

CLIMATE CHANGE ADAPTATION HOW THE PRIVATE SECTOR IS SCALING UP

PROPARCO GROUPE AFD



Private Sector & Development is published by Proparco, Agence Française de Développement Group, share capital of EUR 693,079,200

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Photo credit (front cover) iStock / Getty Images

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Editorial office (:?!;)DOUBLEPONCTUATION

Printing on 70% PEFC-certified paper Pure Impression – ISSN 2103-334X Legal deposit at publication 23 June 2009



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which is essential for scaling up.



loods, fires, droughts, heatwaves... Recent months have been marked by a number of extreme events, which are increasing in frequency due to the climate change now underway. While average global warming still only stands at 1.1° C, the consequences of this increase are already very real. The latest IPCC report even concludes that the impacts are

Regardless of the collective action taken over the next two to three decades, the delayed response to mitigation (reduction of greenhouse gas emissions) and the inertia of the climate system mean that these impacts will get worse in all parts of the world, especially in developing countries.

In this context, adaptation to climate change must be a priority. It has for a long time been considered as a low priority and only accounts for 7% of total "climate finance". Regarded as unprofitable, it still mainly comes under public financing. Yet there are huge needs. The need to adapt to future climate risks is a major issue for all players in the agriculture sector. Infrastructure today cannot be designed purely on the basis of historical data. It must be adapted to the still uncertain climate in 20 or 30 years' time. Generally speaking, in developing countries, which are particularly vulnerable to climate change, it is becoming essential for a company to assess the climate risks it is exposed to and consider measures to adapt to them. Financing these measures involves a change of scale which requires an increasing proportion of private funds. The role of Development Finance Institutions like Proparco is crucial here. We can not only take more risks and finance projects over the long term (as often required for adaptation solutions), but we also have a real capacity to mobilize private finance,

COP27, which will be held in Egypt from 6 to 18 November 2022, is expected to reaffirm the urgent need to finance adaptation and the importance of this component in the fight against climate change. This is becoming a strategic priority for Proparco, which encourages its partners to take greater account of climate risks and supports adaptation by providing them with specific financing, directly or through credit lines. For example, in 2021, Proparco approved six projects with co-benefits for adaptation, including the ARAF fund in Sub-Saharan Africa (see p. 28), for a total of €68 million, over double the amount of the previous year.

Beyond the issue of financing, we are convinced that the private sector must take greater ownership of adaptation issues. We hope that the experiences shared in this issue will contribute to this objective!



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Barbara Barros is Senior Adaptation Finance Manager for the C40 City Finance Programme, responsible for supporting C40 cities in taking action to overcome the financing challenges they face in delivering the green infrastructure necessary to become more climate resilient. Previously, Barbara worked in climate action planning, primarily focusing on adaptation for the Brazilian cities of Rio de Janeiro and Recife. She holds a master's degree in urban engineering focused on adaptation planning from the Federal University of Rio de Janeiro.



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Private Sector & Development, **Proparco's** magazine about the private sector's role in sustainable development.







Financing adaptation: the private sector's role

116> Maria Tapia, Global Lead of the Climate Finance Program, Global Center on Adaptation (GCA)

The climate crisis has become increasingly evident in the last five years. Its alarming effects are also becoming more apparent. Thus, it has become clear that the actions taken to adapt to global climate change have not been sufficient. With the world's populations facing climate-related hazards, much more has to be done to address the issue and accelerate action. Yet, mobilizing the actors and finance will necessitate investment.

AN ARTICLE BY

Maria Tapia leads the Climate finance agenda at the Global Center on Adaptation where she coordinates the implementation of climate finance activities and projects for the Africa Adaptation Acceleration Program and the South Asia Program, From 2011 to 2021. Maria was the coordinator of Climate Innovative Solutions at the Inter-American Development Bank (IDB) From 2001 to 2010, she was a director of the structured finance team for Latin America at Standard & Poor's. Maria has a BA in Finance and an MSc in Global Environmental Change.

espite the various bold statements made by heads of state and delegations at the COP26 climate summit in Glasgow, the world still

has a long way to go to keep global warming below 1.5 degrees Celsius. Moreover, a study by McKinsey highlights that even if the global temperature warms by 1.5 degrees Celsius by 2030, almost half¹ of the world's population

will be exposed to climate hazards, such as heat stress, drought and floods.

Before investing in climate change adaptation, businesses need to have a strong business case, which can be developed by analyzing the risks, costs, and expected returns and the contribution of business to provide solutions towards climate stressors. Key factors that need to be considered include the availability of resources, security of operations, and market opportunities.

WITH LIMITS TO MITIGATION. THE NEED FOR ADAPTATION IS TOWERING

The Adaptation Gap Report released by the United Nations Environment Programme² estimates that the cost of adapting to the effects of climate change will increase from around US\$170 billion to US\$320 billion by 2030. By 2050, the figure will reach around US\$500 billion. The National Oceanic and Atmospheric Administration (NOAA) estimated the cost of natural disasters in the US in 2021 to be over \$145 billion, 50% higher than the previous year. Further, a report by Swiss Re Institute³ notes

that by 2025, climate-related disasters could cost the country's economy around 10% of its gross domestic product.

According to the State and Trends in Adaptation Africa Report of the Global Center on Adaptation (GCA), around 50 natural disasters were reported across Africa every year from 1991 to 2020. Although floods cause the most financial damage, droughts are more common on the continent, with over five times as many people affected. According to this report, funding for climate adaptation is being cut, while climate impacts are growing. To respond to escalating risks, a five- to ten-fold increase in funding will be needed for adaptation globally, up to \$300 billion annually.

In 2019, developed countries agreed to provide financial support to developing countries to help them address the effects of climate change. However, in 2020, they failed to meet their financial commitments. According to estimates released by the Organization for Economic Cooperation and Development (OECD), the total amount of climate finance reached almost \$80 billion in 2019.

Source: Global Landscape of Climate Finance 2021 -Climate Policy Initiative.

ADAPTATION REMAINS MINOR AND STRUGGLES TO GROW WITHIN **CLIMATE FINANCE**

Adaptation is the uncomfortable guest at all climate finance forums. The latest global landscape of climate finance, published by the Climate Policy Initiative in 2021, shows that the global climate finance flows – including public and private flows of both domestic and international origin – were tracked at US\$ 632 billion per year for 2019-2020.

The majority (US\$ 571 billion or 90%) of tracked finance flowed to mitigation, with US\$ 46 billion for adaptation and US\$ 15 billion for cross-cutting themes that include mitigation and adaptation. Private climate investments increased by 13% from 2017/2018 to USD 310 billion in 2019/2020. However, only 1 billion dollars were invested in adaptation.

WHAT MOTIVATES ACTORS TO ADAPT?

The goal of adaptation is to enable actors to cope with the increasing number of weather and climatic conditions expected to occur due to climate change. This can be done by developing technology or establishing a more robust risk-management framework.

Tech-intensive and expensive innovations drive adaptation in the developed countries, given their competitive advantages in R&D. Developed countries have available and reliable climate data that allows them to manage risk and develop technology to cope with climate risks. However, in developing countries, adaptation is driven by daily survival.

Every day, businesses around the world invest in climate change adaptation. From small farmers to large corporations, all contribute significantly to the fight against climate change. Although they may not consider climate change a threat, many businesses still invest in their operations' resilience. They are adapting to the effects of climate change by planning for the future, managing their resources, and responding to droughts and floods. However, investing in adapting to climate change can be daunting for small businesses in developing countries. Due to the lack of resources, they often prioritize their immediate needs over their long-term goals.

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Adaptation finance gained momentum in 2019/2020, increasing 53% to an annual average of USD 46 billion, up from USD 30 billion in 2017/2018. However, adaptation still accounts for just 7% of total climate finance, based on available data.

¹ https://www.mckinsey.com/business-functions/sustainability/our-insights/protecting-people-from-a-changing-climate-the-case-for-resilience 2 · Adaptation Gap Report 2021 (unep.org)

^{3 •} World economy set to lose up to 18% GDP from climate change if no action taken, reveals Swiss Re Institute's stress-test analysis I Swiss Re

G To respond to escalating risks, a five to ten-fold increase in funding will be needed for adaptation globally, up to \$300 billion annually. 99

> Investments in adaptation can lead to a return on investment of 2:1 to 10:14. For example, every dollar invested in resilient infrastructure in Africa yields four dollars, and investing a dollar in climate-smart crops in most African countries can generate between 2 and 14 dollars in benefits⁵.

> Despite the positive benefits and returns of investments, it is not always easy to convince investors that investing in adaptation is a good business practice. Many factors can affect returns, such as the cost of doing business, the availability of resources, and a lack of clear indicators of success. In addition, climate data is not always available, particularly in developing countries. Nevertheless, connecting climate science with financial techniques will translate a climate vulnerability into a business opportunity.

> To mobilize the actors and finance needed for adaptation, investment is necessary. It

will enable understanding the rationale for the investment and deployment of an array of financial instruments and mechanisms. These must attract finance from entities with a range of risk appetites and be able to raise capital and deploy it flexibly. In addition, the level of "concessionality"6 required for specific instruments will vary by market or policy environment.

Not all instruments work in all contexts. The enabling environment in a country will determine the viability of specific financial instruments. In some cases, a lack of financial sector development or commitment to a sector (i.e., water, agriculture) will make specific financial instruments challenging to implement. In these instances, there may be a more substantial role for concessional capital from development finance institutions (e.g., project preparation grants, first-loss debt tranches, and premium support) to facilitate deploying the instrument effectively. For example, local capital markets are a significant source of water infrastructure finance in developed markets and often employ special purpose vehicles (SPVs) to mobilize finance alongside commercial bank lending. However, in developing countries, water infrastructure is sourced from public finance.

Every day, businesses around the world invest in climate change adaptation. From small farmers to large corporations, all contribute significantly to the fight against climate change.

WHAT ROLE IS THE PRIVATE SECTOR PLAYING IN CLIMATE ADAPTATION?

Getting the finance for adaptation is not an easy task, especially in developing countries. Several factors prevent investors from making informed decisions when it comes to investing in climate change. These include a lack of data at the local level, the lack of a bankable pipeline, and high transaction costs.

As governments start to formulate their National Adaptation Plans, the private sector must play a leading role in its efforts to implement these plans.

To ensure that the private sector is well-informed about the various activities involved in climate change adaptation, governments must establish a clear business case and an enabling environment for their investments. Doing so will help them attract more private sector support and encourage more investment.

'Adaptation' and 'resilience' definitions

The Intergovernmental Panel on Climate Change (IPCC) defines adaptation and resilience¹ as:

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Adaptation: The process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or to exploit beneficial opportunities. In some natural systems, human intervention may facilitate adjustment to the expected climate and its effects.

Resilience: The capacity of social, economic, and environmental systems to cope with a hazardous event, trend or disturbance, responding or reorganizing in ways that maintain their essential functions, identities, and structures, while also maintaining their capacity for adaptation, learning, and transformation.

In summary, we can define adaptation as the process of adjustment to actual or expected climate shocks and their effects (risks as well opportunities). We define resilience, as the result of such adjustment enabling a system and its parts to anticipate, absorb, accommodate, or recover from, the effects of a hazardous event in a timely and efficient manner.

Usually adaptation action has two layers, as per also recalled in the EU taxonomy on climate finance:

- A micro layer: Adaptation OF the investment. I.e. how the project can deliver its benefits even under current and future climate. This is often designated as "climate proofing".
- A systemic layer: Adaptation BY the project. I.e. how the project provide resilience to the environment in which it operates. It is obvious that such systemic constribution needs first climate proofing check (a water network does not provide systemic adaptation benefit if you don't have enough water in the pipes.

FOCUS **GCA**

The Global Center on Adaptation (GCA) is an international organization that works in partnership with the public and private sectors to catalvze action and support adaptation solutions. from local to international levels, to ensure learning and collaboration for a climate-resilient future. The GCA's work elevates the visibility and political importance of climate adaptation. It facilitates solutions such as smarter investments, new technologies and better planning to promote resilience to climaterelated threats

⁴ https://gca.org/reports/adapt-now-a-global-call-for-leadership-on-climate-resilience/

⁵ https://gca.org/reports/state-and-trends-in-adaptation-report-2021/

^{6 •} Concessional capital is intended to fill the gap where the private sector (commercial capital) would not usually invest. Thus, it is designed to be "additional", being used only to "crowd-in", rather than «crowd-out» private investmen

What indicators for finance devoted to climate change adaptation?

1 Bertrand Reysset, climate adaptation expert, AFD Group

Adaptation is by definition the response to a shock – in this case a climate shock. But if this issue is not identified and taken into account in the business practices and procedures of private players, it is unlikely that an indicator devoted to climate adaptation will come about by chance. Yet this tool is becoming essential. It is increasingly used by private finance to measure climate adaptation, in particular at the request of donors.

AN ARTICLE BY I BERTRAND REYSSET

As a development economist and agronomist, Bertrand Reysset has been working on climate adaptation in Africa, Asia and Europe for nearly 20 years, especially with farmers and water management professionals. In 2011, he coordinated France's first adaptation plan and has participated in the design and implementation of climate adaptation projects for several development actors (World Bank FEEM JEAD Ministry of Foreign Affairs, EU). Since 2017 Bertrand Reysset has been assisting the development of AFD Group's "adaptation portfolio".

f a client requests support from a donor for a project that has already been developed but ignores climate shocks, it will find it difficult to change the "adaptation finance" category.

It is therefore especially important to create and implement indicators for project initiators seeking private financing, in order to take into account the necessary adaptation to climate change. The definition of these "adaptation indicators" also poses several recurrent problems which need to be taken into account.

These indicators are firstly **specific** to a given climate and social context. Consequently, an indicator that is relevant for one project is not necessarily so for another which seems identical, but is implemented in a different climate context. Reducing water consumption in a country where there is no scarcity is not an adaptation use of a cross-sectoral aggregation.

project: the investment does not correspond to any climate risk. The measurement of water savings can therefore be a relevant result indicator for climate adaptation – or not so... This it sufficiently to make it eligible for variability makes it difficult to use it consistently in a portfolio.

> This is also the case for cross-sectoral aggregation, which is complicated to apply in a portfolio: cubic meters of water saved in Namibia cannot be directly compared with hectares planted with climate-resilient crops. So, a "derived aggregatable indicator" may have to be used to carry out a comprehensive analysis of a portfolio. For example, this derived indicator may be a category of individuals or entities (beneficiaries of more resilient services), or a financial or economic monetization. Cubic meters of water can thereby be converted into a value via a shadow price, which allows the

G It is especially important to create and implement indicators for project initiators seeking private financing, in order to take into account the necessary adaptation to climate change.

In absolute terms, it is not difficult to find relevant adaptation indicators.¹ Indeed, they fit in very well with the standard "logical framework" approaches.² However, the outcomes or impacts related to these indicators are not always verifiable

due to the unpredictable nature of the climate stresses concerned: the project's performance cannot be confirmed until there is a drought. The indicators therefore remain a hybrid solution, halfway between the output and the outcome.

REMOVE THE BARRIERS TO PRIVATE FINANCE

It is easier for the public sector to support adaptation. However, it is a question of tempering a recurring idea that it is not suited to the private sector. While it is true that development banks find it hard to generate "adaptation finance" via the private sector, in particular due to the specific nature of its accounting indicators, other factors account for this situation. The specific temporality of business cycles between funders on one side and private clients on the other is one of the barriers to its development. Project initiators and their backers often submit applications to banks that are already quite detailed. If the "climate risks and opportunities" are not included in them, banks do not always have the possibility of proposing changes that are "acceptable for the client" for projects that are already very developed. Consequently, "adaptation opportunities" cannot be seized, whereas the quality of the project could have benefited from them. The issue must therefore be addressed with the client at the earliest possible stage. Clearly, the sticking point here is not the private nature of the players involved, but rather the lack of understanding of the "climate risks and opportunities" and the financing related to them. For example, if a client has only complied with the Eurocode (European code for designing and sizing of construction works) to scale its infra-

structure, it means it has not taken into account the effects of climate change expected over the next 20 years, but just the average climate over the last 30 years. If it does not apply internal procedures that are more demanding than the existing standard, the project seeking financing may have no climate resilience dimension or it may be ill-suited. Furthermore, most development actors only consider adaptation in terms of a response to climate risks. Yet the IPCC definition does not limit adaptation to "problem management", it also encourages "opportunities related to climate change to be seized".

Consequently, while looking for climate risks in private sector projects is obviously a relevant approach, it must be complemented by a logic of seizing opportunities: How can the responses to reduce the climate vulnerability of third parties also fit in with a business logic?

In absolute terms, it is not difficult to find relevant adaptation indicators. [...] However, the outcomes or impacts related to these indicators are not always verifiable due to the unpredictable nature of the climate stresses concerned.

1 See in particular https://publications.iadb.org/en/framework-and-principles-climate-resilience-metrics-financing-operations 2. The logical framework is a tool that facilitates the design, implementation and evaluation of a project. See in particular https://wedc-knowledge lboro.ac.uk/resources/booklets/G006-The-Logical-Framework-on-line.pdf

OPINION

FOCUS AFD GROUP

AFD Group contributes to the implementation of France's development and international solidarity policy. Composed of Agence Française de Développement (AFD, responsible for financing the public sector and NGOs, research and education in sustainable development), its subsidiary Proparco (dedicated to financing the private sector) and Expertise France (technical cooperation agency), the Group finances, supports and accelerates transitions towards a fairer and more resilient world. AFD Group's teams are involved in over 4,000 projects in the field, in the French Overseas Territories, in 115 countries and in territories in crisis to promote common goods – climate biodiversity, peace, gender equality, education and health.

How important is adaptation finance for a just transition?

Iller Tanya Dos Santos, Global Head of Sustainability, Investec Group

Climate adaptation entails responding to climate impacts that result in deteriorating living conditions. It requires private sector investment to scale alongside public investment, to supplement public resources. This is especially the case in developing countries – the most vulnerable being in Africa - where there is an increasing frequency and severity of climate-related shocks.

AN ARTICLE BY II TANYA DOS SANTOS

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ust Transition" is one of the many buzzwords that has sprung up over the past few years as part of the latest woke capitalism movement. This one has a ring of familiarity to it, however, as our need to transition away from "dirty energy" towards more sustainable

power needs to include both environmental and social priorities. The first mention of just transition is attributed to US trade union leader and environmental activist, Tony Mazzocchi (1993) who pleaded for a "superfund" to provide financial support for workers displaced by environmental protection policies¹. The term 'superfund' was seen to have too many negative associations, so it was changed to 'just transition'.

What does this have to do with climate adaptation? Everything. The burning of fossil fuels for decades has accelerated the amount of greenhouse gas (GHG) emissions in the atmosphere, essentially killing the very planet we rely on for our sustenance as a species. Therefore,

we are under massive pressure to transition away from carbon-intensive fossil fuels as our primary energy source to a mix of low-carbon, renewable energy sources. These moves towards cleaner energy sources are known as climate mitigation measures. But, while there is a clear and urgent need to transition, we cannot ignore the present negative impacts of climate change. Dealing with these is known as climate adaptation.

Climate adaptation refers to responding to the climate impacts that entail a steady deterioration in the environmental conditions required for daily living. It includes access to water, energy, air quality, and tolerable working temperatures. The lack of these may arise because of short-term shocks, such as storms, floods and wildfires, which often have abrupt and devastating consequences. Adaptation focuses on building the resilience and protective capability to limit or eliminate the negative and intolerable impacts of climate change on lives and livelihoods.

G Public spending and grants alone cannot meet the adaptation finance gap. We urgently need private sector investment to scale alongside public investment, and supplement limited public resources.

1. https://www.ilo.org/wcmsp5/groups/public/---ed_dialogue/---actrav/documents/publication/wcms_647648.pdf

AFRICA BEARS THE BRUNT

Africa is the most vulnerable continent, with an increasing frequency and severity of climate-related shocks. In Southern Africa, we experience prolonged drought conditions and cyclones, impacting millions of people. West and Central Africa battle with temperature increases and reduced rainfall. And in East Africa, locust swarms cause severe crop destruction. Yet the global climate financing needed to address these issues is lacking, despite the many pledges at Conference of Parties (COP) meetings. Historically, financial support has been directed predominantly towards climate mitigation measures, rather than adaptation. Data from the OECD published in 2020 shows that only 33% of climate-related finance commitments to Africa have targeted at adaptation. Furthermore, adaptation finance tends to be in the form of loans that need to be repaid, which increases the debt burden for developing countries, which have limited public finances available. In terms of climate justice, these countries should receive grant-based funding given that they had little to zero responsibility

for the carbon emissions created in the past century and should therefore be financially assisted by the developed world.

DIVERSITY DELIVERING RESILIENCE

With the many challenges to be overcome such as regulatory barriers and a lack of climate data -investment must be activated from an extensive range of public and private sources. According to the Stockholm Environment Institute, agriculture and water supply and sanitation account for half of all adaptation commitments to Africa. Support for the basic development sectors, such as education and health, is negligible in comparison, and only a tiny fraction of adaptation-related funding targets biodiversity.

There are, however, also many adaptation finance opportunities. For example, there is the potential to help highly indebted countries through general-purpose debt financing linked to climate impacts. This concept is like a corporate sustainability-linked loan but at the national level. Debt challenges could also be addressed by

linking credit ratings with a reduction in climate risk to incentivise resilience and lower the cost of debt. When considering all of these financing opportunities, it is imperative to ensure that adaptation funding reaches the most vulnerable and supports equitable development.

But public spending and grants alone cannot meet the adaptation finance gap. We urgently need private sector investment to scale alongside public investment, and supplement limited public resources. A wider range of funds will mobilize further investments to build climate resilience. Financing options range from highly concessional terms with lower return expectations and longer tenors to commercial terms with market-related returns and shorter tenors. A mix across the spectrum is known as blended finance, and this is where the MDBs and DFIs play a critical role. They evaluate climate risks and vulnerability, while assisting country governments in building capacity and drawing in private capital from commercial banks, which are restricted by international capital standards. Besides providing further capital, commercial banks leverage their critical banking relationships with farmers, co-operatives, and SMEs - all of whom contribute valuable adaptation solutions.

Until his death in 2002, Mazzocchi sought to mobilise the just transition campaign and mitigate the inequitable effects on livelihoods caused by transformations in energy systems and resource use. Two decades later, we have never been more acutely aware of the need for a just transition. Decisions made today will affect how climate impacts play out in the future. Immediate and ambitious action is needed across the full range of potential adaptation finance sources to respond to ongoing climate impacts and build a more climate-resilient and equitable future.

FOCUS **INVESTEC GROUP**

Investec Group partners with private, institutional and corporate clients offering international banking investment and wealth manage services in two principal markets. South Africa and the UK, as well as in certain other countries. The group was established in 1974 and currently has more than 8.200 employees. Investec has a dual-listed company structure with listings on the London and Johannesburg Stock Exchanges

A network of central banks and regulators committed to climate action

I An interview with Jean Boissinot, Head of Secretariat, Network for Greening the Financial System (NGFS)

The financial sector is increasingly mainstreaming climate-related risks into its analyses, in particular through the action of the NGFS, an international network of central banks and regulators. Details and analyses from Jean Boissinot, Deputy Director for Financial Stability at Banque de France and Head of the NGFS Secretariat.

PHYSICAL RISKS

'Physical risks" arise from the effects of climate change on economic actors. This may involve chronic risks (increase in average temperatures change in rainfall patterns, rising sea levels) or acute risks (extreme weather events, forest fires, etc.)

TRANSITION RISKS

"Transition" risks cover all the risks resulting from structural changes in the economy during its transition towards carbon neutrality: regulatory shocks or the technologica obsolescence of assets involved in the use of fossil fuels, changes in consumer behavior, risks of bubbles and overinvestment, etc. In most cases, these risks arise from mismatches between the expectations of players and the actions of others

IN WHAT WAY DOES CLIMATE CHANGE POSE A RISK FOR BANKS AND FINANCIAL INSTITUTIONS?

Climate change is no longer a hypothetical phenomenon. Since the beginning of the year, there have been an increasing number of heatwaves, droughts, floods, large-scale forest fires and so on, often with an intensity rarely seen and sometimes in regions where these phenomena were quite unprecedented. These events are a tragedy for the people who are victims of them. In addition to their human cost, they also have an economic and financial cost. The damage caused by natural disasters can be estimated at some \$270 billion in 2021. The indirect economic repercussions are at least comparable and probably of an even greater order of magnitude.

However, the economic and financial impacts of climate change were for a long time a "blind spot" of financial analysis, despite the fact that they were known. These physical risks, such as the transition risks involved in strengthening climate policies (in particular if they are not anticipated), are no longer negligible, although they wouldn't appear to be serious enough to destabilize the financial system at this stage. But what gives cause for concern is the rate at which these risks may increase in the coming years if they are not managed proactively. Climate change is a "green swan": a huge and unavoidable risk (the only uncertainty concerns the timing and form of this risk).

HOW HAVE REGULATORS AND SUPERVISORS TAKEN UP THE ISSUE OF "CLIMATE FINANCIAL RISKS"?

In the lead-up to COP21 in 2015, central banks became more aware of the nature of the financial risks related to climate change and the "macroeconomic" nature of the transition to a carbon neutral global economy more generally. They

took an interest in climate change, not despite or beyond their mandates, but in the actual context and precisely because of these mandates (i.e., price stability, financial stability).

G The economic and financial impacts of climate change were for a long time a "blind spot" of financial analysis, despite the fact that they were known.

This approach may seem a little distant compared to other development stakeholders who are directly engaged in financing the transition. While it is perhaps more discreet, it is equally important: the success of the transition depends on our collective capacity to not only make "green investments", but also to ensure the overall coherence of capital allocation with climate constraints.

In practical terms, seven years after COP21, this agenda, which resonates with Objective 2.1.c of the Paris Agreement,¹ is now in an implementation phase: supervisors are starting to draw operational conclusions from stress tests. In the same vein, the macroeconomic developments involved in the current energy crisis and its interactions with the transition are very much in the minds of central banks when they decide their monetary policy.

IN THIS CONTEXT, WHAT IS THE ROLE OF THE NGFS, WHICH GATHERS 121 CENTRAL BANKS AND FINANCIAL SUPERVISORS FROM ALL OVER THE WORLD?

Central banks very quickly understood the practical implications of the obligation to take climate issues into account in all their activities. For example, there was clearly a need to conduct stress tests. However, this was hampered by the unavailability of scenarios translating the IPCC conclusions into macro-financial terms. But these projections are too complex to be produced by an individual institution. The need for a collaborative platform between central banks therefore rapidly emerged and in December 2017, at the initiative of Banque de France, eight central banks (China, France, Germany, Mexico, Netherlands, UK and Singapore) and supervisors (Sweden) created the NGFS to develop this collaborative approach.

The collaboration has developed around various issues: formalization of best practices for supervision or investment for non-monetary portfolios, development of scenarios, work on data and so on. This is one of the strengths of the NGFS: the work undertaken is first and foremost technical and any differences of political assessment are a matter for other discussion forums (G20, FSB and so on). Furthermore, a number of other institutions have clearly seen the value of the collaboration. They have joined the network to contribute to it, but also to "ramp up" their own expertise by participating in the work. Seen from the Secretariat, the dynamic is impressive, both in terms of the subjects covered (all the activities of central banks are now addressed) and in terms of the depth and quality of this work.

IN YOUR OPINION. CAN THIS RISK-BASED APPROACH ENCOURAGE THE PRIVATE SECTOR TO INVEST IN ADAPTATION?

Investment in adaptation is both an absolute necessity and a real challenge. An absolute necessity insofar as even if we achieve a rapid transition towards carbon neutrality, the inertia of the climate system will increase the physical risks for another 15 to 20 years. This poses a real challenge, as adaptation is first and foremost a way of limiting future costs and there are not systematically cash flows to build a

business model on. The risk-based approach makes little difference to this second point, but by better identifying the risks, we also make a better assessment of the value of adaptation. The financial sector consequently goes for appropriate investments, in the absence of specific investments in adaptation, which often remain the responsibility of public authorities.

1. Objective 21c of the Paris Agreement: Making finance flows consistent with a pathway towards low greenhouse gas emissions and climate resilient development.



II → JEAN BOISSINOT

Deputy Director for Financial Stability at Banque de France. Jean Boissinot has also been head of the NGES Secretariat since 2021. Prior to joining Banque de France in 2018, he held various positions at the Directorate General of the Treasury, HM Treasury INSEE and the OECD. He was notably responsible for the COP21 Private Finance Agenda and, more generally, the development of green finance for the French Ministry of Finance (2012-2018)

FOCUS NGFS

The Network for Greening the Financial System (NGFS) comprises 121 central banks and the supervisors of 90 different jurisdictions. The work of the network aims to facilitate the mainstreaming of climate issues into all the activities of central banks (monetary policy, financial supervision, etc.). Banque de France nouses the initiative's permanent secretariat, which also hosts the staff of NGES members.

INTERVIEW

A model of resilience: Brazil's leading private sanitation provider

IIII Interview with Radamés Andrade Casseb. CEO. Aegea

Thanks to its business model – aligned with ESG principles – Aegea has become the leading private sanitation company in Brazil, servicing 154 cities in 2022 (up from 6 in 2010). Providing sanitary sewage service, it brings treated water to the population and is contributing to guaranteeing the legacy of the sanitation ecosystem by mitigating the effects of climate change and reducing water loss rates.

ANDRADE CASSEB

Radamés Andrade Casseb is the CEO of Aegea, the leading private sanitation company in Brazil. He has degrees in computer science, specialized in Infrastructure Management at Fundação Getúlio Vargas (FGV), and Advanced Management, at Fundação Dom Cabral/INSEAD. In 2011, he joined Aegea as a director. He has held leadership positions in other infrastructure companies. such as CIBE Participações e Empreendimentos S.A., a group specialized in infrastructure, where he was the Operations Director

SEVERE DROUGHTS AND FLOODS ARE BECOMING MORE INTENSE AND FREQUENT IN BRAZIL. ARE YOU WITNESSING THE IMPACTS OF THESE ON THE CONCESSIONS YOU OPERATE?

Radamés Andrade Casseb: Aegea invests in building wells and ensuring water quality. initiatives that guarantee – in the face of lower rainfall – the continuity of its services and respects the natural environment in its different regional operating environments (154 cities in 13 states). With this huge responsibility, the daily monitoring of the country's water systems and the volume of water stored in the hydrographic basins where its units are located is a strategic issue. Investment in protecting water sources and guaranteeing supply includes searching for new sources, expanding surface water infrastructure, drilling aquifers,

The company has programs for preserving springs and water security; one entails producing and planting seedlings in springs, deforested and conservation areas - actions that increase awareness and environmental preservation. Its new projects aside, Águas Guariroba has planted around 40,000 seedlings and maintains a nursery inside the Los Angeles Sewage Treatment Station and the Revivendo Águas Claras Program, at the Prolagos unit. We aim to reforest 10 hectares of the Juturnaíba spring, which supplies several cities in the interior of Rio de Janeiro.

CLIMATE CHANGE IS CREATING A RANGE OF POTENTIAL IMPACTS AGAINST WHICH INFRASTRUCTURE WILL NEED TO BE RESILIENT. WHAT IS THE PRIORITY STRATEGY FOR THE SECTOR IN BRAZIL?

When we talk about water resilience, several The model proposed in the sanitation regufactors are involved, such as climate change, urbanization of cities, the construction of dams, and human intervention in supply systems. Thus, water security is a set of good practices developed by society to ensure that water is available regardless of its related factors. It is a joint effort involving public authorities, private companies and the population.

latory framework in 2020 - which seeks universal service by 2033 – opens the door to the involvement of the private sector, and it is beneficial for the public sector. In this model of complementarity and integrated action, we understand and believe it is essential to reverse the current situation in the sector.

TO WHAT EXTENT CAN THE PRIVATE SECTOR LEAD INVESTMENT IN RESILIENT AND SUSTAINABLE FACILITIES?

The new regulatory framework for sanitation shows how concerned Brazil is with changing its basic sanitation conditions. The legislation establishes a daring goal, while improving and modernizing the sector, bringing the necessary legal certainty to attract more investment and

attain national coverage of water services and sewage. Notably, the new environment has already seen increased interest from potential investors. Low service rates are challenges that, if solved properly, generate positive social impacts and financial results.

IN TERMS OF INFRASTRUCTURE, HOW DO YOU ACCOUNT FOR THE IMPACTS OF CLIMATE CHANGE IN YOUR PLANNING?

Aegea has been increasing investments to improve water security and the resilience of water bodies in the cities and regions where it operates. To minimize the impacts of climate change, it has partnered with Climatempo (a Brazilian meteorology company) to provide short- and long-term meteorological inforgraphic stations in basins where the company

collects water. In 2021, based on a study by Climatempo, Aegea identified possible droughts and scarcities in 14 of the 25 concessions located in Mato Grosso. Since then, approximately R\$50 million (around 10 million euros) has been invested in preventive engineering works, such as expanding reservation capacity, reducmation to aid in risk inspections of hydro- ing water loss, drilling wells, and identifying new capture points.

WHAT BARRIERS - FOR EXAMPLE, REGULATIONS, FINANCIAL **RESOURCES, ACCESS TO DATA, CAPACITY - DO YOU FACE?**

Brazil has different demographic, social and cultural realities. Our business model works to serve populations ranging from 3,000 to 6.8 million inhabitants, respecting the envithat promote dignified and healthy lives. Aegea treats each locality according to its needs and characteristics. Management of the 'social license to operate', especially in its relationships

with communities, is one of the pillars of the company's legacy of social and environmental development. We know that in providing sanitation, we act directly and indirectly in the lives ronment and people's rights, with initiatives of communities and cities, generating jobs and promoting the local economy. As we increase our understanding of their specificities and demands, we also act to raise awareness of the importance of the sector.

INCREASING WATER STRESS AND REDUCING THE LOSS RATE HAVE BECOME INCREASINGLY IMPORTANT. HOW DO YOU DEAL WITH THESE IN YOUR OPERATIONS?

The water supply system in Brazil loses around 40% of its product to leaks and clandestine connections, according to a study by Instituto Trata Brasil, based on data from the SNIS (National Sanitation Information System). This is equivalent to 7,500 Olympic swimming pools of treated water wasted daily. Aegea has an extensive Energy Efficiency and Water Loss Reduction Program to face this chal-

lenge and optimize water resources, which helps maintain the sustainability of its operations. Last year, the reduced loss rate represented around 39 billion liters of water saved (supply of 970 000 people/year). Bringing treated water to the population should not be the only priority of the sanitation sector. Reducing the loss rates of this essential input for life will guarantee the legacy of an entire ecosystem.

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FOCUS **AEGEA**

Aegea Saneamento is Brazil's leading private sanitation company, operating through its concessionaires in 13 states, in all regions of Brazil. With exponential growth the enterprise's presence went from six cities in 2010 to 154 cities in 2022, benefiting more than 21 million people. This growth was possible thanks only to the company's business model, based on operational efficiency, goal-oriented responsible investments, and alignment with ESG principles

Investing in nature for water security: the power of collaboration

Ille Naabia Ofosu-Amaah, Senior Corporate Advisor of Water, The Nature Conservancy Sophie Trémolet, Europe Freshwater Director, The Nature Conservancy

Around the world, the impacts of climate change are increasingly being felt and have become impossible to ignore. Stories of increased drought, more intense storms, and changing rainfall patterns are commonplace. These changes are putting global water security at risk: according to the UN, about 4 billion people, representing nearly two-thirds of the global population, already experience severe water scarcity during at least one month of the year, and businesses consistently rank water risk as a top concern, based on a survey published by the World Economic Forum every year.

> nsuring humanity's water security is an issue of top priority for public and private sector leaders around the world. How to get there, however, is currently up for debate. The Nature Conservancy (TNC) has articulated a clear vision, focusing on investing in nature to tackle this challenge.

> While traditional grey infrastructure has been and will remain a centerpiece of global water

management, significantly more investment is needed in green infrastructure, as it is flexible, cost-effective and resilient and can generate a multitude of benefits for nature as well as create local green jobs. Investing in nature to strengthen the resilience of global watersheds can both deliver measurable benefits to those most vulnerable to the impacts of climate change and be good for business. This is why we must prioritize these investments on our path to 2050.

WATER FUNDS: HARNESSING THE POWER OF NATURE FOR WATER SECURITY

TNC has worked for over two decades to demonstrate how investments in nature can deliver water benefits to those who need them most. The creation of Water Funds1 - purpose-built collective action mechanisms that promote upstream conservation practices to drive measurable downstream water quality and quantity benefits – has been a primary focus to date. These structures enable stakeholders to overcome common challenges such as governance fragmentation and lack of coordination

and help them invest at scale in nature-based solutions like reforestation, habitat restoration and sustainable agricultural practices.

Watershed investment is not an individual endeavor. Creating watershed-scale change requires a team of stakeholders - including local communities, public entities and the private sector – working together in lockstep to define common objectives and approaches. Water Funds are designed to facilitate this collaboration, bringing stakeholders together

needs most.

Since the first Water Fund was established in Quito, Ecuador in the early 2000s to restore and protect the páramo (large areas of wetlands in the Andes that act as a sponge and regulate water

THE ROLE OF THE PRIVATE SECTOR

Though Water Funds can benefit both communities and nature, financing and launching these projects with the right stakeholders can be a lengthy, complex process. To be successful, Water Funds require an 'anchor organization' or local lead, which is usually a city or a public utility. But for these stakeholders, who have for so long relied on traditional, grey infrastructure as the only solution, investing in nature often represents a paradigm shift, and securing their necessary buy-in can be a challenging feat.

The private sector has a unique role to play at this critical early stage. In several cases, corporations that were actively working to address water security challenges in their production centers provided critical early funding and guidance that helped get new Water Funds off the ground. They understood that in order to fulfill their responsibilities as water stewards, working at the level of a single production facility (like a bottling plant) could not deliver meaningful change in complex systems that are shared and influenced by many actors. Instead, they recognized that investing in larger coalition

to implement the actions that the watershed flows), TNC has worked with partners around the world to support the establishment of 44 Water Funds. From South America to Europe, the United States, Africa and the Asia Pacific region, TNC and partners have designed custom-built Water Funds to address a number of water security challenges.

> building can deliver more impactful results over a longer period. This is critical as most investments in nature need to be sustained over time to generate impact.

> In early 2018, for example, The City of Cape Town in South Africa faced a prolonged drought that left the city of 4 million people days away from Day Zero – the point at which taps were predicted to run dry. While Cape Town narrowly escaped the worst-case scenario due to the arrival of the winter rains and water pumped from a neighboring region, the crisis created a sense of emergency and triggered multi-pronged action. TNC and its local partners focused on making the case for investing in nature and together showed that removing water-thirsty invasive plants in the upper watershed (in a targeted and sustained manner) could save 55 billion liters of water per year², the equivalent of 2 months' worth of water supply to the city within the first six years of the program. The analysis also showed that this could be done at 1/10th of the cost of grey infrastructure solutions considered by the City².

f Investing in nature to strengthen the resilience of global watersheds can both deliver measurable benefits to those most vulnerable to the impacts of climate change and be good for business.

2 • https://www.nature.org/content/dam/tnc/nature/en/documents/GCTWF-Business-Case-April-2019.pdf

AN ARTICLE BY OFOSU-AMAAH

Naabia is Senior Corporate Advisor of Water at The Nature Conservancy (TNC). She focuses on developing and implementing the strategy for engaging companies to further TNC's global water goals. This includes research on priority companies, recommendations on industries and companies to target, support for corporate engagement in TNC's regional programs, and the development of tools and resources to empower Conservancy staff to continue to engage companies.

II → SOPHIE TRÉMOLET

Sophie is Europe Freshwater director at The Nature Conservancy. She leads the development and implementation of a program to accelerate investment in naturebased solutions for water security in Europe and globally, amongst other activities focused on river restoration and protection. She is in charge of ouilding strategic relationships with Europe-based public and private funders, utilities and regulators to support a gradual shift towards greater incorporation of nature in water security investments.

But getting this idea off the ground and mobilizing funding for implementation was not easy. Early commitments from the private sector made the difference as they created critical momentum needed to prove out the plan and inspire public investment for long-term sustainability. An initial \$100,000 investment from one company in 2017 helped leverage nearly \$3 million in private support and subsequently inspired a \$4 million investment to date for the city. The project is now underway to generate an astonishing 100 billion liters in annual water gains within 30 years.

A similar story played out in Sao Paulo, Brazil, where TNC is working with farmers and other landowners to restore forests to address local

water quality issues and tackle climate change (there are approximately 1.1 million tons of carbon stored in standing forests within the Sao Paulo Water Fund's geographic scope and 45,000 additional tons of carbon being captured across local restoration and conservation sites each year). Again, it was early investments from 6 corporations that helped generate the momentum needed to start this program. More than 18 companies have since committed nearly \$6 million, which has helped leverage over \$16 million to date from 4 new public funding sources. Together, this support has helped TNC and partners restore, conserve and implement landuse best practices on 25,000 acres.

GETTING TO SCALE, TOGETHER

The hard truth is that developing one Water Fund at a time will not be sufficient to address water security challenges that keep growing by the day. To scale, we need to equip entities that work across the globe, such as development finance institutions and corporations, and address the many barriers to entry that exist in developing watershed investment programs. And we must do it fast.

To that end, TNC and partners have developed a full range of tools, associated training programs and technical assistance facilities to help partners advance from understanding the benefits of investing in NBS for water security to delivering investments on the ground.

Tools like WaterProof³, for instance, help partners understand whether nature-based solutions (NBS) are viable options in their watershed, by providing an estimated return on investment: use of this tool can save precious time and money in assessing options at an early stage of project development. Working with the CEO Water Mandate (established by the United Nations Global Compact), it became apparent Funds Toolbox⁶.

that generating additional private investment in nature-based solutions (NBS) is dependent on businesses gaining a more systematic understanding of the full range of benefits that NBS generate - including water quantity, water quality, carbon/climate, socio-economic, and biodiversity and environment - and of their economic and financial benefits. This prompted the creation of the NBS Benefits Explorer⁴ to help businesses gain a clearer understanding of the full range of these benefits in a way that is relevant to their activity.

Jointly with the World Water Council, TNC supported the preparation of an Investor Guide⁵ that identifies six investment areas or "business lines" for nature-based solutions that are especially relevant to addressing water security risks and appear to offer the most promising models for international replicability, such as constructed wetlands and agricultural best practices. These and other tools, along with decades of field experience, are centralized and easily accessible in the TNC's Water

TNC also helps partners through tailored training, including for corporate partners whose value chains reach every corner of the world and development finance institutions interested in increasing their investment in nature-based solutions as independent and combined green-grey infrastructure projects. More than 1,000 practitioners have been trained to date.

To help partners move from theory to practice, the Nature for Water Facility⁷ was recently set up as a joint venture between TNC and Pegasys, a consultancy. This facility provides best-in-class technical assistance to project developers looking to include green infrastructure and NBS in developing watershed investment programs, either on a probono basis for selected projects following periodic calls for proposals or on a fee-for-service basis.

NEXT STEPS: A CALL TO ACTION

For people and nature, the stakes for getting this work right could not be higher. But the good news is that a clear vision and associated tools have invest in NBS and support the development of been developed to get there. The private sector has a unique and important role to play in helping deliver solutions. Moving into the future, we all

must work to understand our unique strengths and commit to working together, continue to new tools, resources and technology that will propel us forward, together. Climate change will not wait. Let us get to work.

Restoring natural flows and managing water demand in Pout, Senegal

Since 2019, TNC has been working in partnership with Agence française de développement investment projects. In Senegal, this joint project is focused on tackling the rapid deteriora of the Pout aquifer, which is a critical resource for Dakar's water supply. On the back of this joint effort, AFD provided a 6 million euro grant¹ to the Government of Senegal to develop governance arrangements for improved management and water-sharing resources and to invest in nature-based solutions, including improved agricultural practices and restoration natural water retention features. This seed investment will lead to establishing "an aquifer

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FOCUS THE NATURE CONSERVANCY

The Nature Conservancy is a global conservation organization dedicated to conserving the lands and waters on which all life depends. Guided by science TNC creates innovative, on-thearound solutions to our world's toughest challenges so that nature and people can thrive together. Working in 72 countries and territories, it uses a collaborative approach that engages local communities, governments, the private sector, and other partners.

^{3 .} https://water-proof.org/ 4 https://nbsbenefitsexplorer.net/

^{5.} https://www.worldwatercouncil.org/sites/default/files/Thematics/NATURE_CONTRIBUTING_TO_WATER_SECURITY.pdf 6 https://waterfundstoolbox.org/

Climate change adaptation: investments remain insufficient

The rising cost of adaptation

Financial flows for adaptation have increased in recent years, from \$30 billion in 2017 to \$46 billion in 2020. However, they remain insufficient to avoid the serious economic and human consequences of climate change, especially in developing countries. Indeed, the United Nations Environment Programme (UNEP) estimates that the cost of adaptation will reach \$140 billion to \$300 billion a year by 2030, then \$280 billion to \$500 billion by 2050.





Source: United Nations Environment Programme (UNEP) - 2021

Financing climate change adaptation: an investment for the future

Studies conducted by the Global Commission on Adaptation show the strong leverage effect of investments related to climate change adaptation.

Investing \$1.8 trillion globally in five areas between 2020 and 2030 could yield \$7.1 trillion of profits.



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Source: Enabling private investment in climate adaptation & resilience (2021) - Banque mondiale / GFDRR

The **five areas** targeted are: Early *warning* systems Climate-**resilient** infrastructure Improvements in agricultural production in arid areas Global mangrove conservation Projects aiming to make water resources more resilient

In the face of climate urgency, the necessary adaptation $\overline{}$

The facts

+**1.5** °C

Signed in 2015, the Paris Agreement has a temperature goal of limiting global warming to 1.5 °C compared to preindustrial levels.

+1.11°C

In 2021, the average global temperature was already about 1.11 °C above its pre-industrial level

Sources: World Meteorological Organization / IPCC (2022) / Carenews



4 scenarios for the 21st century

The experts have analyzed the projections under four possible trajectories (called RCP scenarios) depending on the pattern of our greenhouse gas (GHG) emissions.



RCP 8.5, RCP 6.0, RCP 4.5 and RCP 2.6 are baseline scenarios for changes in radiative forcing (see glossary) for 2006-2300. The worst-case scenario is RCP 8.5.

Sources: Ministry of Ecology, Sustainable Development and Energy / IPCC https://www.ecologie.gouv.fr/sites/default/files/ONERC_Fiche_scenarios_evolution_GES_GIEC.pdf



Economic benefits

Early action on adaptation brings a "triple dividend" of avoided losses, economic benefits, and social and environmental benefits.



| RCP 8.5 | RCP 8.5 Business as usual. GHG emissions continue to rise at the current rate. It is the worst-case scenario. |
|---------|--|
| RCP 6.0 | RCP 6.0 Scenario with a stabilization of emissions by the end of the 21st century at a moderate level |
| RCP 4.5 | RCP 4.5 Scenario with a stabilization of emissions by the end of the 21st century at a low level |
| RCP 2.6 | RCP 2.6 Scenario with very low emissions and a peak before 2050. It is the best-case scenario. |

What do we mean by adaptation and resilience?

The terms adaptation and resilience are often used interchangeably, but though they partly overlap, they refer to two distinct concepts.

Resilience

- Sociale resilience
- Market & financial resilience
- Ecological resilience
- Institutional/political resilience

Climate Change adaptation

- Cross-timescales (present, near & long term)
- Focuses on risks & opportunities attributed to climate change
- Reduces climate change vulnerability & costs
- Global causes > Local impacts

Climate change adaptation

is the process of adjustment of human systems and societies to the impacts or expected impacts of climate change. It includes changes in behaviors, practices, skill sets, and knowledge to address anticipated short-, medium-, and longterm climate change impacts.



Resilience

is the capacity of a human or natural system to withstand the impacts of exogenous shocks, and to cope with and/or recover from them while retaining the essential functions of the original system. Resilient health systems, for instance, can cope with multiple crises, while resilient infrastructure refers to assets such as roads, bridges, cellphone towers, and power lines that can withstand multiple external shocks, as defined by the developer or procurer, typically including climate-related hazards.



Source: Enabling private investment in climate adaptation & resilience (2021) - World Bank / GFDRR

Adaptation, under what conditions?

Glossary



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The use of ecosystem management activities to increase the resilience and reduce the vulnerability of people and ecosystems to climate change (Campbell et al; 2009).

Ecosystem-based adaptation

Maladaptation

Actions that may lead to increased risk of adverse climate-related outcomes, including via increased greenhouse gas emissions, increased or shifted vulnerability to climate change, more inequitable outcomes, or diminished welfare, now or in the future. Most often, maladaptation is an unintended consequence.

Mitigation

A human intervention to reduce emissions or enhance the sinks of greenhouse gases.

Biodiversity

The variability among living organisms from all sources including, among other things, terrestrial, marine and other aquatic ecosystems, and the ecological complexes of which they are part; this includes diversity within species, between species, and of ecosystems (UN, 1992).

Climate resilient development (CRD)

In the WGII Report refers to the process of implementing greenhouse gas mitigation and adaptation measures to support sustainable development for all.

Adaptation gap





*

A functional unit consisting of living organisms, their non-living environment and the interactions within and between them. In the current era, most ecosystems either contain people as key organisms, or are influenced by the effects of human activities in their environment.

Source: IPCC (2022)





KEY FIGURES



Extirpation

The disappearance of a species from an area, sometimes also referred to as local extinction. Its use implies that the species still occurs elsewhere.



Radiative forcing

It is the change in the radiation balance (downward radiation minus upward radiation) at the top of the troposphere (at an altitude of 9 to 16 km) or the atmosphere, due to a change in one of the factors influencing climate change, such as the concentration of greenhouse gases.



×↑

6 x

Adaptation limits

The point at which an actor's objectives (or system needs) cannot be secured from intolerable risks through adaptive actions.

Adaptation options

The array of strategies and measures that are available and appropriate for addressing adaptation. They include a wide range of actions that can be categorised as structural, institutional, ecological or behavioural.



Residual risk

The risk related to climate change impacts that remains following adaptation and mitigation efforts. Adaptation actions can redistribute risk and impacts, with increased risk and impacts in some areas or populations, and decreased risk and impacts in others.



Any system in which human organisations and institutions play a major role. Often, but not always, the term is synonymous with society or social system. Systems such as agricultural systems, urban systems, political systems, technological systems, and economic systems are all human systems in the sense applied in the WGII Report.



Vulnerability

The propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts and elements including sensitivity or susceptibility to harm and lack of capacity to cope and adapt.



In Sub-Saharan Africa, the ARAF fund is strengthening the climate resilience of smallholder farmers

I By Proparco's Communication and Marketing Division

Financed by several partners and development finance institutions – including Proparco, via AFD Group's FISEA+ facility – the ARAF fund targets the issues of food security and climate change. It invests in startups offering innovative solutions to improve the conditions and climate resilience of smallholder farmers in East and West Africa. Tamer El-Raghy, its managing director, provide further details.

I > TAMER EL-RAGHY

Managing director, ARAF Tamer El-Raghy is the founding managing director of the Acumen Resilient Agriculture Fund (ARAF); a \$58 million impact Agri VC fund and the world's first equity fund designed to build the climate resilience of African smallholder farmers utilizing blended finance. Tamer has more than 20 years of private equity venture capital, M&A, entrepreneuria and innovation experience in Africa, the Middle East, the United States and Europe. He has 9 patents, an MBA from NYU, a PhD in Materials Engineering from Drexel University and a B.Sc. in Metallurgica Engineering from Cairo University.

amer El-Raghy's assessment is clear. "Climate change is wreaking havoc here," warns from Nairobi the manager of the equity fund ARAF (Acumen Resilient Agriculture Fund) which operates in several African countries affected by climate change. Intense floods followed by long periods of drought which degrade cultivated areas... "These disruptions weigh especially on the most vulnerable - women, children - and small-scale farmers who have very few means to protect

and boost their crops." This high exposure to these climate events consequently makes the performance of the agriculture sector in Kenya - and everywhere else in Sub-Saharan Africa - highly unstable, points out this expert who graduated from universities in Cairo and New York. "Indeed, over half of the people living in poverty are smallholder farmers. Yet they provide 80% of the food consumed in the region." This illustrates how climate change, which hundreds of thousands of African farmers are facing, weakens local economies and exacerbates food security.

30% OF BENEFICIARIES LIVE BELOW THE POVERTY LINE

To address this situation, the ARAF fund, which was launched in 2020 by Acumen Capital-Partners – a subsidiary of Acumen, an organization specialized in supporting social enterprises in Africa –, invests in local start-ups offering innovative solutions to smallholder farmers. will give farmers in East and West Africa the means to increase their incomes and improve

change. This adaptation requires diversifying crops (corn, vegetables, etc.), improving irrigation and facilitating access to the most climate-resistant seeds and species. "We're currently investing in 6 start-ups1 and are ultimately targeting 5 to 7 additional investments The objective is to build an ecosystem that by 2026," says Tamer El-Raghy. "We target the most vulnerable farmers. 30% live below the poverty line.² Through its action, ARAF seeks their living conditions and resilience to climate to reduce poverty, strengthen climate resilience

and demonstrate the impact of investment in \$5 million stake in 2021, through FISEA+, the resilient agriculture." ARAF is supported by the Green Climate Fund (GCF)³ – see interview p. 31 – and is financed with \$58 million from several partners and development finance 1,200 jobs and indirectly support a total of institutions, including Proparco which took a 2 million smallholder farmers.

SEVERAL CROPS EVERY YEAR

On the ground, the ARAF teams regularly measure the impacts⁴ on the living standards of farmers and their work. "The activities of the start-ups we're supporting have already had an impact on some 400,000 farmers in Sub-Saharan Africa. 43%⁵ of them report that they are now resilient to the consequences of climate change and 79% say that their incomes have increased," says the fund's CEO. The Kenyan start-up Sun-Culture, which supplies solar irrigation systems to its clients (see box p. 30), estimates that on average there has been a 120% increase in the disposable income of the farmers who benefit from its innovations.

AFD Group's facility implemented by Proparco under the Choose Africa initiative. Over the next 4 years, the fund aims to safeguard some

TECHNOLOGICAL ADVANCES FOR THE BENEFIT OF AGRICULTURE

Yet with the technological advances in agricul- an emergency."

"With climate change, rainfall in Sub-Saharan ture, the continent should be able to feed its Africa has declined by over 100 mm a year since population without the slightest problem. "For the mid-1970s," says Samir Ibrahim, cofounder this to happen, these advances must focus as a of SunCulture. As a result, Africa, which has priority on helping smallholder farmers who 65% of the world's uncultivated arable land, are the most vulnerable to climate change," has an annual food imports bill of \$35 billion. says Tamer El-Reghy. "It's both a need and

We're currently investing in 6 start-ups¹ and are ultimately targeting 5 to 7 additional investments by 2026," says Tamer El-Raghy, managing director of ARAF. "We target the most vulnerable farmers. 30% live below the poverty line.



FOCUS

ARAF (Acumen Resilient Agriculture Fund) is a \$58 million investment fund managed by Acumen, an American NGO specialized in supporting social enterprises offering goods and services to disadvantaged people Acumen has been in operation for 20 years and at the end of June 2021 had invested over \$137 million in 139 social enterprises which have served some 263 million beneficiaries. With the ARAF fund, Acumen targets the issues of food security and climate change which are vital to African development.

This is the case of Josephine Waweru, a farmer specialized in coffee growing. She is based in Kirinyaga County, in central Kenya, and has installed a solar pump system supplied by SunCulture. "I used to use a really expensive and polluting gasoline system. I've also been able to diversify my crops to cope better with the risks related to climate change," says the farmer. This observation is also shared by Jamleck Gichovi Karuri, who is based in another region in Kenya badly affected by the prolonged droughts. Thanks to a solar water pump system supplied by SunCulture, this breeder and farmer can now feed her livestock and harvest several crops every year.

¹ In September 2022, the portfolio of the ARAF fund was composed of 6 start-ups: Famerline, FarmWorks, SunCulture, Uzima Chicken, Tomato Jos and Flow Equity Ventures

^{2.} The World Bank sets the poverty line at \$3.20 per day in middle- and low-income countries.

^{3.} The Green Climate Fund has contributed \$23 million to ARAF via a first loss guarantee facility 4. These impacts are evaluated on the basis of interviews carried out by the teams of the ARAE fund which use the ARIS tool 5 Against 37% on average in the countries in which the ARAF fund operates.

The impact of the ARAF fund on farmer well-being

Farmer well being



Adapting to climate change: how 3 African start-ups go about it

Q

innovation to help smallholder farmers adapt to climate change. All their managers agree that there is an emergency. "The major impact of climate change is the reduction in rainfall and the irregularity of rainy seasons. This causes a stagnation or decline in the overall yield of the main crops," says **Peter Muthee, cofounder of FarmWorks**,¹ a Kenyan start-up whose objective is to create a network of medium-sized farms (10 to 40 hectares) based on a rational farming model which improves adaptation to climate change. "These farms are operated using regenerative farming methods such as minimum tillage, mulching, drip

climate change, as well as training services tailored to the needs of local farmers. "The latest report of the NGO 60 Decibels³ states that farmers in the South are on the front line of the climate crisis. 70% are faced with a myriad of climate risks, such as the lack or unpredictability of rainfall, extreme heat, flooding and the increase in parasites or agricultural diseases," says **Alloysius** Attah. cofounder of Farmerline.

How the Green Climate Fund is using ARAF funding to continue to tackle climate change

Interview with Lilian Macharia, Director, Portfolio Management Division, Green Climate Fund

WHAT IS GREEN CLIMATE FUND'S (GCF) GLOBAL STRATEGY?

GCF's Strategic Plan for 2020-2023 reiterates the target 50:50 balance between mitigation and adaptation, as well as a minimum allocation floor of 50 percent of adaptation resources to particularly vulnerable countries. As the window for climate action narrows, GCF aims to deploy adaptation support inclusively to continue to meet the urgent needs of the most vulnerable countries, people and communities. GCF targets areas conventional finance cannot reach and sets up building blocks for systemic adaptation investment. It also aims to deploy support cata-

lytically by using its significant investment risk appetite to test and scale up approaches that accelerate the transition from an incremental adaptation response to a transformational and systemic one. GCF seeks to leverage its comparative advantages to accelerate adaptation investment planning and scale up adaptation finance to help close the adaptation gap in line with developing countries' Nationally determined contributions (NDC), National adapation plans (NAPs) and long-term strategies.

HOW DOES GFC SUPPORT ARAF PROJECTS?

GCF provided an anchor investment in ARAF of up to USD 23M toward a target fund size of USD 50M by de-risking investment through a first-loss facility. Based on the success of ARAF, it is expected that GCF's capital can provide higher leverage potential in follow-on funds and lower first-loss requirements once the commercial viability of investing in climate resilient agriculture is established. GCF provided USD 3M in grant funding towards a USD 6M

technical assistance facility, to help investees build climate resilience. The grants will raise awareness, steer crop choices in line with climate forecast, and promote adaptation tools and techniques and income stream diversification. ARAF is expected to develop new climate adaptation impact measurement tools that help other investors integrate climate adaptation considerations into their investment criteria.

HOW DO YOU ACTUALLY MEASURE THE IMPACTS OF ARAF PROJECTS?

on lives impacted, on farmer well-being and in line with GCF's results management frame-

ARAF has an impact at three levels, namely the generation and use of climate information in decision-making, additional adaptive capacity on climate resilience. To measure the impacts, and reduced exposure to climate risks, increase in ARAF reports against core indicators that are awareness of climate threats and risk reduction processes, as well as any increased resilience work. At the impact level, ARAF reports on and enhanced livelihoods of the most vulnerthe number of the Fund's Direct and Indirect able people, communities and regions. GCF Beneficiaries (disaggregated by gender). At the also measures increased resilience of health outcome level, GCF measures the increase in and well-being, and food and water security.



II → LILIAN MACHARIA

Lilian Macharia is a Kenvan national with over 24 years of experience in designing, structuring and managing complex public and private financial sector investments in multiple sectors across Africa. Her experience also includes microfinance and civil society. Since joining the GCF, Lilian has led and contributed to the setting up of portfolio monitoring and management systems and oversight on implementation of GCE's portfolio Prior to joining the Green Climate Fund, Lilian served for over 11 years with the African Development Bank (AfDB) and represented the AfDB or various investee company boards.

FOCUS GCF

The Green Climate Fund (GCF) is the world's largest climate fund mandated to help developing countries achieve their Nationally Determined Contributions (NDC) towards low-emission. climateresilient pathways. Established as an operating entity of the Financial Mechanism of the United Nations Framework Convention on Climate Change (UNFCCC), GCF is a critical component of the Paris Agreement With its focus on climate change. GCF seeks to maximize climate benefits balancing and optimizing synergies between mitigation and adaptation

How Seed Co Group is tackling climate change in Zimbabwe

Ile> Interview with Samson Ruwisi, Treasury, Seed Co Group

Farmers in Southern Africa are grappling with the hazards of climate change and reduced rainfall. Seed Co Group – a company based in Zimbabwe – is attempting to provide them with solutions by developing hardier seeds that can thrive in these changed conditions. Stepping up R&D investment and effort is a crucial part of the process and the results in terms of resilience can deliver multiple benefits to farmers.

I SAMSON RUWISI

Samson Ruwisi currently manages the Treasury function of the Seed Co Group. A holder of a Masters Degree in Banking from the University of London, Samson is a highly accomplished and results-driven agriculture and financial management executive with over 18 years of broad and diversified experience in commodity financing, trade and project financing, and internationa trade. Sam has previously held senior corporate positions in the banking sector in Southern Africa, as well as in the agriculture industry.

WHAT CONSEQUENCES HAS CLIMATE CHANGE HAD **ON YOUR CUSTOMER'S ACTIVITY?**

In recent years, we have witnessed significant changes to weather patterns. The following are just some of the negative effects of climate change that have affected our farmers:

A general shift in rainfall patterns has resulted in prolonged sun drying of seeds on grower farms, which has resulted in increased diseases such as cob rot. For instance, between 2013 and 2018, some of our growers lost a significant tonnage to maize cob rot.

Our growers have experienced erratic rains and long mid-season dry spells in recent times which has significantly affected farmer's yields.

Furthermore, and due to unpredictable weather conditions, our growers have experienced increased production costs of seed which is compounded by the manual on-farm processing and handling of seed.

WHAT MEASURES HAVE YOU TAKEN TO DEAL WITH THESE **CLIMATE RISKS?**

In trying to assist our farmers, we have taken Our Research & Development [R & D] team conthe following measures:

We recently commissioned The Seed Co Drier Project in 2021 which was financed by Proparco to the tune of USD 12.5 Million.

tinues to release climate smart seed varieties every 2 years across all main crop types in our basket offering. These are hybrid corn varieties adapted to the climates in the regions where we operate.

HOW IS SEED CO GROUP HELPING TO REDUCE FARMERS' **VULNERABILITY TO CLIMATE CHANGE?**

We are also trying to diversify and in the process encourage our farmers to progressively grow small grain crops like pearl millet, sorghum, sunflower and upland rice. These crops are hardy and generally do well in semi-arid conditions. The commissioning of the drier project has helped farmers with early seed delivery and seed

processing. This involves assisting farmers on reduced processing days and potential double cropping due to early harvests. General product quality has also improved as early deliveries enable Seed Co to handle quality issues at Seed Co handling facilities.

HOW WILL THE CONSTRUCTION OF A MAIZE DRYER - FINANCED THANKS TO A PROPARCO LOAN - INCREASE PRODUCTION CAPACITY AND DOUBLE FARMERS' HARVESTS?

We have obtained a 7-year project finance facility from Proparco worth USD 12.5 Million.

To our growers, sun dried seed takes 60 days to get to a recommended moisture content of 12.5%, whilst artificially dried seed takes just 4 days [moisture content down to 12,5% from 35%], meaning farmers can harvest and deliver early quality seeds. The installation of a corn drying unit will allow farmers, who currently dry their corn in the sun, to harvest their ear corn earlier in the year and give it to Seed Co to dry. This will considerably reduce losses related

to climate hazards. Early seed deliveries equally mean early payments to growers, which will enable growers to have disposable incomes for other agricultural activities, i.e., early purchase of agriculture inputs. To the company, earlier processing of seed will enable the company to avail seed to the distribution channel early; in other words, seed is placed in the channels as early as March/April depending on seed variety. Lastly, the Seed Maize Conditioning Plant uses the very latest seed drying technology comparable to best international world standards.

SEED CO GROUP IS THE LARGEST AFRICAN SEED COMPANY. HOW ARE ITS SEED R&D RESEARCH PROGRAMS BETTER ADAPTED TO NEW CLIMATE CONDITIONS?

We continue to invest in R & D and our Group CEO has committed to investing about 10% of turnover on research & development. Examples of the benefits of this commitment include a new world class lab in Zimbabwe, and increased investments at our Zambia research station, which has culminated in the release of new long-season varieties.

We collaborate in our R & D activities very closely with the R & D teams of our main shareholder, Groupe Limagrain - one of the largest seed companies worldwide - to continuously work on new varieties that are better suited to new climatic conditions, whilst benchmarking our activities in line with world class standards.

To cater for different market segments, our R & D division continues to work on releasing late maturing maize seed varieties that do not suffer the effects of mid-season droughts. They enter a vegetative state in drought conditions and derive optimal benefit from late season rains. Furthermore, the main focus of our R & D is to release early maturing maize seed varieties that mature within short rain seasons.



FOCUS **SEED CO GROUP**

Seed Co Group is the largest certified hybrid seed company in Africa. authorized to market seed varieties developed by itself, governments and other associated seed breeders. The company operates in over 15 African countries, with public stock exchange listings in Zimbabwe and Botswana. The Company is involved in the selection, multiplication and distribution of mainly hybrid seed varieties for the following crops: maize, wheat, sova beans, sugar beans cowpeas sorghum groundnuts and vegetables.



How cities can focus their climate adaptation and resilience actions

Ile> Barbara Barros, Senior Adaptation Finance Manager, C40 Cities

More than half of the world's population lives in cities – and all are at risk from increasing climate change impacts (floods, storms, extreme temperatures, among others) due to warming at alarming levels. This means that communities, the built environment and economies are exposed. Lower- and middle-income countries experience worse scenarios, with amplified impacts for vulnerable groups, the poor, women, children, and the elderly, exacerbating poverty and undermining development.

AN ARTICLE BY BARBARA BARROS

Barbara Barros is Senior Adaptation Finance Manager for the C40 City Finance Programme, responsible for supporting C40 cities in taking action to overcome the financing challenges they face in delivering the green infrastructure necessary to become more climate resilien Previously, Barbara worked in climate action planning, primarily focusing on adaptation for the Brazilian cities of Rio de Janeiro and Recife. She holds a master's degree in urban engineering focused on adaptation planning from the Federal University of Rio de Janeiro and is an adaptation finance expert at the Frankfurt School of Finance and Management



daptation to the changing climate is urgently needed to protect the health and wellbeing of populations, avoid significant economic impacts,

with loss and damage to assets and services, as well as to conserve natural ecosystems. City action on adaptation and resilience is key to providing the opportunity for communities to prosper during the climate emergency.

HIGH IMPACT ADAPTATION SOLUTIONS FOR BUDGET-CONTRAINED CITIES

Cities around the world are already taking action to adapt to climate change. Despite these efforts, many cities in lower- and middle-income countries deal with budget constraints and competing priorities, as well as decision-makers' preference to invest in actions that demonstrate short-term benefits. Given this context, it is important to guide decision-makers and planners on which adaptation actions bring the best results regarding climate risk reduction and cost-effectiveness, allowing cities with limited resources to prioritize no-regret measures. According to a study led by C40 Cities and McKinsey (2021)¹, naturebased solutions (NBS) and enhancing systemic resilience in planning and urban systems are optimal solutions.

Nature-based solutions take advantage of the natural ability of ecosystems to reduce climate

risks, such as coastal protection using mangroves or tree planting to reduce heat. Implementing these solutions is cost-effective and promotes climate resilience, as they use existing natural systems that are protective against climate impacts and bring multiple benefits, such as improved air and water quality, healthier ecosystems, carbon sequestration, and economic benefits, such as green jobs. NBS can be integrated into grey infrastructure, often at a lower cost than conventional infrastructure.

Cities should enhance systemic resilience by integrating climate risk reduction into their city planning and operations and preparing for present and future climate risks. To do this, actions should focus on climate risk awareness - based on climate risk and vulnerability assessments; incorporate an adaptation lens on

1 C40 Cities and McKinsey. 2021. Available at: https://www.c40knowledgehub.org/s/article/Eocused-Adaptation-A-strategic-approach-to-climate adaptation-in-cities?language=en_US

urban expansion planning and infrastructure design; improve building standards; provide effective emergency response systems, especially adopting early warning systems in highly risky zones; and integrate an adaptation lens on financing programmes and insurance.

Experiences in cities show that this approach is low-cost, while protecting people's lives and reducing economic costs. One example is Rio

de Janeiro's (Brazil) implementation of warning systems² among low-income communities in areas exposed to landslides and flooding. Another is Ahmedabad's³ (India) public awareness and community outreach programmes, and its implementation of early warning systems in low-income communities, to increase cities' resilience to extreme heat.

HOW THE INTERNATIONAL DEVELOPMENT FINANCE COMMUNITY CAN SUPPORT CITY RESILIENCE

The efforts developing cities are making to advance adaptation are notable. However, financing for adaptation projects remains a significant barrier for cities⁴. International climate finance for the adaptation agenda remains low compared with the climate mitigation agenda.

The international development finance community can help cities overcome the barriers that hinder investment in adaptation projects - resulting in transformative benefits to communities – by providing direct funding support to cities. One recommendation would be to provide funding to support projects in their early stages. The Gap Fund⁵ initiative of the World Bank and European Investment Bank is an example of this good practice. Hence, it is critical to avoid projects dying early on and to build a pipeline of projects that can attract private investment.

CONCLUSION V

Despite the challenge imposed by climate change, cities in lower- and middle-income countries have an opportunity to develop resilient pathways to healthier, greener, and safer cities focused on reducing vulnerability and building social inclusion. Cities need support in overcoming barriers to investment in adaptation projects.

In this regard, the international development finance community has a crucial role to play by paving the way for, and encouraging greater private sector engagement, enabling adaptation projects to flourish.

34 PS&D

FOCUS C40

C40 is a network of mayors collaborating to deliver the urgent action needed right now to confront the climate crisis. It connects 96 of the biggest cities in the world; members represent over 650 millior people and 20% of the global economy. Through its Climate Action Programme, C40 has supported more than 60 global cities in developing their Climate action plans in line with the Paris Agreement targets.

Additionally, projects with an innovative NBS approach need to be supported with de-risking instruments. Development finance institutions (DFIs) and the donor community can provide specific small grants to implement pilot projects, so they have proven experiences that can be scalable in the future.

Finally, lack of data and risk assessments, as well as a lack of on-site expertise, remain significant barriers to risk awareness and political buy-in. City networks such as C40 Cities, ICLEI and the Global Covenant of Mayors have proven that working with local parties building capacity and political leadership has been vital in leading change towards more ambitious climate action. DFIs and bi- or multilateral-donors can support and partner with climate-focused city networks to scale up technical capacity building and local political engagement.

² http://www.sistema-alerta-rio.com.br/

³ https://www.c40knowledgehub.org/s/article/How-to-adapt-your-city-to-extreme-heat?language=en_US
4 CPI, 2021. Climate Policy Initiative: An Analysis of Urban Climate Adaptation Finance - CPI
5 Gap Fund official webpage: City Climate Finance Gap Fund

Private sector action in analyzing climate risk data

I Alix Roumagnac, CEO, PREDICT Services

Climate change is part of our daily lives. It must no longer be considered as a problem of the future but as a current challenge: it is essential to adapt our societies and systems. Private sector players have a major role (almost a responsibility) to play in this adaptation by proposing innovative responses that meet current challenges. By improving knowledge on the issue, providing strategic advice to decision-makers and implementing operational technical solutions, the objective is indeed to enhance the overall resilience of societies to the consequences of climate change. The agility and innovation which private organizations are capable of are a driving force in this race against time.

AN ARTICLE BY I C ALIX ROUMAGNAC

Following his studies in hydraulic engineering at Polytech Montpellier, Alix Roumagnac joined BRL, a regional hydraulic engineering consultancy firm in the Occitania region for local authorities, firstly as a project manager then as a director. Following the floods in 1999 in the Aude region and in 2002 in the Gard region, he became aware of the need to inform local elected officials in order to help them protect people and ensure their safety. This is how PREDICT Services came about in 2006, where he is CEO

he findings of the IPCC experts in their latest report (2022) are very clear: climate change increases the intensity of climate hazards and their frequency on a global scale. Heatwaves in Europe and India,

floods in China, disastrous events in Africa and France: the consequences of climate change are being felt all over the world. The impact and pressure of intense natural phenomena on our systems (leading to both human and material losses) are growing.

As a witness to these developments, PRE-DICT Services continuously monitors these hazardous natural phenomena in real time all over the world and assists regional and local authorities, risk managers from private groups, insurers and individuals with their decision-making.

To address the challenges posed by climate change, adapt, cope and protect ourselves, it is now necessary more than ever to strengthen the action taken by society as a whole.

SYNERGIES BETWEEN PUBLIC AND PRIVATE PLAYERS ALREADY IN PLACE

There is now a real awareness, in both the private and public spheres. By better identifying the needs, devising efficient solutions and implementing them, the stakeholders can jointly build actions for prevention, early warning, vulnerability reduction and, ultimately, disaster reduction.

own level to find solutions and data to minimize the impact of natural disasters. For example, a

number of industrial groups and insurers have already taken measures to anticipate the risks on their sites and minimize the effects of climate hazards.

A number of research projects are markers of this collaborative approach. They are led Together, it is essential for everyone at their in consortium to exploit expertise, share data and contribute to the deployment of solutions.

A MAJOR IMPERATIVE: IMPROVING THE QUALITY OF AND ACCESS **TO DATA AND SERVICES**

There continues to be a lack of access to the information required to address climate change issues.

A number of projects led with regional and international organizations have achieved significant progress on the issue, such as COPER-NICUS¹ and the Climate Data² of the World Meteorological Organization (WMO), but there is still a major challenge.

Knowledge of the risk, which is essential for planning safeguard actions and the responsiveness of decision-makers, varies widely and in some cases there is none whatsoever. Creating data to identify the areas at risk and priority issues is therefore a prerequisite for any organization of efficient crisis management.

Similarly, data to effectively anticipate changes in weather conditions and analyze them in real time on a global scale are also still largely insufficient.

To compensate for this, PREDICT devotes a significant part of its activity to basic and applied research. It is also working on several innovative and operational projects which aim to facilitate the detection and real-time monitoring of risk events. The objective is to collectively help improve the responsiveness of warning systems and therefore contribute to ensuring people's safety at local level. The prospects for new initiatives to promote this public-private partnership, with the aim of increasing the resilience of the populations at risk, are a major source of hope for the coming years.

COSPARIN: an innovative project supported by the European Space Agency (ESA)

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1 COPERNICUS: a European Union Earth observation program via satellite and non-spatial data looking at our planet and its environment for the benefit of all European citizens

2 • Climate Data: a reliable source of 18 climate datasets, evaluated by international experts using a method agreed internationally by WMO

FOCUS PREDICT SERVICES

PREDICT Services, which was set up in 2006 in Montpellier, works on the prevention and management of climate risks. It assists individuals, companies, regional and local authorities and crisis management services, both in France and abroad, with their decision-making before, during and after hazardous events. It helps them anticipate and manage these phenomena through planning, training and early warning The objective is to prepare crisis management and risk anticipation in order to provide a more effective collective response

Helping financial institutions to scale up climate change adaptation for increased resilience

16> Felix Stiegler, expert in Financial Systems Development, GFA Consulting Group Jonas Gödicke, economist, GFA Consulting Group

The financing of adaptation measures has not become widespread up to now due to a number of obstacles. These include – but are not limited to – insufficient harmonization of practices and terminology, less harnessing of private and public capital for climate adaptation than for climate change mitigation, and the complexity of climate risk management.

AN ARTICLE BY II → **FELIX STIEGLER**

Felix Stiegler joined GFA in 2017 as a Financial Systems Development (FSD) consultant after working on agricultural investments in Ethiopia Holding a Master's Degree in Agricultural Economics, Felix assists international Development Finance Institutions (DFIs) with Technical Assistance (TA) projects linked to concessional credit or quarantee facilities. For example, he is currently working on the Transforming Financial Systems for Climate (TFSC) programme financed by AFD, Proparco and the GCF in South Africa.

I > JONAS GÖDICKE

Jonas Gödicke is an economist and seasoned expert in financing green and sustainable investments He worked for several project developers as project financier and project manager for merger and acquisition transactions in the fields of Renewable Energy (RE) and Energy Efficiency (EE) before joining GFA in 2018 as a Consultant. His focus is on setting up credit lines on behalf of various DFIs and on sub-project bankability assessments.

hile different obstacles are specific to different segments, the main barriers can be divided into three categories from the

perspective of Financial Institutions (FIs) and regulatory/supervisory bodies:

Technical and operational capacity gaps in climate risk management practices. An existing and increasing awareness of climate risks within FIs has yet to be translated into operational risk management practices. This encompasses several factors such as the necessary improvement of the management of physical climate risks, insufficient availability of climate risk data and the general need for relevant decision-making tools.

Weak regulatory and policy guidance for the financial sector. Until recently, financial regulations on climate disclosure and climate risk management have remained below the required level of transparency. With a few exceptions, regulators have made neither adaptation financing nor physical climate risk management central priorities. Consequently, there has not been adequate supervision of financial sector compliance with existing regulations. Combined with the absence

of harmonized and robust metrics or standards for measuring the climate resilience impacts of adaptation projects, there is a lack of meaningful disclosure of climate risks.

Perceived lack of profitable adaptation finance projects. The market generally regards adaptation projects as public goods (e.g. the water sector, disaster management etc.) and does not readily invest unless through blended finance approaches as there is no apparent business case. Furthermore, innovative resilience and adaptation technologies may take time to achieve market acceptance and become commercially viable.

Against the background of the afore-mentioned prevailing challenges, GFA supports private and public FIs as well as regulatory bodies to build up the necessary capacities and frameworks to enable scaling-up of adaptation finance. To this end, GFA created a specialized Financial Systems Development department. Cooperation with GFA's Climate Competence Centre and dedicated, adaptation relevant technical departments such as Agriculture, Water, Sanitation and Waste Management and Natural Resource Management provide flexible and appropriate responses to the fast-paced climate adaptation finance environment.

GFA'S APPROACHES TO BOLSTERING FI INVOLVEMENT IN CLIMATE **CHANGE ADAPTATION**

In DFI-funded financial sector projects, GFA has successfully participated in:

- Capacity building in adaptation finance. In general, the key to overcoming perceptions of unprofitability is through capacity building and knowledge creation. To this end, it is crucial to promote the success and benefits of climate adaptation projects (e.g. by showcasing innovative pilot projects) to ultimately further project origination. A good guiding principle is to improve understanding of adaptation projects by addressing their greater complexity when compared to mitigation projects and reducing resulting uncertainties among FIs. This entails conveying the relevance of key adaptation sectors like water, infrastructure, green building/housing or agriculture as the main priority sectors for adapting to climate change. By accompanying FIs in the assessment of underlying technologies and project concepts (e.g. water reduction technologies for resilient agriculture) and the related impact measurement, calculation and interpretation, the derived insights can be translated into improved origination and implementation practices for adaptation projects. - Improving climate risk regulations and

management practices in FIs.

Thanks to the work of the Task Force on Climate-Related Financial Disclosures (TCFD) inter alia, there is a growing consensus around definitions concerning the types of climate risk (e.g., physical, transition, liability).

Nevertheless, interpreting climate risks at the level necessary for financial decision-making often requires expertise not sufficiently available in financial regulatory agencies and FIs. Consequently, regulators (e.g. Central Banks) should be assisted in internalizing taxonomies, reporting and disclosure guidelines and converting these into national legislation. The enforcement and monitoring of these regulations should be accompanied

by quantitative and qualitative monitoring tools. Improving regulators' skills and approaches for

climate scenario analyses and overall climate data

management can enhance their future capacity to shape the regulatory environment.

On the FI side, climate-risk management ideally becomes a core process right across its entire operations. Ultimately, this means that FIs must have relevant climate risk expertise across key functions, including credit, risk management, portfolio management and investment officers. In this regard, assistance with understanding and deploying climate risk management tools and applying climate risk management and disclosure practices is crucial.

products.

GFA supports FIs in the development of green financing instruments for adaptation finance, such as green bonds or green credits. These products can channel large amounts of private and public capital into sustainable economic adaptation activities. Through these products, investors can finance company's adaptation projects, including investments in sustainable and resilient agriculture and forestry or resilient water supply. Suitable financial products do not have to be limited to green bonds or credit products but may also include investment funds or (impact) crowdfunding platforms. Product development should follow a tried and tested pattern that includes market research, determining preconditions, regulatory/legal framework assessment and financial product design. It will also include operating processes, guidelines, reporting and disclosure processes and oversight.

66 On the Financial Institution side, climate-risk management ideally becomes a core process right across its entire operations.

- Development of adaptation finance

FOCUS **GFA CONSULTING GROUP**

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Collaborating to accelerate investment in climate adaptation and resilience

I C> Chiara Trabacchi. Climate change manager. Bll

While there is an urgent need to step up action on climate adaptation, the action is not in step with the need. This is especially true of the required financing, particularly from the private sector. To overcome the various barriers to private sector investment in climate adaptation and resilience, international DFIs in 2020 set up a Collaborative group and put forward ambitious commitments to the G7 in May 2021. Its overarching goal is to accelerate and scale up private investment in climate adaptation and resilience in developing countries.

AN ARTICLE BY II → CHIARA TRABACCHI

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is an urgent priority. The devastating flooding in Pakistan and South Africa, the record-shattering heatwave that engulfed most of India, and the longest in 40-years drought in the Horn of Africa are the latest in a series of extreme events calling for urgent action.

Action, however, is not taking place at the scale and pace required. Investments in adaptation continue to fall short of documented needs. Global adaptation finance reached USD 46 billion

in 2019/2020 according to the Climate Policy Institute's latest estimates¹, which is well short of the estimated costs for 2020-2030 - ranging between USD 155 and USD 330 billion annually in developing economies according to UNEP's analysis². Over the same period, the Nationally Determined Contributions (NDCs) of just 50 developing countries identified more than US\$50 billion per year in adaptation needs.

Higher and accelerated levels of investments are required to meet these needs, especially from the private sector. Institutional, policy and market failures, financial impediments, knowledge and capacity barriers have hindered private investors' ability or incentive to invest in climate adaptation and resilience.

Collaboration is essential to deliver the systemic change needed to overcome these challenges and close the adaptation finance gap. The Adaptation & Resilience Investors Collaborative was set up with this aim.

RADICAL COLLABORATION IS ESSENTIAL TO UNLOCK AND ACCELERATE INVESTMENT

Collaboration is essential to deliver the systemic change needed to overcome these barriers and failures and close the adaptation finance gap. The Adaptation & Resilience Investors Collaborative (the "Collaborative") was set up with this aim. The Collaborative is an international partnership of development finance organisations working together to accelerate and scale up private investment in climate adaptation and resilience in developing and emerging countries.

Formed in late 2020³ at the occasion of the Finance in Common Summits (FICS), the Collaborative has rapidly grown in membership and ambitions. It is currently composed of 18 development finance organisations working together to deliver on the set of ambitious commitments put forward to the G7 in May 2021.4 These commitments, which have been operationalized through dedicated work streams, are aimed at enabling

progress on critical areas needed to build and demonstrate the business case for investing in climate adaptation and resilience. These are:

- investment process.
- and resilient investments.

PROGRESS HAS BEEN MADE, BUT MORE WORK LIES AHEAD

The Collaborative has made progress towards its goals and has planned further activities in the months ahead to advance across each of the commitment areas. The following paragraphs highlight the progress made; the report released⁵ in June for the G7 outlines this progress and previews its future activities in greater detail.

INVESTOR-RELEVANT METRICS

The Collaborative's members have agreed to adopt common principles for tracking finance for climate adaptation and resilience, in line with best practices for a stepwise process-based approach, granularity, and conservativeness. Their agreement followed an assessment of the factors common to members' existing approaches and those implemented in other institutions and jurisdictions.

They have also taken steps toward developing clear, consistent, and comparable climate adaptation and resilience impact metrics. The work performed to date, which has encompassed case studies and exchanges with private investors and other relevant initiatives, has underscored the need to work with and build the capabilities of intermediaries - fund managers and financial institutions - and counterparties on climate finance investing, measurement, and reporting. This is seen as critical to expanding the reach, scale and quality of adaptation and resilience investing and financing. It is also critical to ensuring usability by private investors and financiers in developing and emerging markets.

As key next steps, members will advance the analytical work needed to develop and adopt a common methodological approach in collaboration with other stakeholders.



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- Investor-relevant climate adaptation and resilience metrics, to increase clarity about what qualifies as adaptation, and to adopt standardised approaches for measuring the contribution of investments towards adaptation and resilience-impact objectives.

The integration of physical climate-risk assessment in capital allocation decision-making, to systematically identify opportunities for building climate resilience throughout the

Investment vehicles and approaches, to increase awareness about business models, financing structures and avenues for shaping markets and generating pipelines of bankable adaptation

^{3 •} Finance in Common – Accelerating Investment in Climate Adaptation and Resilience 4 • See International Collaboration of development finance organisations agree new steps to increase the resilience of economies threatened by

the climate emergency

^{5 •} See G7 Progress Report: Adaptation & Resilience Investors Collaborative

Figure 1. Examples of climate adaptation and resilience-building solutions across sectors igvee



Agriculture Drought-tolerant crops, agroforesty, solar-powered water efficient irrigation or cold chain storage solutions.



Resilient infrastructure Mangrove or wetlands restoration to prevent coastal flooding, smart stormwater systems, storm sewers, bioswales.



Real Estate Efficient cooling technologies, grey-water reuse technologies, green roofs, 3D printed shelters for extreme events



Resilient Energy Weatherization of renewable energy assets, upgrade of hydropower plants to secure operations in the context of climate change driven changes to hydrolocal systems.



Water Water storage and harvesting, water savings, loss reduction and recycling technologies, wastewater recovery and reuse technologies.



Transports 'Green' interventions such as enhancing mangroves to protect against storm flooding and reduce wave damage.





Financial Services Climate parametric insurance, data analytics to better asses borrowers' repayment risk and A&R benefits in the face of physical risks and associated

impacts.

INVESTMENT VEHICLES AND APPROACHES

The need for and thereby the opportunity for investments in climate adaptation solutions exist across all sectors and geographies. This is because climate change will affect all sectors of an economy, and all sectors must adapt to its impacts. This calls for harnessing all the possible avenues - direct and indirect - and products to identify, finance and invest in climate adaptation and resilience solutions. It also implies collaborating with others across the investment value chain to leverage the varying degrees of risk appetite and tolerance of public vis-à-vis private investors.

Against this background, members have collaborated to identify and learn about possible investment strategies and are exploring avenues to develop pipelines and foster opportunities for co-investment. The core output of this working stream to date is a draft report outlining potential strategies for fostering investment in climate adaptation and resilience through various investment and financing approaches. Building partnerships with other actors across the investment value chain has emerged as a key strategy to ensure that the right capital and support are available at critical stages of project development or business and technology maturity. For example, partnering with accelerators, early-stage venture capital investors, and later-stage ones is critical to supporting innovative ventures offering climate adaptation and resilience solutions to become investment-ready, reach scale and grow. Similarly, partnerships with 'upstream' stakeholders are essential to enhance the enabling environment required to unlock private capital and ensure that priority investments happen

Members have also worked individually on various initiatives⁶ focused on building a bankable pipeline of adaptation and resilience investments and on advancing support for public-private collaboration. These include: - AFD Group's AdaptAction programme⁷, Phase 2, with a 15-million euros budget targeted at

- supporting climate-vulnerable African countries in implementing their adaptation strategies. - British International Investment's GBP 200 million Climate Innovation Facility⁸, a new fund supported by its shareholder FCDO, to seed pioneering climate solutions.
- The increased funding by the Global Center on Adaptation (GCA) of its Africa Adaptation Acceleration Program⁹ (AAAP), in partnership with the African Development Bank.

More recently, some members have also started to contribute to efforts focused on assisting developing countries to identify and articulate the priorities outlined in their NDCs and

National Adaptation Plans and strategies for private sector investment opportunities.

PHYSICAL CLIMATE RISK ASSESSMENT

As key next steps, the Collaborative plans to

The Collaborative has committed to improving members' collective ability to identify, assess, and manage physical climate risks in investments. To date, members have worked together to outline an initial sector-agnostic, step-by-step framework for providing guidance in systematic and consistent physical climate-risk identification, assessment, and management. This guidance, which includes a bespoke approach for the agricultural sector, is meant to enable a standardized categorization of transactions based on the relative degree of physical climate risk, with a view to informing decision-making throughout the investment cycle. advance this initial phase of the work to ensure it is fit for purpose and to develop common tools for engaging with counterparties.

WHAT'S NEXT: THE COLLABORATIVE CALLS FOR GREATER JOINT ACTION

Collaborative members vary in their mandates, degree of maturity on climate adaptation, geographies they serve, and financing avenues available, among other factors. The market for adaptation and resilience investment will grow as areas of alignment among this diverse group emerge, leveraging their respective roles in the investment value chain and varying degrees of risk appetite and tolerance. Even as the Collaborative remains committed to achieving its ambitious goals, governments must create effective policy and wider enabling environments. The Collaborative calls on the global community to join in accelerating and scaling private investment in the adaptation and resilience of socioeconomic and natural systems.

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FOCUS **BRITISH INTERNATIONAL** INVESTMENT

British International Investment (BII formerly CDC Group) is the UK's development finance institution, with the mission to help solve the biggest global development challenges by nvesting patient, flexible capital to support private-sector growth and innovation. The company has over 70 years of experience in successfully supporting the sustainable. long-term arowth of businesses in Africa and Asia, and recently expanded to invest in the Indo-Pacific and Caribbean It plays a central role in the UK's nternational financing offer, to help developing and emerging countries meet their significant financing needs for infrastructure and enterprise

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^{6 •} https://www.bii.co.uk/en/news-insight/news/collaborating-to-accelerate-investment-in-climate-adaptation-and-resilience 7 https://www.afd.fr/en/actualites/communique-de-presse/cop26-launch-adaptaction-programme-phase-2-2022-2025 8 https://www.bii.co.uk/en/news-insight/news/cdc-group-to-invest-over-3-billion-over-the-next-five-years-to-combat-the-climate-emergency

⁹ https://gca.org/programs/aaap







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