

EXPLORING THE CHALLENGES OF CLIMATE CHANGE ADAPTATION

Key publications and resources



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Selected publications on adaptation to climate change

*A selection of recent publications, research and programmes
supported by Agence Française de Développement*

UNDERSTANDING THE CHALLENGES OF ADAPTATION

Over thirty years, adaptation has progressed through the creation of concepts, learning by doing and critical research. This movement has produced a substantial body of knowledge, while also revealing the limits of its uptake and implementation.

Funding, however, remains far below needs. International public flows to developing countries fell back to USD 26 billion in 2023, while needs are estimated at between USD 310 and 365 billion per year by 2035. Beyond volumes, we need to adopt approaches that are more systemic, more anticipatory, multisectoral and transformational, with longer time horizons, without reproducing the very vulnerabilities they seek to correct.

OUR PUBLICATIONS AND PROJECTS

The challenge is therefore no longer only to produce new knowledge, but to accelerate its dissemination and its translation into practice. Through the conference and by making our research and our projects accessible, we hope to foster dialogue between researchers, decision-makers and practitioners. In particular, we seek to strengthen knowledge flows from AFD's partner countries to stakeholders in France and Europe.

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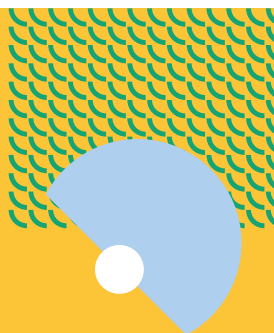
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THE CONFERENCE

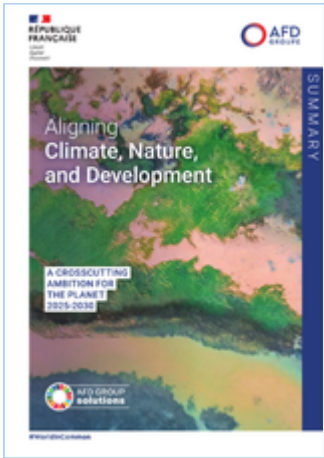
How – and how far – can we still adapt?

Knowledge and societies responding to the
challenges of adaptation

October 6 & 7 2026 · Paris & Online



OUR AMBITION



Aligning climate, nature and development: a crosscutting ambition for the planet 2025-2030 - Summary

AFD Group · AFD Group Solutions · October 2025

This document summarises AFD Group's crosscutting “Planet” roadmap for the 2025-2030 period. The increasingly clear links between the climate crisis, the biodiversity crisis and development pathways call on the Group to support a deeper and faster transformation of the development models of countries and economic actors. The new roadmap strengthens AFD's commitments and evolves its methods and tools, so that it can deliver on its mandate for climate and nature in an uncertain international context.



Climate - nature: Activity report 2025

AFD Group · Activity report · June 2026

In 2025, the AFD Group reached a record level of financing for climate and biodiversity, while increasing the share devoted to adaptation and to projects with systemic effects. This activity report presents the year's results through key figures, the geographical breakdown of commitments and the main financial instruments deployed. With its new “Planet” roadmap, the Group affirms an ambition for transformation that matches the scale of the climate and biodiversity challenges ahead.

TAKING STOCK: HOW FAR HAS ADAPTATION ACTUALLY GOT?

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nature · nature climate change · articles · article

Article | Published: 19 October 2023

Status of global coastal adaptation

Alexandre K. Magnan · Robert Bell, Virginie K. E. Duvat, James D. Ford, Matthieu Lacambra, Inigo J. Losada, Katharine J. Mach, Méline Noblet, Devanathan Part, Anisimov, Susan Hanson, Alexandra Malmström, Robert J. Nicholls & Gundula W.

Nature Climate Change 13, 1213–1221 (2023) | Cite this article

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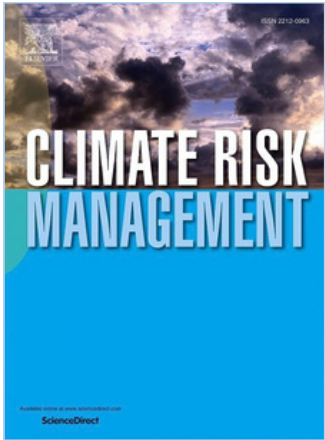
Abstract

The state of progress towards climate adaptation is currently unclear. Here we assess multiple dimensions shaping adaptation (equally weighted): risk knowledge, evidence on risk reduction, long-term pathway strategies. We apply this framework, clustered into four urban and rural archetypes to develop a locally informed assessment of adaptation. We show with medium confidence that today's global coastal adaptation potential. Urban archetypes generally score higher than rural ones (with efforts are unbalanced across the assessment dimensions and strategies). Our results provide a multi-dimensional and locally grounded assessment of foundations for international climate negotiations by showing that there are identifiable priorities transcending development levels.

Status of global coastal adaptation

Magnan, A.K., Bell, R., Duvat, V.K.E. et al. · *Nature Climate Change*, 13, 1213–1221 · October 2023

How far adaptation to climate change has actually progressed remains difficult to assess with precision. This article proposes an original assessment based on structured expert judgment. It analyses 61 coastal case studies from around the world, grouped into four urban and rural archetypes, across several dimension: risk knowledge, planning, concrete action, capacities, evidence of risk reduction and long-term pathway strategies. It finds that global coastal adaptation stands roughly halfway to its full potential, with efforts unevenly spread across those dimension



The value of structured expert judgment to help assess climate adaptation

Magnan, A.K., Li, J., Tanguy, A., Hallegatte, S., Buffet, C., *Climate Risk Management*, 47, 100692 · January 2025

This article explores the major methodological challenges raised by the assessment of climate change adaptation. As risks intensify, current measurement methods, often based on purely statistical and quantitative indicators, struggle to capture the complexity of adaptation and the local specificities of environmental risk. To address these gaps, the article makes the case for developing a complementary approach, structured expert judgment (SEJ), and sets out both what it can deliver and the conditions for using it rigorously.



Assessing global progress on climate adaptation: GAP-Track
IDDRI · Ongoing research project · Since 2021

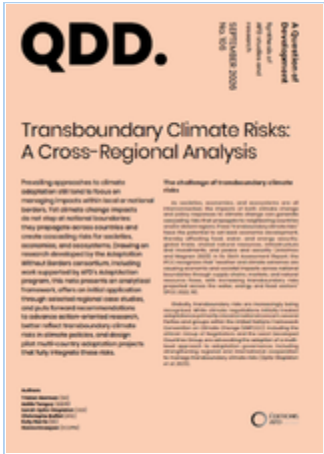
How can global progress on climate change adaptation be measured? In the absence of quantifiable targets and reliable indicators, such assessments remain difficult to establish precisely. Led by IDDRI, the Global Adaptation Progress Tracker (GAP-Track) proposes an alternative approach based on expert judgment and structured around six key questions covering risk knowledge, planning, actions taken, capacities mobilised, evidence of risk reduction and long-term anticipation.



Strengthen climate adaptation research globally
Magnan, A.K., Anisimov, A. & Duvat, V.K.E. · Science, 376(6600), 1398-1400 · June 2022

As time to act is running out, efforts toward climate adaptation policy, implementation and financing remain inadequate at the global scale. This article argues for increased investment in transdisciplinary research, focused on three scientific frontiers: understanding climate risk reduction's true potential (including maladaptation, residual risk and adaptation limits), assessing systemic, cascading and transboundary risks, and tracking global adaptation progress. It calls for stronger international incentives and coordination to make that investment happen.

RISKS THAT CROSS BORDERS, AND LIMITS THAT CANNOT BE ADAPTED AWAY



Transboundary climate risks: A cross-regional analysis

Norman, T., Tanguy, A., Opitz-Stapleton, S., Buffet, C., Harris, K., Knaepen, A., AFD, A Question of Development No. 106, 2026

Prevailing approaches to climate adaptation still tend to focus on managing impacts within local or national borders. Yet climate impacts do not stop at national boundaries: they propagate across countries and create cascading risks for societies, economies and ecosystems. Drawing on research developed by the Adaptation Without Borders consortium, including work supported by AFD's AdaptAction programme, this note presents an analytical framework, offers an initial application through selected regional case studies, and recommends ways to reflect transboundary risks in climate policies and in pilot multi-country adaptation projects.

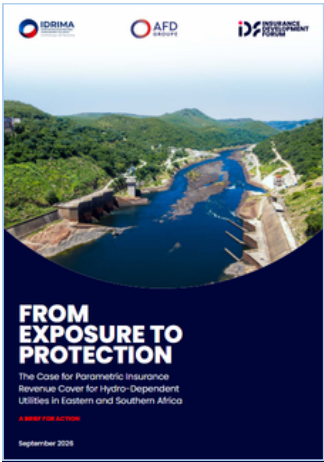
See also: Opitz-Stapleton, S et al., [Cross-border cascading climate risks and the LDC Group: Catalyzing management options within the UNFCCC](#), Adaptation Without Borders Policy Brief. ODI Global, 2025.



AFD & KfW activities in the context of Loss and Damage - Position paper

AFD & KfW · Position paper · December 2023

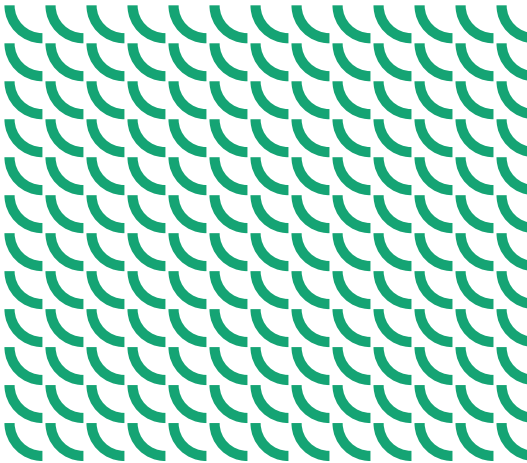
First mentioned in 1991, loss and damage has become, within a few years, the third pillar of the climate negotiations. Discussions on financing led to the creation of a dedicated fund at COP27, operationalised at COP28 with initial pledges exceeding USD 600 million. In the light of this critical new component of international climate policy, AFD and KfW are reconsidering their activities. This joint working paper intends to stimulate discussion, not least among development finance institutions and public development banks.



From exposure to protection - The case for parametric insurance revenue cover for hydro-dependent utilities in Eastern and Southern Africa

AFD - IDF - IDRIMA · September 2026

Hydropower supplies over 17% of Africa's electricity, and more than 80% in countries such as the DRC, Ethiopia, Malawi and Zambia, leaving power systems and public finances directly exposed to hydrological shocks like Zambia's 2024 drought, which halved Kariba's storage and cut growth projections in half. Yet most utilities carry no structured financial protection. IDRIMA, a joint AFD-IDF initiative, shows how to turn such shocks into a known, pre-arranged annual cost.



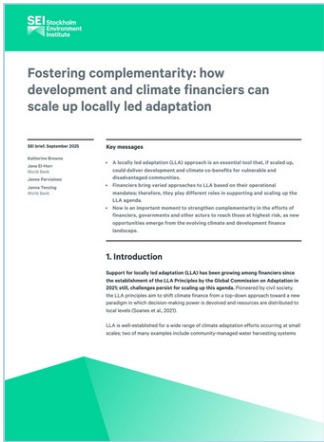
FINANCING ADAPTATION WHERE IT IS NEEDED



Does Climate Change Vulnerability Matter for the Allocation of Adaptation Finance? An Empirical Analysis of Donors and Instruments over the Period 2019–2023

Feindouno, S. ; coordination Ehrhart, H. & Simonet, C. (AFD) · AFD, Research Papers No. 402 · April 2026

International financing for climate change adaptation is growing, yet how these funds are distributed across countries remains poorly documented. This research paper analyses how donors allocated these resources over the 2019-2023 period, and examines a key question: does countries' structural vulnerability actually factor into financing decisions? By cross-referencing financial data with vulnerability indicators, the study sheds light on the underlying dynamics, sometimes far removed from actual needs, that govern the distribution of adaptation aid.



Fostering complementarity: how development and climate financiers can scale up locally led adaptation

Browne, K., El-Horr, J., Parviainen, J. & Tenzing, J. · SEI & World Bank · September 2025

Support for locally led adaptation has been growing among donors since the Global Commission on Adaptation set out its principles in 2021. Yet scaling up remains difficult: less than a quarter of international adaptation finance currently targets local communities. This brief from the Stockholm Environment Institute and the World Bank draws on a symposium co-organised with AFD in June 2025. It explores how bilateral donors, climate funds, multilateral banks and the private sector can combine their strengths to scale up locally led adaptation.

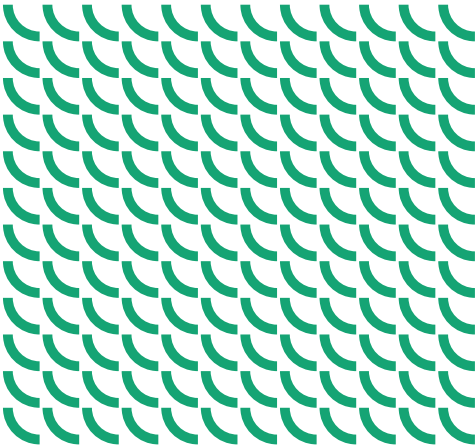


Linking weather forecasts and risk financing

Wilkinson, E., Dupar, M., Weingärtner, L., Arvis, B., Mendler de Suarez, J., AFD, A Question of Development No. 48 · January 2021

Eastern Caribbean states are highly exposed to extreme weather. Advances in impact forecasting and disaster risk financing create opportunities for reducing the impacts of imminent disasters; but proponents of forecast-based early action must be careful to avoid crowding out longer-term investments in reducing risk. Funded by AFD's AdaptAction programme, this study proposes a rethink of risk governance and an approach to anticipating shocks and reducing impacts in a fiscally constrained environment.

See also: [How to take early action in the eastern Caribbean to avoid climate extremes becoming disasters](#), ODI Global, Red Cross/Red Crescent Climate Center





African cities apply new planning tool to guide urban NbS action for climate resilience: insights from Addis Ababa and Kigali

Beyer, L., Mungai, O., Tassem Kebede, A. et al. · *Environmental Research: Infrastructure and Sustainability*, 6(2), 025012 · June 2026

Cities across Sub-Saharan Africa face mounting climate risks but often lack the resources, capacity and tools to design locally relevant resilience strategies. This paper examines the World Resources Institute's Strategic NbS Framework, applied in two pilot cities, Addis Ababa and Kigali, drawing lessons for urban planners and policymakers on integrating nature-based solutions into climate resilience planning. Carried out under AFD's ECOPRONAT program with WRI and local partners, the work is now being followed up by a project appraisal involving Métropole du Grand Lyon.



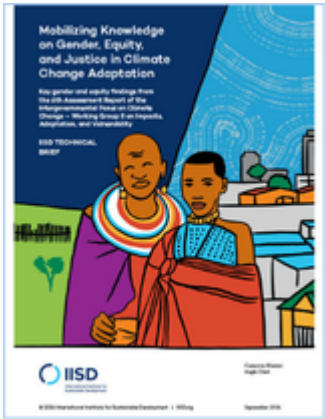
Effects of heat stress and green cover on urban birds in the megacity of Bengaluru

Jambhekar, R., Naidu, D.G.T. & Krishnaswamy, J. · *Ecological Applications*, 35(3), e70039 · April 2025

Cities drive the loss of habitat as they grow, yet they are also an important refuge for biodiversity. Bengaluru is one such case: the megacity is home to over 350 bird species, while also facing significant warming and urban heat island effects. This study examines the role of green cover and heat stress in bird occurrence across the city. It helps identify areas of conservation value that also mitigate heat stress for citizens. Research supported by AFD's ECOPRONAT program.

See also: Building Resilience with Nature and Gender in the Caribbean, Organisation of Eastern Caribbean States

ADAPTING WITH PEOPLE



Mobilizing knowledge on gender, equity, and justice in climate change adaptation

Hunter, C. & Dazé, A. · IISD, technical brief with [companion comic](#) · September 2024 · in English and French

This comic and its companion technical brief together unpack the key messages of the IPCC Working Group II report (Sixth Assessment Cycle, 2022) on the links between gender, equity and justice in climate change adaptation. Given the length and technicality of the original report, they make these messages more accessible and useful for practitioners and policy-makers, illustrating them with concrete examples. Both were produced as part of an IISD project funded by AFD's AdaptAction program.



Strengthening climate services in Africa by incorporating local knowledge

Bompas, J. · AFD, A Question of Development No. 60 · June 2023

Local knowledge is currently attracting growing interest on the international stage, in particular for its contribution to biodiversity conservation and climate change adaptation. An increasing number of development projects are now opting to incorporate it in scientific knowledge. Based on a review of the literature on Africa and a field survey financed by AFD among 285 farmers in northern Côte d'Ivoire, this document identifies the potential of local forecasting knowledge (LFK) in the field of climate services for farmers.



Human rights and climate policies - The human rights impacts of climate change and mitigating measures

Ploug Petersen, M. · AFD, Research Papers No. 399 · March 2026

This research paper summarises and analyses the findings of studies conducted by six national human rights institutions, in Colombia, The Gambia, Honduras, Kenya, Namibia and Sierra Leone. Using a common analytical framework based on human rights indicators, these institutions assessed climate policies and collected data from affected communities. Their findings underline how climate change undermines the right to life as well as the full range of economic, social and cultural rights, with disproportionate impacts on vulnerable groups, and highlight that compliance with procedural rights remains limited.

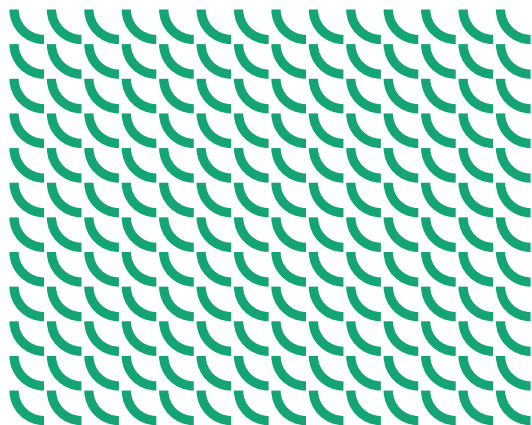


Les notes de SUD: Civil society perspectives on climate and development

Coordination SUD, Climate & Development Commission · Notes de SUD Nos. 39-46, co-funded by AFD · September-December 2025 · Published in French

Coordination SUD brings together French international solidarity NGOs. Its Climate & Development Commission has produced a series of Notes de SUD, co-funded by AFD, on maladaptation, on the use of scientific knowledge and of climate and biodiversity information, on loss and damage, and on climate justice. Written by and for practitioners, these notes translate research and field experience into operational guidance for NGOs and their partners.

This research paper critically examines climate governance through the lens of the commons literature. Based on a review distinguishing analytical and empirical approaches to commons from more normative perspectives, it highlights the limitations of a climate governance system historically centred on nation-states and market mechanisms. The paper shows how commons-based approaches draw attention to forms of collective action operating beyond states and markets and across multiple scales, both for mitigation and adaptation. It also explores the contribution of polycentric governance and emerging narratives around the climate as a global common good, and concludes by identifying a research agenda combining empirical and normative approaches to the commons and climate governance.



ADAPTATION AS A MACRO-FISCAL CHALLENGE



GEMMES and ESTEEM: Modelling the macroeconomic stakes of adaptation in Vietnam, Tunisia, Morocco and Rwanda

AFD with the Department of Climate Change (Vietnam), ITCEQ (Tunisia) and DEPF (Morocco) · Research programmes · Since 2018

What does climate change cost an economy, and what does adaptation pay back? GEMMES and ESTEEM are two macroeconomic models developed by AFD that integrate climate impacts and natural resource constraints into economic projections. Co-built with national institutions, their country versions feed policy dialogue with ministries. In Vietnam, more than 80 researchers assessed impacts to 2050, from salt intrusion in the Mekong Delta to extreme heat. In Tunisia, the model shows that without adaptation, falling farm output would drive up external debt, food inflation and poverty, while the benefits of adaptation outweigh its costs, especially when financed through low-cost foreign-currency loans. In Morocco, coupling GEMMES with a hydro-agricultural model shows that covering 75% rather than 50% of irrigation needs in 2050 would raise GDP by 0.5%. In Rwanda, the current development of the ESTEEM models aims to support the Central Bank to assess financial and monetary risks related to climate via the agricultural sector.

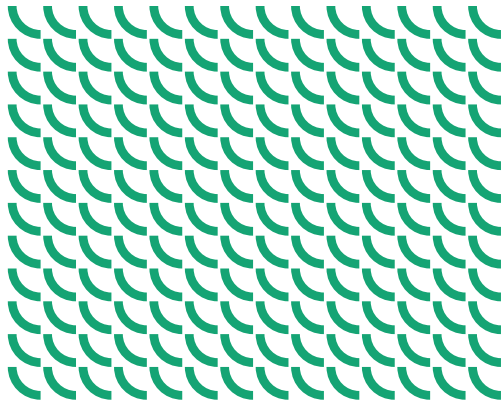
See also: [AFD and Macroeconomic Modelling Tools for the Ecological Transition](#)



Biodiversity, macroeconomics and sovereign risk

AFD with Banque de France, the Development Bank of Southern Africa, the South African National Biodiversity Institute and the South African Reserve Bank - Research programme - since 2020

Aside from its direct impact on societies and economies, climate change also affects ecosystems. It is one of the main drivers of biodiversity loss and will become the main one in the coming years. The AFD has developed a research program and novel methodologies to assess nature-related risks on macro-financial indicators. In France, 42% of the securities held by banks are exposed to risks related to biodiversity collapse. In South Africa, 80 % of the country's exports are generated by sectors exposed to water stress and 23% are produced in municipalities that are already under water stress. In the Southern Africa Development Community, net exports are highly exposed (67% directly and 88% including indirect effects) to physical risks from ecosystem service loss. A recent global study highlights how emerging and developing countries are the most exposed to the risks related to biodiversity collapse, especially through their exports and tax revenue.



To learn more



Podcast | [Climate change adaptation in Africa: understanding, planning, investing \(in French\)](#)

With Madeleine Diouf Sarr and Christophe Buffet

Africa emits little, yet remains on the front line of climate change. This episode of Savoirs AFD's podcast "Grandes Lignes" examines the continent's adaptation levers — financing, local innovations and the risks of maladaptation.



Blog Post | [Adaptation at COP 30: indicators at the heart of the debate](#)

Tanguy, A., Buffet, C., Magnan, A., November 27, 2025

COP30 was meant to be the "COP of adaptation." A set of indicators to measure global progress on adaptation was adopted there, falling short of initial ambitions but laying a first common basis for the Parties and for tracking the Global Goal on Adaptation.



Book | [L'économie africaine 2026 \(in French\)](#)

For its 2026 edition, AFD's annual review of the African economy (La Découverte, Repères) covers financing, public debt, demography, climate adaptation, urban mobility and the cultural and creative industries. Chapter IV, "Adaptation au changement climatique en Afrique: comprendre, planifier, investir" by Christophe Buffet and Madeleine Diouf Sarr, reviews adaptation finance and its growing gap, then shows how research, planning and locally led investment can turn adaptation science into action.



[Watch our videos on AFD and its partners' adaptation projects in the field](#)



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A world in common

AFD Group finances and drives the transition to a fairer, safer and more resilient world, working with its partners to support communities all over the world. Drawing on the complementary strengths of its entities – Agence Française de Développement for public financing, Proparco for responsible private investment, and Expertise France for technical expertise – the Group is ideally positioned to meet all sustainable development challenges.

Working in over 160 countries, including France's Overseas Territories and Departments, the Group adapts its operations to the realities on the ground, actively supporting local initiatives. With over 4,000 projects, whose objectives are aligned with the Sustainable Development Goals (SDGs), AFD Group works on behalf of the French people, together with all stakeholders committed to economic development and the preservation of common goods: climate, biodiversity, peace, gender equality and global health. Working by your side, toward a world in common.



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