CAIP Climate Adaptation Investment Planning

ADB

LESSONS 2

The CAIP method involves a five-step approach.

STEP 1 starts with a country-context analysis, including planning and financing frameworks, and identifies the actors and entry points for adaptation.

STEP 2 builds on existing climate risk assessments to develop a strategic climate diagnostic.

STEP 3 develops the adaptation priorities into packages, based on urgency and sequencing.

STEP 4 assesses the benefits and the costs of these packages, including their potential economic and financial viability.

STEP 5 investigates the financing opportunities for each package, considers multiple sources, and matches each package with appropriate financial instruments.

Economic Analysis in the Climate Adaptation Investment Planning Process

Introduction to the Climate Adaptation Investment Planning Process

The Climate Adaptation Investment Planning (CAIP) program of the Asian Development Bank (ADB) aims to support selected developing member countries in adaptation investment planning. As part of the overall national adaptation plan (NAP) or nationally determined contribution (NDC) process, this takes identified adaptation priorities from these documents with the objective of developing investment packages that can unlock finance at scale for a priority sector or area.

To do this, the CAIP approach moves beyond small, individual projects to pipelines of bankable adaptation packages, taking a strategic and programmatic approach aligned with national and sector-based planning, economic, and fiscal frameworks. It then identifies opportunities for mobilizing finance from multiple sources, including public, private, and blended finance, as well as the enabling factors that might support these activities.

Throughout this process, the CAIP approach embeds stakeholder co-creation and identifies the enabling conditions needed to help deliver adaptation. The outcome of the CAIP process is a bankable project pipeline and an investment prospectus.

This note provides insights and lessons related to **Steps 3 and 4 of the CAIP process**. It draws on the experience of the first six CAIP countries.

CAIP Sector: **Agriculture**
Country: Armenia, Cambodia, Indonesia, Nepal
CAIP Sector: **Water**
Country: Bhutan, Mongolia



Photo by Sonam Chophel.

Background and Introduction

Developing countries in Asia and the Pacific recognize the importance of scaling up investments in climate adaptation for advancing sustainable development. While the countries have taken actions to improve planning for adaptation, large gaps remain in turning the priorities identified in NDCs and NAPs into investments that can attract financing.

One reason is that, although around half of submitted NAPs and NDCs now feature an analysis of adaptation costs (financing needs),[1] almost none include quantified analysis of **adaptation benefits**. But the analysis of benefits is critical for securing financing, because it identifies the nature of the benefit—as well as who benefits—and it helps to build support for the action and signposts the appropriate financing sources. This note summarizes key lessons learned from Steps 3 and 4 of the CAIP process, which focus on assessing benefits and the economic case for adaptation investments.



Photo by International Centre for Environmental Management.

Overview of Benefit Analysis in the CAIP Process

The CAIP process takes a "policy-first" approach to adaptation, starting with the country development background and focusing on adaptation objectives, rather than a "science-first" method that begins with climate model projections. It also takes a more programmatic approach, using a strategic climate risk assessment (including multi-hazard risk analysis and considering cross-sector risk linkages). This provides a greater focus on providing information to support adaptation decisions.

This workflow takes existing NAP or NDC actions for a specific sector, including cross-sector linkages, and groups them into strategic **adaptation investment packages**.

A key advance of the CAIP process has been an explicit focus on articulating the **benefits** of these adaptation packages (and the options within them) and then extending this analysis to

[1] United Nations Environment Programme. 2024. Chapter 4: Adaptation Finance. In *Adaptation Gap Report 2024: Come Hell and High Water*. https://www.unep.org/resources/adaptation-gap-report-2024.

their potential **economic and financial benefits**, as well as their costs. This is undertaken across steps 3 and 4 of the CAIP process and involves three activities.

- First, it identifies the potential benefit streams that each adaptation investment package provides and the economic rationale for its implementation.
- Second, it categorizes benefits from the perspective of different actors, looking at economic benefits (societal benefits, including environmental and social benefits), fiscal benefits (public finances), and financial benefits (investors). This helps develop new positive narratives for adaptation.
- Third, it examines quantitative evidence on the economic and financial return of the packages, to demonstrate that adaptation packages can meet the necessary return thresholds for investment.

This analysis helps signpost the potential sources and financial instruments that are suitable for financing in Step 5. Box outlines some of the key economic and financial terms used within the framework.

Box: Key Definitions

A number of key concepts and definitions are important for economic and financial analysis.

Economic analysis (appraisal) is based on the principles of welfare economics and aims to assess the ability of a policy or investment to improve social welfare or well-being. It is carried out from *the perspective of society* and includes the economic valuation of nonmarket effects, such as environmental benefits and costs.

Financial analysis (appraisal) is different. It considers the incremental revenues and costs generated by an investment and can generate cash flows that might be used to repay any financing. It is therefore carried out from *the perspective of an investor*. A financial analysis excludes environmental or social benefits except where these are reflected in financial cash flows.

Economic and financial metrics. The results of economic and financial analyses are often expressed using indicators of return. Higher values generally indicate greater net economic benefits or higher economic or financial returns.

- Economic net present value (NPV): The value today of a project's economic benefits minus its economic costs. A positive NPV means the project creates net value.
- Economic benefit–cost ratio: A comparison of a project's economic benefits and costs. A ratio above 1 means benefits are greater than costs.
- Economic internal rate of return: The project's rate of return from an economic or societal perspective, including wider benefits and costs.
- Financial internal rate of return (FIRR): The project's rate of return based on actual financial cash flows, such as costs, revenues, and investment returns.

Financing relates to how the upfront costs, as well as sometimes the ongoing costs, of an investment or activity are covered. An example would be a loan from a multilateral development bank or a commercial bank.

Funding relates to how the investment is ultimately paid for, including how any financing costs might be paid. For example, if a government takes out a loan from a multilateral development bank to undertake an adaptation activity, then the funding will ultimately come from taxpayers.

Hurdle rate: The minimum expected FIRR that an investor or lender requires before considering an investment commercially acceptable.

Source: Authors.



Photo by Jitendra Bajracharya, ICIMOD.

Identifying Benefits and Establishing Economic Rationale

While it may seem obvious, a critical part of adaptation investment planning is to identify and define the specific benefits. This requires specifying exactly what each adaptation investment package will deliver, for example, the reduction in crop yield losses or avoided water-induced disaster impacts from climate change. This analysis should identify not only the direct adaptation benefits—for example, avoided climate-related losses or reduced costs—but also any co-benefits, including positive economic, environmental, or social effects. This identification of benefit streams is critical for building subsequent revenue models. The analysis should also identify who receives these benefits.

The CAIP uses an established framework to help identify when the benefits of adaptation arise and, therefore, identify the **urgency** of action. This draws on adaptive management approaches, which help to prioritize the early **building blocks for adaptation**.[2] These recognize that the most beneficial areas on which to focus adaptation over the near term (to address impacts over the short and long term) are:

1. No-regret, low-regret, and win-win adaptation actions, which address existing economic costs of climate, build resilience, and provide immediate economic benefits.
2. Climate-smart design (climate proofing) of long-lived investments or decisions that will be made in the near term, providing near and longer-term benefits by preventing maladaptation.
3. Low-cost preparatory actions to improve future decisions, as part of adaptive management plans (adaptation pathways) that provide benefits from the value of information.

The adaptation investment packages for each CAIP country involved a mix of all these investment types. For example, in Armenia, Cambodia, Indonesia, and Nepal, the agriculture-related adaptation investment packages included climate-smart agriculture (a no-regret or low-regret action that increases yields and reduces losses); the integration of climate-resilient design into new value chain transport, storage, and processing infrastructure (climate proofing); and climate-resilient planning for agricultural development and research on climate-tolerant crops (early adaptive management which will provide future benefits). Likewise, in Bhutan, the water-related adaptation investment packages included weather and climate services, including early warning systems (a no-regret or low-regret action); the integration of climate-resilient design into new water transmission, distribution, and treatment systems (climate proofing); and the incorporation of climate resilience into integrated water resources management (IWRM) to support river basin supply-and-demand planning under future climate scenarios.



Photo by Dorji Khando.

[2] P. Watkiss and R. A. Betts. 2021. Method. In R. A. Betts, A. B. Haward, and K. V. Pearson, eds. Third UK Climate Change Risk Assessment Technical Report. Prepared for the Climate Change Committee, London. https://www.ukclimaterisk.org/wp-content/uploads/2021/06/CCRA3-Chapter-2-FINAL.pdf.

Categorizing Benefits from the Perspective of Different Actors

Following the identification of the broad benefits of each adaptation investment package, the analysis assesses the specific benefits from each package, considering:

- The economic (societal) benefits of adaptation, which include both market and nonmarket benefits, including any co-benefits.
- The associated fiscal benefits of adaptation and any positive effects on public finance (such as the benefits of adaptation in reducing government spending associated with disasters, or maintaining or increasing tax revenues).
- The direct financial benefits of adaptation and the scope for generating revenue and cash flows, and thus their consequent attractiveness to financiers and private investors.

An example is included in the Table. This shows the approach applied to the IWRM package for Bhutan's CAIP for the water sector. In each case, the activities identified are assessed against each of these three perspectives.

This provides a critical step in building the case for investing in adaptation, identifying whether a package or subpackage might be more public in nature or have potential for private investment, and thus linking to the potential sources of finance (in Step 5 of the CAIP process). For example, the first subpackage on IWRM planning and water user governance has strong economic benefits, and should have strong fiscal benefits, but has less immediate revenue potential (though it might create conditions for subsequent revenue raising). In contrast, the focus of the third subpackage on water-efficient technology could have a strong financial case, through the potential for cost savings for water users (provided water prices are high enough), implying opportunities for private finance.

Table: Potential Economic, Fiscal, and Financial Benefits of the Integrated Water Resources Management Subpackages in the Bhutan Climate Adaptation Investment Plan

Subpackage	Economic Benefits	Fiscal Benefits	Financial Benefits or Revenues
IWRM planning and water user associations	○ Improved management of water resources to maximize economic and social welfare, including more efficient allocation of water to its highest value uses and greater availability and reliability of water supply ○ Maintenance or improvement of ecosystem service benefits ○ Improved governance through water user associations, with reduced economic losses and disruption ○ Improved investment climate and investor confidence	○ Potential tax and charge revenues, including revenues from hydropower exports (as majority of major hydropower is nationally owned) ○ Improved management and planning of fiscal expenditure ○ Reduced costs from environmental degradation ○ Lower dispute-management costs ○ Fiscal savings from fewer disaster responses	○ Potential revenues from hydropower producers and agricultural water users after implementation, although some actors may be disadvantaged relative to the status quo, depending on water allocations and pricing
Nature-based solutions	○ Improved ecosystem services—provisioning, regulating, cultural, and supporting—including market and nonmarket benefits from water regulation, reduced runoff, reduced soil erosion and siltation, and increased carbon sequestration ○ Potentially increased economic output and resilience among water-dependent industries	○ Improved management and planning of fiscal expenditure ○ Potentially increased tax revenues from more profitable water-dependent sectors	○ Potential revenues from carbon credits ○ Potential revenues from payments for ecosystem services financed by water-dependent sectors
Water-efficient technology	○ Greater allocative efficiency ○ Reduced costs for water-dependent industries ○ Improved ecosystem services through reduced water abstraction	○ Reduced public expenditure on water supply ○ Potentially increased tax revenues from a more profitable water sector and new technology markets	○ Lower water costs following adoption ○ Private sector opportunities in the provision of goods and services
Climate resilience design standards	○ Improved infrastructure resilience and reduced loss and damage ○ Reduced service disruption and associated economic losses ○ Reduced health impacts resulting from interrupted water connections	○ Reduced public expenditure on infrastructure replacement or repair ○ Reduced loss of public revenues resulting from supply interruptions and their economic effects ○ Fiscal cost savings from disaster response	○ Reduced loss of revenues

IWRM = integrated water resources management, PES = payments for ecosystem services, WUA = water user association.
Source: Royal Government of Bhutan. 2026. *Climate Adaptation Investment Plan for the Water Sector in Bhutan.*

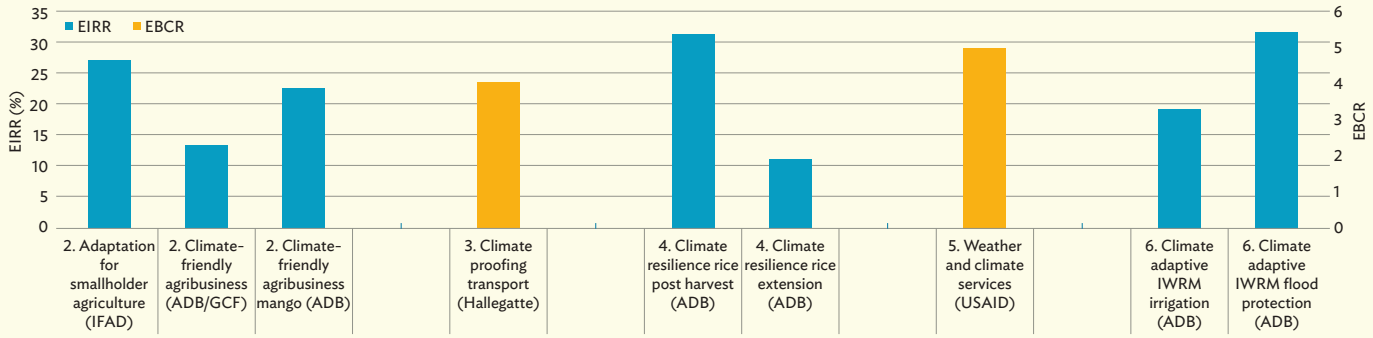
Analyzing Economic and Financial Returns

The final analytical step is to look at the potential economic and financial return of each of the adaptation investment packages (see definitions in the box). This involves two separate assessments, in each case using existing literature and country-specific examples to build the evidence base.

First, the CAIP undertakes an initial indicative analysis of the potential economic (societal) return of each adaptation package, using the economic benefit–cost ratio (EBCR) or the economic internal rate of return (EIRR). Positive economic returns establish the economic case for investment, as is required for most government public policy appraisal. It is also required for multilateral development bank financing under ADB's economic guidelines[3] and for multilateral climate funds, including the Green Climate Fund.[4] This analysis found that based on comparator projects, nearly all adaptation investment packages in the agriculture and water sectors had the potential to deliver high net positive economic (societal) benefits. This is shown with the example in the Figure from Cambodia.

Second, this step includes an initial indicative analysis of the financial internal rate of return (FIRR; see the box on key definitions) and, therefore, the broader financial viability of each package. This analysis helps determine the potential financing approach for a package. A general finding was that the financial returns of packages in the CAIPs were lower than the economic returns, sometimes significantly so. This reflects the nature of many packages—for example, their focus on government activities or public goods. Consequently, ensuring these investments are financially viable and sustainable may be a challenge. In some cases, governments will need to fund the investments, although concessional climate finance may

Figure: Cambodia: Economic Internal Rates of Return and Benefit–Cost Ratios from Adaptation Economic Appraisals of Agriculture Packages



ADB = Asian Development Bank, EBCR = economic benefit–cost ratio, EIRR = economic internal rate of return, GCF = Green Climate Fund, IFAD = International Fund for Agricultural Development, IWRM = integrated water resources management, USAID = United States Agency for International Development.
Note: Values are based on ex ante appraisals of similar interventions and are expressed as economic internal rates of return (%) or benefit–cost ratios. As these come from different projects and appraisals, they provide indicative evidence and should not be interpreted as directly comparable estimates of the returns of CAIP packages.
Source: Royal Government of Cambodia. 2026. Climate Adaptation Investment Plan for the Agriculture Sector in Economic Pole 4.

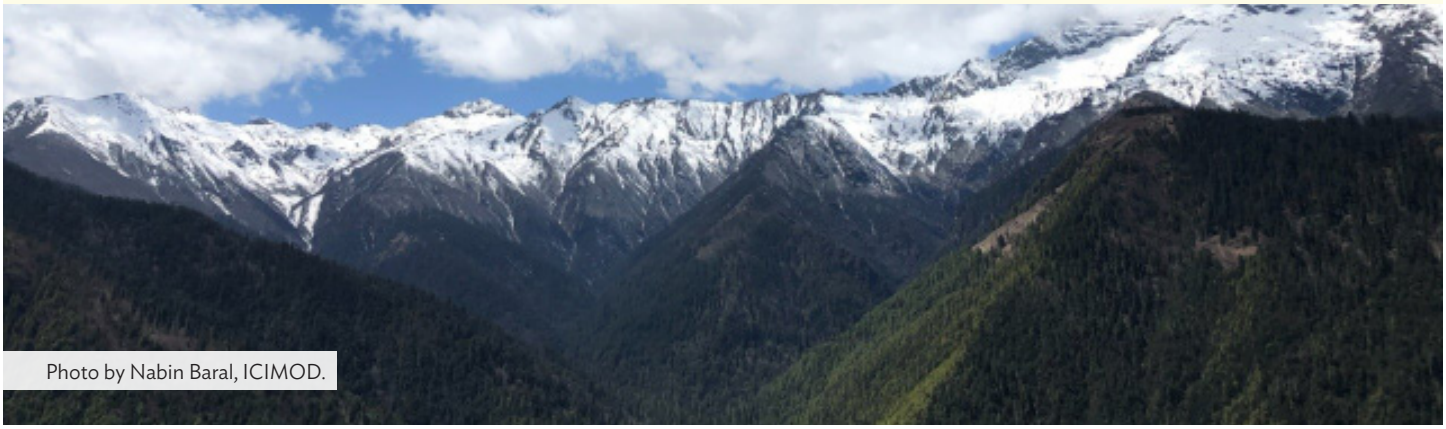


Photo by Nabin Baral, ICIMOD.

[3] ADB. 2017. *Guidelines for the Economic Analysis of Projects*. https://www.adb.org/documents/guidelines-economic-analysis-projects.
[4] Green Climate Fund. 2022. *Annex VI: Economic and Financial Analysis (EFA) Guidance*. https://www.greenclimate.fund/document/annex-vi-economic-and-financial-analysis-efa-guidance.
[5] ADB. 2026. *Financial Matchmaking in the Climate Adaptation Investment Planning Process. CAIP Lessons Series 3*.



Photo by Sonam Wangdi.

provide support. The analysis also identified packages with high financial viability in both the agriculture and water CAIPs. It also found that enabling conditions can increase the potential for private financing. Examples are provided in *CAIP Lessons Series 3: Financial Matchmaking in the Climate Adaptation Investment Planning Process.*[5]

A detailed economic and financial appraisal will still need to be conducted as investment packages are further developed. Detailed economic and financial appraisal should be undertaken at the project feasibility stage. The CAIP process has also completed more detailed cost–benefit analyses to support the case for priority investments in specific countries. For example, in Armenia, a deep dive was undertaken on climate-smart technologies (water efficiency and hail nets) for orchards, including an economic and financial cost–benefit analysis. The estimated economic benefit–cost ratio for these investments was greater than 2:1, with EIRRs of more than 25%. This detailed information was used to present the EIRR estimates to the Government of Armenia, noting that EIRRs are a requirement in the government's public investment management criteria. These values therefore helped justify the project and secure its acceptance.

Useful lessons emerged from the economic analysis in the CAIP process. Quantitative data on future climate change risks were difficult to obtain, partly because of significant uncertainty and partly because of limited data on adaptation effectiveness—and thus on quantitative estimates of benefits. Economic and financial analysis of adaptive management pathways for broader investment packages was also challenging. Such pathway analysis is easier for specific projects and can be undertaken as priority projects are identified. Finally, these analytical steps require technical capacity; detailed analysis also requires considerable time and resources. Such considerations will be especially important for more detailed preparatory work to help advance the packages.

Concluding Lessons and Insights

The application of Steps 3 and 4 of the CAIP process to the specific adaptation investment packages in different countries and sectors identified several lessons and insights:

A key advance from the NAP process in the CAIPs—and the most important lesson—is the greater focus on benefits. This is critical because it identifies the nature of the benefit and in turn helps to signpost appropriate financing sources.

A further insight is the framing of benefits from different perspectives in terms of their economic, fiscal, and financial returns. This is particularly important as finance ministries consider many adaptation activities less attractive or more challenging to finance than competing development priorities. To counter this, each CAIP makes a case for the fiscal benefits of adaptation, alongside the economic and societal benefits. This sets out the positive narrative that adaptation reduces current government expenditure associated with disaster relief and can protect tax revenues.

The analysis of economic and financial returns found strong indicative evidence that carefully selected adaptation investments can generate high economic returns. However, their financial returns are often lower, and financial sustainability can be an issue. This suggests a strong role for public finance, although opportunities may arise to monetize co-benefit streams. It is therefore useful to make the broader case for adaptation using indicators relating to public finance, macroeconomic performance, and fiscal management. This includes reinforcing the links between development and resilience[6] and strengthening economic and fiscal management.[7] At the same time, all CAIPs identified adaptation packages with financial benefits and private sector potential (footnote 5). The analysis also found that enabling actions can increase this potential.

Finally, while the stronger CAIP focuses on adaptation benefits and economics is key, it also raises capacity challenges. There will be a need for training programs, capacity building, and institutional strengthening within countries to support these steps of adaptation investment planning going forward.

[6] J. Li, E. G. Naikal, T. M. Kerr, and S. Hallegatte. 2024. *Rising to the Challenge: Success Stories and Strategies for Achieving Climate Adaptation and Resilience*. World Bank. https://doi.org/10.1596/42326.

[7] ADB. 2024. *Climate-Resilient Fiscal Management: Experience from Southeast Asia*. https://www.adb.org/publications/climate-resilient-fiscal-management-southeast-asia.

The Climate Adaptation Investment Planning (CAIP) program helps developing member countries translate their adaptation priorities into strategic investment packages and bankable project pipelines. The CAIP Lessons Series shares practical insights from applying the five-step CAIP approach in the program's first six participating countries.

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