and forest projects can increase resilience and reduce emissions through better food production solutions and reducing food loss and waste, while halting deforestation and restoring degraded woodlands and wetlands improves air quality, increases water supply, boosts biodiversity, bolsters food security and improves rural economies.

Sustainable agriculture practices help in adapting to changing conditions. Vertical farming and hydroponics solutions in cities can reduce emissions and bolster resilience, and these have often been pioneered by the private sector and research institutions. Afforestation and sustainable agriculture may, thus, be a significant market for financial institutions. Afforestation and sustainable agriculture/aquaculture can involve a wide range of potential investing entities, from large-scale government and private entities investing in infrastructure and supply chains through to small-scale informal farming households that will require the use of aggregation mechanisms and instruments and significant outreach costs. The following are two examples of private sector agriculture-focused funding mechanisms.

ARCH Cold Chain Solutions East Africa Fund (CCSEAF)[173] is managed by the United Kingdom-domiciled emerging market specialist firm, ARCH Emerging Markets Partners. The fund's primary objective is to reduce food loss, increase food security and improve economic development across Africa. The fund focuses on designing, building and operating multi-purpose, state-of-the-art, temperature-controlled storage facilities across East Africa. Each facility in the region will be complemented by a fleet of temperature-controlled trucks that will assist with maintaining the end-to-end cold chain through inner-city and long-haul routes, transforming the landscape of East Africa's supply chain and logistics industry. The fund size is $81 million, and the investors/limited partners include the European Investment Bank.

Climate-Smart Rice Project in the Upper Pampanga River Integrated Irrigation System—Alternate Wetting and Drying (AWD) Investments in the Philippines. The National Irrigation Administration and Ostrom Climate Solutions, a Canadian climate-solutions firm, are collaborating on the Upper Pampanga River Climate-Smart Rice Project—an initiative that supports sustainable rice production and improved farmer livelihoods across Central Luzon in the Philippines.

The project promotes the use of AWD technology, a proven, climate-smart irrigation technique that enhances water-use efficiency and significantly reduces methane emissions from irrigated rice cultivation. The project aims to promote wide-scale and sustained adoption of AWD technology throughout the Upper Pampanga River Integrated Irrigation System through capacity-building activities and financial incentives for farmer-partners.

AWD technology involves changes in traditional continuously flooded irrigation methods, allowing rice fields to dry out to depths of 12–15 cm below the soil surface before re-flooding the field. This practice does not negatively impact crops and allows for a 16 percent to 30 percent reduction in water use, which allows for wider distribution of water in the region during periods of drought, and significantly lowers the methane emissions produced by rice farming.

Ostrom Climate provides ongoing technical assistance, monitoring and training through farmer field schools on water, nutrient, pest and harvest management. In partnership with the National Irrigation Administration and local irrigators' associations, the project contributes to improved sustainability and efficiency in rice

173 Burwood-Taylor, L., S. Devermann and D. Zook (2024). Climate Capital: Financing Adaptation Pathways for Smallholder Farmers. ISF and AgFunder.

production while generating verifiable emission reductions under internationally recognized carbon standards.

Another example is the **Strengthening the Resilience of Smallholder Agriculture to Climate Change-induced Water Insecurity Project in Viet Nam**. Implemented by the Ministry of Agriculture and Environment with support from GCF, ADB and the Government of Viet Nam, the project aims to improve water security, agricultural productivity and the adaptive capacity of smallholder farmers—particularly poor, near-poor, ethnic minority and women farmers—in the Central Highlands and South-Central Coast regions. Key outcomes include climate-resilient water infrastructure, improved water resource management and the adoption of climate-resilient agricultural practices.

The project combines multiple financing instruments. GCF grants of $30.2 million support last-mile water infrastructure, irrigation systems, climate-resilient ponds and agriculture for vulnerable smallholders, alongside a voucher scheme and technical support to help farmers access credit, markets and climate services. ADB concessional loans of $84.8 million finance large-scale modernization of irrigation infrastructure, with GCF co-financing ensuring smallholder connectivity. The Government of Viet Nam contributes $23.2 million in public co-finance for water connections, rain-fed storage and farmer assistance.

Microfinance also plays an important role in financing sustainable agriculture. For example, the **Al-Amal Microfinance Bank (AMB)**, a non-profit bank operating in Yemen and the Middle East and North Africa region, has actively supported small-scale farmers in building resilience to climate impacts through its support for sustainable agriculture under its Green Banking Initiative. It is supported by a range of international partners, including the European Union and IFC. Since 2018, it has been offering an agricultural loan product that targets small-scale farmers—both agricultural and livestock producers—by providing essential tools and supplies, such as solar-powered irrigation pumps and systems, greenhouses, seeds, fertilizers and improved livestock. This initiative was implemented in partnership with a network of specialized suppliers contracted by AMB to ensure the delivery of high-quality products and services. AMB introduced tailored solutions to reduce the cost of financing these products and services by offering Islamic financing options, including Qard Hasan (interest-free loans), in addition to Murabaha financing at rates that are among the lowest across AMB's services. These interventions (over 1,800 loans) have had a positive impact on job creation, generating an estimated 2,640 jobs.[174]

A.4.3.3 Health

Financing health involves financing a wide range of investment types, as discussed in chapter 3, and thus a range of modalities appropriate to the stakeholders. This financing also needs to take into account revenue streams from health insurance schemes and other potential public service obligations from the government. In addition, as we have seen in the example of the Bendigo Hospital Project provided in annex 3, section A.3.3, there are significant potential commercial revenues associated with land and other development in and around the hospital. Two examples are provided at opposite ends of the scale—one very local and the other global.

Foundation S Health Resilience Grants.[175] The Health Resilience Fund established by Foundation S aims to support women and strengthen local resilience against the health impacts of climate change in low- and middle-income countries. The priorities for funding focus on programmes that are informed and implemented by communities and that seek to address both the current and future impacts of climate crisis on community health. The current

174 Al-Amal Bank (2024). Al-Amal Microfinance Bank's Interventions in Supporting Sustainable Agriculture amid Green Banking Initiative.

175 Sanofi (2024). Investing in a Healthier Future for Climate Resilience 2024.

call for proposals will support programmes and interventions that focus, at least, on one of the following three priority areas: women-centred climate adaptation and resilience; resilient local systems for health in lower- and middle-income countries; and innovation and data-driven interventions for climate adaptation and health resilience. Applicants can be community-based organizations; local NGOs or networks of civil society organizations; national, regional or international NGOs; and consortium and multi-actor platforms that support local responses and community adaptation. The foundation will support projects for one to two years at a funding level of euros €50,000 to €100,000.

Green Climate Fund and World Bank Cooling Facility.[176] The Cooling Facility is an innovative, multi-sector and multi-country programmatic financing mechanism to help address the key sustainable development challenge of providing access to cooling while minimizing negative climate impacts. The Cooling Facility will support projects that meet its criteria in the following cooling target areas (in either grid or off-grid contexts): (i) space cooling and cool/green surfaces (including passive cooling strategies in the built environment and cooling equipment; (ii) building automation and controls, as well as solar and vegetative roofs and walls; and (iii) refrigeration, cold chains and logistics (including refrigeration, storage and distribution activities, along with the associated equipment and logistics). The project components are: Component 1—policy, regulatory and enabling environment support ($91.6 million, of which $15.7 million is a GCF grant); Component 2—financing for cooling investments ($769.04 million, of which $141.3 million is from GCF funds—$125 million in loans and $16.3 million in grants); and Component 3—project management ($19.2 million, to which GCF is not contributing).

The facility will provide critical support to the transition to sustainable cooling through the mobilization of approximately $879.8 million in financing (including both GCF and IBRD/IDA). It is expected to avoid or reduce over 9.1 million tonnes of carbon dioxide-equivalent over the 10-year implementation period of the facility (a reduction that would reach 16.2 million tonnes of carbon dioxide-equivalent over the 27-year lifespan of the facility's underlying assets), strengthen local capacities, policy and regulatory environments to mainstream and support sustainable cooling, facilitate countries' efforts to meet NDCs and, importantly, reach approximately 4.2 million direct beneficiaries across the four countries most vulnerable to extreme heat risk hazards (Bangladesh, El Salvador, Malawi and Somalia).

A.4.3.4 Ecosystems and biodiversity

Biodiversity and conservation investment often requires the financing of commercial entities, government-provided infrastructure and community-level initiatives, each requiring different financing mechanisms. It is necessary to address the needs of these groups and even the needs within groups, as financing needs may vary—for example, the needs of ecotourism developers and corporates investing in the sustainable use of forest products may differ. Many of the projects could have diverse revenue streams, such as carbon credits from dual-benefit projects (see the discussion on carbon markets in chapter 4, section 4.3) and PES payments. Support for such projects is available, and an example is set out below.

Blue Natural Capital Financing Facility (BNCFF) of the International Union for the Conservation of Nature (IUCN).[177] Blue natural capital (BNC) is the natural capital found in coastal and marine environments—in ecosystems such as coral reefs, mangroves and seagrass beds. BNC ecosystems provide invaluable ecosystem and biodiversity services, resources and livelihoods to local communities. They also sequester carbon from the atmosphere but are sources of significant

176 GCF (2021). FP177: Cooling Facility.

177 IUCN (2021). IUCN's Blue Natural Capital Financing Facility Showcases How Conservation Projects Can Move Towards Becoming Sustainable Businesses with Investment Appeal. 28 October.

carbon emissions if destroyed. Since its launch in 2018, the BNCFF has supported a wide variety of marine and coastal conservation projects, with a high climate impact, on their path to becoming sustainable, climate resilient BNC businesses that are appealing to private investors.

Investment in sustainable coastal protection and management brings tangible benefits to local communities that are often heavily dependent on the health and abundance of marine resources. Together with partners, IUCN is building the business case for investing in oceans. It works with projects on the ground to develop sustainable businesses with private investor appeal and support the broader finance and conservation community with valuable lessons on investment opportunities.

The facility supports the development of sound, investable BNC projects with clear ecosystem service benefits, based on multiple income streams and appropriate risk-return profiles. The BNCFF is managed by IUCN and funded by the Government of the Grand Duchy of Luxembourg. The IUCN also manages the Blue Carbon Accelerator Fund, which supports the development of blue carbon restoration and conservation projects in developing countries and helps pave the way for private sector finance. It is funded by the Australian government.

Global Fund for Coral Reefs (GFCR).[178] The GFCR is an example of a multi-partner blended finance instrument designed to raise at least $500 million in capital by 2030. It operates through two primary financial mechanisms: the GFCR UN Fund, managed by a global UN team including UNDP, and the private sector-led GFCR Equity Fund, managed by Pegasus Capital. The GFCR UN Fund provides grants, technical assistance and concessional finance through on-site partners, while the GFCR Equity Fund invests in commercial projects and companies with "reef-positive solutions". As a blended finance vehicle, the Equity Fund includes a junior anchor investment from GCF.

A.4.3.5 Livelihoods and industries

Industry can increase its resilience by investing in the means to minimize climate impacts—including local drainage, flood control and coastal protection—by increasing self-sufficiency, reducing the vulnerability of supply chains and lowering emissions through the adoption of passive or renewable energy-based heating and cooling systems and improvements in process energy efficiency. Incentives or inducements may be required to speed up the process.

Catalytic Capital for First Private Investment Fund for Adaptation Technologies in Developing Countries (CRAFT) is an example of a private sector initiative to address such issues.[179] CRAFT will allow the Investment Fund to scale up adaptation finance and accelerate the development, application and transfer of private sector technologies in climate adaptation and resilience, particularly in the context of promoting green recovery from COVID-19. Implemented with Pegasus Capital Advisors, the programme supports investment in six technologies (agricultural analytics, water harvesting and irrigation, food systems, geospatial mapping and imaging, catastrophe risk modelling and supply chain analytics) in six countries in Africa, Latin America and the Caribbean. GCF contributed $100 million in subordinated equity to a total fund allocation of $400 million, with the remainder being provided by private investors.

Resilient economic activity involving investments in "green building" and sustainably sourced products may require new approaches to financing developers and building systems providers, and will also require different approaches to financing household purchases and upgrades.

Supporting livelihoods will also require support for industry transitions away from maladaptive

178 See Global Fund for Coral Reefs website.

179 GCF. FP181: CRAFT - Catalytic Capital for First Private Investment Fund for Adaptation Technologies in Developing Countries.

activities (for example, overfishing). In this context, there are major differences in the capacities of large-scale enterprises compared with SMEs. An example of a financing facility addressing transition issues is the Newfoundland and Labrador Green Transition Fund, which provides financial support to businesses, organizations, post-secondary institutions and industry associations to assist with the province's transition to a green economy. The programme will de-risk commercial and non-commercial activities that facilitate collaboration, investment and industry growth required for the transition. The Green Transition Fund targets the greening of commercial operations in traditional sectors and the development of new opportunities related to the growth of a green economy. The programme supports research and development projects related to green transition and green economy supply chain improvement. The programme also includes streams for projects led by Indigenous and rural proponents that are focused on a green economic transition.[180]

A.4.3.6 Cultural heritage (including displacement and migration)

As discussed in chapter 3, climate change can have severe impacts on both urban and rural populations, with poor people being particularly vulnerable as they are likely to be living in areas of most risk. Financing the resilience of such communities is complex because the threats they face manifest through both physical impacts and on livelihoods. Financing national, state/provincial and local government programmes requires consideration of the need to provide significant resources for community engagement—usually through NGOs, which in turn may need capacity-building. ADB's StepUp programme is an example of such support and of the need to provide the means to finance households in a flexible way.[181] Its use of homeowner association-managed revolving funds provides an example of such decentralized financing, which often has a pivotal role in providing services to vulnerable groups. Larger adaptation-focused funds are also available.

The Livelihoods initiative is building the resilience of rural communities by taking a practical, holistic approach to sustainability, working at the intersection of climate action and sustainable sourcing, providing rural communities with dependable livelihoods based on regenerative agriculture and nature-based solutions, reducing rural-urban migration and helping businesses achieve their net-goals while transforming their supply chains for the future.[182] The initiative invests in large-scale projects in Africa, Asia and Latin America to empower smallholder farmers and rural communities, restore ecosystems and contribute to platforms providing the means to restore or preserve ecosystems that are degraded or threatened, by mobilizing innovative investment vehicles for environmental goods and services, sustainable agriculture markets and carbon-offset mechanisms. The Livelihoods Funds (both LCF & L3F) are advised by Livelihoods Venture, a social business based in Paris. Livelihoods Venture has the responsibility of identifying, designing and accompanying projects that are implemented by local project developers, which most of the time are well-established local NGOs that have been working closely with rural communities to empower them to be positive drivers of change.

The funds are supported by private companies who are committed to generating positive impact by offsetting their unavoidable carbon emissions and transforming their supply chains through sustainable and transparent agricultural models. All investors work together to share business knowledge and investment risks for project implementation and maintenance during the whole duration of the projects, around 10 to 20 years. The companies that support Livelihoods

180 Government of Newfoundland and Labrador, Canada. Green Transition Fund Program.

181 ADB (2000). Grant Assistance (Financed from the Japan Fund for Poverty Reduction) to the Republic of the Philippines for Supporting the On-site Integrated Urban Upgrading for Vulnerable Slum Communities of Payatas Project.

182 See Livelihoods website.

Funds provide their expertise and are closely involved in governance, along with the project developers, farmers and local communities in Asia, Africa and Latin America.

A.4.3.7 Human settlements and infrastructure

Climate-resilient human settlements will require building homes with improved resource use, cooling and/or heating and better insulation, investments by businesses in low-carbon processes and resilience, and infrastructure that is both resilient to climate impacts and reduces the climate impact of the settlements (i.e. low-carbon development). The financing of these investments (and incentives for appropriate development) is thus a priority.

Retrofitting existing infrastructure and buildings is potentially complex and expensive but necessary. Balancing short-term costs with long-term benefits is essential. For example, the financing of flood control and coastal protection investments often requires a mix of public action (such as tax increases), and ring-fencing of resultant revenue streams—through mechanisms such as land leases, land value capture and betterment levies—together with systems to procure developers to deliver appropriate amenities.

Governments and urban planners play a key role in promoting climate-resilient infrastructure, where collaboration between public and private sectors is essential. Financing mechanisms that cater to a wide range of stakeholders—from governments to private developers and individual households—are critical. Such financing will need to take into account the large range of business models possible in this field (see chapter 3). A range of financing sources is available, however.

The Economic Resilience Initiative (ERI) Fund[183]

of EIB aims to support resilient and inclusive growth in Europe's Southern Neighbourhood and the Western Balkans. Donor contributions help unlock investments that can create new opportunities in the regions, especially for vulnerable groups, including young people and women. The ERI Fund, capitalized by nine European countries, presents an opportunity to leverage the full range of instruments, networks and expertise at EIB's disposal to maximize the development impact in the affected regions and work towards achieving the Sustainable Development Goals. The ERI Fund was established under the EIB-managed Partnerships Platform for Funds. It is expected to generate over 70,000 sustainable jobs and provide over 30,000 loans for micro and small businesses. It will upgrade infrastructure to provide better sanitation services for 740,000 people and safe drinking water for 465,000 people, with another 65,000 people benefitting from other improvements to urban infrastructure and services.

In terms of financing sustainable infrastructure, there are many private funds. One example is the **EdenTree Green Infrastructure Fund**,[184] which aims to generate income with the potential for capital growth by investing in infrastructure-related companies around the globe that demonstrate positive environmental impact. The fund is on its second round of financing, with £48.11 million in funds (as of August 2024). As with most private funds, the fund is heavily invested in renewable energy but is open to other types of investments.

In relation to specifically urban projects, **EBRD's Green Cities initiative**[185] is an example of a programmatic approach to a multi-country, multi-sector regional facility. EBRD has established a Green Cities Facility, which will be capitalized at around €3.7 billion and aims to address cities'

183 European Investment Bank. Economic Resilience Initiative Fund.
184 EdenTree. Edentree Green Infrastructure B; EdenTree Green Infrastructure Fund.
185 See EBRD Green Cities website.

climate change challenges while building the market case for private-sector investment in sustainable urban infrastructure. In addition to its main investment function, the facility has four technical assistance components that: deliver policy and strategy support to cities to assist them in prioritizing actions through Green City Action Plans; facilitate green city infrastructure investments; build capacity of the key stakeholders; and facilitate and provide a pathway for cities to access green finance and capital markets via the Green Financing Roadmap. The facility offers concessional financial instruments, with GCF contributing €228 million in loans and grants.

Photo: UNDP Kenya

Annex 5.
Potential development partners

INVESTOR	Green Climate Fund (GCF)	
INVESTOR TYPE	Multilateral climate fund—UNFCCC climate fund	
MAIN INVESTMENT OBJECTIVE This fund provides a 50:50 balance between mitigation and adaptation investments over eight strategic result areas: energy generation and access; transport; buildings, cities, industries, and appliances; forests and land use; health, food and water security; livelihoods of people and communities; ecosystems and ecosystem services; and infrastructure and the built environment.		
REGIONAL FOCUS	TYPES OF FUNDING MECHANISMS	KEY ELIGIBILITY CRITERIA
GCF has no regional focus. All developing country Parties to the Convention are eligible for funding.	Grants, loans, equity, result based payments and guarantees	A country is required to be a developing country (non-Annex I) Party to the UNFCCC. Accredited entities are eligible for support.
APPLICATION PROCEDURE Private, public, non-governmental, sub-national, national, regional, or international organizations may apply to become GCF Accredited Entities, having shown proven capacity in driving transparent climate finance resource management. An Accredited Entity can apply for funds in cooperation with GCF National Designated Authority or Focal Point. Accredited Entities must formulate and submit a project proposal to the GCF, which is then revised on three levels before receiving approval by the Board. The project proposal must include a signed “no-objection letter” from the National Designated Authority of Focal Point of each country for the review to start. The letter indicates an official approval of the national authority for the project. Proposals are accepted on a continuous basis.		

Photo: Manuth Buth/UNDP Cambodia

AGENCY	Special Climate Change Fund (SCCF)	
AGENCY TYPE	Multilateral climate fund—UNFCCC climate fund	
MAIN INVESTMENT OBJECTIVE The SCCF prioritizes adaptation projects related to water resources management, land management, agriculture, health, infrastructure development, fragile ecosystems (including mountainous ecosystems), integrated coastal zone management, and early warning systems. Mitigation projects are also supported in selected sectors including energy, transport, industry, agriculture, forestry and waste management, and economic diversification. Furthermore, this fund promotes technology transfer, including research demonstration and deployment projects for climate change adaptation and mitigation. SCCF is managed by GEF and operates in parallel with the Least Developed Countries Fund (LDCF).		
REGIONAL FOCUS	TYPES OF FUNDING MECHANISMS	KEY ELIGIBILITY CRITERIA
SCCF funds national and regional projects for all developing countries to address climate change.	Grants	Unlike the LDCF, all developing country Parties to the UNFCCC are eligible to obtain financing from SCCF.
APPLICATION PROCEDURE Project proposals are developed by an Implementing Agency or GEF, which must be endorsed by a National Focal Point prior to submission to and endorsement by the GEF chief executive officer. Furthermore, the grants need to be matched by cofinancing, provided by the grant-seeker.		

AGENCY	Mitigation Action Facility (MAF)	
AGENCY TYPE	Multilateral climate fund—other	
MAIN INVESTMENT OBJECTIVE MAF provides technical support and climate finance for ambitious mitigation projects, with an aim of decarbonizing key sectors of the economy and society, focusing on projects designed to implement , NDC's and long-term strategies that are central to meeting the Paris Agreement goals. The Facility primarily focuses on three priority sectors—energy, transport and industry, but remains open to cross-sectoral projects linked to one of the priority sectors. These sectors cumulatively account for more than 40 GtCO2e, or 67% of global annual GHG emissions (as of 2021). The facility encourages projects that can catalyse sector-wide transformational change.		
REGIONAL FOCUS	TYPES OF FUNDING MECHANISMS	KEY ELIGIBILITY CRITERIA
MAF does not have a regional focus, with all LDCs being eligible for funding.	Grants (TA and investment), concessional loans and guarantees	MAF is open to, and has funded, international NGOs, national agencies (e.g. development banks), private sector entities and international organisations working in developing countries. There are no specific organizational requirements. Regional projects are also eligible if submitted by qualifying agencies.
APPLICATION PROCEDURE There is a yearly Call for Projects. Project Concepts and subsequent Project Outlines can be submitted by: a) a national ministry (which must identify at the Project Outline Phase an Applicant Support Partner); and b) legal entities that comply with certain capacity and eligibility requirements and receive sufficient endorsement by the national government institutions relevant for the potential implementation of the project. The capacity and eligibility requirements are set out in the General Information Document for the Call. The application goes through several levels of assessment— from the project concept to project outline, proposal and award/implementation.		

AGENCY	CLIMATE INVESTMENT FUNDS (CIF)	
AGENCY TYPE	Multilateral climate fund—other	
MAIN INVESTMENT OBJECTIVE CIF is an enabler of pioneering climate-smart planning and climate action in low and middle-income economies, many of which are the least prepared yet the most prone to the challenges of climate change. CIF responds to the worldwide climate crisis with large-scale, low-cost and long-term financial solutions to support countries achieve their climate objectives. The current project focus is on clean technology, energy access, climate resilience and sustainable forests. Current programmes are: the accelerating coal transition investment programme; clean technology fund; global energy storage programme; the forest investment programme; industry decarbonization programme; nature people and climate programme; the pilot programme for climate resilience; the renewable energy integration programme; the scaling up renewable energy programme in low income countries; the smart cities programme; and the technical assistance facility.		
REGIONAL FOCUS	TYPES OF FUNDING MECHANISMS	KEY ELIGIBILITY CRITERIA
CIF does not have a regional focus, with all LDCs being eligible for funding.	Grants	All LDCs that are part of a programme put forward by eligible MDBs.
APPLICATION PROCEDURE CIF works exclusively through five MDBs to mobilize investments to pilot and scale cutting-edge climate solutions. Projects are generally pipelined through these agencies' country partnership programmes. The application process can happen at two levels. The first is suggesting a new programme (such as a Pacific SIDS regional programme), which is a longer process and requires bringing together a group of countries and an additional step in approvals—a review by an independent expert group. The other alternative is to join an existing programme.		

AGENCY	Adaptation Fund (AF)	
AGENCY TYPE	Multilateral climate fund—UNFCCC climate fund	
MAIN INVESTMENT OBJECTIVE The Adaptation Fund prioritizes adaptation and resilience projects tailored to local needs, ranging from disaster risk management, sustainable urban and rural development, and the sustainable management of coastal areas, agriculture, forests, and food and water security.		
REGIONAL FOCUS	TYPES OF FUNDING MECHANISMS	KEY ELIGIBILITY CRITERIA
No specific regional focus, but focuses on developing countries particularly vulnerable to the adverse effects of climate change.	Grants	To access the Adaptation Fund, it is required to be a developing country that is a Party to the Kyoto Protocol, and is particularly vulnerable to the adverse effects of climate change. Applicants are usually national government agencies, but civil society organizations can be included in the project implementation.
APPLICATION PROCEDURE To apply for funding, countries must submit a proposal through an accredited entity, either a National Implementing Entity, Regional Implementing Entity, or Multilateral Implementing Entity. The proposal must be endorsed by the designated national authority and receive approval by the AF Board upon review according to a set specific approval criteria. Proposals are accepted three times a year.		

AGENCY	International Fund for Agricultural Development	
AGENCY TYPE	Multilateral climate fund—UNFCCC climate fund	
MAIN INVESTMENT OBJECTIVE IFAD is an international financial institution and specialized United Nations agency. This fund promotes agricultural growth that is environmentally sustainable and integrated into ecosystems with a focus on adaptation and increasing resilience, in addition to agricultural mitigation actions, as well as cross-cutting aspects including rural development, water, youth, gender and indigenous people, among others.		
REGIONAL FOCUS	TYPES OF FUNDING MECHANISMS	KEY ELIGIBILITY CRITERIA
There is no regional focus as it is available to all developing countries.	Grants, concessional loans, blended finance and debt sustainability frameworks	The resources of the fund are available for financing for developing Member States.
APPLICATION PROCEDURE The projects and programmes financed by the fund are evaluated by the Executive Board based on a series of policies and criteria before receiving endorsement, depending on the nature of the grants and/or loan.		

AGENCY	Nordic Environment Finance Corporation (NEFCO)	
AGENCY TYPE	Multilateral finance institution—other	
MAIN INVESTMENT OBJECTIVE NEFCO is an international financial institution that was founded in 1990 by the five Nordic countries of Denmark, Finland, Iceland, Norway, and Sweden to take concrete actions to accelerate the green transition. It finances small and medium-sized, public-sector projects in Eastern Europe using concessionary loan financing, and blending loan financing with grant funding from Nordic governments, the European Union, and other countries. It offer special green transition funds for international development initiatives. Furthermore, it supports results-based or grant programmes at a global level in partnership with GFC		
REGIONAL FOCUS	TYPES OF FUNDING MECHANISMS	KEY ELIGIBILITY CRITERIA
Supports finance in Eastern Europe.	Loans, equities, buyer credits, grants, results-based financing, technical assistance and concessional loans	NEFCO only finances projects that will generate positive environmental and climate-related impacts.
APPLICATION PROCEDURE The normal process for public sector procurement involves the following steps: notification of opportunities for tendering; prequalification when appropriate; invitation to tender and issuance of tender documents; receipt of tenders, evaluation of tenders, and contract award; and contract administration.		

AGENCY	UN Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (UN REDD Programme)	
AGENCY TYPE	Multilateral finance institution—other	
MAIN INVESTMENT OBJECTIVE The UN REDD Programme aims to reduce emissions from deforestation and enhance carbon sinks from forests while contributing to sustainable development at the national level. It supports nationally led REDD+ processes and promotes the informed and meaningful involvement of all stakeholders.		
REGIONAL FOCUS	TYPES OF FUNDING MECHANISMS	KEY ELIGIBILITY CRITERIA
UN REDD does not have a specific regional focus and supports developing countries globally.	Grants	Countries are required to be a partner country of the UN-REDD Programme, achieving regional balance, enhanced coordination with other initiatives, the ability of UN agencies to assist the country, the ability to demonstrate progress or results in the short term based on REDD+ early action, REDD+ potential, and commitment to applying the principles of the UN-REDD Programme.
APPLICATION PROCEDURE National governments, regional development banks, and NGOs can receive funding through participating UN organizations, acting as executing agencies. An applicant usually applies at the UNDP country office. If there is no UNDP country office, then the application can be made to FAO or UNEP country offices. The UN-REDD Programme is not an exclusive UN mechanism. National governments, regional development banks and NGOs can receive funding through one of the participating UN organizations by acting as executing agencies.		

AGENCY	UK Foreign, Commonwealth and Development Office (FCDO)/UK International Climate Finance	
AGENCY TYPE	Bilateral development assistance institution	
MAIN INVESTMENT OBJECTIVE While FCDO is the lead agency for development cooperation, the United Kingdom's climate finance initiative is also undertaken by two other government agencies—the Department for Business, Energy and Industrial Strategy (BEIS) and the Department for Environment Food and Rural Affairs. The International Climate Finance (ICF) initiative addresses climate change globally by:(i) building the resilience of the poorest people and communities, supportings countries to prepare for and adapt to climate change, improving how disasters are managed and reducing the harm they cause and the costs of responding; (ii) working to ensure that the vast expansion in infrastructure in developing countries is low carbon and climate resilient, using finance to build capacity and unlock greater flows of private finance towards clean growth, bringing down the costs of a global low-carbon transition in the process; and (iii) supporting work to halt deforestation and create new supply chains that are both profitable and sustainable. ICF helps communities to use land in ways that reduce emissions and improve productivity whilst protecting and restoring forests that support important biodiversity and fragile eco-systems.		
REGIONAL FOCUS	TYPES OF FUNDING MECHANISMS	KEY ELIGIBILITY CRITERIA
ICF has no specific regional focus and has supported initiatives in Latin America, Africa, and Asia and the Pacific.	Grants and concessional loans	International agencies and state and nonstate entities, including NGOs, are eligible for funding.

APPLICATION PROCEDURE There is currently no direct route through which an organisation outside of the UK Government can independently develop a project to be considered for development or ICF funding. It is recommended that in-country project sponsors apply to the current delivery partners or FCDO or BEIS representatives within UK embassies and High Commissions to enquire about funding.

AGENCY	**Swiss Agency for Development and Cooperation (SDC)**	
AGENCY TYPE	Bilateral development assistance institution	
MAIN INVESTMENT OBJECTIVE SDC aims to contribute to a world that is free from poverty and is peaceful. SDC seeks sustainable development pathways and is guided by several themes, including agriculture and food security, disaster risk reduction, emergency relief, reconstruction and protection, climate change and the environment, and water. Within the thematic area of climate change and the environment, the priority sectors are sustainable forestry, energy supply, climate change adaptation, mountainous regions and funding climate protection.		
REGIONAL FOCUS	TYPES OF FUNDING MECHANISMS	KEY ELIGIBILITY CRITERIA
SDC has a list that identifies partner countries and regions, including countries in Central America, Africa, the Middle East, and the South Caucasus.	Grants and concessional loans	State and nonstate entities, including NGOs, are eligible for funding.
APPLICATION PROCEDURE Apart from direct support or project implementation under SDC's mandate, NGOs from developing countries may receive support from SDC through partnerships with Swiss NGOs.		

AGENCY	**Dutch Entrepreneurial Development Bank (FMO)**	
AGENCY TYPE	Bilateral finance institution	
MAIN INVESTMENT OBJECTIVE FMO supports sustainable private sector growth in developing and emerging markets.		
REGIONAL FOCUS	TYPES OF FUNDING MECHANISMS	KEY ELIGIBILITY CRITERIA
There is no regional focus with FMO providing financing globally in developing and emerging markets.	Loans, syndicated loans, private equity, guarantees and capacity development	All countries on the OECD Development Assistance Committee country list, which contains all countries and territories eligible to receive official development assistance.
APPLICATION PROCEDURE Initial assessment focuses on country, investment plan, development impact, and FMO's role as the financier. If the financing opportunity meets the investment criteria, FMO continues to analyze the potential risks and challenges.		

AGENCY	Korean International Cooperation Agency (KOICA)	
AGENCY TYPE	Bilateral development assistance institution	
MAIN INVESTMENT OBJECTIVE KOICA focuses on bilateral projects of development cooperation between the Republic of Korea and other countries. Its main themes include economic development, energy and transport.		
REGIONAL FOCUS	TYPES OF FUNDING MECHANISMS	KEY ELIGIBILITY CRITERIA
Asia (including Central Asia) and the Pacific, but KOICA also has programmes in Africa and Latin America	Grants	Government and government-approved nongovernment entities.
APPLICATION PROCEDURE The embassy will provide guidance as to the priority areas of development cooperation with selected institutions and partners in the countries concerned. Subsequently, it identifies potential budget and available assistance for particular measures and interventions.		

AGENCY	French Development Agency (AFD)	
AGENCY TYPE	Bilateral finance institution	
MAIN INVESTMENT OBJECTIVE AFD aims its funding at accelerating the transition to a fairer and more sustainable world by focusing on climate, biodiversity, peace, education, urban development, health and governance.		
REGIONAL FOCUS	TYPES OF FUNDING MECHANISMS	KEY ELIGIBILITY CRITERIA
It operates in Africa, Latin America, the Orients, and Three Oceans.	Loans, grants, and guarantees	Government and nongovernment entities.
APPLICATION PROCEDURE AFD posts calls for proposals and calls for projects. Panel members process and review applications once a call for projects has ended. Applications are shortlisted by the project partners, which are then submitted for review by the panel members.		

Annex 6.
Investment finance allocation process

As set out in chapter 5, section 5.2.2, a critical part of AFS preparation is the process of allocating available and potential financing to adaptation investment projects. This annex sets out that process.

A.6.1 Financing characteristics

The effective use of available financing options needs to take account of the characteristics of the financing instruments used. These will always differ, and these differences will likely make these instruments more or less attractive for use on a particular project or programme of investments. The advantages and disadvantages of particular sources and instruments of financing can be characterized and assessed for use in relation to several dimensions. These are the following:

- Cost of finance (including fees—the present value of these plus repayments gives the true cost of the finance);
- Counterpart financing requirements (how much does the city have to contribute?);
- Currency of financing—what is the foreign exchange risk? Can the city hedge[186] this?
- Are there guarantee structures available with the finance that will reduce the cost of finance and/or risk?
- Transaction costs of access, including those relating to staff time, consultant input, processing fees, etc.;
- Other "strings attached"—must/must not use contractors/suppliers from specific countries (financial/political cost?) and/or what sectors are allowed/disallowed?
- Who bears risk for project underperformance (especially in a PPP)?
- Cost of MRV—both financial management costs and monitoring for climate outcomes; and
- Time for approval—some institutions are slower to approve financing than others and, at least, this needs to be factored into programming for finance and, at worst, may preclude use of a source.

This annex sets out a process for such an assessment and the structuring and allocation of financing for an investment portfolio.

A.6.2 Fiscal assessment analysis

In the context of any extant macro-level INFF assessments[187] or IFF analysis either at the national[188] or sectoral level,[189] the key elements[190] of this analysis are:

- Assessing the existing fiscal space and likely impact of climate change on this space—this involves the identification of risks, quantification of risks (choosing a metric) and undertaking climate fiscal risk modelling;
- Devising a programme of Climate Fiscal Risk Management and the likely fiscal outcomes used for investment planning; and
- Feeding the results of the analysis into the climate finance strategy.

Although beyond the scope of the present document, the institution or institutions carrying

186 Insure against adverse currency movements.

187 See INFF website.

188 UNDP (2009). Methodology Guidebook for the Assessment of Investment and Financial Flows to Address Climate Change.

189 For sector methodologies see UNDP (2020). UNDP Methodology for Assessing Investment and Financial Flows.

190 Gonguet, F., C.P. Wendling and B. Battersby (2021). Climate-Sensitive Management of Public Finances—"Green PFM". IMF Staff Climate Note 2021/002. IMF.

out this analysis, usually including the ministry of finance, need a mandate and baseline of capacity to do so. IMF has provided useful guides and resources setting out the approach and methodologies needed.[191, 192, 193]

A.6.2.1 Risk modelling

In relation to climate fiscal risk modelling, the public financial management (PFM)[194] process needs to modify the process of macroeconomic projections to include climate impacts. Input–output, computable general equilibrium or dynamic stochastic general equilibrium models can be modified to include the primary and secondary impacts of climate on key economic variables and, in particular, the fiscal impacts of such change on sectors and the various government agencies. Given the variable nature of climate impacts, the results of this modelling should be subjected to sensitivity tests in order to assess the resilience of public finance. It is also necessary to assess how the risks to public finances may evolve over time. Given this basis, a strategy for fiscal risk management can be formulated.

Climate-related risks can impact fiscal health through a range of impact channels. Acute risks of flooding, extreme storms, drought and heatwaves can have high short-term physical and productivity impacts. Chronic risks of sea-level rise, temperature change, ocean acidification and desertification will also have these impacts—increasing over time. These impacts will have direct fiscal impacts:

- Macroeconomic shocks—sectoral and commodity price shocks and financial sector impacts;
- Implicit and explicit liabilities—relief costs, reconstruction costs, liabilities of SOEs and PPPs;
- Adaptation needs—infrastructure resilience (upgrading/retrofitting) and sector resilience (systems and changes in technology, such as new types of seeds); and
- Public services—increased costs of social safety nets, public health and education.

These impacts result in:

- Reduced taxation revenue, changes in resource rents (such as royalties from fisheries) and currency depreciation; and
- Increased government expenditures.

These can, in turn, impact other metrics that have flow-on negative impacts, such as debt-to-GDP ratios and increased volatility of revenue, which can impact credit ratings and raise borrowing costs.

The results of this analysis need to be broken down so as to determine the likely routine and investment budget implications for government sectoral agencies. These can be fed into the investment roadmaps referred to in chapter 2 and annex 2.

A.6.2.2 Climate planning and budgeting

The key areas involved, in addition to PIM are:

- Establishing the fiscal framework;
- Budget preparation;
- Budget execution, reporting and accounting; and
- Audit and scrutiny.

High-quality PFM and PIM processes determine the quality of investment preparation and execution. Improving these processes and the

191 Massetti, E. and M. Bellon (2022). Planning and Mainstreaming Adaptation to Climate Change in Fiscal Policy. IMF.
192 Aligishiev, Z., E. Massetti and M. Bellon (2022). Macro-fiscal Implications of Adaptation to Climate Change. IMF.
193 Bellon, M. and E. Massetti (2022). Economic Principles for Integrating Adaptation to Climate Change into Fiscal Policy. IMF.
194 ADB (2024). A Governance Framework for Climate-relevant Public Investment Management.

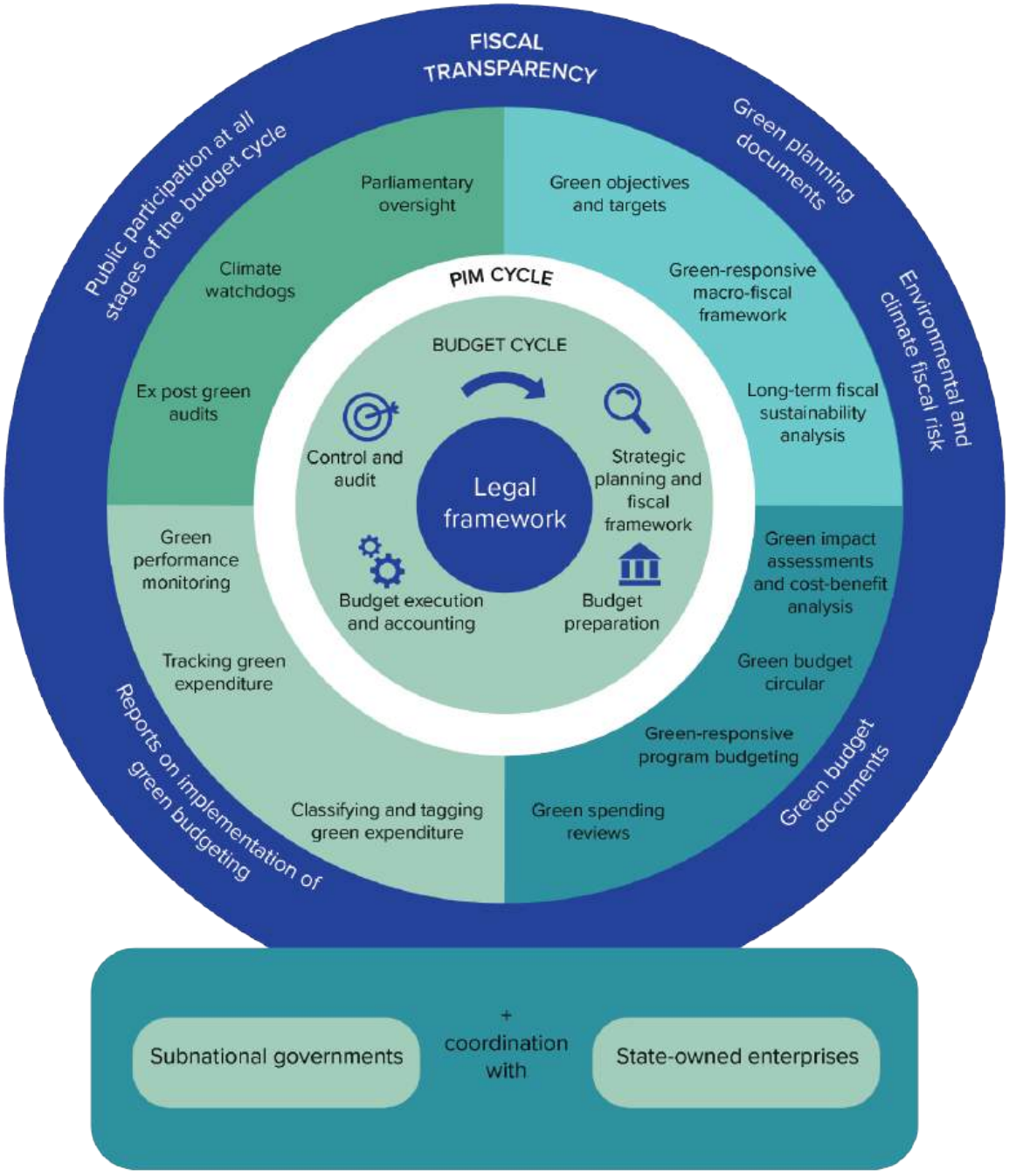
governance within them is critical to improving the quality of investment propositions and unblocking the deployment of climate finance. Estimates of more than one-third of the resources spent on creating and maintaining public infrastructure are lost because of poor management. Better management systems, in particular through improved governance within PFM and PIM processes, could recover more than half of the observed efficiency losses.[195]

PFM refers to the set of laws, organizations, systems and processes that governments employ to effectively manage their financial resources. Green PFM refers to the institutional arrangements in place to facilitate the implementation of fiscal policies that support climate-sensitive policies. Figure A.6.1 sets out the process and its climate linkages.

195 G. Schwartz et al., eds (2020). Well Spent: How Strong Infrastructure Governance Can End Waste in Public Investment. p. 1. IMF.

Photo: UNDP Bangladesh

Figure A.6.1: The green public financial management process



Source: Gonguet, F., C.P. Wendling and B. Battersby (2021). Climate-Sensitive Management of Public Finances—"Green PFM". IMF Staff Climate Note 2021/002. IMF.

The four steps in the PFM process and their climate linkages are:

- **Setting fiscal targets.** This stage refers to the setting of a framework for strategic and fiscal policy goals and targets in line with a medium-term fiscal framework. A number of initiatives have been undertaken to support governments to strengthen this framework.[196] The fiscal framework could be used to define medium-term fiscal targets that are consistent with the costing of green priorities, such as the reduction of GHG emissions and addressing resilience needs while ensuring fiscal discipline. Flexible fiscal rules are needed to allow for a fiscal response in case of a climate change-related emergency. Fiscal rules should also allow for their suspension in the wake of large disasters.
- **Budget preparation.** Based on the medium-term fiscal framework and sector strategies, the finance ministry or similar agency prepares the annual budget for approval by the legislative body. UNDP and others have initiatives to support governments in developing climate-relevant budget processes.[197] The budget circular is an effective tool for incorporating environmental or climate-related instructions into budget decisions. Green budget tagging is a valuable tool that assesses each component of the budget based on its climate or environmental impact and gives it a "tag" according to whether it is helpful or harmful to green objectives. It has been adopted in a number of countries, including Bangladesh, France, Indonesia, Ireland, Nepal and the Philippines.
- **Budget execution.** This stage refers to the execution of the approved budget and the production of accounts and financial reports. In this phase, reporting on climate-related expenditure is an important part of an effective green PFM system. Tracking of green expenditure should ideally be factored in from the outset when putting a tagging system in place. The reporting should allow a direct comparison between budget and actuals.
- **Audit and evaluation.** This stage includes independent oversight and audit of the budget and programme evaluation. Control and audit mechanisms should examine, measure and monitor the efficiency and effectiveness of climate policies. The finance ministry and line ministries and agencies perform the internal control and audit. Line ministries and agencies should monitor and assess the climate outputs attached to their budget actions. Internal audit or inspection bodies can also adopt a climate focus in their work programmes. State audit institutions could assess the compliance of government programmes or projects and transactions with climate-related objectives and requirements.

Countries have implemented a range of approaches to improve the climate responsiveness of their PFM frameworks. While still in the nascent stage in many countries, including advanced countries, progress is being made across a wide range of geographies and economies to integrate climate into the PFM framework.

A.6.2.3 Greening PIM processes

Within PFM, PIM processes control public investment planning; project appraisal and selection; and funding, financing and delivery of investments, including those with climate-related objectives. Green PIM refers to the strategic planning, allocation and oversight of public funds towards projects and initiatives that aim to promote environmental sustainability and combat climate change. The base for a green PIM process should be the investment roadmaps as set out in annex 2. There are three key stages of public investment:

- Investment planning, which includes needs assessment, setting strategic objectives and project identification and prioritization;
- Project appraisal, which includes resource allocation, project evaluation and selection for implementation; and
- Funding, financing and project delivery, which

196 For example, see UNDP. Integrated National Financing Framework for SDGs.

197 For example, see UNDP. Climate Public Expenditure and Institutional Review Methodology.

include project management, structuring, procurement and contracting, quality control and monitoring, and asset management and maintenance.

The PIM cycle is integrated with the PFM budget cycle, with prioritized and prepared projects being assessed for resource allocation as part of the budget process. Once projects are fully funded and receive budget allocation, they can then be financed and implemented. Strong governance within a PIM is critical to closing the investment gap. Since the institutions and frameworks constitute governance, strong governance ensures that projects are chosen using best-practice investment planning and prioritization processes and project appraisal processes (see also annex 2). Projects are prioritized and funded to deliver the greatest benefits and sustainability within the country's fiscal strategy and funding and financing limitations. The projects are then implemented using best practice "green" procurement processes, project execution and operations monitoring processes.

A.6.2.4 Climate fiscal risk management

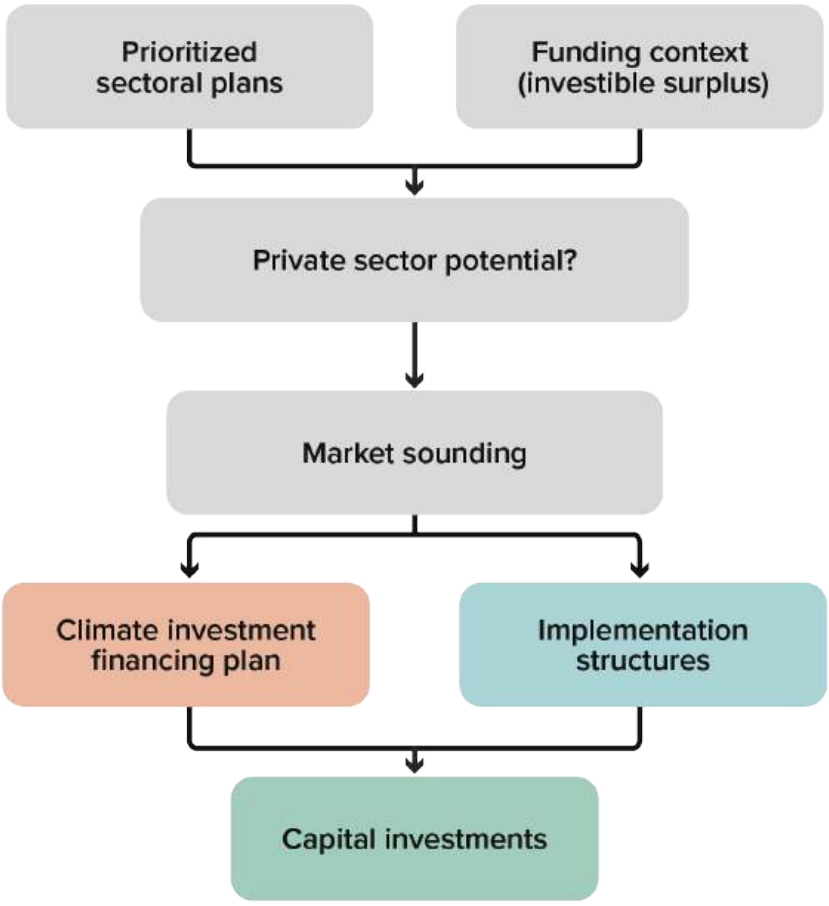
Climate fiscal risk management includes both risk assignment and investment in climate action to reduce, transfer and manage climate-related fiscal risks. Risk assignment provides clarity on contingent liability and overall fiscal exposure and creates incentives to invest in adaptation. Risk management aligns investment programmes with climate action by integrating climate priorities into PIM and PFM systems and providing fiscal instruments that offer needed adaptation incentives. Specific risk mitigation instruments, such as insurance and the provision of guarantees, need to be considered at the sector, programme and project levels and used where they are economically viable.

A.6.3 Prioritizing cross-sectoral investment

While sector prioritization is undertaken in sectoral roadmaps, the national budget will need to prioritize across sectors in order to allocate scarce government funds (the process can also be used at the state/provincial and local government levels). The climate investment financing analysis process is shown in figure A.6.2.

Photo: UNDP Vietnam

Figure A.6.2: Climate investment financing analysis process



The process has a number of steps:

Step 1: Develop a base case financial projection

It is likely that a base case financial projection exists in some form, including a BAU service provision and the medium-term capital investment plan. The BAU case at the beginning of this exercise will normally exclude mitigation and adaptation projects, as well as the cost uplift for climate-proofing BAU projects.

Step 2: Optimize financial projections by defining key reform actions

Once a base case is established, consider how key existing and potential revenue and expenditure reforms, identified in the sector roadmaps (see annex 2) and other policy documents, can increase investment funding capacity through increasing the "investible surplus"—the difference between current revenue and expenditure. Reforms will normally be categorized as:

- Interventions to lower costs, such as improving the management of revenue water systems;
- Capital-intensive interventions, such as an overhauled tax information technology system that will improve tax recovery and reduce avoidance; and
- Policy initiatives, such as increasing the annual escalation of user charges.

Step 3: Undertake a sensitivity analysis and set the fiscal capacity

The fiscal capacity will depend significantly on the assumptions used in the financial projections in Step 2, including the forecast effectiveness and the efficiency of the key reform actions identified. Using the public expenditure model, the key inputs should vary within feasible ranges and determine the extent to which fiscal capacity changes. Thes may include population forecasts, economic growth forecasts and estimated borrowing costs. A consensus model of fiscal capacity can be developed after consideration of the results of this analysis. Where modelling is not available, the existing capital budget can be extrapolated.

Step 4: Prioritization and preliminary allocation of surplus

Sector roadmaps (see annex 2) should set out the key information that needs to be assembled for cross-sectoral prioritization. In particular, this includes the estimated project costs, broken down by major component; the sectoral priority of the project (derived from a structured project prioritization exercise); and the potential financing sources and the funding context, including the flow of grant finance linked to specific project types. If not done under the roadmap, the prioritizing entity will need to determine which projects and/or components could recover their costs from user charges or other means and could thus be implemented/financed by the private sector.

As in Armenia (see annex 2) multi-criteria analysis will be needed to undertake cross-sectoral prioritization.[198] Methodologies using criteria that prioritize criteria relating to maximizing the number of beneficiaries and cost effectiveness to prioritize would be appropriate.

The investible surplus should be allocated to the highest-ranked climate projects until the surplus is depleted. This may mean that some high-ranked mitigation and adaptation projects cannot be funded from within the investible surplus, which is not entirely surprising, as governments always must allocate scarce resources to competing needs.

Step 5: Market sounding

For projects or components with private finance potential, "market sounding'' should be carried out relating to (i) the likelihood of attracting private investors and/or finance to those projects identified for private sector implementation, and (ii) the cost and timing of potential private and public financing (international and national) of non-private investments and any required risk mitigation instruments. If the market sounding is negative, the prioritization process needs to be re-done with the project partly or wholly on the government budget.

Step 6: Finalize the climate investment financing plan

Step 6 allocates the investible surplus among the prioritized projects using lower cost/risk financing sources first.

Step 7: Document the implementation arrangements for the Climate Investment Financing Plan

Step 7 documents the process of establishing the legal and other structures required to implement the plan—and for monitoring the performance of financing, evaluating effectiveness and reallocating resources as circumstances change.

198 For example methodology, see Infrastructure Australia. Guide to Multi-criteria Analysis.

UNDP Climate Finance Network

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