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Financial Innovation for Climate Adaptation in Africa

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ABOUT THE GLOBAL CENTER ON ADAPTATION

The Global Center on Adaptation (GCA) is an international organization, hosted by the Netherlands, which works as a solutions broker to accelerate action and support for adaptation solutions from the international to the local, in partnership with the public and private sector, to ensure we learn from each other and work together for a climate resilient future.



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FOREWORD

A TIMELY STRATEGY TO UNLOCK CLIMATE-ADAPTATION FINANCE FOR AFRICA

Understanding how to mobilize vastly greater adaptation investment and financing is key to building a more resilient and livable future

Africa continues to be the most vulnerable continent to the impacts of climate change, even as extreme weather disasters become widespread.

Home to 27 of the world's 40 most climate-vulnerable countries, the continent is fighting on three fronts: containing COVID-19, rebuilding economies on severely depleted budgets, and struggling to adapt to the impacts of an increasingly hostile climate.

Global climate financing continues to fall far short of what is needed to meet the ever-increasing costs of climate impacts in this most vulnerable of continents.

Innovative and fundamental change is needed, fast, and this report sets out a three-pronged strategy to mobilize climate adaptation investment and increase the breadth and depth of capital available.

It showcases lighthouse projects and initiatives that could be scaled up and replicated, offering a clear and achievable roadmap. It also explores how investment can be mobilized from a wide variety of sources, public and private, and highlights some barriers that must be overcome for success, from regulatory issues to a lack of robust climate data.

Examining how to make climate resilience integral to investment decision-making, creating the right environment for effective adaptation investment and

the part that innovative financial instruments such as debt for climate swaps could play, it is essential reading for governments, investors, corporations and individuals alike.

The report also highlights new partnership models such as the Africa Adaptation Acceleration Program, a joint initiative between the Global Center on Adaptation and the African Development Bank, which aims to mobilize \$25 billion for adaptation activities in Africa by 2025. This Africa Union backed program addresses the nexus of climate change, COVID-19, and the economy and will support all African countries in designing and implementing transformational adaptation of their economies and post-COVID recovery development paths. Its four program areas are closely interconnected: finance mobilization will support infrastructure investments, digital finance services to farmers, and youth enterprise support. Through its water investments, the infrastructure program will support climate adaptation for food security and employment opportunities for youth. The food security program will drive the innovative energy of young entrepreneurs to change the landscape of food production through the digital climate advisory services.

The report's publication is timely, urging urgent action now. As the window of opportunity to adapt to climate change grows ever narrower, there is still a chance to help the continent access the full scale of adaptation finance needed to build a better future.

But we must act today to seize it.



PATRICK VERKOOIJEN
Chief Executive Officer
Global Center on Adaptation

EXECUTIVE SUMMARY

INTRODUCTION

Current adaptation finance flows to Africa are insufficient to meet growing adaptation needs on the continent.¹ This report provides an overview of existing adaptation finance flows in Africa and identifies opportunities to increase the volume and efficacy of that finance. The core objectives of this report are to:

- **Assess the state of adaptation finance and risk-finance mechanisms** already available and in use in Africa.
- **Analyze African financial market readiness** for climate adaptation finance and risk finance mechanisms.
- **Identify gaps where climate risk exists yet there is insufficient finance** to address it, as well as the barriers to implementation.
- **Propose solutions to increase the volume and variety of capital** available for adaptation finance and risk transfer mechanisms in Africa and to enable pipelines for adaptation and dual benefits projects in the region.

More than half (27) of the world's 40 most climate-vulnerable countries are in Africa² and climate-related disasters are increasingly common: Southern Africa has been exposed to prolonged drought conditions since 2018, cyclones impacted 3 million people in Mozambique, Malawi, and Zimbabwe in 2019, and locust swarms in 2020 caused severe crop destruction across Ethiopia, Somalia, and Kenya, compounding existing food insecurity and economic pressure from the COVID-19 crisis. The COVID-19 pandemic has resulted in Africa's worst recession in more than half a century. Real gross domestic product (GDP) contracted by 2.1% in 2020 and lasting impacts of the pandemic could drive 40 million additional people into extreme poverty.³ Amidst this prolonged economic challenge, the increasing intensity and frequency of extreme weather events and chronic climate-related stressors continues to threaten livelihoods, ecosystems, and communities, reversing progress made on sustainable development goals.

FINANCIAL FLOWS TO ADAPTATION IN AFRICA FALL FAR SHORT OF THE NEEDS

There is a pressing need to increase investment in climate change adaptation. While only six countries have submitted National Adaptation Plans (NAPs) to date, all African countries, with the exception of Libya, have submitted nationally determined contributions (NDCs), all of which include an adaptation component. Based on these NDCs, the top three priority sectors for adaptation across all African regions were 1) agriculture, 2) water, and 3) either health or forestry, land-use, and ecosystems. 40 African countries provided estimated investment needs for adaptation, totaling roughly USD 331 billion through 2030.⁴ Fifteen countries⁵ provided a breakdown of conditional vs unconditional cost estimates,⁶ with an average ratio of 80:20. An average 80:20 ratio indicates that of the USD 331 billion estimated investment need (or USD 33 billion annually), countries expect to contribute around USD 66 billion (or 6.6 billion annually) from their national budgets, while the remaining investment gap of USD 265 billion (or 26.5 billion annually) must be met by international donors and domestic and international financiers.

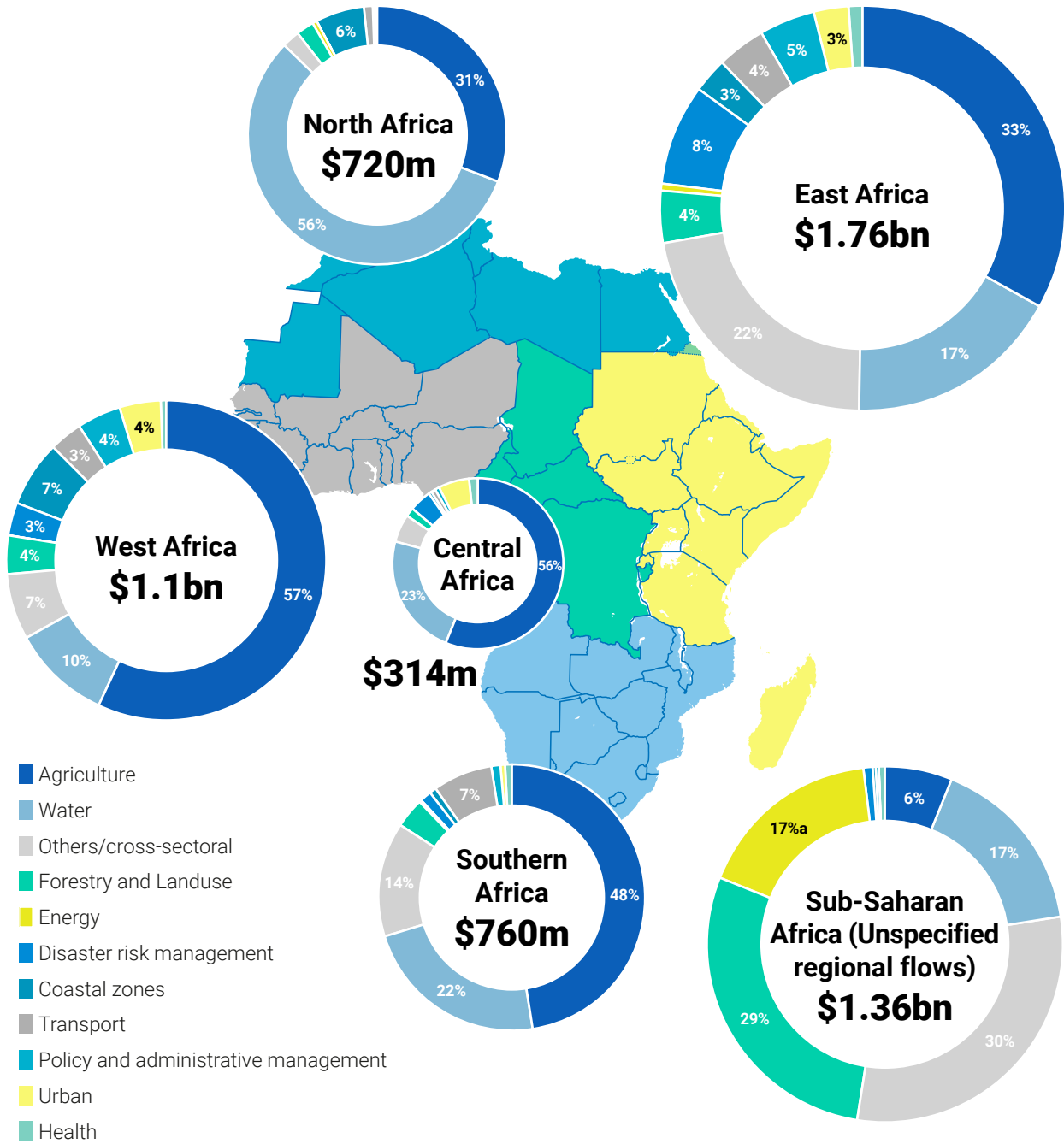
Globally, an annual average of USD 30 billion in adaptation finance was tracked for 2017 and 2018, mostly provided by public actors (DFIs alone accounted for 67 percent of the total). Due to data limitations, nearly all flows tracked are from international public finance.⁷ Just over USD 6 billion was tracked in adaptation finance to Africa in that period.⁸ If this trend continued through 2030, total finance from 2020-2030 would only amount to USD 66 billion, far short of the USD 331 billion (or approximately USD 33 billion annually) in estimated needs per stated cost estimates in NDCs. Adaptation finance is therefore scaling too slowly to narrow the gap while the costs of climate impacts rise.

Of the USD 6 billion in adaptation finance tracked, grants and concessional debt accounted for approximately 90% of financial flows to adaptation in Africa. Two sectors – agriculture, forestry, land-use, and natural resource management; and water and wastewater management – combined to receive 62% of total adaptation finance in 2017-18. These results are consistent across African sub-regions (Figure 1). The majority of finance flowed

from Development Finance Institutions (DFIs) both from the region and external to Africa: multilateral, national, and bilateral DFIs contributed and managed 67% of total adaptation finance flows to the region, followed by bilateral government flows at 19%. The most vulnerable

countries in Africa have not been recipients of proportionally high volumes of adaptation finance.⁹ There is limited to no correlation at the country-level between climate vulnerability and adaptation finance overall or per capita.

Figure 1. Tracked Adaptation Finance by Region and Sector (USD, 2017-18 average)



THE COVID-19 PANDEMIC CREATES SIGNIFICANT UNCERTAINTY IN FUTURE ADAPTATION FLOWS, AS WELL AS OPPORTUNITY TO CATALYZE A RESILIENT RECOVERY

A comprehensive dataset for 2019 and 2020 is not yet available. In particular, the impact of COVID-19 on adaptation finance is not yet well understood.¹⁰ Key factors likely to impact the volume of 2020 adaptation finance flows and in future years are as follows.

NEGATIVE FACTORS:

Inclusion of resilience in stimulus packages is limited.

In an upcoming study, the World Resources Institute reviewed 66 countries' – including all G20 and V20 countries – 2020 fiscal stimulus packages for whether and how they included climate resilience. Less than one-third (18) of the countries' responses that were examined were found to integrate physical climate risk awareness and resilience components – including just two African countries: Niger and Kenya. This limited inclusion of resilience in stimulus packages suggest that there is a potential missed opportunity to ensure that climate risks are considered in new funding allocations. Beyond the limited inclusion, the overall size of stimulus packages in developing economies has been much smaller than those in developed economies, with middle income countries spending 6% of GDP and low-income countries spending 2%, vs 24% of GDP spent in high income countries, in 2020.¹¹

Private sector investment has declined in the short term.

Although capital outflows stabilized relatively soon after hitting record lows in March 2020, foreign direct investment (FDI) declined 16% in 2020 in Africa, to USD 40 billion, a decline to 2005 levels of investment.¹² Liquidity support for firms was also largely not conditional on adopting any climate resilience measures. Given the potential for private sector investment in adaptation activities, robust flows of foreign direct investment and domestic private investment are critical to maintain a high baseline for potential adaptation mainstreaming.

The COVID-19 pandemic continues to severely impact developing economies.

Just over 50 million¹³ doses of COVID-19 vaccine have been administered across a continent with a population of 1.3 billion.¹⁴ As of June 2021, less than 1% of Africa's population had been fully vaccinated.¹⁵ Adaptation finance flows in future years will depend heavily on vaccine distribution speed and equitability to enable recovery of sectors critical to Africa's macroeconomic prospects including international trade and tourism.

POSITIVE FACTORS:

Multilateral Development Bank (MDB) adaptation finance commitments to Africa increased substantially in 2020 from 2019 levels.

The group of MDBs reported USD 4.7 billion in adaptation finance committed to Sub-Saharan Africa in 2020, vs USD 3.6 billion in 2019. For Middle East-North Africa, USD 1.4 billion was committed in 2020 vs USD 1.0 billion in 2019.¹⁶ It is not clear if this increase is sustainable without re-capitalization or replenishments of MDB funding, which was spent quickly to counter the effects of the pandemic. For example, the 32% increase in adaptation finance commitments across the two regions is roughly proportional to the total increase in MDB commitments in 2020, estimated at 39%.¹⁷

MDB climate finance targets are increasingly targeting adaptation.

In 2019, nine MDBs announced a collective commitment to double their total levels of adaptation finance provided to clients by 2025, to USD 18 billion annually.¹⁸ Towards that end, the World Bank announced a 35% target for climate finance as a proportion of total finance from 2021-2025, of which at least 50% will support adaptation. The African Development Bank (AFDB) has committed to a target of at least 40% for climate finance by 2025, a doubling of climate finance to USD 25 billion between 2020 and 2025 and to prioritizing adaptation finance.

The IMF is firmly committed to deal with climate risks

by integrating climate in their economic and financial services. In addition, a proposed allocation of Strategic Drawing Rights (SDRs) of \$650 billion would benefit all IMF members, including in Africa, and could support a global green and resilient recovery.

A group of Development Finance Institutions is collectively advancing adaptation finance efforts.

Under the Adaptation & Resilience Investors Collaborative, members are advancing a set of actions to accelerate finance to adaptation and resilience. The group has made commitments including to pursue a substantial increase in investments in adaptation and

resilience, to move towards ensuring all investments made have assessed and are resilient to climate risks, and to increase support and collaboration to shape markets and build pipelines of bankable investments in climate adaptation.¹⁹

New innovative models are being launched to address the gap. For example, the Global Center on Adaptation (GCA) and the AfDB have jointly developed the African Adaptation Acceleration Program (AAP). The AAP was launched at the Climate Adaptation Summit in January 2021 and aims to mobilize USD 25 billion towards adaptation activities in Africa by 2025. AfDB has committed USD 12.5 billion to the AAP with the remaining USD 12.5 billion to be mobilized through partnerships and domestic resource mobilization through national governments and the private sector and will be centered on four action areas:

- Innovative financial initiatives to enhance access to finance and mobilize new investment in adaptation activities (potential innovative finance mechanisms are highlighted further in Table 3) through support to the development of debt instruments in viable markets and training programs to increase technical capacity in climate risk assessment and financial structuring.
- Climate smart digital technology for agriculture and food security to help smallholder farmers increase yields and drive climate resilience in the agriculture sector.

- An African Infrastructure Resilience accelerator to mobilize investment in climate resilience infrastructure through project preparation initiatives and innovative finance mechanisms including debt-for-resilience swaps.
- Youth empowerment in entrepreneurship in climate adaptation and resilience with the aim to generate climate resilient jobs for youth and to strengthen your entrepreneurship via an incubator program and training programs.

With appropriate policy approaches, there is substantial potential for a green and resilient recovery.

There are efforts underway to drive a resilient recovery to COVID-19 in Africa – including through the Debt Service Suspension Initiative, the Access to COVID-19 Tools Accelerator, and through moves to issue and allocate new Special Drawing Rights. These efforts all have potential to help facilitate a resilient recovery and additional investment in climate adaptation.²⁰ A resilient recovery also has potential to address challenges Africa faced prior to COVID-19 including youth unemployment, high climate risks, poor infrastructure, and weak governance. Investment in climate resilient infrastructure, nature-based solutions, technology, and other sectors has significant potential to address underlying climate risks and respond to pre-COVID-19 challenges.

ADAPTATION INVESTMENT NEEDS TO BE MOBILIZED FROM A WIDER VARIETY OF FINANCE SOURCES

Future adaptation finance for Africa is expected to more than double by 2025 based on announced commitments discussed above. However, even if many of the main DFI actors adopted best practice commitments (similar to World Bank’s commitment to dedicate 35% to climate finance, of which 50% to adaptation) and if currently announced private sector mobilization efforts are successful (assuming at least 20% of MDBs’ USD 40 billion private sector mobilization target goes to adaptation in Africa), annual adaptation finance flows may still not meet minimum estimated investment needs by 2025.

To mobilize further investments and to increase the impact of investments in terms of building resilience, a wider variety of sources of finance need to be tapped. Public spending alone cannot meet the adaptation finance gap, so private sector investment must scale alongside public investment to supplement limited public resources.²¹ Figure 2 summarizes the financial actors which have a role to play in mobilizing finance for adaptation at scale in Africa. These actors offer financing along a spectrum of terms, ranging from highly concessional terms (lower return expectations and/or longer tenors) to commercial terms (market returns and tenors expected). Concessional capital is intended to fill a gap where the private sector (commercial capital) would not otherwise invest.

Figure 2. Potential Sources of Adaptation Finance in Africa

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Commercial Banks: Commercial banks can raise their own funds through bank deposits and are governed by international standards set by Basel II and III regulations for capital adequacy. Commercial banks have networks that can be leveraged including relationships with farmers, co-operatives, and MSMEs and can build technical capacity to structure financial instruments in partnership with development banks and other concessional finance providers.

- **Pan African Banks:** PABs can invest in MSMEs and mainstream resilience into their lending portfolios. PABs have been successful in increasing firms' access to finance and increasing competition and efficiency in the banking industry and can have a positive impact on micro-prudential stability with the least cyclical behavior in times of crisis.

Private Equity and Venture Capital: Africa's PE industry was cultivated by DFIs that had a mandate to invest in private sector businesses in Africa to promote social and economic development. Gradually the industry expanded and by 2020, there are more than 150 active fund managers of different sizes spread across geographies and sectors in Africa. The nature of their investments is suitable for scaling up adaptation finance and has potential for investment in new and innovative adaptation technology and services.

African Institutional Investors: African institutional investors have USD 1.8 trillion assets-under-management in 2020. Institutional investors' core goals are capital gains and stabilization of returns over the long term. They have very high ability to mobilize funds through pensions in the right regulatory environment and their prudential responsibilities require them to invest in assets with high credit ratings and assets that are listed.

- **Sovereign Wealth Funds:** Invest in domestic markets and have potential to finance adaptation focused securities and government bonds.
- **Pension Funds:** Are instrumental in mobilizing long-term saving and can support long-term adaptation investments.

Insurance: Insurance penetration is concentrated in a few major markets like South Africa, Egypt, Morocco, Nigeria, and Kenya. Insurers have advanced technical capacity to evaluate climate risks and capacity for innovation in climate risk transfer mechanisms. Insurance companies must undertake qualitative and quantitative assessments of impact of physical and transition risks on their investment portfolio.

Large Corporations: Sustainability and resilience in food production and supply chain are increasingly a focus for large multinational corporations especially those with global supply chains. Corporations have potential to deploy finance and technology at scale to undertake adaptation measures though will be largely focused on their own supply chains.

Multilateral & Bilateral DFIs: DFIs play a critical role in mainstreaming adaptation in development finance by assessing climate risks and vulnerability, assisting country governments to build capacity for mainstreaming adaptation, and mobilizing private capital. DFIs can bridge knowledge gaps through tools such as feasibility studies, business risk assessments, technical assistance, and market studies.

Sub-Regional Development Banks: SRDBs have a mandate to contribute to regional integration and regional infrastructure development projects. Four African SRDBs: Eastern and Southern African Trade Development Bank, East African Development Bank, West African Development Bank, and Ecowas Bank for Investment and Development are operational in Africa in three separate Regional Economic Communities. 40 African countries are shareholders of the SRDBs and in 2013, the total assets of African SRDBs were USD 6.2 billion.

National Development Banks: NDBs are state-owned or government-sponsored financial institutions with a primary mandate of providing long-term and concessional capital to high-risk sectors and industry which are underserved by private commercial banks and contribute to the country's development agenda. NDBs are important intermediaries for international climate finance and more than 10 currently have direct access to GCF funding.

Multilateral Climate Funds: Multilateral Climate Funds established through international agreements or for a specific mandate provide financing for adaptation in Africa either through grants or market-linked instruments. They are catalytic in facilitating and accelerating financing in perceived high-risk adaptation projects by providing instruments like first-loss or junior equity, repayment guarantees, and grants to mobilize private investments.

National Climate Funds: National, country-driven, dedicated, catalytic financial institutions designed to address domestic market gaps, take ownership of climate finance and crowd-in private investments in low carbon and resilient projects. NCFs have potential to provide integrated access to grants and finance to meet NDCs and have strong potential to mobilize private sector investments.

State-owned Enterprises & Financial Institutions (SOEs): SOEs are public entities that are partly or wholly owned by government to deliver services in a particular sector or sectors. SOEs have not financed many climate adaptation activities to date but have substantial opportunity to lead in climate resilience given size of market share and public governance model.

African Governments: African governments are already spending a considerable share of their budget on adaptation. For 42 African countries where data was available, the total weighted adaptation expenditure was around 0.18% of GDP, and the unweighted expenditure was around 3.4% of GDP, both higher than the share of adaptation finance received from international donors. African governments are instrumental in deploying capital to noncommercial adaptation activities and current levels of expenditure meet around 20% of the total adaptation need.

Foreign Government Agencies (ODA): ODA is a critical component of adaptation finance in Africa to de-risk adaptation activities and support more commercial finance. Bilateral agencies have a relatively high risk appetite and strong climate mandates.

Philanthropies, Foundations, and Non-profits: Like ODA, funding from these organizations can de-risk adaptation activities, draw in private finance, and support technical capacity building. Philanthropic funding is more nimble and flexible than ODA and can serve as catalytic capital for private sector investment.

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YET THERE ARE NUMEROUS BARRIERS TO INVESTMENT IN ADAPTATION THAT MUST BE ADDRESSED

There are cross-sectoral barriers as well as sector-specific barriers hindering investment in adaptation activities. Table 1 summarizes key barriers to investment across seven key sectors assessed in this analysis alongside cross-cutting barriers which affect investment potential across sectors.

Table 1. Barriers to Mobilizing Adaptation Finance by Sector and Cross-Cutting

Sector	Barriers
Cross-cutting	<p>Inadequate risk-adjusted returns: Returns do not compensate investors in developing countries for the additional risk associated with unfavorable regulations and policies, such as foreign investment restrictions.</p> <p>Complexity of project due diligence: Many private sector actors, including institutional investors, have largely avoided financing infrastructure projects across sectors in the region due to cost recovery challenges and the complexity of the technical due diligence.</p> <p>Limited capacity to collect and analyze relevant climate data: The lack of reliable and accessible information about climate risks and impacts, combined with limited capacity to process available climate data in infrastructure modeling and translate findings into the necessary resilience measures makes it difficult to adapt proactively.</p>
Water	<p>Lack of municipal/subnational implementation capacity: Water projects often involve municipal or other subnational implementers with limited implementation capacity (to pursue finance, structure an adaptation project, or access climate analytics).</p>
Agriculture	<p>Policy and regulatory barriers: Lack of regulatory incentives for climate-smart agriculture in terms of priority lending and mal-incentives in regulatory environments with subsidies for non-adaptive crops.</p> <p>Limitations in aggregation: Difficulty in aggregating or securitizing many small-scale projects due to local contexts and disparate level of development</p>
Transport	<p>Variability of climatic conditions within a single project: Transport projects are often cross-jurisdictional in nature and therefore face a complex range of climate risks.</p> <p>Public sector nature of the sector: Even more than for other infrastructure projects, some elements of the transport sector including roads, railways, and ports are often publicly owned and operated and private sector investment involvement may not be feasible.</p>
Energy	<p>Need for regional coordination: As countries are tackling domestic energy security challenges separately, this is creating build-up of overcapacity in some countries and deficiencies in others.</p> <p>Risk attitudes of decision-makers: Given the long lifespan of energy infrastructure, ranging from 50 to 100 years for hydropower assets, it is critical to base expansions and new infrastructure investments on future climate projections. However, uncertainties around climate projections and the magnitude of associated revenue losses contribute to the lower risk perception of decision-makers.</p>
Urban Infrastructure	<p>Lack of subnational fiscal autonomy: Subnational borrowing capacities for infrastructure and other capital needs are severely constrained, making long-term planning for climate resilience challenging and creating delays in responding and recovering promptly from disasters.</p>
Coastal Ecosystems	<p>Challenging economics: Adaptation in coastal ecosystems zone is often overlapping with flood risks management and land-use planning which have significant public good characteristics making it difficult to build an economic case.²²</p>
Land Use and Forestry	<p>Multi-stakeholder solutions can create complexity for channeling funding: Developing and implementing solutions in land use and forestry involves numerous actors and flows across sectors and jurisdictions. Coordination across these sectors and jurisdictions can make the design and implementation of funding solutions complex.</p>



TO MOBILIZE THESE INVESTORS, A THREE-PRONGED STRATEGY IS NEEDED.

1. MAINSTREAM RESILIENCE INTO INVESTMENT DECISION-MAKING

Many investors are already engaged in investment that has significant relevance to adaptation goals – but their investments are not yet climate resilient. For example, a multinational corporation investing along an agricultural supply chain or an infrastructure investor building a water treatment facility will be operating in a sector with substantial climate risk but may not be screening for climate risk nor mitigating that risk. For example, the Infrastructure Consortium for Africa (ICA) finds that water infrastructure sector commitments totaled USD 13.3 billion in 2018 in Africa. This compares to the USD 1.2 billion tracked in adaptation finance to the water sector in the same year – suggesting that a significant proportion of finance to the sector is not climate resilient – or at least has not been rigorously assessed for physical climate risks or only is MDB finance that does not meet the MDB definition of adaptation finance.

To enable financial institutions to mainstream resilience into the investments they are making, the following steps are critical:

- Increase access to robust climate data:** There is a critical lack of climate data in many parts of Africa which limits adaptation projects and leads to uncertainty about the optimal approach. The poorest countries have the most significant lack of climate data: either they are post-conflict or fragile states, or simply do not have the funding and technical resources to develop climate data such as groundwater baseline data, 24–48-hour precipitation data, and forward-looking climate projections. Lack of past and current hydromet data particularly hinders design of some types of adaptation activities and finance instruments. Resilience bonds or results-based performance instruments for example, require disaggregated data across hazards, exposures, and vulnerabilities to accurately inform risk assessments and track impact.

Concessional funding and grants are needed to increase climate information collection, accessibility, and technical capacity to utilize the information. The ability to access and use climate information is critical for project implementers seeking funding for

climate adaptation projects. Without robust climate information on hazards, exposures, and vulnerabilities, implementers in Africa are stuck in a vicious cycle where they cannot prove the adaptation-relevance of a project – and are also unable to access finance that would help them collect and utilize that climate information.

More targeted concessional finance and grants, from DFIs, donor governments, and foundations are needed to support policy makers and other implementers in collecting and providing access to sufficient data, as well as support collaboration and training on open-source models that can utilize the data. Across the board, there should be an emphasis on increasing access to high resolution climate data at low cost so that implementers may undertake climate risk assessments as a basis for future adaptation planning.

- Incubate technical expertise in financial structuring:** Adaptation work requires blending of public, private, domestic, and international finance and

therefore calls for substantial financial engineering expertise. Donors are also increasingly requesting quantitative adaptation metrics, including data on physical infrastructure. It is very difficult to assess what volume of adaptation finance is needed and where it should be directed, due to the shortcomings of our current approach to aggregating adaptation finance flows. Policymakers should prioritize development of frameworks for measuring adaptation progress at the global level. This step will be especially critical to drawing in the private sector and to developing a more robust analysis of investment gaps in terms of direct impact on resilience outcomes.

- **Pension funds should be engaged through appropriate financial instruments:** Pension funds are instrumental in mobilizing long-term saving and can support long-term investments. However, traditionally they have low risk appetite due to liquidity requirements. The percentage of people covered by pension schemes has reached about 80% in some North African countries while it is still as low as 10% in Sub-Saharan Africa. Pension funds are especially strong in South Africa, Botswana, and Namibia per their assets-to-GDP ratio. Total assets under management in 12 emerging markets in Africa are close to USD 400 billion. Reports suggest that the assets-under-management of African pension funds were expected to rise to USD 1.1 trillion by 2020.
- **Build capacity of African financial institutions and government entities to evaluate and act on climate risks:** A concerted effort should be made to increase membership of Pan African Banks, locally based pension funds, and national development banks in international financial initiatives such as the UN Principles for Responsible Investment and Banking, and the International Development Finance Club – and to provide these institutions with the resources to participate actively. Capacity building is also crucial to strengthen African financial institutions' capacity to access finance from Climate Funds through pre- and post- accreditation support. National Designated Authorities (NDA), Direct Access Entities (DAEs) and the other Accredited Entities (AEs) also require technical and institutional capacity building to build project pipelines and proposals to the GCF. These needs are especially acute



in the most vulnerable countries where access to international climate finance is also difficult. The support of International Accredited Entities and readiness programming is crucial in strengthening the DAEs and NDAs to achieve the goal of bottom-up, country-driven approach of mobilizing adaptation finance.

- **Require disclosure of climate risks – via national legislation and/or via DFI on-lending.** Domestic financial regulators in Africa should consider requiring financial institutions to disclose climate-related risks in line with the Task Force for Climate-related Financial Disclosures recommendations. Moody's has found that the 49 banks it rates across Africa have more than USD 200 billion in lending across sectors with high potential climate risk, so disclosure of climate risks is critical.²³
- **Support small and medium-size enterprises (SMEs) that are offering adaptation-relevant products and services.** There should be increased attention on the considerable potential value that SMEs hold in unlocking climate adaptation solutions and engaging the private sector. There are 100s of SMEs across Africa that have valuable adaptation solutions and have developed viable business models to implement those solutions. Significantly more focus and finance are needed in this space to support the number of SMEs with potential to deliver adaptation solutions.

2. BUILD THE ENABLING ENVIRONMENT FOR ADAPTATION INVESTMENT

The enabling environment in a country will help determine the viability of certain types of instruments. In some cases, lack of financial sector development or lack of commitment to a particular climate adaptation priority will make certain investments difficult to implement. In these instances, there may be a stronger role for concessional capital from DFIs or foundations to facilitate the effective deployment of an investment. Countries' readiness for adaptation finance may be assessed via several factors across categories of policy environment, market environment, and stakeholder environment, which are further detailed in Table 2 to indicate which specific factors enable the successful implementation of different instruments.

Table 2. Key Factors in Enabling Environment

Policy environment	Market environment	Institutional/stakeholder environment
<ul style="list-style-type: none"> National adaptation plans/strategy in place Regulations enforcing adaptation measures (i.e., building codes) Availability and capacity to analyze climate data and modeling 	<ul style="list-style-type: none"> Access to international markets Developed insurance market PE/VC availability Subnational borrowing capacity 	<ul style="list-style-type: none"> Availability of accredited entities for accessing climate finance Engagement of NDB, regional development bank, and other regional institutions

Enabling environment priorities to mobilize investment include the following:

- Articulate investment-ready NAPs and mainstream climate resilience in government procurement:** Having a nationally articulated strategy for adaptation is critical for establishing long-term expectations, identifying priority actions across sectors, and indicating areas for private sector participation. Only six countries in Africa have submitted NAPs to date while 34 other countries have received funding or have submitted proposals to access funding from GCF and LDCF for NAP development. Policymakers should ensure that adaptation planning is incorporated and mainstreamed into all relevant policy and procurements plans. An increased focus on climate adaptation mainstreaming within procurement plans, in particular, is critical to ensure that international infrastructure investment must screen for and build in resilience.
- Build capacity to develop science-based policy and projects:** For much international public climate finance, there is a need to establish attribution between a climate impacts and the corresponding action/measure that aims to mitigate that impact. This attribution is challenging, requires substantial quantitative and science capacity and is often a critical factor for mobilizing adaptation finance. There is a substantial need to increase capacity to translate science into policy, and to translate policy into investment needs, for instance by utilizing climate resilience indicators to prioritize budget allocations. Resilience outcomes are also difficult to track against a moving baseline—for example, other development projects may have also contributed to improved social outcomes in a given region.
- Improve macro-economic environments and adopt a multi-faceted approach to address debt burdens faced by African countries:** Even before the pandemic, external debt averaged 40% of GDP across the African continent. Gross debt-to-GDP ratios across Africa are projected to have increased by around 8 percentage points in 2020, and by over 20 percentage points in the Republic of the Congo, Seychelles, Sudan, and Zambia.²⁴ Four countries are already in debt distress,²⁵ while 15 other countries are at high risk of external debt distress.²⁶ Absent substantial global efforts to help reduce the debt burden, many countries are not able to take on additional debt to address climate risk. Overall, African countries have low sovereign credit ratings from the three major credit rating agencies (CRA): Moody's, Standard & Poor's (S&P), and Fitch. Just two countries – Botswana and Mauritius – have investment grade ratings from Moody's while all

other countries are either sub-investment grade (19 countries) or do not have a rating (26 countries). A low sovereign credit rating or lack of a rating raises the cost of debt and makes attracting foreign direct investment more challenging. Already low sovereign credit ratings are put further at risk by increasing climate-related risks as CRAs begin to incorporate such risks into their ratings. Moreover, increasing climate impacts and a lack of adaptation action pose significant risk to sovereign credit ratings across the region.²⁷

African finance ministers have called for external assistance of USD 100 billion annually over the next three years to close a financing gap of USD 345 billion to achieve a sustainable recovery.²⁸ The participation of private creditors will be critical to relieve existing debt burdens, requiring innovative financing

models that set clear incentives. Additional actions that should be considered to address debt challenges in African countries include:

- Advance efforts to link credit ratings with reductions in climate risk to incentivize resilience and lower the cost of debt.
- Continue implementation of the Debt Service Suspension Initiative (DSSI) program and seek as many avenues as possible for alleviating debt strain on African countries as a key strategy to increase domestic adaptation finance.
- Develop sovereign bonds with an adaptation component (i.e., Ghana's 2030 bond with an IDA guarantee of 40 percent) and scale up sovereign debt-for-adaptation swaps to countries where conditions are viable.²⁹



3. DEPLOY INNOVATIVE FINANCE INSTRUMENTS

There is a wide array of available investment instruments, risk finance mechanisms, and broader finance-relevant solutions that financial actors are already mobilizing in support of climate resilience across Africa. The universe of financial instruments captured in this analysis is represented in Table 3. The level of “concessionality” required for certain instruments will vary by market or policy environment. Financial instruments can be used to finance activities that build physical resilience to climate change impacts (reducing physical risk) and are also useful in responding to risks where physical climate impacts cannot or have not been eliminated (through risk transfer and risk reduction instruments).

It is critical to carefully select a financial instrument or structure that meets the conditions and activities targeted. Selection of appropriate financial instruments must be informed by the sectoral focus of the adaptation activity, underlying country-level policy and market conditions, and the stakeholders and actors engaged. Instruments will only function successfully when they target an

appropriate context. Key factors that must be considered when designing an instrument include currency stability, strength of project pipeline, strength of debt capital markets, presence of strong policy environment, existence of a sovereign credit rating, existence of corporate bond market, robustness of climate information, and engagement/existence of a domestic private sector.

Table 3. Financial Instrument Types

Instrument Typology	Example
<p>Grants: Funding (non-repayable or reimbursable) typically used for technical assistance, early-stage project development, and capacity building.</p>	<p>Example (application in the agriculture sector): The Ethiopian government launched the Productive Safety Net Program in 2005 in partnership with international and aid organizations. The program finances conditional or unconditional cash or food transfers for undertaking public works or social infrastructure in response to chronic food insecurity or short-term shocks like droughts targeting the highly-climate vulnerable population.</p> <p>Stage of Implementation: In November 2020, Phase V of PSNP began through Strengthen Ethiopia's Adaptive Safety Net Project (SEASN) project. This financing includes a USD 200 million credit and a USD 312.5 million grant, with additional support from USAID (USD 430 million), UK FCDO (USD 281 million) and Government of Ethiopia (USD 600 million). The project aims to expand geographic coverage and enhance service delivery of PSNP and effectively respond to disasters.</p> <p>Country context: Countries with relatively challenging underlying market and policy conditions are well suited to this instrument because it is largely concessional in nature. This could include countries with low sovereign credit ratings, high sovereign debt, and limited capital markets. The implementing environment does require at least some monitoring and evaluation capacity in the form of at least a sufficiently stable political environment to allow for the evaluation of progress to take place.</p>
<p>Project finance: Typically involves direct debt or equity investments into a single project; can be fully commercial, or forms of concessional finance could include loan guarantees, first loss debt, and off-taker guarantees.</p>	<p>Example (application in the agriculture & urban infrastructure sector): Cooling as a Service (CaaS) aims to deploy efficient cooling technology at scale through a pay-per-service model that enables customers to pay per unit of cooling consumed and eliminates upfront investment in cooling technology. CaaS supports dual benefits projects across mitigation and adaptation – reducing emissions through cleaner cooling technology deployed and addressing underlying climate risks associated with increased heat.</p> <p>One current application of the CaaS model is in Nigeria where increased temperatures associated with climate change affect food storage capacity and will lead to increased harvest losses, increased food waste, and adverse health outcomes. The social enterprise ColdHubs designs, installs, commissions and operates solar-powered walk-in cold rooms in produce aggregation centers and outdoor markets that can help address those climate risks and support agriculture sector adaptation. Farmers and retailers pay a fixed price per 20kg crate per day to store their goods inside the cold room.</p> <p>Country context: Servitization instruments work well in country contexts with relatively strong country-level market and policy enabling environments, basic legal and regulatory frameworks in place for contract enforcement, and availability of local commercial banks. 21 countries indicated urban planning and infrastructure as a priority sector in their NDCs.³⁰ The SADC Center for Renewable Energy and Energy Efficiency (SACREEE), a member of the CaaS Alliance, recently launched an Industrial Energy Efficiency Program (SIEEP) which will run through 2018-2023 and will involve providing training for bankers, creation of project pipelines, and seed funding. Participating countries in this program may be good candidates for CaaS.</p>

Financing facilities:

Involve debt or equity funding for a pool of projects, companies, or individuals (as opposed to single projects); can offer varying levels of concessionality including subordinate debt or equity, longer debt tenors or fund horizons, or supplemental grant capital.

Example (application in the water sector): Climate Investor Two is a fund structured to finance projects across three stages: 1) a development fund, 2) a construction fund, and 3) a re-financing fund. Climate Investor Two will focus on water, oceans, and sanitation subsectors, including: municipal and industrial water and wastewater supply, desalination, bulk water supply, waste and wastewater to energy, and riverine and coastal ecosystem management and protection.

Country Context: Climate Investor Two requires a strong project pipeline in the water sector in target countries. A strong ecosystem of project developers is critical to this criterion. Project pipeline can be supported by a favorable policy environment where it is feasible to engage private capital in water infrastructure projects and where there is sufficient climate risk information available to ensure the projects meet set climate adaptation criteria.

In addition, the Fund makes investments in non-local currency, so a relatively stable currency environment is needed to avoid significant foreign exchange losses or hedging costs that would erode investor return. The ability to move capital in and out of the country without significant penalty or delay is also critical.

Results-based finance:

Involves debt or grant capital for a project or portfolio of projects that is contingent on the achievement of a certain climate adaptation outcome.

Example (application to land use and forestry): The African Conservancies Fund (ACF) was established by Conservation International (CI) with the objective to align economic and conservation objectives in the communities in and around the Maasai Mara in Kenya. The ACF provides debt capital to a trust to develop sustainable revenue generating activities such as eco-tourism, sustainable agriculture, and carbon credit generation. The loans are to be repaid from this revenue. To-date, CI and its affiliates have provided USD 500,000 in loan capital to the Trust and aim to increase this to USD 5 million over two years.

Country context: The Trust model relies on the authority of local communities to make decisions around how their land is managed, and to be able to earn income from activities carried out (or avoided) on the land. Areas under national government control are less likely to be able to benefit from this highly local, highly participatory structure. In addition, Trusts need a legal framework to be able to incorporate and have authority to take investments, borrow money, distribute funds, and oversee and implement conservation and income generating activities.

Debt for climate swaps:

Debt for climate swaps are a type of debt swap in which the debtor nation, instead of continuing to make external debt payments in a foreign currency, makes payments in local currency to finance climate projects domestically on agreed upon terms.

Example (application to coastal ecosystems): In 2017, the Seychelles became the first country to successfully undertake a debt-for-climate swap aimed at specifically protecting the world's oceans. The Nature Conservancy (TNC) acquired Seychelles' foreign external debt at a discounted price and raised additional funding worth USD 5 million from private donors. In return, the government of Seychelles promised to repay the loans to TNC to a specially created Seychelles Conservation and Climate Adaptation Trust. Since 2017, SeyCCAT has issued over USD 1.5 million in grants to more than 25 grantees implementing a total of 33 projects. More than half of the funds have gone towards projects led by or benefitting women and a third towards youth-led or projects where youth are the primary beneficiary. 23 projects have benefited small-scale artisanal fisheries.

Country context: Countries with sovereign debt held bilaterally and not at imminent risk of default are likely the most conducive to debt for climate swaps, to ease negotiations and as they still require repayment into a trust. In addition, high-level political support and whole-of-government support from the debtor's government is needed.

Liquidity instruments:

Grant or debt facilities designed to provide immediate access to capital; typically established to help governments, businesses, or individuals cover their immediate needs in the wake of a major event.

Example (application in the agriculture sector):

Cash transfer programs provide unconditional cash transfers to poor and vulnerable households. Research suggests that these programs have significant climate resilience benefits and that households receiving cash transfers suffered much less from weather shocks, their food security increased, and poorest households saw the biggest gains.³¹ These programs are especially critical in countries with a high proportion of the labor force in the agriculture sector. For example, Mozambique suffered from severe droughts in 2015-16, which negatively impacted agricultural yields in 2017-18. Cyclones Idai and Kenneth in 2019 exacerbated the crisis faced by farmers, leaving nearly 3% of the population at risk of severe food insecurity. In response to these crises, World Food Programme, with funding from DFID, developed a program to supply the affected population with either cash or food vouchers to allow them to obtain food for themselves and their households.

Country context: Access to climate data relevant to vulnerable populations and geographic areas in order to target assistance most effectively is needed. In the case of Mozambique this was done by using other indicators of social and economic vulnerability as proxies for food insecurity. In addition, a reliable mechanism for distributing funds, either through physical networks (such as local banks or community organizations), or mobile payments systems, is needed.

Insurance:

Most common form of risk transfer and captures catastrophe bonds, parametric insurance, index insurance, and risk pooling.

Example (application in the agriculture sector):

The African Risk Capacity (ARC) is a sovereign risk pool and early response mechanism designed to provide insurance to countries in the event of a contingency. ARC's mission is to help members of the African Union to protect the food security of their vulnerable populations. As an insurance risk pool, ARC's objective is to capitalize on the natural diversification of weather risk across Africa, allowing countries to manage their risk as a group in a financially efficient manner to respond to probable but uncertain risks.

Country context: To participate in ARC, countries must undertake several processes, including customizing the Africa RiskView (ARV) software, signing MOUs for in-country capacity building, defining a contingency plan for ARC payouts, and determining risk transfer parameters. ARC currently offers maximum coverage of USD 30 million per country per season for drought events that occur with a frequency of 1 in 5 years or less. ³⁴ African Union member states are a part of ARC in 2020, 24 have active MOUs, 13 are Class A Members who have purchased the policy and 7 countries have received payouts. Since 2014, ARC Ltd has collected over USD 100 million in premiums, provided USD 720 million of insurance coverage, and paid a total of USD 65 million in payouts mainly in the agriculture sector that has finance efforts including scale-up on cash transfers and replenishment of strategic grain reserves in Malawi in 2017 and response to severe drought in Mauritania in 2018 and in Madagascar in 2020.

CONCLUSION

In sum, African countries are among the most at risk of increasing frequency and severity of climate-related shocks and stressors. There is a pressing need to invest in climate change adaptation to support individuals, SMEs, municipalities, corporations, financial actors, and governments in building resilience to climate impacts. To date, climate adaptation finance is scaling far too slowly to build climate resilience while the costs of climate impacts rise.

To mobilize the levels of investment needed and to increase the resilience impact of these investments, a wider variety of sources of finance must be tapped. A three-pronged strategy is needed to tap the wide range of potential actors: 1) mainstream resilience in investment decisions making, 2) build the enabling environment for adaptation investment,

and 3) aggressively deploy innovative finance instruments at scale towards adaptation activities. Action taken now across the full range of potential adaptation finance sources will be critical to determining the course of Africa's capacity to respond to present and oncoming climate impacts and to building a more climate-resilient and livable future.

A. INTRODUCTION

I. OVERVIEW AND CONTEXT

The COVID-19 pandemic has resulted in Africa's worst recession in more than half a century. Real gross domestic product (GDP) contracted by 2.1% in 2020 and lasting impacts of the pandemic could drive 40 million additional people into extreme poverty.³² In the midst of this existing economic challenge, increasing intensity and frequency of extreme weather events and chronic climate-related changes continue to threaten livelihoods, ecosystems, and communities. Twenty-seven of the world's 40 most climate-vulnerable countries are in Africa³³ and climate-related disasters are increasingly common: in 2018, cyclones impacted 3 million people in Mozambique, Malawi, and Zimbabwe and in 2020, locusts caused severe crop destruction across Ethiopia, Somalia, Kenya, and Yemen, compounding existing food insecurity and economic pressure from the COVID-19 crisis.

There is a pressing need to invest in adapting to climate change, but adaptation finance is scaling too slowly to narrow the gap as the costs of climate impacts rise. Per Climate Policy Initiative's (CPI's) Global Landscape of Climate Finance (Landscape), Africa received just over USD 6 billion annually in adaptation finance in 2017-18.³⁴ Adaptation finance in Africa represents 30% of total climate finance flows to Africa tracked in the Landscape, higher as a proportion of climate finance than any other region; however, the volume of finance is still insufficient to address the compounding climate risks the continent faces. The USD 6 billion in adaptation finance tracked across 2017-18 stands in comparison to total estimated investment needs in submitted African nationally determined contributions (NDCs) which total USD 331 billion through 2030 across the 40 countries that have included estimated costs. If the trend of USD 6 billion annually in adaptation finance to Africa holds through 2030, total finance from 2020-2030 would total USD 66 billion, far short of the USD 331 billion needed.

Barriers to mobilizing adaptation finance are substantial; however, investing in climate resilience when done successfully can also address direct physical climate risks and protect economic, social, and financial systems, bringing net economic benefits. The Global Commission on Adaptation's 2019 report *Adapt Now* indicates that investing USD 1.8 trillion globally in five sectors from 2020-30 could generate more than three times that investment (USD 7.1 trillion) in total net benefits.

There is positive momentum towards increasing adaptation finance volumes and efficacy in Africa. Among these promising developments:

- Multilateral development banks (MDBs) are setting increasingly ambitious climate action targets – with a collective pledge to increase annual commitments by USD 50 billion for low- and middle-income countries and to double their annual combined adaptation finance to US \$18 billion by 2025.³⁵ The World Bank alone has committed to mobilizing USD 50 billion to adaptation finance over FY21-25.³⁶
- The African Development Bank and the Global Center on Adaptation (GCA) launched the Africa Adaptation Acceleration Program which aims to mobilize USD 25 billion in finance for African climate adaptation and resilience building between 2020 and 2025.
- The International Monetary Fund (IMF) is firmly committed to deal with climate risks by integrating climate in their economic and financial services. A proposed allocation of Strategic Drawing Rights (SDRs) of \$650 billion would benefit all IMF members, including in Africa, and could support a global green and resilient recovery.³⁷
- African governments are increasingly engaged in funding adaptation activities and in developing technical capacity to mobilize domestic finance and engage international markets. The Government of Kenya, for example, has designed and launched a County Climate Change Fund to support climate action at the local level, its central bank has

supported a green finance initiative to launch green bonds (including to finance resilience), and the government has made capacity building to access international climate funding within its National Treasury a priority.³⁸

- The private sector is increasingly involved in adaptation finance in Africa. This engagement includes multinational, local and regional corporations which have recognized physical climate risks in their own portfolios³⁹ as well as developers of innovative financial instruments which seek to draw in the private sector. These instruments include private equity funds investing in adaptation small and medium-sized enterprise (SMEs) and large-scale water and wastewater activities, as well as a growing number of Africa-based adaptation SMEs operating in agriculture, water, energy, and forestry.
- The United States has recommitted to fulfilling its global climate finance promises. In April 2021, President Biden's budget proposal included a USD 1.2 billion contribution to the Green Climate Fund (GCF) and an additional USD 1.3 billion for other bilateral and multilateral climate programs. G7 leaders recommitted in June 2021 to jointly mobilize USD 100 billion annually through 2025 to climate finance. Canada also doubled its climate finance pledge to USD 4.4 billion over the next five years while Germany has pledged at least USD 7.2 billion in climate finance annually by 2025.⁴⁰
- A group of Development Finance Institutions are working under the DFIs+ Adaptation and Resilience Collaborative to advance a set of actions to accelerate finance to adaptation and resilience. The group has made commitments including to pursue a substantial increase in investments in adaptation and resilience, to move towards ensuring all investments made have assessed and are resilient to climate risks, and to increase support and collaboration to shape markets and build pipelines of bankable investments in climate adaptation.⁴¹
- The Green Climate Fund (GCF) has committed half of its USD 7 billion portfolio to adaptation, two thirds of which will flow to the Least Developed Countries and Small Island Developing States – including African countries.



- The Coalition for Climate Resilient Investment (CCRI) was launched at the UN General Assembly's Climate Action Summit in September 2019. CCRI's mission is to create a more resilient global financial industry where physical climate risks are accurately priced into investment decisions making. CCRI supports national decision-making, project valuation and investment appraisal, and financial innovation.⁴²
- The Infrastructure Consortium of Africa (ICA) finds that financing for infrastructure in Africa reached an all-time high in 2018 at USD 100 billion. This finance flowed to sectors where climate resilience is critical: transport (USD 32.5 billion), water (USD 13.3 billion), and energy (USD 43.8 billion).⁴³ The significant and increasing overall flows of finance to infrastructure in Africa suggest the enormous opportunity to leverage existing investment activity to mainstream climate resilience.

II. REPORT APPROACH

1. REPORT OBJECTIVES

It is critical that we understand the current state of finance to address climate risk in Africa to inform efforts to increase its volume and efficacy. The core objectives of this report are to:

- **Analyze African financial market readiness** for climate adaptation finance and risk finance mechanisms.
- **Assess the state of adaptation finance and risk-finance mechanisms** already available and in use in Africa.
- **Identify gaps where climate risk exists yet there is insufficient finance** to address it, as well as the barriers to implementation.
- **Propose solutions to increase the volume and variety of capital** available for adaptation finance and risk transfer mechanisms in Africa and to enable pipelines for adaptation and dual benefits projects in the region.

The report aims to accomplish these objectives in three sections:

- **Section B: Current State of Adaptation Finance Flows** – Summarizes the state of tracked adaptation finance flows from the Global Landscape of Climate Finance and assesses the outlook for future adaptation finance flows given present conditions. The section also summarizes the state of financial actors operating in Africa and highlights how each actor type operates broadly in the market and specifically in mobilizing climate adaptation finance.
- **Section C: Adaptation Finance Mechanisms Deployed Across Africa by Sector** – Categorizes financial instruments that have had success in mobilizing finance for adaptation interventions in Africa or that have a clear path forward to mobilization of finance. The section then summarizes finance mechanisms deployed across Africa for seven sectors through a four-part approach: 1) outlining the climate risk context and adaptation activities available to be financed in the sector, 2) offering context on the broader investment ecosystem in the sector, 3) barriers to investment, and 4) highlighting instruments that have been financed in the sector that aim to address climate risks. The analysis of instruments aims to capture the basic structure of each instrument, the status of implementation, the actors involved and the reasons the instruments were designed to engage those actors, and the factors at the country-level that make the instrument viable in particular contexts.
- **Section D: Structural Barriers and Recommendations to Advance Adaptation Investment** – Summarizes barriers to increasing the volume and efficacy of finance towards addressing climate risk in Africa. The section concludes with recommendations at the actor-level as well as systemic and acute actions that could be taken to increase the volume and efficacy of adaptation finance in Africa.

2. DEFINING ADAPTATION FINANCE

Defining and tracking finance towards adaptation activities is notoriously challenging. Challenges include context dependency (whether an investment has adaptation outcomes depends on specific geographic vulnerability), uncertain causal links (disaggregating adaptation outcomes from development outcomes is challenging) and demonstrating adaptation benefits against a counterfactual scenario (whether the intervention significantly reduced the impact of a hazard, all other things held equal). Quantifying climate risks and resilience benefits is also hampered by significant limitations in spatially disaggregated hazard, exposure, and vulnerability data. These challenges also make it difficult to design and secure funding for adaptation projects in the first place.

In light of these barriers, the MDB-IDFC Common Principles for Climate Change Adaptation Finance Tracking

have become a broadly accepted standard for tracking adaptation finance. Based on the principles, adaptation activities must 1) set out the context of climate risks, vulnerabilities, and impacts, 2) state the project's intent to address the risks, and 3) demonstrate a direct link between the identified risks and the financed activities. Pending more robust methodologies for demonstrating climate resilience benefits, the intent of the project implementer remains a decisive factor distinguishing adaptation activities, which is also reflected in the way the OECD tracks adaptation finance through its Rio Marker system. The World Bank's recently launched resilience rating system offers a more nuanced method for comparing the resilience of projects along a 5-point scale (R-C-B-A-A+) dependent upon the breadth and depth of the climate information incorporated into design and how that information is reflected in design, operations, and risk analysis.⁴⁴

New efforts in the private sector, including Lightsmith's Adaptation SME Accelerator Project (ASAP) Taxonomy, seek to expand this approach to include finance to activities that address underlying climate risks even if project implementers do not state the project's intent to address those risks. This shift allows for a wider range of finance to be acknowledged as having resilience benefits and may be especially useful in instances where precise climate risk data is limited. For instance, many corporates have already started investing in resilient supply chains, but they have no mandate to label nor report their financing as adaptation relevant.

An additional challenge for tracking adaptation finance is the need to disaggregate adaptation activities from non-adaptation activities within a project. Although the MDB-IDFC principles require this, the requirement is challenging in practice as project implementers are increasingly asked to mainstream adaptation across all

projects. Finally, an important caveat underlying this discussion is that adaptation finance volume does not equal adaptation progress. A focus on finance volumes can create the perception that progress is being made when funding has gone to major infrastructure projects vs lower cost projects that build capacity for data collection or improve efficiencies for allocating post-disaster payouts, when the latter may be more effective in reaching the most climate vulnerable populations. It will be critical to report adaptation impact alongside finance figures, as methodologies for tracking impact continues to evolve.

The analysis in this report aims to capture both adaptation finance (as tracked in the Global Landscape of Climate Finance) as well as other instruments and risk finance mechanisms that additionally mobilize finance for a range of adaptation outcomes, but where implementers may not always have sufficient data or capacity to identify these projects as adaptation relevant.



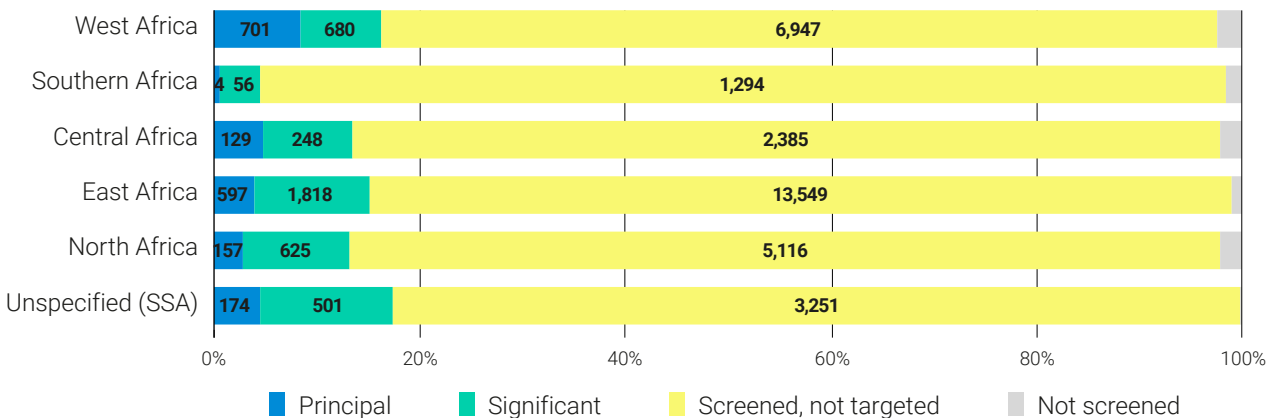
B. CURRENT STATE OF ADAPTATION FINANCE FLOWS

I. TRACKED ADAPTATION FINANCE FLOWS

Since 2012, CPI has sought to comprehensively track domestic and international investment in activities that address and respond to climate change through the Global Landscape of Climate Finance (the Landscape). In the most recent version of the Landscape, published in 2019, CPI tracked USD 30 billion on average annually in 2017 and 2018 of adaptation finance⁴⁵ from government and bilateral aid agencies, climate funds, and bilateral, multilateral, and national finance institutions.⁴⁶ The Landscape currently

does not track any private sector adaptation finance and tracking of public domestic adaptation finance is limited. The analysis that follows is therefore representative of only a portion of total current and potential adaptation finance flows (as represented by the more diverse set of financial actors in section I) because of informational limitations in adaptation finance tracking. These values should be understood as representative of the direction of public international flows to adaptation activities.

Figure 3. Share of Adaptation Finance in Net ODA (USD mn, 2017/18)



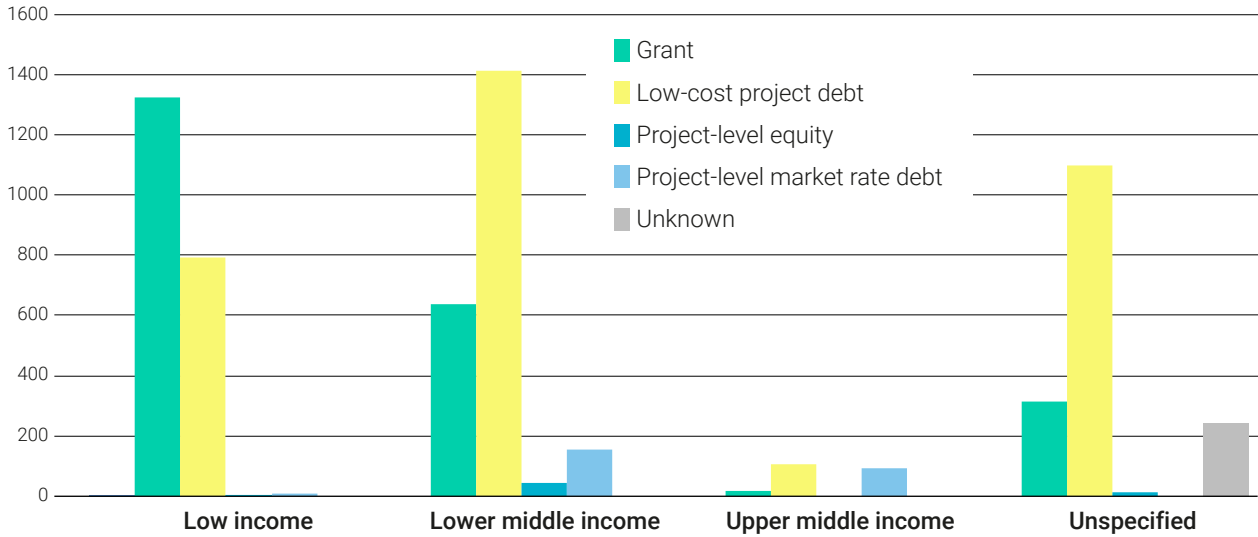
The 2017-18⁴⁷ flows are a new high-water mark for adaptation finance tracked in the Landscape – a 35% increase from the USD 22 billion annually tracked in 2015 and 2016. Of the USD 30 billion tracked in annual adaptation finance globally in 2017-18, USD 6.2 billion annually flowed to Africa. This represents around 14% of net Official Development Assistance received by African countries over the same period of around USD 42 billion. Of this funding, 4% was tagged as having adaptation as a principal objective, and another 9% was tagged as having adaptation as a significant objective. The share of flows targeting adaptation as a principal objective was greatest in West Africa (Figure 3).

Adaptation finance in Africa represents 30% of total climate finance flows in the region, higher as a proportion of total climate finance than any other region. In every African Union region, multilateral DFIs provided the most adaptation finance of any source, followed by bilateral DFIs, governments, and public funds depending on the region. The division between grants and concessional debt varies by region: North, Southern, and West Africa received majority concessional debt to adaptation activities, while Central and East Africa received majority grants. There was also a limited amount of commercial-rate finance tracked, both equity and debt, to adaptation activities in the region

– primarily in North and Southern Africa. By income group, grants were the dominant form of adaptation finance received by low-income countries at 62%, while

low-cost project debt accounted for the majority in lower middle-income countries at 63% (Figure 4).

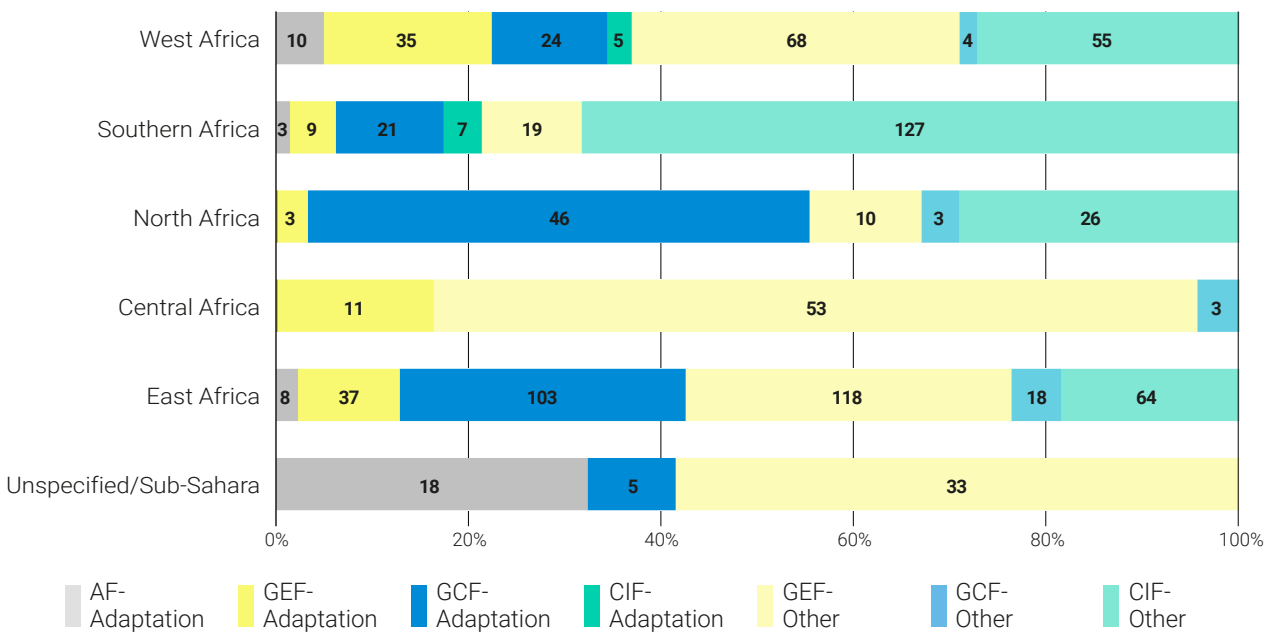
Figure 4. Adaptation Finance by Instrument and Income Group (USD mn, 2017/18)



Finance flowing through climate and environment dedicated funds⁴⁸ represented less than 0.5% of total ODA to Africa, indicating significant room for scale up. Despite their relatively small scale, adaptation has been a strong

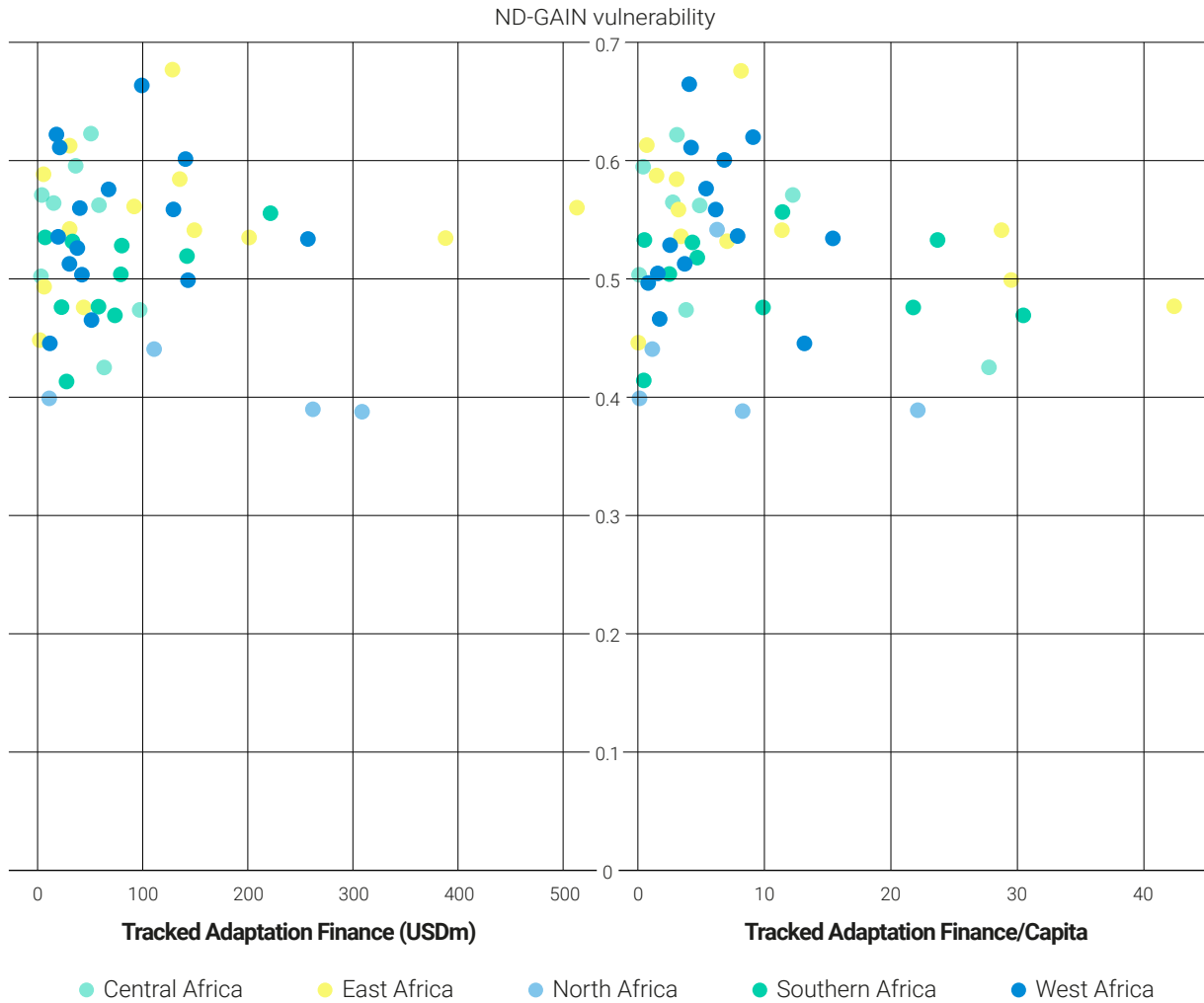
focus of these funds, at more than 40% of total finance reaching East Africa, North Africa, and Sub-Saharan regional flows in 2017/18.

Figure 5. Adaptation vs. Non-Adaptation Flows from Climate & Environment Dedicated Funds (USD mn, 2017/18)



* GEF includes Least Developed Countries Fund (LDCF)

Figure 6. Tracked Adaptation Finance vs. ND-GAIN Vulnerability by Country



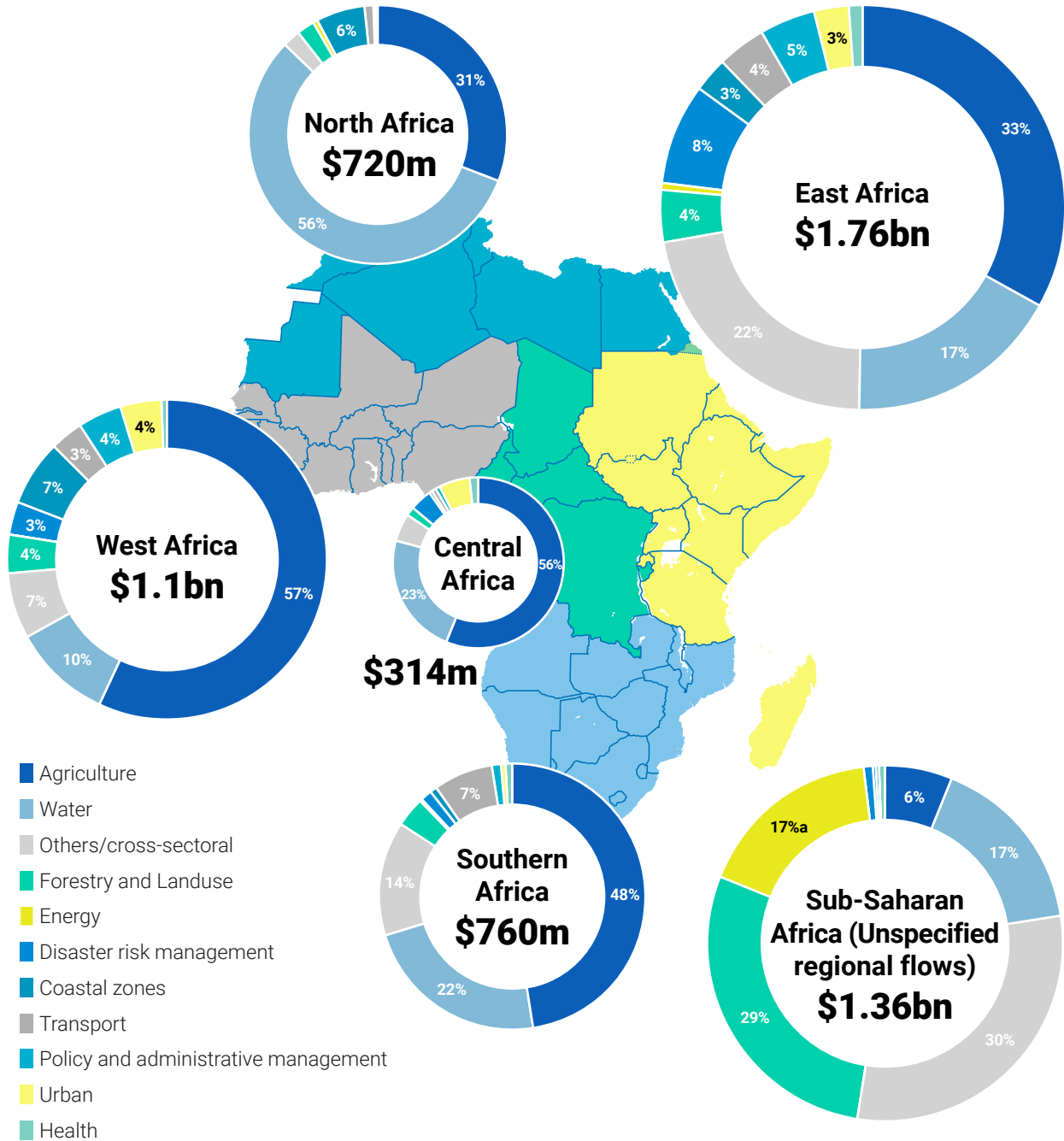
At the country level, the most vulnerable countries have not been recipients of the most volumes of adaptation finance. As shown in Figure 6, there is limited to no correlation at the country-level between climate vulnerability (per ND-GAIN) and adaptation finance overall and per capita.

The top three sectors receiving adaptation finance across all countries were agriculture (USD 2 billion annually), water (USD 1.3 billion annually), and forestry and land use (USD 551 million annually). Agriculture and water were the top two sectors receiving finance across all regions, with agriculture accounting for 31-57% of total regional flows. In North Africa, water received the most finance at 56% of total regional flows. Coastal zones were also a top finance receiving sector in North and West Africa, while the urban sector featured

prominently in East Africa. About a fifth of total flows (USD 1.36 billion) did not target a specific subregion and went towards projects across Sub-Saharan Africa, largely for cross-sectoral, forestry, and energy projects. Across all regions, USD 41 million was tagged as related to supporting risk transfer and insurance mechanisms, primarily in the agriculture sector.

While there are no estimates of adaptation investment needs by sector, a rough estimate of total investment needs may be derived from existing NDCs. Based on 40 countries that have submitted NDCs, total adaptation investment needs total USD 331 billion through 2030 (See Section C.I.3 for further details). Assuming this translates to around USD 33 billion in annual investment needs, current levels of financing yields an overall annual investment gap of at least USD 27 billion.

Figure 7. Sectoral Allocation by Region



II. FINANCIAL ACTORS OPERATING IN AFRICA

1. SUMMARY

To mobilize the levels of investment needed and to increase the impact of investment in terms of building resilience, a wider variety of sources of finance need to be tapped. Public spending alone cannot meet the adaptation finance gap, so private sector investment must scale alongside public investment to supplement limited public resources.⁴⁹ There is significant variety in the kinds of actors involved in adaptation finance in Africa.

Nearly all finance tracked to adaptation in the Global Landscape of Climate Finance flows from international public actors.⁵⁰ Beyond the Landscape’s focus on international public actors given informational constraints, there is a much broader universe of actors who are or can be engaged in adaptation finance. Figure 8 summarizes the financial actors assessed in this section which operate in Africa and have a role to play in mobilizing finance for adaptation at scale.

Figure 8. Summary of Financial Actors' Role in Financing Adaptation

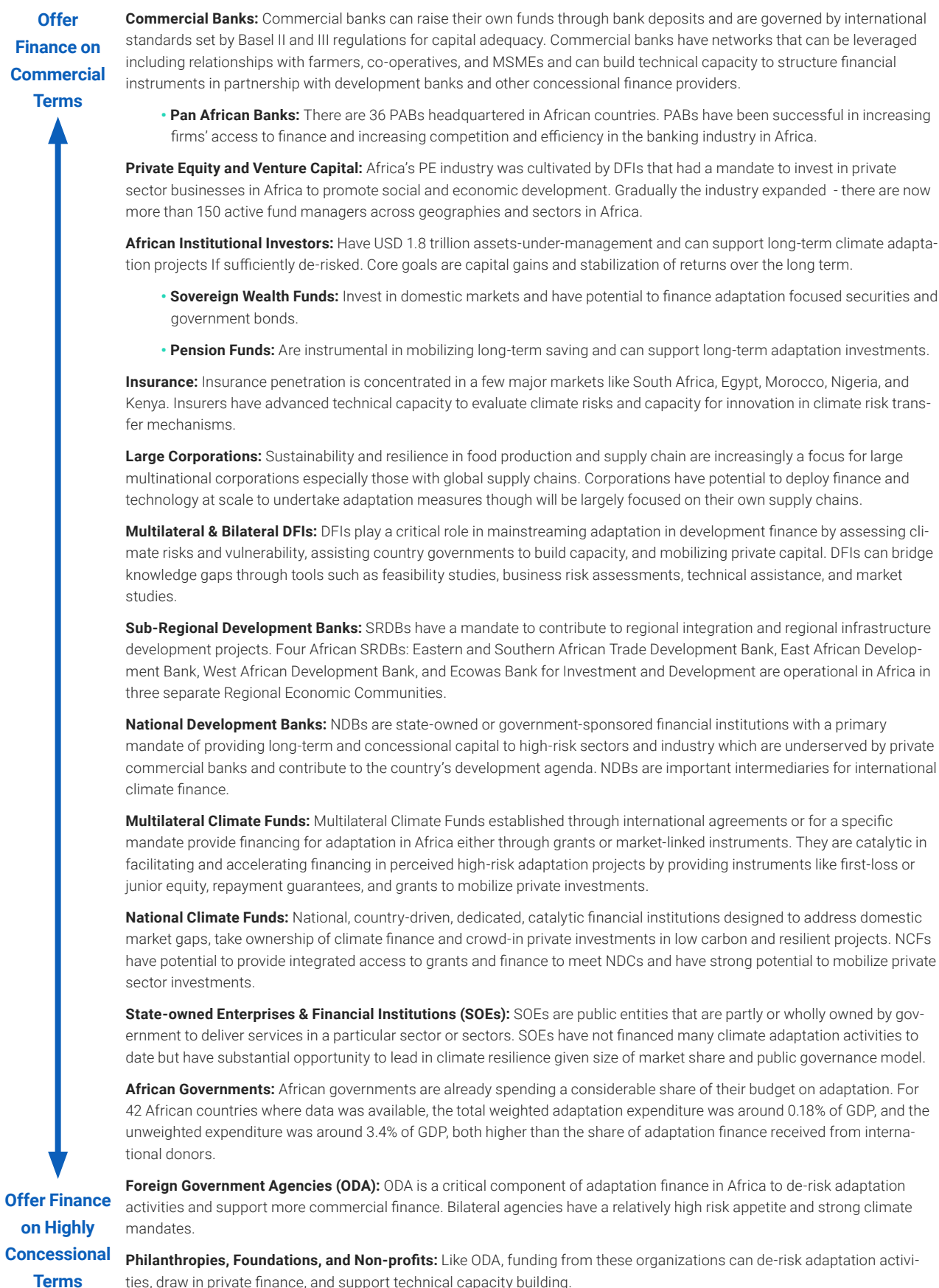
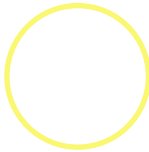



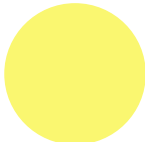


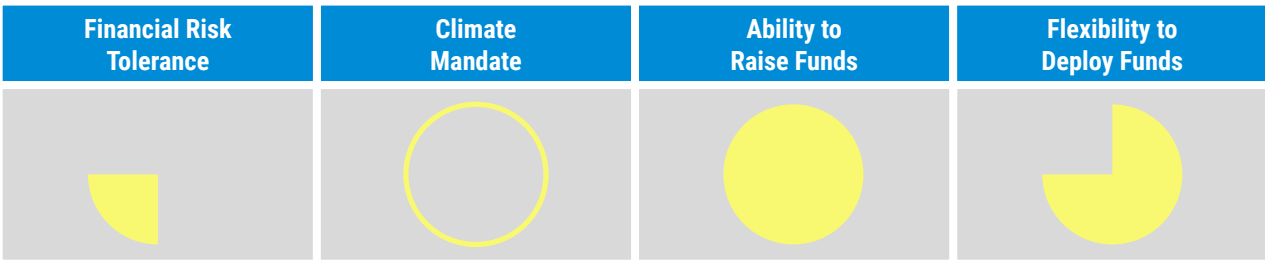
Table 4 indicates how the indicators correspond to these four factors. For a snapshot of comparative strengths and constraints of all actors, please refer to Annex V. Additional details are provided following Table 4 in order of actor from commercial terms of finance offered to highly concessional finance – outlining the role each actor type currently plays in the financial ecosystem in Africa and their current and potential role in financing adaptation activities. The graphic for each actor summarizes comparative strengths and constraints faced by these actors across the factors listed in Table 4: risk appetite, climate mandates, ability to raise their own capital, and flexibility to deploy funds for climate adaptation projects.

Table 4. Indicators of Strengths and Constraints by Actor

Indicator	Financial Risk Tolerance	Climate Mandate	Ability to Raise Funds	Flexibility to Deploy Funds
	Risk averse policy approach and/or mandated commercial returns required	No formal and/or regulatory mandate to embed climate change strategy in investment decisions; no mandate to avoid climate harming investments	No ability to raise own funds (funded through direct gov't transfers or other externally determined mandate)	All funds under management are directly earmarked for specific programs or policy priorities; frequently limited by liquidity regulatory requirements
	Minimal risk appetite	Largely voluntary efforts to embed climate change strategy in investment decisions; may have negative mandate on climate harming investments	Largely dependent on transfers of funds, with some ability to raise capital through fees, local taxes, or other means	Funds and priorities largely externally mandated, with some flexibility to interpret mandate when deploying funds
	Modest risk appetite	Limited mandate to embed climate change strategy in investment decisions; climate harming investments prohibited	Ability to raise funds from restricted funding sources, but limited ability to leverage funds to raise additional capital	Ability to determine funding mandate and vehicle, though process or change; approval or exemption may be lengthy and difficult
	Relatively high-risk appetite	Stronger mandate to embed climate change strategy in investment decisions; climate harming investments prohibited	Minimal restrictions on direct fundraising and ability to tap capital markets to further grow capital	Ability to determine funding mandate and flexibility on types of vehicles, with some limits on one or both
	Dynamic and expansive risk appetite	Presence of legal/regulatory frameworks to embed climate change in investment decisions	Capital raising unrestricted	Full flexibility to determine policy mandates and deploy capital through any type of funding vehicle

2. ANALYSIS BY ACTOR

Commercial Financial Institutions:



49 banks across 14 African countries face climate risks worth USD 218 billion (nearly 29% of their total loans) due to credit extended to environmentally sensitive sectors.⁵¹ Commercial banks dominate the financial sector and financial intermediation across Africa. They have the ability to raise own funds through bank deposits and are governed by international standards set by Basel II and III regulations for capital adequacy. Though the depth of banking sector is developing, domestic credit to private sector by banks (% of GDP) is still low in Africa at 27% compared to other emerging economies.⁵² Commercial banks have a fiduciary responsibility to seek market-based returns for their investments and are therefore very risk averse.

Commercial banks and non-banking commercial financial institutions currently do not have developed climate strategies, but they have a critical role to play in mainstreaming resilience in their lending portfolios. Commercial FIs have networks that can be leveraged including relationships with farmers, co-operative and MSMEs. They can build technical capacity to structure financial instruments in partnership with development banks and other concessional finance providers e.g. dedicated lines of credit for climate adaptation projects. They have the potential to align their products with emerging taxonomies and metrics for adaptation & resilience.

- Pan African Banks (PABs): There are 36 PABs which are headquartered in African countries and have operations in other countries in the continent.⁵³ Studies suggest that PABs have been successful in increasing firms' access to finance, increasing competition and efficiency in the banking industry and have a positive impact on micro-prudential stability with the least cyclical behavior in times of crisis.⁵⁴ PABs hold great potential to raise their own capital and to drive financial innovation in Africa⁵⁵, but no specific climate commitments have been made by PABs to date.

Private Equity and Venture Capital (PE/VC):



Africa's PE industry was cultivated by DFIs that had a mandate to invest in private sector businesses in Africa to promote social and economic development. Gradually the industry expanded and by 2020, there are more than 150 active fund managers of different sizes spread across geographies and sectors in Africa. Close to USD 20 billion funds were raised from 2014 to 2020 in African PE. DFIs such as EIB, AfDB, CDC Groups, Proparco, IFC

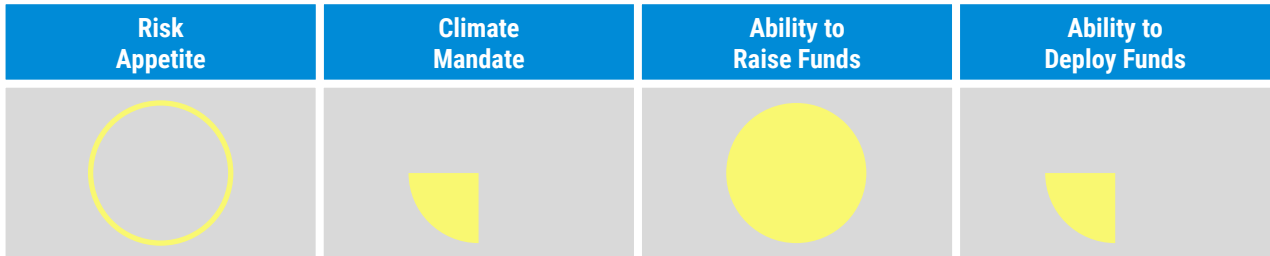
etc. still are the largest investors in PE funds in Africa.

In 2020, 74% of PE investors reported having a responsible investment strategy in place for climate action, 34% regularly conduct a climate risk assessment of their portfolios and 45% have made changes in their investment strategies based on these assessments.⁵⁶ PE and VC are traditionally very risk averse, requiring market-based

returns that are risk adjusted for the stage of investment and other country and industry risks. As noted above, many of the funds in Africa have DFIs as anchor inves-

tors, which allow them to take a higher level of risk (and therefore potential for a lower return) than typical PE/VC funds.

Institutional Investors:



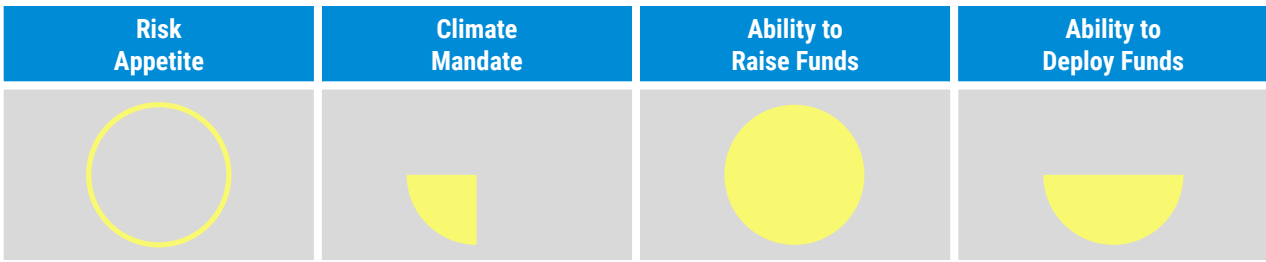
Assets-under-management by African institutional investors⁵⁷ is estimated to have reached USD 1.8 trillion in 2020.⁵⁸ Institutional investors’ core goals are capital gains and stabilization of returns over the long term. They have very high ability to mobilize funds through pensions in the right regulatory environment. Their prudential responsibilities require them to invest in assets with high credit ratings and assets that are listed. This has limited their

ability to deploy funds to climate adaptation projects to date. Political and regulatory risks include weak regulatory reforms, lack of legal enforcement mechanisms, insufficient accountability, and lack of bankable projects and project preparation facilities. These risks are associated with African markets for domestic and international institutional investors alongside technical and commercial risks such as low returns and low ticket sizes.

- Sovereign Wealth Funds:** There are 21 SWFs in Africa with more than USD 1.6 trillion in assets under management, of which the majority is owned by Algeria and Libya.⁵⁹ African SWFs are still small compared to their global peers representing only 2.1% of global SWF assets. Traditionally, SWFs invest in high rated fixed-income securities and government bonds due to their low-risk appetite. Unlike their global peers, African SWFs are looking to invest in domestic markets and attract international capital to make the African economy resilient. They are shifting to alternate asset classes for higher yields and to facilitate long-term, viable investments in the agriculture supply chain, food security, land degradation and water sectors.⁶⁰ Gulf Sovereign Wealth Funds are also increasingly turning to investments in Africa. The Abu Dhabi Investment Authority (ADIA), for example, is a USD 710 billion fund and has recognized African markets as having among the greatest potential for long-term investors.⁶¹
- Pension Funds:** Pension funds are instrumental in mobilizing long-term saving and can support long-term investments. However, traditionally they have low risk appetite due to liquidity requirements, therefore they target debt investments. The percentage of people covered by pension schemes has reached about 80% in some North African countries while it is still as low as 10% in Sub-Saharan Africa. Pension funds are especially strong in South Africa, Botswana, and Namibia per their assets-to-GDP ratio. Total assets under management in 12 emerging markets in Africa are close to USD 400 billion.⁶² Reports suggest that the assets-under-management of African pension funds were expected to rise to USD 1.1 trillion by 2020.⁶³

World Bank, in collaboration with Columbia University, published a Pension Climate Risk Heatmap in 2019 to identify the risks and challenges of climate change that pension funds across the world face.⁶⁴ It found out that South African pension funds have one of the highest levels of climate risks globally. Many other countries in the region also face similar risks mainly due to high asset-to-GDP ratio, high ratio of domestic investments and high vulnerability of the countries to climate risks. This makes a very strong case for pension funds to rethink their investment strategy and move towards investing in sustainable projects domestically.

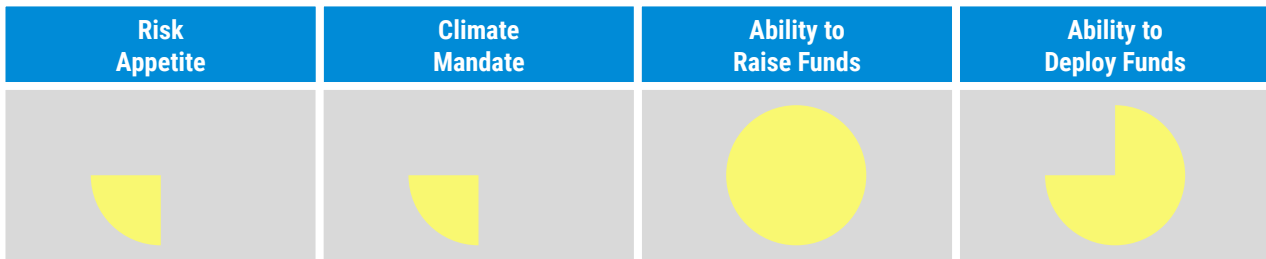
Insurance:



There is very low insurance penetration rate in Africa with 3.5% of GDP compared to the OECD country average of 10%. Insurance penetration is concentrated in a few major markets like South Africa, Egypt, Morocco, Nigeria, and Kenya. Reports suggest that the assets-under-management of African insurance companies were expected to rise to USD 445 billion by 2020.⁶⁵ Insurance companies employ a mix of investment strategies but have a relatively low-risk appetite given liquidity needs. Insurance companies are the most advanced in technical know-how on climate risks among all institutional investors and some have capacity for innovation in climate risk transfer.

23 African financial regulators for insurance are members of International Association of Insurance Supervisors (IASA), an international standard setting body for insurance supervisors. The IASA recently conducted a consultation to issue guidelines on the Supervision of Climate-related Risks in the Insurance Sector. It suggests that insurance companies need to undertake qualitative and quantitative assessments of impact of physical and transition risks on their investment portfolio. Such guidance from international organizations can enable African financial regulators to issue guidelines to African insurance companies and steer investment towards sustainable investments.

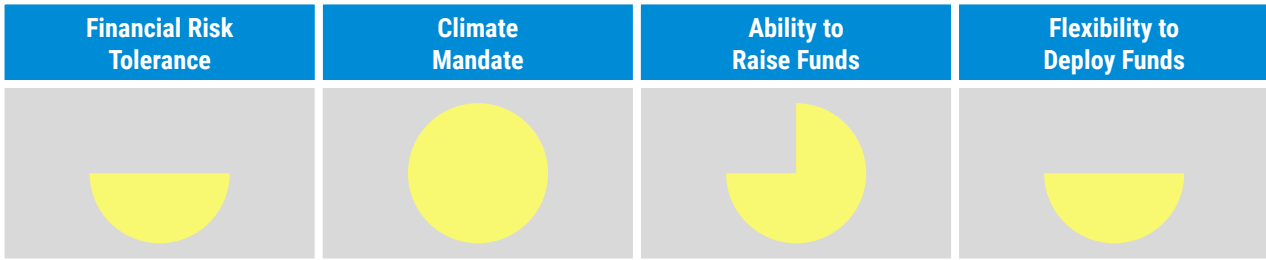
Large Corporations:



Sustainability and resilience are increasingly a focus for large multinational corporations (MNCs) especially those with global supply chains. Various disclosure and reporting standards and frameworks include climate change and environment-related parameters on productivity, land degradation, soil fertility, resource efficiency, and emissions accounting. For example, companies responding to the CDP (formerly Carbon Disclosure Project) climate change questionnaire for corporations must provide details on climate risks identified with potential

to have substantive financial or strategic impact on their business and plans in place to address those risks. Strategies reported by MNCs to date in Africa include investing in physical climate risk analysis, supporting sustainable agroforestry in response to climate-related forestry risks, and investing in climate smart capacity building for farmers in their supply chains.⁶⁶ MNCs have potential to deploy additional finance and technology at scale to undertake adaptation measures.⁶⁷

Multilateral and Bilateral Development Finance Institutions:



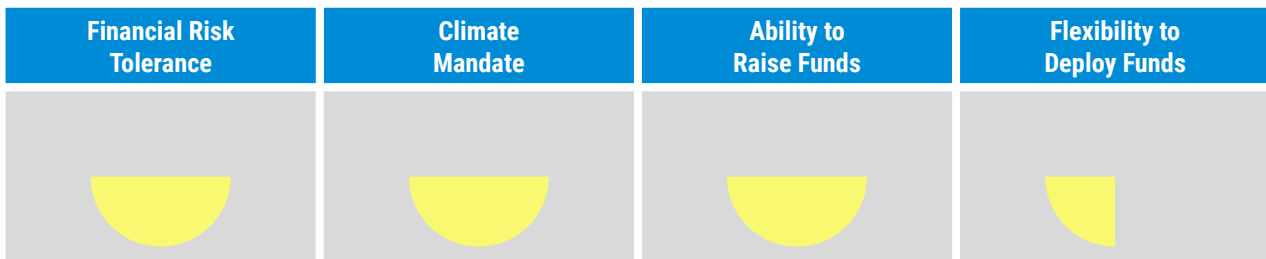
As noted in the summary of tracked adaptation finance flows, 67% of all tracked adaptation finance to Africa in the Landscape came from DFIs in 2017 and 2018.⁶⁸ DFIs play a critical role in financing adaptation in Africa as their mandates align closely with adaptation outcomes. DFIs are increasingly mainstreaming climate adaptation across projects through climate risk and vulnerability assessments. They have a low capacity to raise funds from international capital markets as sometimes they have a high ratio of shareholders' equity to debt and can not borrow from markets.⁶⁹

DFIs can assist country governments in building adaptive capacity for mainstreaming adaptation and can support private investments by testing innovative financial instruments.⁷⁰ DFIs are also uniquely placed to support adaptation investments in the private sector which can create positive externalities for social and economic

development.⁷¹ For example, they can support private sector adaptation projects by bridging the knowledge gaps through tools such as feasibility studies, business risk assessments, technical assistance, and market studies. They can provide concessional finance to MSMEs engaged in adaptation activities in cases where returns are low. Intermediated financing to local banks which on lend to MSMEs to undertake resilient practices can be another way to finance adaptation with low transaction costs.

The IMF as an international financial institution focusing on macroeconomic and financial stability is working towards integrating climate change into its economic surveillance programs through its "Article IV" mandate and consultations.⁷² As noted in the Introduction, a proposed SDR allocation of \$650 billion globally will also potentially increase resources for a green and resilient recovery in Africa.

Sub-Regional Development Banks (SRDBs):

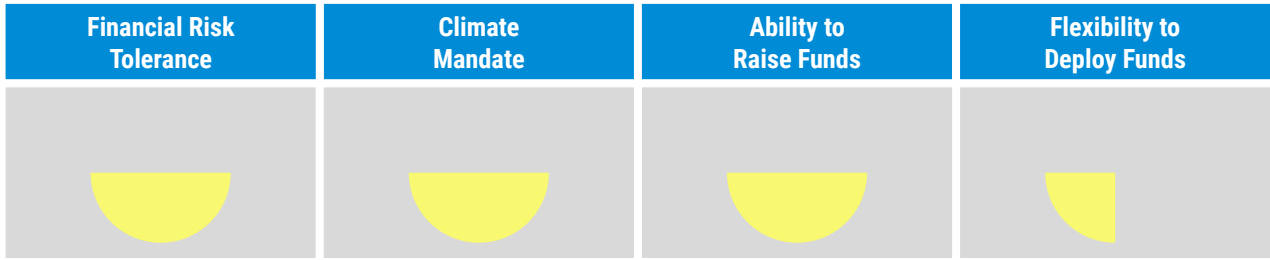


Four African SRDBs: Eastern and Southern African Trade Development Bank (commonly referred to as the PTA Bank), East African Development Bank (EADB), West African Development Bank (BOAD) and Ecowas Bank for Investment and Development (EBID) are operational in Africa in three separate Regional Economic Communities. 40 African countries are shareholders of the SRDBs.⁷³

The SRDBs have a mandate to contribute to regional integration and regional infrastructure development projects and some are incorporating climate change

into strategic planning efforts. ECOWAS, for example, is in the process of developing a regional climate strategy and published an ECOWAS Guide to implementation of the Paris Agreement in September 2020 for its members states.⁷⁴ Key challenges SRDBs face include weak institutional governance, lack of mandate clarity, and limited capacity and cross-regional communication. SDRBs are relatively financially stable and shareholding countries generally report satisfaction with their performance which makes them potentially suitable to mobilize more capital to finance the NDCs in Africa.⁷⁵

National Development Banks (NDBs):



NDBs are state-owned or government-sponsored financial institutions with a primary mandate of providing long-term and concessional capital to high-risk sectors and industry which are underserved by private commercial banks and contribute to the country’s development agenda. 84 NDBs are present in Africa.⁷⁶ NDBs’ expertise in domestic market opportunities, relationships with public and private sector entities, partnerships with large international MDBs, access to international capital markets to raise capital from a wide range of sources, co-lending ability for risk mitigation instruments in a local currency like guarantees and countercyclical nature of lending make them potentially important for financing resilient development in Africa.^{77,78} In 2015, Addis Ababa Action Agenda reiterated the role of well managed NDBs as a govern-

ment tool in financing sustainable development even though they currently face many constraints of sovereign funding resources along with issues like weak governance structures and poor execution.

NDBs play a role as important intermediaries for international climate finance. It is important for them to access these funds to raise their capacity to provide concessional lending, build project pipelines and crowd in private investments. However, only one NDB, the Development Bank of South Africa (DBSA), has direct access to the Global Environment Fund, one NDB (Banque Agricole du Niger) is an implementing agency for the Adaptation Fund, and two NDBs (CDG Capital, Morocco and DBSA) are direct access entities for the Green Climate Fund.^{79,80}

Box 1. Islamic Finance in Africa

Per the Islamic Finance Development Report 2020, globally, Islamic financial assets are expected to grow beyond USD 3.3 trillion by 2024. In 2019, Islamic financial assets in Sub-Saharan Africa and other Middle East and North Africa countries except the Gulf Cooperation Council (GCC) countries reached USD 760 billion. Morocco and Nigeria are the fastest growing markets in Islamic finance assets in 2019. Islam is the majority religion in more than 15 countries in Africa and the overall share of the Muslim population in Africa ranges between 40%-50% in estimates. A majority of the population is unbanked and underserved by the financial sector.

The arid and semi-arid regions of Africa have significant Muslim populations which can benefit from innovative sharia-compliant financial products. Access to financial services plays a critical role in building adaptive capacity of low-income households to withstand climate shocks and invest in education, assets and businesses. Islamic micro-financial institutions can contribute towards building climate resilience, adaptation and disaster risk management in regions with high Muslim population.

Islamic Development Bank (IsDB), the MDB focused on Islamic finance, is leading the way in mainstreaming climate action within Islamic financial institutions. The bank released its Climate Change Action Plan (2020 – 2025) to ensure that climate resilience is systematically integrated in all of its activities and operations. It is also supporting systemic efforts in its member countries, investee companies and other Islamic financial institutions to incorporate physical risks in planning and development. IsDB issued its debut Green Sukuk in November 2019 raising €1 billion and allocated to 11 green projects in alignment with environmental objectives, out of which 3 projects had adaptation components namely, RE projects and Floods Impacts Mitigation Project in Dakar, Senegal and Integrated Agricultural Development Project in Kef and Kasserine Governorates in Tunisia. However, identifying eligible project pipelines with substantial adaptation components has been a challenge.

Multilateral Climate Funds:

Multilateral Climate Funds (MCFs) established through international agreements or for a specific mandate provide financing for adaptation in Africa either through grants or market-linked instruments. Climate and environment funds represented 5% of adaptation finance tracked in the Landscape in 2017-18 and per Climate Funds Update, seven MCFs have funded adaptation activities

in Africa for USD 2.5 billion in total funding to adaptation to date. MCFs are catalytic in facilitating and accelerating financing in perceived high-risk adaptation projects by providing instruments like first-loss or junior equity, repayment guarantees, and grants to mobilize private investments. Funding by MCF to date as reported by Climate Funds Update is presented in Table 5.

Table 5. Funding to Multilateral Climate Funds to Date (USD)

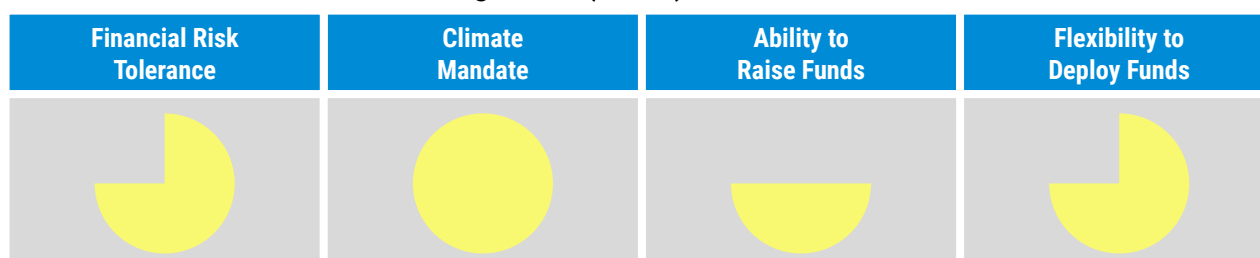
Climate Fund	Adaptation Funding to Africa to Date
Global Environment Facility (Incl. Least Developed Countries Fund & Special Climate Change Fund)	963 million
Green Climate Fund	645 million
Adaptation Fund	320 million
Pilot Program for Climate Resilience	287 million
Adaptation for Smallholder Agriculture Programme	168 million
Global Climate Change Alliance	158 million
MDG Achievement Fund	20 million



Though these funds have been commendable in providing support for African countries to meet NDCs, countries face financial and capacity constraints in accessing funding. The funds have high standards for proof of the climate adaptation relevant of projects which can prove challenging for prospective implementers with limited capacity to conduct sufficiently robust climate

risk analysis to validate the climate adaptation relevance of their project.^{81,82} The multilateral climate funds also face challenges in raising their own funds as they are entirely dependent on voluntary sovereign contributions. For more information on adaptation finance mobilized by various multilateral climate funds active in Africa, please refer to Annex IV.

Green Banks and National Climate Change Funds (NCCFs):





In March 2021, the AfDB, in partnership with CIF, commissioned the Coalition for Green Capital (CGC) to conduct a feasibility study to set up National Climate Change Funds and Green Banks, which can scale up climate finance in Africa. It assessed the country-specific market readiness, financing requirements and challenges to set up green banks and national climate change funds and fund priority sectors like renewable energy and climate-smart agriculture in six countries: Ghana, Zambia, Tunisia, Mozambique and Benin. The work is intended to lead to a proposal to the GCF to fund green banks and NCCFs in Africa.

Green Banks (or Climate Finance Facilities) are national, country-driven, dedicated, catalytic financial institutions designed to address domestic market gaps, take ownership of climate finance and crowd-in private investments in low carbon and resilient projects. The study concluded that Green Banks in combination with NCCFs have a strong potential to mobilize private sector investments in all six countries, by creating innovative instruments to blend grants and commercial capital to suit the local market needs.⁸³

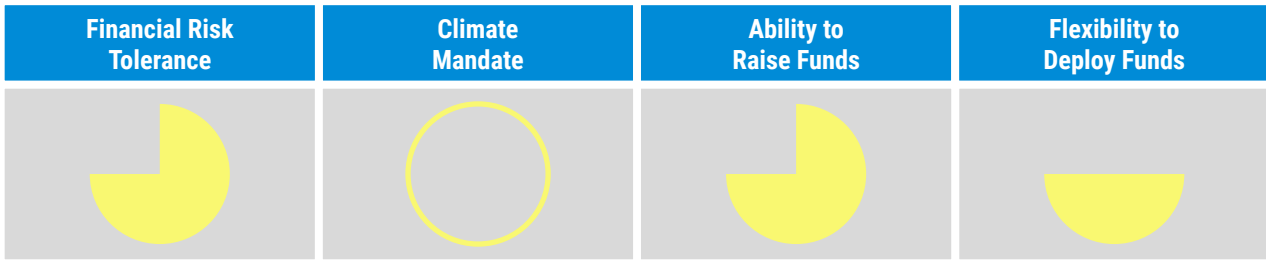
The Climate Finance Facility (CFF) of the Development Bank of Southern Africa (DBSA) is a specialized lending facility pioneering the green banking model in developing countries. It will address the challenge of increasing private investments in the Southern African Development Community (SADC) region i.e., South Africa and other Rand-based countries, including Namibia, Lesotho, and Eswatini. It will provide credit enhancement (\$5M to \$10M) focused on first loss or subordinated debt and tenor extensions (up to 15 years) to infrastructure projects that demonstrate climate mitigation and adaptation benefits, especially projects which are commercially viable but cannot attract market-rate capital due to specific financing barriers. The CFF raised an initial \$110 million, with DBSA and the GCF as the two anchor funders. DBSA provided low-cost debt (\$55 million). Both DBSA and GCF provided grant funding of USD 610,000. The CFF will invest local currency (Rand) into projects with the aim of attaining a leverage ratio of 1:5.⁸⁴

Another NCCF, the Rwanda Green Fund (FONERWA) already exists with seed capitalization commitments of USD 37 million from FCDO-UK, USD 8 million from KfW and USD 5 million from UNDP.⁸⁵ This fund has invested around USD 40 million in 35 projects in Rwanda through several investment products, including grants, innovation investments, and credit lines.⁸⁶ Another new facility which will use a green bank approach is the Rwanda Catalytic Green Investment Facility (RCGIF). RCGIF is under development by AfDB in partnership with the government of Rwanda. The initial support is being provided by the UNDP and Nordic Development Fund. It will utilize blended financing structures for not-yet-bankable projects through two windows: 1) within the Development Bank of Rwanda (BRD) to provide direct loans and lines of credits and 2) a project preparation facility (PPF) at the Rwanda's Green Fund (FONERWA) to provide grants to increase the bankability of projects.⁸⁷

The Seychelles Government created a Climate Adaptation and Conservation Fund in 2015 to manage the proceeds of a debt for climate adaptation swap concluded with the Paris Club. The Seychelles Conservation and Climate Adaptation Trust (SeyCCAT)⁸⁸ received the proceeds of the debt buy back of 21.6 million USD, and also received additional grant funding following Global Environment Facility support for the issuance of a sovereign Blue Bond in 2018⁸⁹. The fund allocates annual grants to adaptation projects.

Regional Climate Funds can also play a role in channeling funding into specific shared adaptation goals. For example, the Blue Fund for the Congo Basin is an initiative with the objective to support states to transfer extractive forestry based economic activity to sustainable blue economy projects- using economic opportunity generated from the ocean and water ways and through carbon offsets⁹⁰. While it aims to achieve mitigation it also aims to build livelihoods and adaptation around its investments in protection of the natural environment.

State-owned Financial Institutions (SOEs):

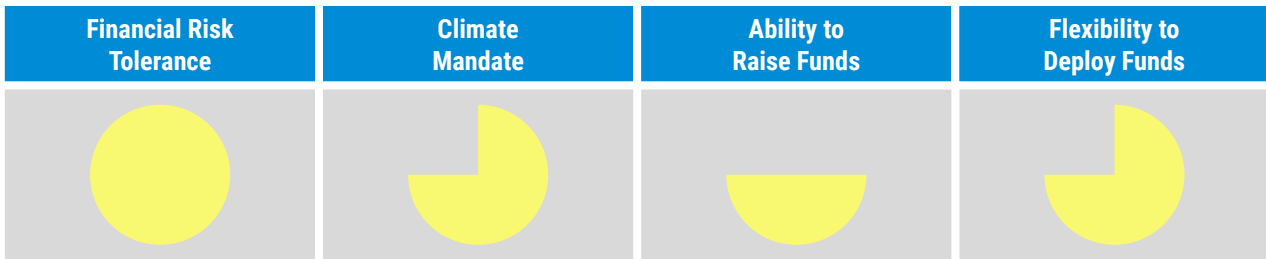


SOEs are public entities that are partly or wholly owned by government to deliver services in a particular sector or sectors. To date, SOEs in Africa have not been deeply involved in climate adaptation activities, but they have substantial opportunity to be leaders in building climate resilience given their market share and public governance model which can set the standard for non-public actors.

To date, the most significant share of SOE investment in Africa is from China: approximately 25% (USD 26 billion) of all infrastructure investment in Africa in 2018 flowed from China.⁹¹ Much of this investment flowed from Chinese

state-owned financial institutions including the China Overseas Infrastructure Development and Investment Corporation, and the China-Africa Development Fund. SOEs within Africa include the Kenya Pipeline Company (a state corporation responsible for transporting and delivering petroleum products), South Africa’s Eskom (an electric public utility), and National Railways of Zimbabwe. To date, the vast majority of this investment has not been in adaptation activities, but the size of investment is substantial and represents an untapped opportunity for an adaptation focus.

African Governments:



Budgetary allocations are among the largest and most well-suited mechanisms for financing adaptation activities in Africa. A UNDP report in 2017 found that African governments are already spending a considerable share of their budget on adaptation.⁹² The study takes an approach of calculating total weighted adaptation expenditure using standardized Adaptation Benefit Share (ABS%) value applied across all countries. The ABS% reflects the proportion public expenditures that relate to adaptation, rather than routine development. The study estimates that for 42 African countries where data was available, the total weighted adaptation expenditure was around 0.18% of GDP, and the unweighted expenditure was around 3.4% of GDP, both higher than the share of adaptation finance received from international donors. The report also noted that this level of expenditure meets around 20% of the total adaptation need, leaving an

overall gap of 80% while some vulnerable countries face a gap of more than 90%. The study emphasizes that the share of 20% is disproportionate to the share of GHG emissions of African countries and calls for a boost in global investments in Africa.^{93,94,95}

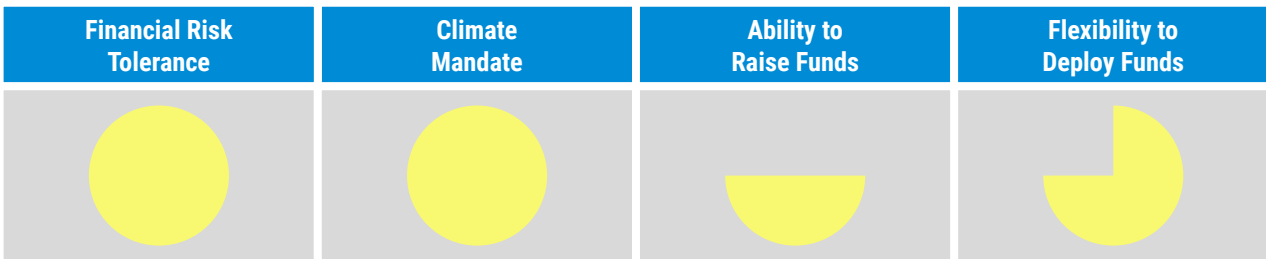
A recent CPI report, The Landscape of Climate Finance in Kenya, finds that in fiscal year 2017-2018, the Kenyan government disbursed USD 700 million in climate-related development expenditures, of which 30% (USD 200 million) were spent on solely adaptation sectors, and an additional 20% (USD 140 million) for activities with dual mitigation and adaptation outcomes. Approximately USD 110 million was tracked in the water and wastewater management category, followed by agriculture, forestry, land-use, and natural resources (USD 50 million), disaster risk management (USD 18 million), and health (USD 16 million).⁹⁶



Similarly, the South African government accounted for USD 640 million, or 15% of the tracked disbursements in the South African Climate Finance Landscape 2020 for fiscal year 2017 and 2018. More than 80% of these direct South African Government disbursements were focused

on adaptation and dual benefit sectors. The water conservation, supply and demand sub-sector was the second-largest recipient for adaptation finance, averaging USD 90 million annually or 30% of tracked adaptation finance.⁹⁷

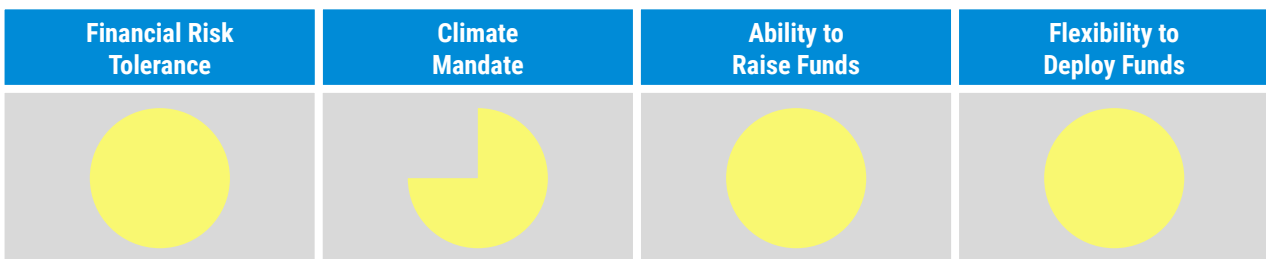
Foreign Government Agencies (Official Development Assistance):



19% of tracked adaptation finance in the Landscape in 2017-18 flowed from international government sources (USD 1.2 billion annually). In East Africa and Sub-Saharan regional flows, the share of flows targeting adaptation as a principal objective was greater than those targeting mitigation as a principal objective. ODA

is a critical component of adaptation finance in Africa to de-risk adaptation activities, build capacity and a pipeline of projects, and support more commercial finance. The bilateral agencies have a relatively high risk appetite and strong climate mandates.

Philanthropies, Foundations, and Non-Profits:



The OECD tracks adaptation finance to Africa from the following six foundations: Bill & Melinda Gates Foundation, McKnight Foundation, Children’s Investment Fund Foundation, David & Lucile Packard Foundation, Oak Foundation, and MAVA Foundation. Of these, the Bill & Melinda Gates Foundation delivered the most funding,

including a UDS 33.6 million grant in 2018 to the International Crops Research Institute for the Semi-Arid Tropics which aims to modernize Africa-focused dryland cereals and grain breeding.⁹⁸ Like ODA, funding from these organizations can de-risk adaptation activities, draw in private finance, and support technical capacity building.

III. FUTURE OF ADAPTATION FINANCE FLOWS

A comprehensive dataset for 2019 and 2020 on adaptation finance flows is not yet available. In particular, the impact of COVID-19 on adaptation finance is not yet well understood.⁹⁹ Covid-19 impacts on adaptation finance are predicted to be mixed: the majority of stimulus packages have not prioritized resilience, and private sector investment (especially external private finance inflows to the developing worlds) fell in 2020, however DFI funding for climate finance has continued to increase through 2020. These impacts are discussed further below:

NEGATIVE FACTORS:

Inclusion of resilience in the first year of stimulus spending is limited. In preliminary results to a forthcoming study, the World Resources Institute reviewed 66 countries' – including all G20 and V20 countries – 2020 fiscal stimulus packages for whether and how they included climate resilience. Less than one-third (18) of the countries' responses that were examined were found to integrate physical climate risk awareness and resilience components – including just two of fourteen African countries sampled: Niger and Kenya. This limited inclusion of resilience in early stimulus packages suggest that as stimulus packages start focusing less on emergency stabilization and more on recovery and growth there is an opportunity to ensure that climate risks are better integrated into new funding allocations. Beyond the limited inclusion, the overall size of stimulus packages in developing economies has been much smaller than those in developed economies, with middle income countries spending 6% of GDP and low-income countries spending 2%, vs 24% of GDP spent in high income countries, in 2020.¹⁰⁰

Private sector investment has declined in the short term. The early months of the pandemic were marked by substantial liquidity support for firms. Most of that support was not conditional on adopting any climate resilience measures. Although capital outflows stabilized relatively soon after hitting record lows in March 2020, foreign direct investment (FDI) declined 16% in 2020 in Africa, to USD 40 billion, a decline to 2005 levels of investment.¹⁰¹

The COVID-19 pandemic continues to severely impact developing economies. Just over 50 million¹⁰² doses of COVID-19 vaccine have been administered across a continent with a population of 1.3 billion.¹⁰³ As of June 2021, less than 1% of Africa's population had been fully vaccinated.¹⁰⁴ Adaptation finance flows in future years will depend heavily on vaccine distribution speed and equitability to enable recovery of sectors critical to Africa's macroeconomic prospects including international trade and tourism.

POSITIVE FACTORS:

MDB adaptation finance commitments to Sub-Saharan Africa and Middle East-North Africa regions increased 32% in 2020 from 2019 levels. The group of MDBs reported USD 4.7 billion in adaptation finance committed to Sub-Saharan Africa in 2020, vs USD 3.6 billion in 2019. For Middle East-North Africa, USD 1.4 billion was committed in 2020 vs USD 1.0 billion in 2019.^{105,106} It is not clear if this increase is sustainable without re-capitalization or replenishments of MDB funding, which was spent quickly to counter the effects of the pandemic. For example, the 32% increase in adaptation finance commitments is roughly proportional to the total increase in MDB commitments in 2020, estimated at 39%.¹⁰⁷

DFI climate finance targets are increasingly targeting adaptation. In 2019, nine MDBs announced a collective commitment to double their total levels of adaptation finance provided to clients by 2025, to USD 18 billion annually.¹⁰⁸ Towards that end, the World Bank announced a 35% target for climate finance as a proportion of total finance from 2021-2025, of which at least 50% will support adaptation. AfDB has committed to a doubling of climate finance to USD 25 billion between 2020 and 2025, earmarking more than USD 12 billion for adaptation.

The IMF have proposed the creation of a Resilience and Sustainability Trust. This proposed trust fund will manage a percentage of SDRs for the purposes of providing low cost financing to developing countries to build resilience to climate change and resilience to future shocks like the COVID19 pandemic. The new trust fund will critically provide access to more concessional finance for middle income countries currently excluded from the Poverty and Growth Trust (PRGT) and has ambitions of financing of up to 100 billion USD¹⁰⁹.

There are an increasing number of approaches to risk transfer and risk pooling. For example, African Risk Capacity (ARC) Ltd has a 5-year plan to scale to a USD 100 million insurance company to provide climate-related risk coverage to 150 million Africans.¹¹⁰ ARC Ltd

plans increase market penetration by increasing sovereign buy-in of existing products, continue product development to broaden their client base, and diversify product offerings to expand peril coverage from drought insurance to also include tropical cyclones and floods. ARC Ltd also aims to broaden their client base beyond sovereign clients to include subnational governments and small to medium-scale farmers through aggregators. Advancements in risk pooling and risk transfer have potential to give more governments, individuals, and other organizations the tools to manage climate risks that cannot be fully mitigated.

New partnerships and programs are being launched to address the gap. For example, the Global Center on Adaptation (GCA) and the AfDB have jointly developed the African Adaptation Acceleration Program (AAAP). The AAAP was launched at the Climate Adaptation Summit in January 2021 and aims to mobilize USD 25 billion towards adaptation activities in Africa by 2025. AfDB has committed USD 12.5 billion to the AAAP with the remaining USD 12.5 billion to be mobilized through partnerships and strategic initiatives including support for upstream policy and project preparatory work. The AAAP's focus will be on domestic resource mobilization through national governments and the private sector and will be centered on four action areas:

- Innovation financial initiatives to enhance and facilitate access to climate funds, strengthen enabling environments for adaptation investment, including capacity programs to assess, manage, and disclose climate related risks in the financial sector, and support the development of tools, instruments, and mechanisms for catalyzing public and private investment in adaptation at scale.
- Climate smart digital technologies for agriculture and food security to help smallholder farmers

increase yields and drive agriculture sector climate resilience in the face of a changing climate and enhance their resilience.

- An African Infrastructure Resilience accelerator to mobilize investment in climate resilience infrastructure through upstream support to integrate climate adaptation and resilience into infrastructure and water investment pipeline
- Youth empowerment in entrepreneurship in climate adaptation and resilience with the aim to generate climate resilient jobs for youth via an incubator program, grants, and training programs.
- As another example, a proposed African Liquidity and Sustainability Facility to help create a secondary repurchasing (repo) market for African bonds with the purpose of channeling finance into investments aligned with the SDGs and the Paris Agreement¹¹¹. The facility in particular can help crowd in private sector financing towards adaptation.

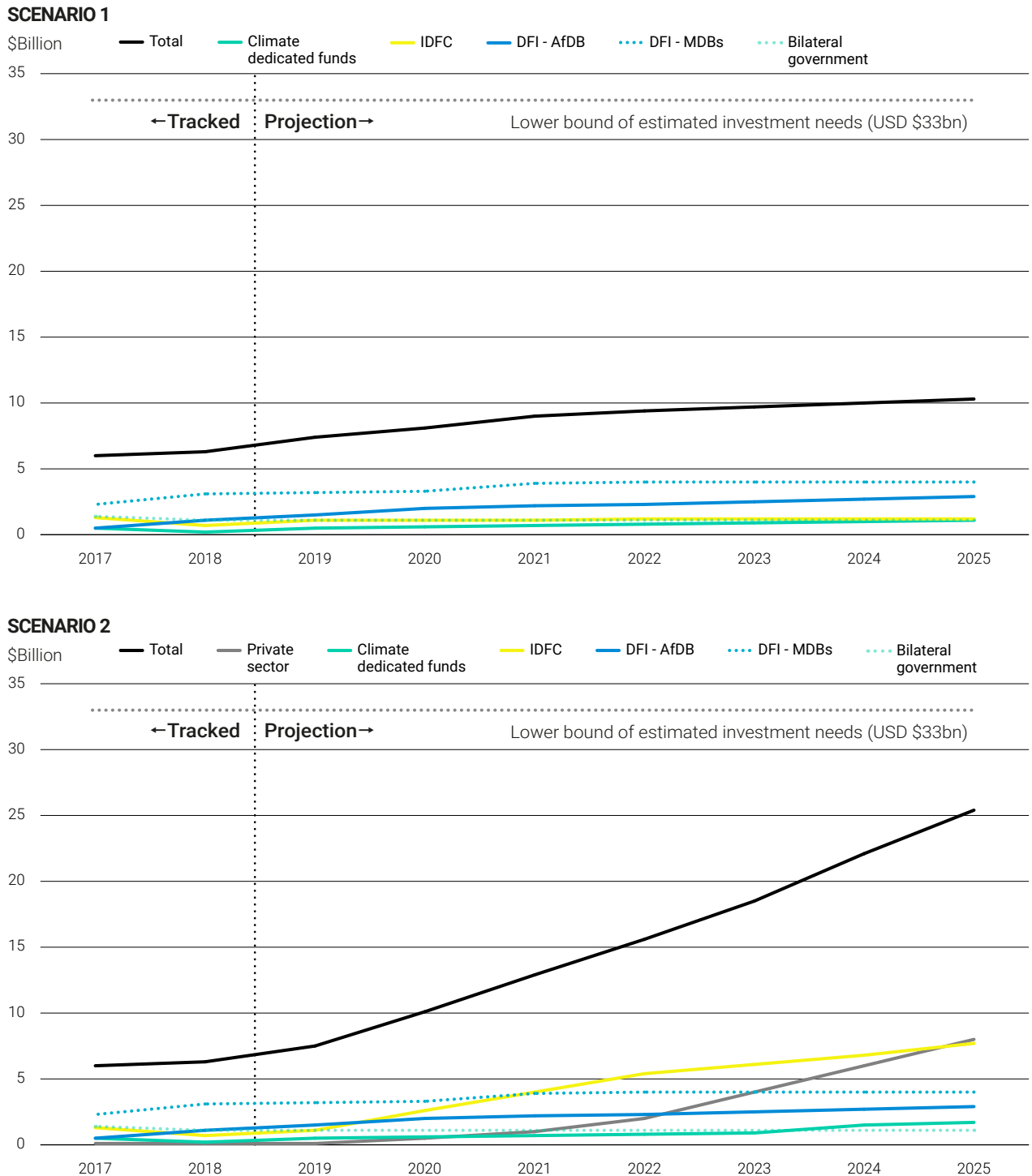
With appropriate policy approaches, there is substantial potential for a green and resilient recovery.

There are efforts underway to drive a resilient recovery to COVID-19 in Africa – including through the Debt Service Suspension Initiative, the Access to COVID-19 Tools Accelerator, and through moves to issue and allocate new Special Drawing Rights. These efforts all have potential to help facilitate a resilient recovery and additional investment in climate adaptation.¹¹² A resilient recovery also has potential to address challenges Africa faced prior to COVID-19 including youth unemployment, high climate risks, poor infrastructure, and weak governance. Investment in climate resilient infrastructure, nature-based solutions, technology, and other sectors has significant potential to address underlying climate risks and respond to pre-COVID-19 challenges.

Despite some drawbacks in the near-term, future adaptation finance is expected to more than double by 2025 based on announced commitments discussed above (Figure 9, Scenario 1). This scenario includes AfDB's commitment to finance more than USD12 billion in adaptation over 2021-2025, as well as MDBs' collective pledge to finance USD 18 billion annually in adaptation by 2025. However, even if many of the main DFI actors adopted best practice commitments (i.e. World Bank's commitment to dedicate 35% to climate finance, of which 50% to adaptation) and if private sector mobilization efforts are successful (assuming at least 20% of MDBs' USD 40 billion private sector mobilization target goes to adaptation in Africa), annual adaptation finance flows may still not meet minimum estimated investment needs by 2025 (Scenario 2).

The minimum estimated investment need of USD 331 billion for 2020-2030 is derived from NDCs submitted by 40 African countries, and therefore should only be considered the lower bound of a much wider range of estimated investment needs. Because there are no robust estimates of the upper bound of adaptation finance investment needs, this is not represented in Figure 9. As a point of comparison, the UNEP Adaptation Gap report 2020 estimates that the annual cost of climate change in developing countries (not specific to Africa) is currently around USD 70 billion and may increase to USD 140-300 billion in 2030 and USD 280-500 billion in 2050.¹¹³ While all actors could raise the ambition of their current commitments, successfully mobilizing the private sector will be critical to meet estimated investment needs.

Figure 9. Two Scenarios of Future Adaptation Finance Flows



C. ADAPTATION FINANCE MECHANISMS DEPLOYED ACROSS AFRICA BY SECTOR

To mobilize the actors assessed in Section B, employment of a wide array of financial mechanisms is critical. Instruments must be able to attract finance from across financial risk appetites and have the ability to raise capital and flexibility to deploy capital. This section will introduce financial instruments available to mobilize investment in adaptation in Africa and will outline how instruments can and have been applied to seven sectors: water, agriculture, transport, energy, urban infrastructure, coastal ecosystems, and land use and forestry. It should be noted that use of financial mechanisms is one solution in the toolbox for catalysing investment in climate resilience, and will be more effective as part of holistic approaches that also include policy reform. In addition, their deployment must consider social and environmental impact beyond climate resilience. For example, instruments that promote both financial inclusion and climate resilience for smallholder farmers can address multiple benefit areas simultaneously.

I. INSTRUMENT INTRODUCTION AND SUMMARY

There is a wide array of available investment instruments, risk finance mechanisms, and broader finance-relevant solutions that financial actors are already mobilizing in support of climate resilience across Africa. This work maps these instruments along two continuums: phase and purpose. The phases below correspond to types of activities that occur before, during, and after a climate crisis:

- **Resilience:** Preparing infrastructure, business, and individuals for the impacts of climate change before a crisis occurs to minimize their potential impacts.
- **Response:** Stabilizing physical assets, safeguarding people's health and safety, and providing temporary shelter or other needs that have been damaged or destroyed in the immediate aftermath of a crisis.
- **Recovery:** Rebuilding assets and livelihoods.

These phases can be viewed as a cycle, with resilience efforts intended to mitigate response and recovery needs, and recovery activities intended to foster resilience for future crises. These phases are most relevant in the context of acute climate crises or disasters (e.g., floods, drought, insect infestations) where a clear delineation of each phase is clear. In the case of the context of longer-term effects of climate change, such as rising seawaters and loss of crop productivity due to changing rainfall patterns, the emphasis is largely on resilience activities, to both minimize future acute crises, while also facilitating

easier response and recovery when a crisis does occur. While understanding the phases of a climate crisis is key to mapping out an overall plan for climate adaptation measures, from a financial instrument standpoint, an additional useful framing is where the approach fits in terms of risk mitigation. Financial instruments can be used to finance activities that build physical resilience to climate change impacts (reducing physical risk) and are also useful in responding to risks where physical climate impacts cannot or have not been eliminated (through risk transfer and risk reduction instruments).

Risk reduction: The objective of risk reduction activities is to take measures that eliminate or meaningfully mitigate the vulnerabilities of infrastructure, businesses, and individuals to future climate crises. Risk reduction involves swapping behaviors and practices that exacerbate risk for those that lower it (e.g., switching to planting drought resistance crops, designing flood resistant infrastructure). Instruments that fit into the category of risk reduction seek to incentivize these behavioral changes and practices through financial incentives such as reduced interest rates, preferential lending to meet climate policies, or debt forgiveness.

Risk retention and risk transfer: Risk retention and risk transfer instruments can be deployed across response and recovery phases in the case that a physical climate impact cannot be or has not been avoided. When a climate shock occurs, financial instruments that address the needs faced by individuals, businesses, and governments in the immediate aftermath are critical to stabilize physical assets, safeguard people's health and safety, and provide temporary shelter or other needs that have been eliminated by the crisis. Once the immediate crisis is controlled, communities will need to recover – in this phase, instruments focused on rebuilding assets and livelihoods are needed.

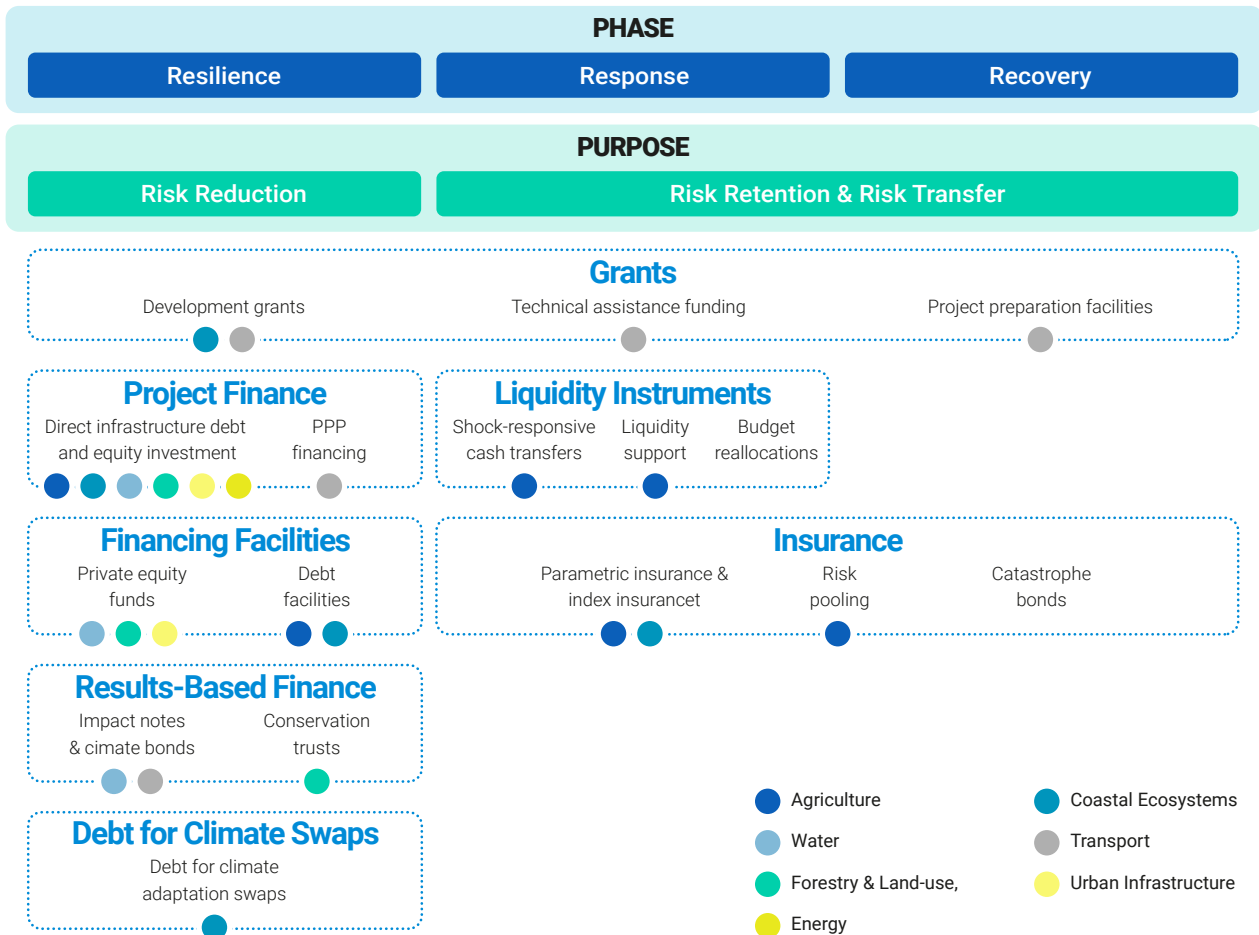
Risk retention instruments are intended to serve as the backstop for any residual risk that cannot be eliminated through risk reduction measures and where the actor(s) experiencing the risk retain it. When developing a risk mitigation plan, all actors (governments, businesses, and individuals) must weigh the costs – including both financial and social – of fully eliminating risk versus retaining some risk and provisioning against it. Risk retention instruments include budget reallocations to shift funds towards response and recovery efforts, shock-responsive cash transfers, and contingent credit instruments.

Risk transfer instruments are valuable when there are other actors better equipped to manage the financial risk of physical climate impacts due to availability of predictive climate data and the opportunity for portfolio diversification. In these cases, those stakeholders who are likely to face a climate crisis may choose to transfer some of the financial risk to one of these third parties. Risk transfer instruments include catastrophe bonds, index insurance, risk pools, and parametric insurance.



The universe of financial instruments captured in this analysis is represented in Figure 10. The sectoral icons correspond to the examples in the sub-sections by sector that follow. These icons are not intended to indicate all instruments that have potential viability by sector.

Figure 10. Instrument Typology by Phase and Purpose



1. TYPES OF INSTRUMENTS

The instruments presented below can range from fully concessional (no financial repayment required), commercial (full market returns expected), or blended (capital repayment with some limited return expected). Concessional capital is intended to fill a gap where the private sector (commercial capital) would not otherwise invest. It is intended to be “additional,” and only used to “crowd-in” rather than “crowd-out” private investment. The level of “concessional” required for certain instruments will vary by market or policy environment (described in the sectoral analysis, starting in Section II). Some examples of concessional approaches are included in the descriptions below for illustrative purposes.

Box 2. Impact Investing

The Global Impact Investing Network (GIIN) defines impact investing as, “investments made with the intention to generate positive, measurable social and environmental impact alongside a financial return.” In practical terms, impact investors can be finance first, meaning they prioritize a market or near-market return; impact first, prioritizing the social or environmental impact in exchange for a below market return (or subordinate position); or somewhere in between. For the purposes of this paper, any actor deploying capital to an instrument with the expectation of both a financial and climate adaptation impact is considered an impact investor.

Grants: Grants are direct, non-repayable transfer of funds to an entity to support a project, company, or policy. This type of instrument is typically used to support projects that serve a critical development objective, but where the commercial potential is low. Alternatively, grants are often provided to help set up a project or fund to make it “investment ready.” The major types of grants include:

- **Development grants:** Direct funding to achieve development outcomes where a commercial solution is not viable.
- **Technical assistance funding:** Capital to build capacity of a supporting institution or stakeholder in order to advance development objectives (and in some cases increase commercial potential).
- **Project preparation facilities:** Funding to directly support projects or companies to improve the commercial viability (investment readiness) of their project, product, or business model.

Concessional: *Grants are direct payments to implementing entities to fund specified activities with no expectation of repayment. They are fully concessional.*

Project finance: Project finance typically involves direct debt or equity investments into a single project (e.g., water treatment plant, toll road, etc.) as opposed to a facility with multiple projects. Capital can be commercial, concessional, or blended: Typical forms of project finance include:

- **Direct infrastructure debt and equity investments:** Direct development and investment in an infrastructure project by either a private developer investor and/or donor.
- **PPP financing:** Similar to direct infrastructure investing, this structure involves financing based on a government contract (power purchase agreement, water concession) as collateral.

Concessional: *While project finance can be fully commercial, forms of concessional finance could include loan guarantees, first loss (subordinate) debt, offtaker guarantees, or even policy incentives such as tax holidays or feed-in tariffs.*

Financing facilities: Financing facilities involve debt or equity funding for a pool of projects, companies, or individuals (as opposed to single projects). Examples include:

- **Private equity funds:** Investments in an ownership stake a portfolio of companies.
- **Debt facilities:** Loan capital (no ownership stake) to a portfolio of projects (e.g., water treatment facilities, commercial real estate), companies, or individuals (e.g., microfinance loans for farmers).

Concessional: *Similar to project finance, financing facilities can offer varying levels of concessional. These can include subordinate debt or equity (with at or below market return requirements), longer debt tenors or fund horizons, or supplemental grant capital for technical assistance or project preparation.*

Results-based finance: This type of instrument involves debt or grant capital for a project or portfolio of projects that is contingent on the achievement of a certain climate adaptation outcome. Some examples include:

- **Impact notes or climate bonds:** Instruments that offer an interest-rate discount or other financial incentive to the borrower if they are able to achieve development outcomes.
- **Debt swaps:** Forgiveness of sovereign or subnational debt obligations in exchange for using the freed-up capital to fund specific climate adaptation activities.
- **Conservation trusts:** Can take on a variety of structures, but broadly intended to provide capital to a group of stakeholders (via the trust) to engage in conservation efforts that are funded via sustainable, revenue generating activities.

Concessional: *Results-based finance is inherently a blended finance approach, involving favorable repayment terms or bonuses for achieving policy outcomes. As seen in the instruments above, some forms of concessional include lower interest rates, debt forgiveness, and favorable loan terms in exchange for commitment to and achievement of climate adaptation outcomes.*



Liquidity instruments: These are typically grant or debt facilities designed to provide immediate access to capital. In the context of climate adaptation, these types of instruments are typically established to help governments, businesses, or individuals cover their immediate needs in the wake of a major event. Typical instruments include:

- **Budget reallocations:** Immediate redirection of funds for non-priority budget categories to emergency response.
- **Shock-responsive cash transfers:** Direct transfers of funds to affected parties to meet immediate survival needs.
- **Liquidity support:** Lines of credit (or grants) typically provided to governments to pay for the increased cost of emergency response and humanitarian assistance.

Concessional: *Liquidity instruments are typically concessional, as they are intended to offer immediate assistance to those actors directly impacted by a climate crisis who likely have limited resources. Most facilities are direct transfers of funds to the affected party (government, business, individual). Some may be lines of credit, though repayment terms are likely to be limited to return of capital, or very favorable (below market) interest rates.*

Insurance: These are instruments that make direct payments to beneficiaries (who pay risk-adjusted premia for the policies) in the event of a climate crisis (or other disaster as appropriate). Some examples include:

- **Catastrophe bonds:** “Cat” bonds are debt instruments that transfer risk for specifically named catastrophic events (earthquakes, cyclones, etc.) from one party (typically the government or an insurance company) to the investors who buy the bonds. Payment of the bonds is only triggered if the particular event(s) designated in the instrument occur.
- **Parametric and index insurance:** Index insurance is an insurance instrument that pays out benefits on the basis of a predetermined metric (the index)—such as inches of rainfall—for loss of assets and investments.
- **Risk pooling:** Pooling mechanisms are instruments that aggregate risk across a portfolio of projects, countries, cities, etc. to provide diversification for the investor (less concentration of risk in a single asset) and bargaining or buying power for the insured.

Concessional: *While insurance can be a fully commercial instrument, it can often be prohibitively expensive if the risk it is intended to cover is perceived as too high too costly, or too difficult to diversify through a portfolio approach. To this end, premium support for policy holders and/or partial guarantees for insurers can be useful means of increasing the availability of these types of mechanisms.*

2. INSTRUMENTS AND THE ENABLING ENVIRONMENT

Not all instruments work in all contexts. The enabling environment in a country (or subnational government) will help determine the viability of certain types of instruments. In some cases, lack of financial sector development or lack of commitment to a particular climate adaptation priority will make certain instruments difficult to implement. In these instances, there may be a stronger role for concessional capital from DFIs or foundations (e.g., project preparation grant, first loss debt tranche, premium support) to facilitate the effective deployment of the instrument.

Countries' readiness for adaptation finance can be assessed via several factors across categories of policy environment, market environment, and stakeholder environment. Some instruments and sectors require clear policy support from their national (or subnational) governments in order to be effectively implemented. Table 6 summarizes key factors across these categories.

Table 6. Key Factors in Enabling Environment Across Policy, Market, and Stakeholder Categories

Policy environment	Market environment	Institutional/stakeholder environment
<ul style="list-style-type: none"> • National adaptation plans/strategy in place • Regulations enforcing adaptation measures (i.e., building codes) • Availability and capacity to analyze climate data and modeling 	<ul style="list-style-type: none"> • Access to international markets • Developed insurance market • PE/VC availability • Subnational borrowing capacity 	<ul style="list-style-type: none"> • Availability of accredited entities for accessing climate finance • Engagement of NDB • Engagement of RDB • Engagement of other regional institutions

The existence of a national adaptation plan, strong regulatory environment, and capacity to understand climate risks can greatly incentivize and facilitate adaptation action, whereas a developed capital market will be critical to accessing finance. For non-grant instruments (i.e., those that require some level of financial return to their investors), certain benchmarks of financial sophistication will be required to enable the structuring, deployment, and return of capital to sponsors. Often, the climate leadership of institutions, such as national and regional development banks, Regional Economic Communities and regional power pools, and accredited entities by climate funds, will be key to building project pipelines and mobilizing finance at scale.

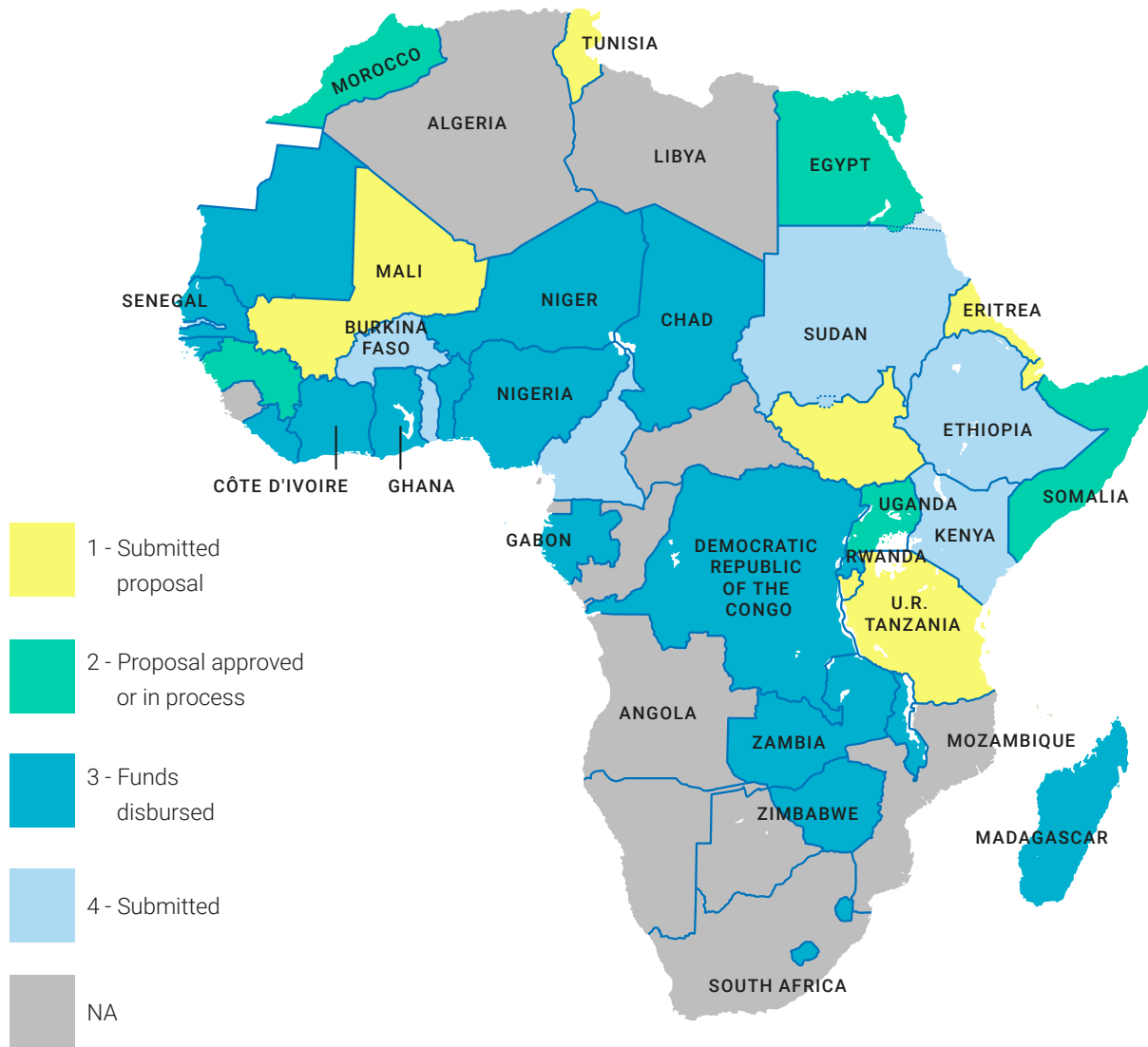
The sectoral analyses below provide more detailed context on the sector-specific barriers as well as the country readiness factors required for the successful application of innovative instruments. If a country does not meet some or all the enabling criteria, the international financial community (particularly DFIs and foundations) can introduce concessional (blended) finance to mitigate some of the risks posed by a less than ideal policy environment or financial sector. Most of the instrument examples presented illustrate how concessional finance can be used to deploy innovative (or traditional) instruments in the absence of an ideal conditions.

3. COUNTRY PRIORITIES

All African countries, with the exception of Libya, have submitted NDCs, all of which include an adaptation component. A number of countries have submitted updated NDCs in 2020 or 2021 as well.¹¹⁴ All countries party to UNFCCC were expected to submit updated NDCs in 2020, but submissions have been delayed due to COVID-19.

By contrast to NDCs, only six countries have submitted National Adaptation Plans (NAPs) to date. Thirty-four other countries have received funding or have submitted proposals to access funding from GCF and LDCF for NAP development (Figure 11). The time from proposal submission to funding approval from the GCF Readiness and Preparatory Support Programme can take more than 30 months, and average 16 months.

Figure 11. NAP Status by Country

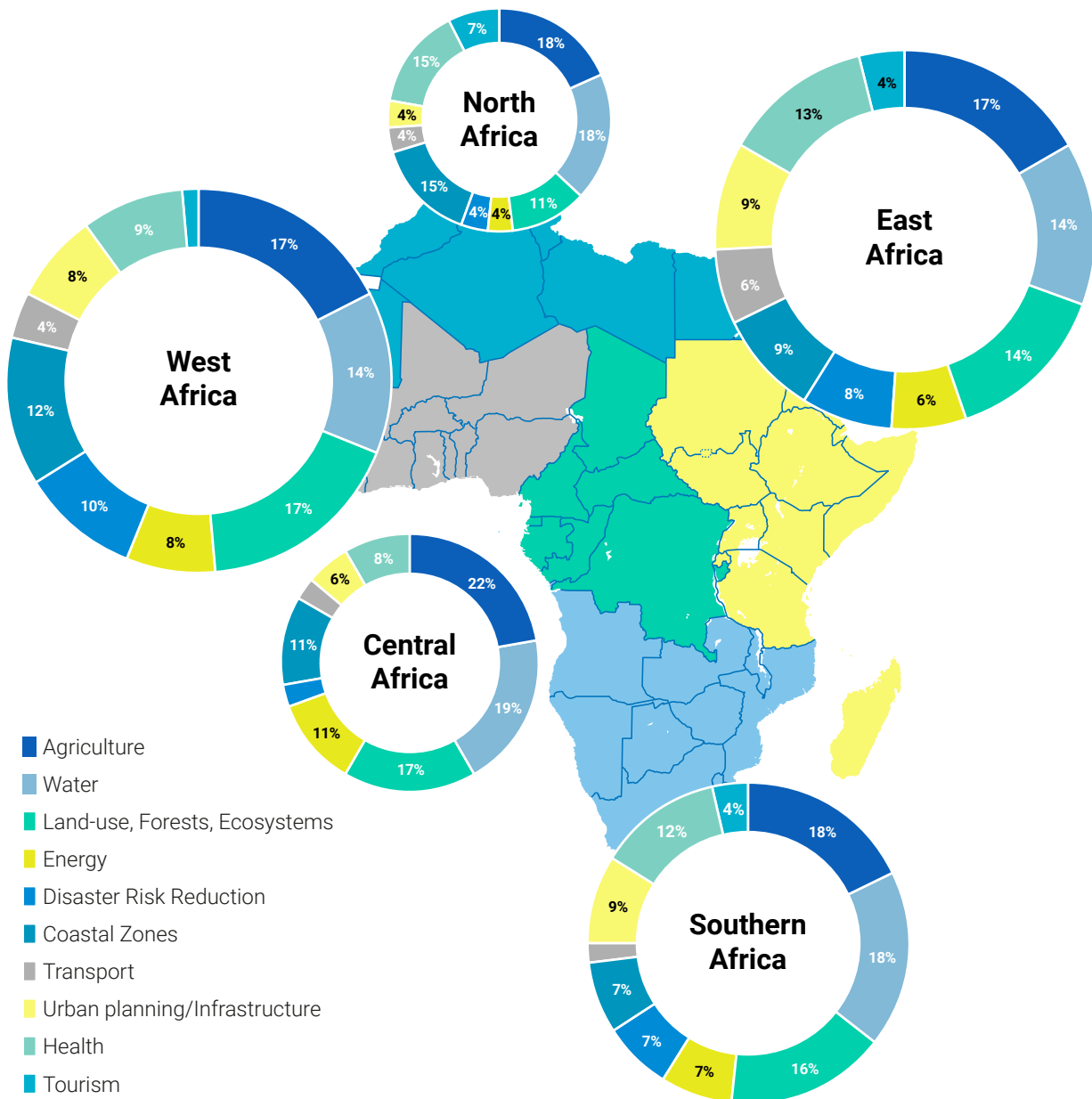


Source: UNFCCC (submission status as of June 2021, funding status as of Dec 2020)

Based on the NDCs, agriculture and water figure in the top three priority sectors for adaptation across Africa. Coastal zones were high on the list for North Africa and West Africa, while health was noted as a top priority in North, East, and South Africa. While all countries that submitted NDCs included an adaptation component, only 40 countries provided estimated investment needs for adaptation, totaling USD 331 billion up to 2030.¹¹⁵

Among these countries, 15 provided a breakdown of conditional vs unconditional cost estimates,¹¹⁶ with an average ratio of 80:20. This means that of the USD 331 billion, countries expect to contribute around USD 66 billion from their national budgets, while the remaining investment gap of USD 265 billion must be met by international donors and financiers.

Figure 12. Sectoral NDC Priorities by Region



It should be noted that methodologies employed for adaptation cost estimates vary widely across NDCs. Among the 40 countries that provided adaptation investment estimates, only a few included adaptation estimates at the sectoral or project level, and the time periods for estimated needs ranged from 5-15 years. NDCs did not provide detailed information on how the estimates were derived, beyond providing a rough estimate of conditional financing needs. Given the wide inconsistencies in the estimates provided in NDCs, the total estimated invest-

ment need of USD 331 billion through 2030 should be considered with low confidence.

This analysis now summarizes findings by sector – capturing climate risks and adaptation activities, the context of broader investment, barriers to investment, and examples of instruments implemented in each of seven sectors. It is important to focus these factors at the sector-level because investment characteristics, barriers, and viable instrument types are highly varied across sectors.

II. AGRICULTURE SECTOR

1. CLIMATE RISKS AND ADAPTATION ACTIVITIES IN THE AGRICULTURE SECTOR

Agriculture is the most important economic sector in Africa in terms of proportion of the labor force engaged in the sector and is among the most significant sectors by share of contribution to GDP. The sector is particularly vulnerable to the adverse impacts of climate change, and the status quo adaptive capacity of rural smallholder farmers is generally low. The impacts of climate change on African agriculture and food security are already being felt and will become increasingly severe going forward. A rise in average temperatures of 2 degrees Celsius by the middle of the century is projected to reduce expected yields by up to 20%.

Vulnerability to climatic shocks is especially acute in dry land areas which have a fragile ecology that limits agricultural potential. In these areas, land has already been degraded—de-forested, eroded, and nutrient depleted—over time, increasing its sensitivity to weather-induced shocks and reducing the resilience of rural populations and ecosystems. Climate change has direct impact on crop yields and indirectly on water availability, quality, pests, and diseases. In recent years, yields of staple crops such as maize, wheat, sorghum, and fruit crops have decreased across Africa, which has significant impacts on the food security, nutrition and thus health, livelihood and living conditions of the African population.

Africa's agriculture sector will need to adapt and improve its resilience to climate change. The most common agricultural adaptation strategies employed are the use of drought-resistant varieties of crops, crop diversification, changes in cropping pattern and calendar of planting, conserving soil moisture through appropriate tillage methods, improving irrigation efficiency, and afforestation and agro-forestry. Activities include crop diversification and resilience, soil health and erosion management, nutrient and pest control management, water management, weather forecasting, and irrigation infrastructure investments.¹¹⁷

2. CONTEXT OF BROADER INVESTMENT IN THE AGRICULTURE SECTOR

In 2003, African governments made commitments to the Comprehensive Africa Agriculture Development Programme (CAADP), an initiative aimed at promoting agricultural growth, poverty reduction and food security in Africa. They committed to allocate at least 10% of total government expenditures to the agriculture sector within five years. The commitment was reaffirmed in 2014 as Malabo Declaration. By 2019, only a fifth of the African countries fulfilled the target of a 10% share of expenditure to agriculture in any year since 2003. Niger, Burkina Faso, Ethiopia, Malawi and Mali allocated more than 10% of their budgets on agriculture growth, while others like Nigeria, Cameroon, and the Democratic Republic of the Congo were unable to reach even 5% annually.

The sector is estimated to hold a USD 1 trillion investment opportunity by 2030¹¹⁸ but receives very little bank credit. The share of commercial bank lending to

agriculture in Africa ranges from 3% in Sierra Leone, 4% in Ghana and Kenya, to 12% in Tanzania and interest rates are particularly high for smallholder farmers.¹¹⁹

Agriculture start-ups in Africa undertook fundraising deals of USD 616 million from various sources including commercial banks, angel investor networks, and philanthropic and other private investment funds. Fintech is also playing an increasingly significant role in the sector: mobile technology allows for increased access to banking services, accelerates the use of smart-contracting, and can shift payments to a system on the blockchain to increase transparency.¹²⁰

Approximately USD 2.1 billion in adaptation finance was tracked to the agriculture sector in Africa on average annually across 2017-18 from bilateral and multilateral DFIs (59%), international government ODA (24%), multilateral climate funds (5%), other public funds (11%), and commercial FIs (less than 1%). Finance to the sector was evenly split between grants and low-cost project debt (49% each) followed by market-rate project debt (2%) and project equity (less than 1%).

3. BARRIERS TO INVESTMENT IN THE AGRICULTURE ADAPTATION

Major barriers identified to scaling up adaptation finance in the agriculture sector in Africa include the following. These do not apply uniformly across the continent – barrier assessment must be context-specific:^{121, 122, 123}

1. Insufficient regulatory incentives for climate-smart agriculture in terms of priority lending and mal-incentives in regulatory environments with subsidies for non-adaptive crops.
2. Insufficient bankable or investable projects due to innovative or early-stage nature of agri-businesses and SMEs or inadequate project preparation
3. Difficulty in aggregating or securitizing many small-scale projects due to local contexts and disparate level of development
4. Insufficient coordination and cohesiveness between climate adaptation policies and investment needs in the sector and between various stakeholders at international, national, and subnational levels
5. Insufficient financial and technical capacity to access international funding through bilateral, multilateral public finance and other private financial institutions as the duration of approval and disbursement process does not align with the short-term mandates of local governments
6. Insufficient information about various risk mitigation and transfer instruments like index insurance, risk pools, etc. at individual and relevant institutional level i.e. at farmers collectives, sovereign, or subnational governments

4. INSTRUMENTS IMPLEMENTED IN THE AGRICULTURE SECTOR

Numerous financial instruments have been designed and/or deployed across Africa to respond to climate risks in the agriculture sector and to build resilience. The instruments discussed in this section span risk reduction instruments and risk transfer mechanisms. Insurance plays a particularly significant role in the agriculture sector – where insurers and risk pools are often better able to manage risk than smallholders and other direct actors in the sector. These instruments all have a place in the ecosystem of financial solutions necessary to scale public and private finance in the sector to meet the enormous investment need.

The summaries of the instruments below capture the basic structure of each instrument, the status of implementation, the actors involved and the reasons the instruments were designed to engage those actors, and the factors at the country-level that make the instrument viable in particular contexts: capturing market and policy enabling environment factors that can yield most success. The instruments assessed here are in order of level of concessionality required, corresponding to enabling environment requirements (where more concessional instruments have fewer requirements).¹²⁴ In the agriculture sector, main instruments captured are:

Instrument	Resilience/ Response/ Recovery	Risk Reduction/ Retention/ Transfer	Barriers Addressed
Grants + Liquidity – Technical Assistance Funding: Productive Safety Net Program (PSNP) Ethiopia	Resilience & Response	Risk Reduction	1,3
Liquidity – Cash Transfers: World Food Program (WFP) Cash transfers and vouchers in response to drought in Mozambique	Response & Recovery	Risk Reduction	1,3
Liquidity/Parametric Insurance/Sovereign Risk Pooling: African Risk Capacity	Response & Recovery	Risk Reduction & Risk Transfer	4,5,6
Financing Facility – Concessional Debt: Subsidized Impact Investing Funds - AgDevCo	Resilience	Risk Reduction	2,3
Financing Facility – Credit Guarantee Scheme: CGS for Smallholder Coffee Producers	Response & Recovery	Risk Reduction & Risk Transfer	2
Insurance + Liquidity – Index Insurance: Agriculture and Climate Risk Enterprise (ACRE)	Response	Risk Transfer	2,4
Insurance + Liquidity – Index Insurance: R4 Rural Resilience Initiative	Resilience, Response, & Recovery	Risk Reduction, Transfer, & Retention	2,4
Financing Facility – Debt Fund: Food Securities Fund	Resilience	Risk Reduction	2,3,4

GRANTS AND LIQUIDITY – Technical Assistance Funding: Productive Safety Net Program (PSNP) Ethiopia

Summary: Ethiopian smallholder farmers are heavily dependent on subsistence agriculture. The Ethiopian government launched the Productive Safety Net Program (PSNP) in 2005 in partnership with international organizations, aid donors. The program finances conditional or unconditional cash or food transfers for undertaking public works or social infrastructure e.g. building terraced hill slopes for water retention etc. in response to chronic food insecurity or short-term shocks like droughts targeting the highly-climate vulnerable population. On an annual basis, the program reaches over 8 million households or about 7% of the population.¹²⁵ It is one of the largest such programs in Africa and is embedded in the Government of Ethiopia's Climate Resilient Green Economy (CRGE) strategy.

Stage of Implementation: In November 2020, Phase V of PSNP began through Strengthen Ethiopia's Adaptive Safety Net Project (SEASN) project. This financing includes a USD 200 million credit and a USD 312.5 million grant, with additional support from USAID (USD 430 million), UK FCDO (USD 281 million) and Government of Ethiopia (USD 600 million). The project aims to expand geographic coverage and enhance service delivery of PSNP and effectively respond to disasters.¹²⁶

Actors involved:

- **African Governments:** The program will be financed and managed by various government agencies like the Ministry of Agriculture and Natural Resources (MoANR), Ministry of Finance and Economic Cooperation (MoFEC), Ministry of Labour and Social Affairs (MoLSA). Government support in finance and execution is crucial to achieving the scale in such social protection programs.
- **DFIs:** 10 development partners have co-financed the program including the World Bank. These partners are the Canadian Government, Danish International Development Assistance (DANIDA), Embassy of the Kingdom of the Netherlands, European Union, Government of Ireland, DFID, United Nation's Children Fund, USAID, and the WFP. The DFIs play a role in offering technical assistance in climate risk assessment and resilience building.
- **Foundations/development agencies:** The CSI implementing consortium is led by CARE with other organizations including SNV, Farm Africa, ORDA, REST and Mercy Corps. These institutions are critical to providing the relevant technical expertise for monitoring, evaluation, conducting pilot-testing, enhance gender mainstreaming etc.

Criteria for country-level market and policy enabling environment: These enabling factors suggest environments in which the instrument could see most success:

- Countries with relatively challenging underlying market and policy conditions are well suited to this instrument because it is largely concessional in nature. This could include countries with low sovereign credit ratings, high sovereign debt, and limited capital markets.
- The implementing environment does require at least some monitoring and evaluation capacity in the form of at least a sufficiently stable political environment to allow for the evaluation of progress to take place.

Applicable countries: Numerous public works safety net programs being deployed and expanded throughout Sub-Saharan Africa (SSA) and beyond which have the potential to integrate adaptation benefits and access international climate finance e.g. Kenya's Hunger Safety Net Programme and the CT-OVC Cash Transfer, the Republic of Malawi's Dowa Emergency Cash Transfers and the Mchinji Food and Cash Transfer, the Republic of Ghana's Livelihood Empowerment Against Poverty and the Republic of Rwanda's Vision 2020 Umerenge Programme¹²⁷

LIQUIDITY – Cash Transfers: World Food Program (WFP) Cash transfers and vouchers in response to drought in Mozambique

Summary: Cash transfer programs including the World Food Program (WFP) effort for Mozambique provide unconditional cash transfers to poor and vulnerable households. Research suggests that these programs have significant climate resilience benefits and that households receiving cash transfers suffered much less from weather shocks, their food security increased, and poorest households saw the biggest gains. These programs are especially critical in countries with a high proportion of the labor force in the agriculture sector.

Mozambique suffered from severe droughts in 2015-16, which negatively impacted agricultural yields in 2017-18. Cyclones Idai and Kenneth in 2019 exacerbated the crisis faced by farmers, leaving nearly 3% of the population at risk of severe food insecurity.¹²⁸ In response to these crises, WFP, with funding from DFID, developed a program to supply the affected population with either cash or food vouchers to allow them to obtain food for themselves and their households.

Stage of Implementation: In cooperation with the Ministry of Gender, Children, and Social Action (MGCSA) and the National Institute of Social Action (INAS), WFP worked to identify the most vulnerable citizens and geographic areas, determine transfer amounts, and distribute the cash and vouchers. Now concluded, the program reached over 24,000 households. A scaled-up version of this instrument is envisioned for the future.

Actors involved:

- **African Governments:** Two key government agencies, MGCSA and INAS, were involved in helping WFP identify, target, and size the cash transfers to the affected populations
- **DFIs:** Funding from DFID was used to establish the program and provide the cash transfers and food vouchers
- **Foundations/development agencies:** WFP was instrumental in designing and implementing the cash transfer/voucher program

Criteria for country-level market and policy enabling environment: To most effectively implement a cash transfer program of this nature, countries should have:

- Access to data tracking the vulnerable populations and geographic areas in order to target assistance most effectively. In the case of Mozambique this was done by using other indicators of social and economic vulnerability as proxies for food insecurity.
- A reliable mechanism for distributing funds, either through physical networks (such as local banks or community organizations), or mobile payments systems.

Applicable countries: There are numerous public works safety net programs in operation across Africa, highlighted in the summary of Technical Assistance Funding: Productive Safety Net Program (PSNP) Ethiopia above.

LIQUIDITY/PARAMETRIC INSURANCE/SOVEREIGN RISK POOLING: African Risk Capacity Sovereign Risk Pooling¹²⁹

Summary: The African Risk Capacity (ARC) is a sovereign risk pool and early response mechanism designed to provide insurance to countries in the event of a climate shock. ARC's mission is to help members of the African Union to protect the food security of their vulnerable populations. As an insurance risk pool, ARC's objective is to capitalize on the natural diversification of weather risk across Africa, allowing countries to manage their risk as a group in a financially efficient manner to respond to probable but uncertain risks. To participate in ARC, countries must undertake several processes, including customizing the Africa RiskView (ARV) software, signing MOUs for in-country capacity building, defining a contingency plan for ARC payouts, and determining risk transfer parameters. The payout occurs when the rainfall deviation crosses a certain pre-defined threshold estimated by the ARV software.

Stage of Implementation: ARC currently offers maximum coverage of USD 30 million per country per season for drought events that occur with a frequency of 1 in 5 years or less. 34 African Union member states are a part of ARC in 2020, 24 have active MOUs, 13 are Class A Members who have purchased the policy and 7 countries have received payouts. Since 2014, ARC Ltd has collected over USD 100 million in premiums, provided USD 720 million of insurance coverage, and paid a total of USD 65 million in payouts mainly in the agriculture sector that has finance efforts including scale-up on cash transfers and replenishment of strategic grain reserves in Malawi in 2017 and response to severe drought in Mauritania in 2018 and in Madagascar in 2020.

Actors involved:

- **Funders to ARC:** UK FCDO (GBP 30 million) and KfW on behalf of BMZ (USD 48 million) have been members since ARC Ltd's inception in 2014. Both are contributors of interest-free capital with a maximum fixed term of 20 years.
- **ARC Agency:** The ARC Agency is the capacity building, educational, and advocacy arm of the ARC Group that is responsible for communicating ARC's mission and goals to Member States and the broader public. ARC Agency's mandate is to bring African Union member states on board the insurance platform and to strengthen member states' capacities around early warning, disaster risk management, and risk financing.
- **ARC Limited:** ARC Ltd is the financial affiliate of the ARC Agency and was established in Bermuda in 2014 as a Class-2 mutual insurance company. Since 2014, ARC Ltd has provided USD 720 million in insurance coverage for the protection to 72 million people and has paid out USD 65 million in claims to countries in need of drought relief.
- **Availability of robust climate data:** Customization of the Africa RiskView software is dependent on historical loss and damage information and different types of weather data disaggregated at the subnational level.
- **Technical and financial capacity within the governments:** Technical expertise in areas of sovereign and weather index insurance is required to take ownership of the ARC's disaster risk financing mechanisms.
- **High level of awareness for ARC:** There needs to be high level of awareness of the ARC program among stakeholder, institutions, and political decision-makers in a potential member country to make participation in the pool viable.

Applicable countries: 24 countries have signed MOUs with ARC: Benin, Burkina Faso, Chad, Comoros, Côte d'Ivoire, Djibouti, The Gambia, Ghana, Guinea, Kenya, Madagascar, Malawi, Mali, Mauritania, Mozambique, Niger, Nigeria, Rwanda, Senegal, Sudan, Togo, Uganda, Zambia, and Zimbabwe. Of these 24 countries, Burkina Faso, Chad, Côte d'Ivoire, Kenya, Madagascar, Malawi, Mali, Mauritania, Niger, Senegal, The Gambia, Togo and Zimbabwe have each taken out at least one drought insurance policy since inception and Malawi, Zimbabwe, Côte d'Ivoire, Madagascar, Mauritania, Niger, and Senegal are payout recipients.

FINANCING FACILITY – Concessional Debt (Subsidized Impact Investing Funds): AgDevCo

Summary: AgDevCo is a specialized subsidized impact investor¹³⁰ and project developer that focuses on early-stage small and medium agri-businesses that contribute to food security, employment, and climate resilience for smallholder farmers in Sub Saharan Africa. It deploys long-term capital and technical assistance (USD 2-10 million) to build sustainable and commercially viable businesses. AgDevCo currently has a presence in Sierra Leone, Ghana, Cote D'Ivoire, Rwanda, Kenya, Malawi, Mozambique, Tanzania, Uganda, and Zambia.

For example, in 2016 AgDevCo's investment established Saise Farming Enterprises Ltd (SFEL), the first commercial seed potato producer in Zambia. Before this, potato market in Zambia completely relied entirely on imported seed potatoes from South Africa. This investment is part of AgDevCo's larger strategy to help develop an agricultural hub in Northern Zambia, by injecting USD 14M into the region and catalyzing an additional USD 23 million of third-party investments to establish irrigation over 250 ha, secure power and purchase farm equipment, sheds, cold stores and machinery. The establishment of Saise, to produce seed potatoes supplied by Europlant (a German seed potato provider) changed the market by introducing locally produced, high quality seeds.¹³¹ The potato farming is secured by irrigation during droughts and allows the growing of potato in winter as well when disease risk is at minimum. The cold chain allows storage in climate-controlled warehouses and sold next year.¹³²

Stage of Implementation: As per the annual reporting of AgDevCo to FCDO, in 2019, 53% of the total capital leveraged was private funding and 47% was from DFIs, which shows a positive shift towards leveraging a greater proportion of capital from outside the conventional international development sources.¹³³

Actors involved:

- **DFIs:** AgDevCo is funded by the UK Foreign, Commonwealth and Development Office (FCDO)-Africa Division which has disbursed 90% of the total committed expenditure of GBP 154,211,173 towards AgDevCo. DFIs play a role in de-risking this instrument through a variety of approaches including through a first loss sub-ordinate investment.
- **Impact Investor:** AgDevCo is a majority shareholder and has invested USD 1.7 million in equity, USD 1.6 million in long-term debt, as well as working capital loans. Such impact investment has a potential for uptaking best practices and crowding-in investments in the entire value chain.
- **Project Developers:** Saise is Zambia's first seed potato producer and one of the only commercial farms in the region. Project developers like Saise have a relatively high-risk appetite, do not generally have climate mandates, and have limited independent capacity to raise capital at scale.

Criteria for country-level market and policy enabling environment: These enabling factors suggest environments in which the instrument could see most success:

- **Project pipeline:** Countries with significant pools of investable project pipeline in agriculture are strong candidates. This pipeline can be informed by a strong policy environment where adaptation projects are identified and prioritized and there is sufficient climate risk analytics capacity to ensure the projects meet set climate adaptation criteria.
- **High smallholder demand:** Key underlying component for the success of commercial agri-businesses is the smallholder demand. Often smallholder farmers do not have available cash nor commercial appetite to invest which can become a constraint.

Applicable countries: AgDevCo currently has a presence in Sierra Leone, Ghana, Cote D'Ivoire, Rwanda, Kenya, Malawi, Mozambique, Tanzania, Uganda, Zambia. As measured employment in agriculture as a percentage of total employment, there is likely additional high smallholder demand in Burundi (86%), Somalia (80%), Chad (75%) and Niger (72%)¹³⁴ – all of which have shares employed in the sector above 70% – though caveated that availability of sufficient project pipeline informed by a strong policy environment may be challenging.

FINANCING FACILITY – Credit Guarantee Scheme for Smallholder Coffee Producers

Summary: A credit guarantee scheme (CGS) provides third-party risk mitigation to banks or lenders where a percentage of lenders losses due to payment default by the borrowers are absorbed. The Common Fund for Commodities (CFC) and the Rabobank Foundation set up a mechanism worth USD 2.25 million to provide loans to coffee farmers in Ethiopia to buy processing equipment and guaranteed 50% losses incurred. The project also provided technical assistance to follow processing best practices. Farmer cooperatives that facilitated the processing, purchase, and export of coffee were also eligible.

Stage of Implementation: More than 23 cooperatives in Ethiopia have received commercial loans using the credit guarantee mechanism.^{135,136} The scheme has enabled better access to commercial loans for smallholder coffee farmers, helped to scale up of agricultural best practices and better access to markets. The technical facility has improved access to production and processing information.

Actors involved:

- **DFI and Philanthropic Foundation:** Common Fund for Commodities (CFC) provided USD 2m as a collateral to support a risk sharing solution between local lending banks, Rabo Rural Fund and CFC and USD 1,240,210 in grants, USD 600,000 of which was financed by OFID. The Foundations have a high-risk appetite and a strong climate change mandate and therefore have a critical role to play in de-risking and covering a share in case of default.
- **Financial Institutions:** Banks are the lending Institutions that are the participating lenders in the risk-sharing facility and who have loan exposures to individual farmers, cooperatives, or SMEs. The lending institutions often have a low-risk appetite, and no climate change mandates.
- **Fund Manager:** The Rabo Rural Fund is the fund manager who is responsible for screening the lending institutions' portfolio and extending the guarantees accordingly. The Facility Manager also verifies the risk claims submitted by Lending Institutions in case of a default and releases funds thereafter.
- **Technical Assistance Provider:** CABI and Rabobank International Advisory Services are providing technical assistance for grants and loan-related activities respectively. They have a critical role to play in capacity building, pipeline development and project preparation assistance for beneficiaries to access the credit guarantee. They also help the lending officers to understand the value chain of the business and familiarize them with governance best practices.

Criteria for country-level market and policy enabling environment: Credit guarantee schemes can be of many types, public, mutual (private) or Public-Private Partnership (PPP) model. Public CGS would be useful when there is strong public sector culture. Budgetary grants are available for providing guarantees while mutual (private) CGS can be undertaken when the expertise in the government is lacking and there is a growing private sector. The PPP model can be useful in building additional sources of funds and expertise to complement government capacity.

- **Project pipeline:** Countries with significant pools of investable project pipeline in the agriculture businesses and SMEs are strong candidates for CGS. There should also be transparency and fairness in selection criteria. Additionally, the borrowers should be carefully screened to assess the potential of creating long-term value and ability to sustain themselves once the guarantees are not available.
- **Strong legal and regulatory framework:** The legal and regulatory framework for the schemes should be in place, with the CGS as an independent legal entity with effective oversight. Enabling regulatory framework is especially critical for mutual guarantee funds concerning minimum capital requirements, the appropriate solvency ratio and transparency criteria.

Applicable countries: Programme for Rural Outreach of Financial Innovations and Technologies in Kenya or Financing Ghanaian Agriculture Project (FinGAP) in Ghana are examples of credit guarantee schemes that have a strong potential to deploy risk mitigation instruments for smallholder farmers.

INSURANCE – Index Insurance: Agriculture and Climate Risk Enterprise (ACRE)

Summary: The Agriculture and Climate Risk Enterprise (ACRE) is the largest input-linked, mobile-enabled index insurance programme in Africa. Smallholders buy agricultural inputs from agri-business business partners and are linked to the insurance program via a mobile application (by scanning a code). The premium is 50% subsidised for the smallholder farmers who pay only half the premium; and the other half is paid by ACRE Africa's agribusiness partners. During a climate crisis, compensation for yield loss is triggered immediately via a mobile money transfer service. Solar-powered local weather stations which regularly update the weather conditions are installed near individual farms to calculate the impact of the event and respective pay-outs.

Stage of Implementation: By 2018, over 1,700,000 farmers in Kenya, Tanzania, and Rwanda insured over USD 180M against a variety of weather risks underwritten by various insurance companies. Crops insured include maize, sorghum, coffee, sunflower, wheat, cashew nuts, and potato, with coverage against drought, excess rain, and storms.

Actors involved:

- **Insurance companies:** A variety of weather risks underwritten by various insurance companies like UAP Insurance Kenya, CIC Insurance Group Limited, APA Insurance, Heritage Insurance, UAP Insurance Tanzania, and SORAS Insurance Rwanda which have the potential to scale and replicate the instrument in high-impact countries.
- **A mobile money platform:** Use of a mobile money platform like M-PESA provides many benefits, like effective collection of data, reduction of administrative and operational costs, faster registration of new policies, and more accurate geo-tagging of farms. It also reduces application and claims settlement time and rapid pay-outs.
- **Subsidy providers:** Donors, governments, or agribusiness partners can partially subsidize the insurance premiums which helps in de-risking it and makes it affordable for the farmers and facilitates the expansion.
- **Distribution channels** will bundle the index insurance with crop seeds from certified distributors. The product will be distributed as a scratch card attached to a seed bag and sold in shops, available in remote areas, or through cooperatives and accessible to all farmers with a simple mobile phone

Criteria for country-level market and policy enabling environment: These enabling factors suggest environments in which the instrument could see most success:

- **Countries with high climate vulnerability** will have a high demand for index insurance, which can be assessed using datasets like The Notre Dame-Global Adaptation Index (ND-GAIN) Country Index, Aqueduct's global water risk mapping tool dataset for drought and flood vulnerability.
- **Availability of robust climate data:** Climate data and associated analytics are critical to developing insurance products. Lack of data to understand the climate risk exposure at the local level, quantify future climate-related risk, estimates losses, identify critical thresholds, etc. are a serious constraint for innovation, deployment, and expansion of insurance products.
- **Progressive regulation and subsidy schemes for index insurance:** African regulators have generally been reactive on index insurance considering it has been introduced first by the markets. Mostly due to the low update, there are no strict regulations on index and mobile insurance.
- **High adoption rate of mobiles and mobile money accounts:** Reports suggest that there are more than 500 million registered mobile accounts in Africa in 2021,¹³⁷ surpassing the number in the United States or Europe. Africa also remains a leader in mobile money use, especially becoming popular in areas where access to financial services is low.¹³⁸
- **The effectiveness of distribution channels** might differ from region to region. Farmer organizations remain an effective channel to both increase demand – for instance through buying group insurance on behalf of farmers – and raise awareness of index insurance within their cooperative.

Applicable countries: The CIMA region¹³⁹ has a regulation that is in favor of agricultural microinsurance integrated with mobile money technology and it is designed to encourage micro insurance agents to enter the market.¹⁴⁰ Further, some governments offer subsidy schemes to support the agricultural insurance sector and the most supportive schemes in Kenya and Senegal are offering a 50% subsidy on the premium.¹⁴¹

INSURANCE – Index Insurance: R4 Rural Resilience Initiative

Summary: R4 Rural Resilience Initiative (R4) was launched in 2011 by the World Food Program (WFP) and Oxfam America (OA) to improve food and income security while adapting to increased climate risks. The R4 initiative combines risk reduction (natural resource management through asset creation and agricultural best practices), risk transfer (microinsurance), prudent risk-taking (livelihoods diversification, investments, and microcredit), and risk reserves (savings and deposits).

Stage of implementation: In 2020, the R4 Rural Resilience Initiative has allowed nearly 180,000 farmers to access index insurance products and a range of complementary risk management services in ten countries. R4 conducted training on insurance, sustainable agricultural practices, financial inclusion, and climate services in Ethiopia, Senegal, Malawi, Zambia, Kenya, Zimbabwe, Burkina Faso, and Mozambique.¹⁴² R4 uses existing government safety net programs or other development programs run by NGOs to provide a replicable and scalable model by creating an enabling environment for pro-poor market growth through increased insurance penetration, financial inclusion.^{143,144,145}

Actors involved:

- **Government departments:** Various government departments, ministries, and regulators play an important role in policy, regulation, research, and operations, as well as in strategic oversight and guidance of climate adaptation projects in the sector. Government support in finance and execution is crucial to achieve the scale in such insurance programs.
- **Community partnerships:** Farmers in each village actively support development of insurance products through design and monitoring of climate resilience benefits. Participatory approaches with communities help to educate them about insurance, build trust, and increase awareness on the benefits of insurance.

Criteria for country-level market and policy enabling environment: These enabling factors suggest environments in which the instrument could see most success:

- **Existence of social protection schemes:** The R4 program is supported by the following existing programs in various countries, Kenya: PSNP in Ethiopia, Senegal: WFP's FFA and Oxfam America's Saving for Change (SfC), Malawi: WFP's Food Assistance for Assets (FFA), Zambia: FAO's Conservation Agriculture Scaling-Up (CASU) project.
- **High climate vulnerability:** These countries have a high demand for index insurance, which can be assessed using datasets like The Notre Dame-Global Adaptation Index (ND-GAIN) Country Index and Aqueduct's global water risk mapping tool dataset for drought and flood vulnerability.
- **Progressive regulation insurance and presence of an insurance market:** African regulators have generally been reactive on index insurance considering it has been introduced first by the markets. Mostly due to the low update, there are no strict regulations on index and mobile insurance.

Applicable countries: Considering the presence of national insurance actors like Nigeria Incentive-Based Risk Sharing System for Agricultural Lending, Nigeria in West Africa where R4, which is mostly present in East Africa, has not yet started operation and can be a good candidate for expansion.

FINANCING FACILITY – Debt Fund: Food Securities Fund

Summary: The Food Securities Fund seeks to provide working capital loans to agricultural aggregators (cooperatives, processors, traders) operating in developing and emerging markets. The fund has been developed by Clarmondial with input from leading institutional investors, agribusinesses, and conservation organizations and aims to provide an additional source of timely and affordable credit to support the transition to sustainable agriculture notably on climate mitigation, sustainable land management, rural livelihoods and gender.

Structured and launched by Clarmondial, the fund's open-ended structure is suitable to institutional investors, allowing it to deliver impact at scale. Conservation International and WWF are founding members of the Fund's Impact Advisory Board, and Clarmondial also received support from Convergence, Good Energies Foundation and Climate KIC. The risk blending of the fund comes from a USAID credit guarantee commitment of USD 37.5 million, and uniquely, also from value chain partners including large corporations. The Global Environment Facility (via Conservation International) has also committed USD 15 million to the initiative.

Stage of Implementation: In March 2021, the Fund successfully began operations with a first investment in coffee production in East Africa to reach nearly 4,000 smallholder farmers operating agroforestry systems and using organic and regenerative practices.¹⁴⁶

Actors involved:

- **Fund manager and advisor:** Vistra is the Alternative Investment Fund Manager (AIFM) and Clarmondial is the Fund's investment advisor.
- **Accelerator funding:** Convergence has provided a design funding grant to support structuring work that is required to launch the fund. This grant funding fills a critical gap in structuring financial instruments that have significant potential to draw in private investment but where private investors may not have risk appetite to enter the instrument at the earliest stage.
- **Institutional investors:** The fund is designed for institutional investors and is in due diligence with several such private sector investors.
- **DFIs and bilateral ODA:** The fund has received a commitment of USD 37.5 million in credit guarantees from the US International Development Finance Corporation (DFC), subsidized by USAID's Bureau for Resilience and Food Security (RFS).

Criteria for country-level market and policy enabling environment:

- **Strength of agriculture SMEs:** The fund targets local SMEs operating in established value chain relationships and will thus be most successful in markets where there are relevant agri-SMEs and where access to working capital is scarce.
- **Strong institutional investor pool:** The fund will also appeal to investors primarily in areas where institutional investors have an interest in SDG-aligned fixed income and private credit investments. The Fund is primarily targeting European and US institutional investors (banks, pension funds, insurance companies).

Applicable countries: The Fund is a global emerging and developing markets fund and has an initial focus on Sub Saharan Africa. The fund intends to have a diverse portfolio of investments, spanning different commodities and countries.



III. WATER SECTOR

1. CLIMATE RISKS AND ADAPTATION ACTIVITIES IN THE WATER SECTOR

In one of the globe's most water stressed regions, countries across Africa face accelerating climate risks in the water sector. Per the World Resources Institute's Aqueduct tool, three countries in Africa are ranked as having extremely high baseline water stress (Libya, Eritrea, and Botswana), another eight rank among countries with high water stress, and a further four face medium-high baseline water stress. Across the continent, climate change is leading to a variety of impacts including more erratic rainfall and a resulting increase in the risk of droughts and floods, reduced water quality, and salinization of coastal aquifers. Inadequate water and wastewater facilities amplify this problem, leading to reduced water quality and supply, damage to land and property, infrastructure damage or collapse, and increased risk of waterborne diseases.

Activities that build resilience to climate change impacts in the water sector vary widely across water, wastewater, and sanitation sector projects that reduce the severity of water shortages by improving residential and commercial infrastructure, strengthening resilience to climate risks, and enhancing water efficiency and quality. Because there is substantial climate risk affecting the water sector in Africa, there is a sizeable pool of activities in the sector that can build climate resilience. Activities considered in this analysis include water collection, water treatment, water supply, wastewater collection networks, wastewater treatment facilities, sanitation, and water harvesting and irrigation.

2. CONTEXT OF BROADER INVESTMENT IN THE WATER SECTOR

The Infrastructure Consortium for Africa (ICA) finds that water infrastructure sector commitments totaled USD 13.3 billion in 2018 in Africa¹⁴⁷. This compares to the USD 1.2 billion tracked in adaptation finance to the water sector in the same year¹⁴⁸ – suggesting that more than 90% of finance to the sector is not climate resilient – or at least has not been rigorously assessed for physical climate risks or water security concerns. ICA also finds that the water infrastructure sector has the highest financing gap of any infrastructure sector in Africa: between USD 43 and 53 billion annually due to a range of challenges including low tariffs, limited local government financial capacity, and low levels of official development assistance (ODA), MDB, and national government funding.

Of the USD 13.3 billion in commitment to the water infrastructure sector in 2018 per ICA, finance was split relatively evenly between Southern, East, and West Africa – with each receiving between 16% and 20% of the total financing. As is true in tracked adaptation finance to the sector, North Africa received the highest proportion of overall water infrastructure sector investment (28%), while Central Africa received the lowest share, only 5%. South Africa – treated as its own category within the ICA analysis – received the remaining 12% of finance to the water sector – more than double the entire Central African region.

Beyond the resilience context, publicly run water and sanitation utilities in Africa rely on private finance from domestic commercial sources (including domestic banks and bonds). In developed capital markets – South Africa for example – local capital markets are a major source of water infrastructure finance and bankable water infrastructure projects often employ special purpose vehicles (SPVs) to mobilize finance alongside

commercial bank lending. Finance to the water infrastructure sector in Africa predominantly is sourced from African National Governments and from ICA members (G7 countries, the South African government, AfDB, the European Commission, EIB, and the World Bank). China has played a moderate but increasing role in the sector while other bilaterals and multilaterals have also increased engagement.



3. BARRIERS TO INVESTMENT IN THE WATER SECTOR

The most significant underlying barriers to adaptation finance in the water sector in Africa include:

1. Lack of transparent and bankable pipelines of projects: This challenge arises from the absence of long-term development plans and failure by many African governments to communicate infrastructure needs to investors.
2. Inadequate risk-adjusted returns: Returns do not compensate investors in developing countries for the additional risk associated with unfavorable regulations and policies, including foreign investment restrictions.
3. Complexity of project due diligence: Many private sector actors, including institutional investors, have largely avoided financing water and wastewater projects in the region due to cost recovery challenges and the complexity of the technical due diligence.
4. Significant set-up and transaction costs: Significant licensing barriers and lengthy project development cycles which are even more relevant for projects that also require proof of adaptation and reduce the pool of financeable projects. Multiple rounds of financing for complicated infrastructure increase costs and time to develop.
5. Monitoring and measurement: Climate adaptation criteria that are often necessary for public finance involvement in projects can add a burden for lenders and there is often limited climate risk information available in the water sector writ large.
6. Lack of municipal/subnational implementation capacity: Water projects often involve municipal or other subnational implementers. When those implementers have limited implementation capacity (to pursue finance, structure an adaptation project, or access climate analytics, etc.) project implementation and especially more complex financial approaches become difficult.

4. INSTRUMENTS IMPLEMENTED IN THE WATER SECTOR

Numerous financial instruments have been designed and/or deployed across Africa to respond to climate risks in the water sector and to build resilience. The instruments discussed in this section span commercial and blended instruments, an outcome-contingent payment structure, and a concessional debt and domestic government-funded project. These instruments all have a place in the ecosystem of financial solutions necessary to scale public and private finance in the sector to meet the enormous investment need.

The summaries of the instruments below capture the basic structure of each instrument, the status of implementation, the actors involved and the reasons the instruments were designed to engage those actors, and the factors at the country-level that make the instrument viable in particular contexts: capturing market and policy enabling environment factors that can yield most success. The instruments assessed here are in order of level of concessionality required, corresponding to enabling environment requirements (where more concessional instruments have fewer requirements).¹⁴⁹ In the water sector, main instruments captured are:

Instrument	Resilience/ Response/ Recovery	Risk Reduction/ Retention/ Transfer	Barriers Addressed
Results-Based Finance – Success Note: UBS Optimus Foundation Social Success Note	Resilience	Risk Reduction	1,2
Project Finance – Concessional Debt: Sustainable Development of Abu Rawash Wastewater Treatment Plant	Resilience	Risk Reduction	1-4,6
Project Finance – Majority Commercial Debt: Climate Adaptation Notes	Resilience	Risk Reduction	1-6
Financing Facility – Equity Fund: Climate Investor Two	Resilience	Risk Reduction	1-5

RESULTS-BASED FINANCE: UBS Optimus Foundation Social Success Note

Summary: This social success note (SSN) is designed to help provide schools in Uganda with access to clean water. Starting with a USD 500,000 working capital loan from UBS Optimus Foundation, Impact Water—the implementing NGO—will purchase and install the water purifications at the schools. The schools then repay their interest-free loan with the savings from on fuel that would normally be purchased to boil water. If targets are met, Impact Water will receive an interest rate discount, and a bonus payment from the Rockefeller Foundation to cover the remaining interest payments. Yunus Social Business will manage monitoring and evaluation and the success of the SSN is based on whether Impact Water provides an additional 1.4 million children with access to clean safe water of the 5-year term. The SSN is a 5-year loan with a 2-year grace period and is priced at 5%, with the UBS Optimus' return increasing to 10% if targets are met.

Stage of Implementation: The SSN 5-year period began in 2018 and Impact Water has to date installed systems in 600 schools in Uganda. Yunus Social Business has continued to monitor and evaluate the progress of the program and Rockefeller Foundation pays out interest proportional to installation rate targets set at the beginning of the period. The instrument is still in progress and full details of success and challenges will be available at the conclusions of the instrument in 2022-23.

Actors involved:

- **Social business:** Impact Water is a social enterprise which seeks lower than market rate returns and has specific objectives related to installation of water systems in schools to increase clean water access. Social enterprises can play an important role in water adaptation projects that are not fully bankable.
- **Foundations/development agencies:** Rockefeller Foundation offers an outcome payment and Yunus Social offers measurement and evaluation support. These institutions are critical to financing this high-risk instrument and to providing the relevant technical expertise surrounding impact evaluation.

- **Private investor:** UBS Optimus Foundation Network, provided a USD 500k working capital loan and plays an important role as a source of private capital. The instrument leverages other concessional forms of capital in order to mobilize this private finance.

Criteria for country-level market and policy enabling environment: Countries with relatively challenging underlying market and policy conditions are well suited to this instrument because it is largely concessional in nature. This could include countries with low sovereign credit ratings, high sovereign debt, and limited capital markets. The implementing environment does require at least some monitoring and evaluation capacity in the form of a sufficiently stable political environment to allow for evaluation of progress to take place.

Applicable countries: The SSN is implementing in Uganda, Nigeria, and Kenya and could also be feasible in other countries with the conditions described above.

PROJECT FINANCE: Concessional Debt: Sustainable Development of Abu Rawash Wastewater Treatment Plant

Summary: With a project cost estimated at USD 387 million, the project aims to increase adaptive capacity and water supply through wastewater infrastructure upgrading and expansion, institutional support, and other engineering services. Total DFI financing in the form of concessional debt for the project is USD 150 million – with USD 100 million from AfDB and USD 50 million from the Africa Growing Together Fund (AGTF). The Government of Egypt will contribute the remaining USD 237 million of project cost (62% of total project cost) through public budget. Stage of Implementation: The project’s planned completion data is the end of 2022.

Actors involved:

- **Development finance institutions:** AfDB and AGTF will jointly finance 38% of the total project cost of the wastewater treatment plant. Beyond this project, DFIs delivered 72% of total adaptation finance tracked to the water sector on average annually across 2017-18 to Africa per the Landscape. DFIs, like AfDB and AGTF, can take a role in de-risking financing of water projects through PPP structures to encourage private sector participation. DFIs also have a role to play in offering technical assistance in climate risk assessment and resilience building.
- **African governments:** The Government of Egypt has committed USD 237 million to the project. Across the region, budgetary allocations are well-suited to financing adaptation activities where returns are challenging or across long time horizons. UNDP estimates that total adaptation expenditures by African governments to date amount to less than one-quarter of 1% of GDP.
- **Contractors.** Spanish water management company FCC Aqualia has signed a contract for design, building, and operation of the treatment plan alongside Egyptian contractor Orascom. Construction is ongoing.¹⁵⁰

Criteria for country-level market and policy enabling environment: These enabling factors suggest environments in which the instrument could see most success:

- **Robust climate information:** Climate data and associated analytics are critical to accessing finance from DFIs for adaptation activities. Per the IDFC-MDB Common Principles, for projects to be identified as adaptation, they undergo a project climate risk assessment based on robust analysis of available climate data and projections across a range of future scenarios. Availability of relevant data and technical capacity to assess it is therefore critical to accessing many forms of concessional debt.
- **Strong or moderate sovereign credit rating:** Countries with strong investment environments, as measured by sovereign credit ratings, can access more diverse finance types including finance that blends risk appetites. A relatively strong credit rating is valuable to reduce the cost of financing and to assure DFIs that further debt finance will not compound sovereign financing challenges.

- **Strong policy environment:** A strong policy environment with national adaptation planning and investment plans in place and regulations to enforce adaptation measures will facilitate project pipeline development to seek concessional finance and will help ensure that projects financed deliver successful adaptation outcomes.

Applicable countries: Per the Global Landscape of Climate Finance, six countries received more than three-quarters of finance from DFIs to the water sector for adaptation: Tunisia, Morocco, Rwanda, Botswana, Gabon, and Egypt. Concessional finance is further possible in additional countries with sufficient climate information and relatively strong investment and policy environments – and can become increasingly possible as more countries in the region develop towards those enabling conditions. Direct project financing also typically requires large scale projects to take advantage of economies of scale.

STRUCTURED PROJECT FINANCE – Blended Finance (Including Commercial Debt): Climate Adaptation Notes

Summary: Climate Adaptation Notes is a structured funding mechanism aimed at increasing private, commercial bank debt, and institutional investment in water and wastewater sector infrastructure projects. The instrument combines short-term project financing for construction from commercial banks with long-term asset-based infrastructure funding provided by institutional investors. The target markets for Climate Adaptation Notes as designed are divided into three categories: pilot countries in the Southern African Common Monetary Union or tied to the South African ZAR, countries in the remainder of the Southern African Development Community (SADC), and then countries in the broader sub-Saharan Africa region.

Stage of Implementation: The instrument is currently in pre-piloting/fundraising stages and has not been implemented. To date, project implementers – Renewable by Nature and GFA Climate & Infrastructure – have identified and consulted with strategic partners, established a licensed independent fund manager, and been endorsed by the membership of the Global Innovation Lab for Climate Finance.¹⁵¹ Next steps for the instrument are to continue grant fund raising efforts to establish the debt capital markets platform and implement financial and impact management processes and then to mobilize investment to support equity project developers from DFI first loss capital providers, institutional capital, and commercial banks. Key challenges to instrument success include 1) project pipeline risk where lengthy project development cycles could reduce the pool of financeable projects and 2) monitoring and measurement challenges as the complexity of climate adaptation criteria can be an added burden for borrowers and lenders.

Actors involved:

- **Project developers:** Project developers may be public, private, or joint (PPP) entities and can be the source of the climate adaptation projects in the water and waste sectors. Project developers have a relatively high-risk appetite, do not generally have climate mandates, and have limited independent capacity to raise capital.
- **Commercial banks:** Are often the lead entity for origination of water projects and carry out financial and technical due diligence. Banks have construction project expertise, relatively higher risk appetites (as compared to institutional investors), and do not have fully committed mandates.
- **Institutional investors:** Have largely avoided financing water and wastewater projects in Africa due to cost recovery challenges and the complexity of the technical due diligence. Institutional investors could provide the funding for the refinancing of water sector climate adaptation projects once they have successfully reached commercial operations if the financial structure is able to accommodate their re-finance of bank finance.
- **DFIs:** Can provide the funding for a “first loss” subordinate debt tranche to credit enhance the funding structure and catalyze the long-term investors and mitigate their risk. DFIs also often provide guidance on climate adaptation screening and monitoring criteria of water adaptation projects. DFIs also often support the technical due diligence required for all investors in a project through funding or their own in-kind contributions. Their presence in deals can also assure investors that projects meet strict environmental, social, and governance criteria.

Criteria for country-level market and policy enabling environment: These enabling factors suggest environments in which the instrument could see most success:

- **Currency stability:** CAN will function best in countries with an existing debt capital market (DCM). In many countries, local capital markets may not be sufficiently deep to offer project finance in local currency – this could limit the instrument effectiveness because it is designed to unlock liquidity in local debt capital markets. Southern Africa is well suited as a pilot region for this instrument because targeted Southern African Common Monetary Union countries benefit from relatively well-developed DCM.
- **Significant pools of project pipeline:** Countries with significant pools of investable project pipeline in the water and wastewater sectors are strong candidates for CAN. This pipeline can be informed by a regulatory environment where adaptation projects are identified and prioritized and there is sufficient climate risk analytics capacity to ensure the projects meet target climate adaptation criteria.
- **Strong debt capital markets:** Aligned with a need for currency stability, this instrument will also function best in countries or regions with strong untapped debt capital markets with limited investment in infrastructure and stakeholder environments including strong institutional investors. Pensions funds are a target for long-term commercial investment and 90% of pension fund assets in Africa are concentrated in four countries: South Africa, Botswana, Namibia, and Nigeria, three of which are CAN-targeted countries.

Applicable countries: Given the use of local currencies, identifiable project pipeline, and deep institutional investor pool, countries/regions that could be well suited to a Climate Adaptation Notes model include the Southern African Customs Union (Botswana, Eswatini, Lesotho, Namibia, and South Africa).

FINANCING FACILITY – Equity Fund: Climate Investor Two

Summary: Climate Investor Two, from Climate Fund Managers (of Climate Investor One, which reached final close at USD 850 million in 2019), comes from a consortium of Dutch development bank FMO, SNV Netherlands Development Organisation (SNV), World Wide Fund for Nature (WWF-NL), and Climate Fund Managers (CFM), which won the tender to manage the EUR 160 million Dutch Fund for Climate and Development (DFCD), awarded by the Dutch Government. Like Climate Investor One, Climate Investor Two is structured to finance projects across three stages: 1) a development fund funded by non-repayable donor contributions, 2) a construction fund, and 3) a re-financing fund.

Stage of Implementation: Climate Investor Two will focus on water, oceans and sanitation subsectors, including: municipal and industrial water and wastewater supply, desalination, bulk water supply, waste and wastewater to energy, and riverine and coastal ecosystem management and protection. Climate Fund Managers is currently fundraising towards a final close of Climate Investor Two to be reached within the next few years.

Actors involved:

- **Development finance institutions:** DFIs are critical at all three stages of the fund – to provide donor capital in the form of development loans for the development fund, to provide first loss capital at the construction stage, and to de-risk the refinancing fund alongside institutional investors. DFIs also often provide guidance on climate adaptation screening and monitoring criteria.
- **Institutional investors:** Institutional investors, such as pension funds and insurance companies, have few investments in infrastructure debt and none in low-income or lower middle-income countries. The Facility will offer new investable securities for institutional investors and local banks in low- and lower middle-income countries that will allow these investors to achieve a greater exposure to pre-operational, operational, and performance assets. Over time, the intended aim is to drive a transition to a more local and private investment market.

- **Local banks and FIs:** Local banks and investors will be targeted in the re-financing stage. CFM's goal is that through the re-financing process, local banks and investors may acquire the skills in the long-term to manage performance and operational risks of climate projects, enabling further lending or further risk adoption through construction financing over time.

Criteria for country-level market and policy enabling environment:

- **Strong ecosystem of project developers:** Climate Investor Two requires a strong project pipeline in the water sector in target countries. A strong ecosystem of project developers is critical to this criterion. Project pipeline can be supported by a favorable policy environment where it is feasible to engage private capital in water infrastructure projects and where there is sufficient climate risk information available to ensure the projects meet set climate adaptation criteria.
- **Moderate currency stability:** The Fund makes investments in non-local currency, so a relatively stable currency environment is needed to avoid significant foreign exchange losses or hedging costs that would erode investor return. The ability to move capital in and out of the country without significant penalty or delay is also critical.

Applicable countries: Climate Investor One – CFM's first fund focused on energy investment has a total of 14 approved African countries by GCF to which it can direct GCF capital.¹⁵² These countries – spanning all five African Union regions – represent a reference point for Climate Investor Two and are likely to have stronger than average ecosystems of project developers and relatively stable market conditions for investment.



IV. TRANSPORT SECTOR

1. CLIMATE RISKS AND ADAPTATION ACTIVITIES IN THE TRANSPORT SECTOR

The African transport sector is projected to be heavily impacted by climate change over the coming years. Climate change could increase road maintenance costs by up to 2.7 times across Africa. Roads are at risk of damage across precipitation, flooding, and temperature climate stressors – and the impacts of those stressors differ between road types. Risks to roads include rutting of asphalt due to temperature increases, reduced load carrying capacity due to precipitation, and washaways of road infrastructure due to flooding.¹⁵³ Bridges are especially vulnerable to climate impacts, especially flooding which can cause bank erosion and make bridges unpassable, and impact costs are projected to rise 1.5-7 times from historic levels.

Across infrastructure sectors, this report defines adaptation activities as those which improve the climate resilience of existing infrastructure (building resilience of the asset), and which employ infrastructure to support systemic resilience (building resilience through the asset). In the context of the transport sector, this includes the following activities: road rehabilitation and

climate-proofing, revision of design criteria (and building to those criteria) informed by climate information and risk, implementation of slope protection and new plantation, spot upgrades in crucial areas including elevating low-lying road links, and employment of soil technology to protect rural roads.

2. CONTEXT OF BROADER INVESTMENT IN THE TRANSPORT SECTOR

The ICA finds that transport sector commitments totaled USD 32.5 billion in 2018 in Africa¹⁵⁴. Yet only USD 100 million was tracked in adaptation finance to the transport sector in the same year – suggesting that the vast majority of transport sector finance is not climate resilient. Even beyond existing transport investment, ICA estimates a total transport sector investment gap in Africa of between USD 4 billion and USD 16 billion annually and notes that only about 1/3 of rural Africans live within 2km of an all-season road.

Per the Landscape, public international climate adaptation investment in the transport sector is dominated by East Africa (43%), Southern Africa (35%), and West Africa (16%), with North and Central Africa each receiving less than 5%. Meanwhile, the plurality of overall investment beyond climate adaptation in the sector flowed to Southern Africa (37%), followed by a relatively evenly split among regions with North, West, and East Africa all receiving between 16% and 23% of investment in the sector. Central Africa received by far the least of any sector (USD 1.4 billion or 4.4%) – aligned with the small amount of climate adaptation finance in the sector directed to the region.

African national governments are by far the most significant source of funding to the sector – contributing USD 19.5 billion of the USD 32.4 billion to the sector in 2018, per ICA. As of 2018, China has become the second largest category of funder of the sector (USD 6.6 billion in 2018) and in 2017 became by far the largest individual financier of transport investments. China's commitments in the sector are concentrated in East Africa – where in 2018, China financed projects across ports, airports, railways, and roads across the region.

3. BARRIERS TO INVESTMENT IN THE TRANSPORT SECTOR

The most significant underlying barriers to adaptation finance in the transport sector in Africa include:

1. Variability of climatic conditions within a single project: Transport projects are often cross-jurisdictional in nature and therefore face a complex range of climate risks.
2. Public sector nature of the sector: Even more than for other infrastructure projects, some elements of the transport sector including roads, railways, and ports are often publicly owned and operated and therefore private sector involvement may not be feasible or beneficial in all cases.

3. Costs of continued maintenance: Even in cases where investments in resilience of transport assets is successful, roads and other transport assets face considerable continued maintenance and operations costs requiring very long-term finance structures.

4. Risk of negative social impact: In some instances across Africa, investment in the sector has been tied to negative social impacts including an increased number of fatalities during construction and increased gender-based and political violence. Safeguards are especially necessary in the transport sector to reduce these risks.



4. INSTRUMENTS IMPLEMENTED IN THE TRANSPORT SECTOR

A number of financial instruments have been deployed across Africa to respond to climate risks in the transport sector and to build resilience. The instruments discussed in this section cover grants and results-based finance instruments. Many instruments have a place in the ecosystem of financial solutions necessary to scale public and private finance in the sector to meet the enormous investment need.

implementation, the actors involved and the reasons the instruments were designed to engage those actors, and the factors at the country-level that make the instrument viable in particular contexts: capturing market and policy enabling environment factors that can yield most success. The instruments assessed here are in order of level of concessionality required, corresponding to enabling environment requirements (where more concessional instruments have fewer requirements).¹⁵⁵ In the transport sector, main instruments captured are:

The summaries of the instruments below capture the basic structure of each instrument, the status of

Instrument	Resilience/ Response/ Recovery	Risk Reduction/ Retention/ Transfer	Barriers Addressed
Grants – Development Grants: Lesotho Transport Infrastructure and Connectivity Project	Resilience	Risk Reduction	2,3
[External to Africa] Results-Based Finance & Project Finance: PPP Scale-up of Private Participation in Road Assets	Resilience & Recovery	Risk Reduction	3

GRANTS – Development Grants: Lesotho Transport Infrastructure and Connectivity Project

Summary: The World Bank/ International Development Association's (IDA) Lesotho Transport Infrastructure and Connectivity project aims to improve access to social services in rural Lesotho, strengthen road safety, and improve Lesotho's capacity to respond to crises. The core focus of the IDA credit is the construction of 35 footbridges in communities located in areas cut off from road access – particularly in the heavy rainy season (increasing in frequency and severity in some regions given climate impacts). Building resilience of the road infrastructure is a central component of the project design. Integration of climate responsive measures to address vulnerability and build resilience to severe floods and ensure safe crossing of rivers by pedestrians during the heavy rain season is a core focus. Approximately 10% of the total estimated cost of construction is expected to be associated with resilience-building measures including flood protection.¹⁵⁶

Stage of Implementation: The IDA commitment was approved in 2017 and the project is intended to close in 2023. Observational indicators against which the project will be evaluated at the close of construction include: pedestrian travel time reduction during rainy season to basic services, local agricultural markets with improved transport connectivity, and road accident reporting frequency.¹⁵⁷

Actors involved:

- **DFI:** IDA lends on highly concessional terms to the world's poorest countries – providing zero- and low-interest loans and grants. Repayments for IDA credits span 30 to 40 years and include a 5- to 10-year grace period.
- **Government Agencies:** The Lesotho Ministry of Public Works – Roads Directorate, and Ministry of Transport are the implementing agencies for this work. Because the transport sector is predominantly publicly owned and operated, domestic government capacity and support for implementation is critical.

Criteria for country-level market and policy enabling environment: These enabling factors suggest environments in which the instrument could see most success:

- **Relatively weak market conditions:** IDA supports only countries with particularly challenging economic conditions (39 African countries are eligible for IDA credit). Countries are eligible for IDA funds when they have a low GNI per capita (USD 1,185 in FY 2021) and a lack of creditworthiness to borrow on market terms.
- **Robust climate information:** Climate data and associated analytics are critical to assess and respond to climate risks, especially in the transport sector where risks are diverse and variable even within a single project.
- **Strong policy environment:** A strong policy environment with national adaptation planning and investment plans in place within the transport sector – across relevant jurisdictions including municipal, provincial, and national government entities is critical to facilitate project pipeline development to seek concessional finance and help ensure that projects financed deliver successful adaptation outcomes.

Applicable countries: 39 countries in Africa are eligible for IDA credit. Of these, 25 received adaptation finance from IDA in 2017-18 and in Many countries in Africa fit the IDA, though just Lesotho and Madagascar received IDA funding for adaptation projects in the transport sector.

[EXTERNAL TO AFRICA – CAMBODIA] RESULTS-BASED FINANCE & PROJECT FINANCE: PPP Scale-up of Private Participation in Road Assets¹⁵⁸

Summary: Outside of the African context, in Cambodia, the World Bank is supporting implementation of performance-based contracts to increase private sector engagement in the adaptation of the transport sector. IDA credit supports USD 170 million in road rehabilitation, building climate resilience and road safety in design and development, and improving road asset management. The World Bank's Public-Private Infrastructure Advisory Fund is working in parallel with the IDA finance with Cambodian Ministries of Public Works and Transportation (MPWT) and Rural Development (MRD) to inform the project design of output and performance-based road contracts to engage the private sector. The aim of the structure is to employ additional support from the Global Facility for Disaster Reduction and Recovery to reduce the impact of frequent floods on roads and structure a results-based payment to transfer benefits of the investment and risk to the private sector.

Actors involved:

- **World Bank (Public-Private Infrastructure Advisory Fund - PPIAF):** The PPIAF provides grants to support government efforts to develop an enabling environment for private sector participation in infrastructure. PPIAF activities include designing and implementing policy, regulatory, and institutional reforms, organizing consultation workshops to develop technical capacity, and building governmental capacity.¹⁵⁹
- **Government Ministries:** Agencies within countries of implementation are critical to designing the output and performance-based road contracts and agreeing to terms – particularly in a sector where the assets are public goods.
- **Global Facility for Disaster Reduction and Recovery (GFDRR):** Managed by the World Bank, the GFDRR is a grant-funding mechanism that supports disaster risk management projects worldwide. The GFDRR programs include the Building Regulation for Resilience Program which provides technical assistance to support governments in strengthening building regulatory capacity and creating a more resilient built environment – including in the transport sector.
- **Private Investors:** Could include any private sector investors across commercial financial institutions, private equity, and institutional investors. Within the sector – there is moderate to high potential per ICA for direct investor engagement in various infrastructure subsectors including toll roads and bridges, rail, and ports under concession agreements and for institutional investment engagement for those same subsectors through securitization of concession bundles.¹⁶⁰

Criteria for country-level market and policy enabling environment: These enabling factors suggest environments in which the instrument could see the most success:

- **Project pipeline:** This instrument would be most valuable in countries in Africa with significant pools of transport pipeline which can be informed by a strong policy environment where adaptation projects are identified and prioritized and there is sufficient climate risk analytics capacity to ensure the projects meet set climate adaptation criteria.
- **Engaged private sector:** This structure will function best in countries or regions with strong untapped private investors (direct investors and/or institutional investors) who could be engaged through the PPP structure to engage with the results-based payment.

Applicable countries: Though this structure has been implemented outside of Africa, in Cambodia, the concept is applicable in many African markets with a project pipeline of adaptation projects in the water sector and an engaged private sector. Judging from just countries where IDA or the World Bank have financed adaptation in the transport sector in 2017-18, Morocco, Madagascar, and Lesotho could all be early candidates for a similar structure in Africa. Of those three countries, Morocco has by far the strongest private sector as measured by domestic credit to the private sector (as a % of GDP) – as 87% compared to 21% for both Morocco and Madagascar and as measured by ease of doing business index where Morocco ranks 53rd (compared to 122 for Lesotho and 138 for Mozambique).

V. ENERGY SECTOR

1. CLIMATE RISKS AND ADAPTATION ACTIVITIES IN THE ENERGY SECTOR

Energy sector resilience is crucial to ensure undisrupted service for critical infrastructure and services and to minimize climate impacts to vulnerable communities. As countries strive to meet rapidly increasing energy demand while shifting towards increasing the share of low-carbon sources, especially hydropower generation, this further exposes them to climate risks. Energy sector bottlenecks and power shortages are already costing African countries around 2-4% of GDP annually, costs which are likely to be exacerbated due to climate change.¹⁶¹ Climate impacts in the energy sector are most prominent in the hydropower sector, which currently accounts for around 42% of electricity generation on average across the continent and exceeds 80% in 11 countries (Annex).¹⁶² Climate risks to hydropower include increased variability of streamflow, fluctuating basin water levels, and increased evaporation rates. These impacts will be spread unevenly across the continent. Expected loss of hydropower revenues range will range between 5-60% and increase consumer expenditure for energy by up to three times in dry scenarios.¹⁶³

Adaptation activities in the energy sector include climate-proofing power generation and transmission and distribution (T&D) assets, improving resilience of hydropower generation, and increasing access to reliable and affordable energy. Hard infrastructure measures can be complemented by soft measures such as identifying potential cascading risks in advance, establishing emergency protocols, and integrating and prioritizing resilience into regional and national energy plans.

Beyond strengthening national energy capacity, regional coordination through river basin organizations, power pools, and development banks should be enhanced to collectively manage shared water resources and power pools, as well as foster cross-border trade of energy. Meanwhile, increasing urban and rural access to clean, affordable, and reliable energy holds immense potential to decrease the exposure and vulnerability of communities and others living in energy poverty.¹⁶⁴

2. CONTEXT OF BROADER INVESTMENT IN THE ENERGY SECTOR

According to the ICA Energy sector commitments in Africa amounted to USD 43.8 billion in 2018, 67% higher than the 2015-2017 average and reaching the highest level of commitments ever recorded in the sector.¹⁶⁵ This is on par with estimated investment needs by the Program for Infrastructure Development (PIDA), which called for USD 42.2 billion annually to 2040 to meet forecasted demand. However, the level of energy commitments and progress on electrification has been uneven across regions.

West Africa received the largest share of energy commitments at USD 14.13 billion (34% of the total) and has the highest energy access rate at 52% in Sub-Saharan Africa (excluding South Africa). South Africa and North Africa were the next largest recipients at USD 7.9 billion and USD 7.7 billion respectively, with electrification rates of 86% and 100%. Southern Africa (excluding South Africa) received USD 4.62 billion, East Africa USD 3.4 billion, and Central Africa USD 3.5 billion, each with electrification rates of 31%, 39%, and 25% respectively.¹⁶⁶ Total private financing across the continent was USD 11.8 billion, with the majority going to energy and ICT sectors. USD 7.7 billion, or 65% of total private financing was destined for South Africa,¹⁶⁷ accounting for the majority of finance received by the country.

Achieving universal energy access, while cost-effectively meeting the increasing energy demand of a growing population and doing so with clean energy are the main

challenges and key priorities faced by decisionmakers in the energy sector.¹⁶⁸ With electricity demand in Africa expected to triple by 2040, many countries have turned to developing their untapped hydropower potential. Current installed hydropower capacity across the continent remains at around 37 GW, representing only around 11% of Africa's full capacity.¹⁶⁹ The low utilization rate may be explained by several factors, such as the land-intensive and site-specific nature of hydropower plants, a high-level of geological and hydrological risks that must be shared across public and private stakeholders, and significant project risks during the construction phase.¹⁷⁰ These factors are amplified in lower-income countries, making it even less attractive for private investors. The only large privately financed project in Africa has been the Bujagali plant in Uganda, whereas the majority of hydropower plants have been publicly financed often with the support of concessional finance and long maturities.¹⁷¹

By 2030, renewable energy capacity in Africa could reach 310GW.¹⁷² Over 50 hydropower projects currently under construction are expected to add only 15GW of installed capacity by 2025,¹⁷³ suggesting significant room for scaling up. Additional investments will be critical to account for increasing climate impacts and aging infrastructure, two of the main drivers contributing to low-capacity factors.¹⁷⁴ For instance, installed capacity in hydropower increased at an annual rate of 4.4% over the past decade, whereas generation only increased at an annual rate of 2.4%.¹⁷⁵

Approximately USD 250 million in adaptation finance tracked to the energy sector in Africa on average annually across 2017-18 from multilateral DFIs (95%) and international government ODA (5%). Finance to the sector was overwhelmingly in the form of low-cost project debt (91%) while the remainder was in the form of grant funding (9%).

3. BARRIERS TO INVESTMENT IN THE ENERGY SECTOR

Investments are being implemented worldwide including in Africa to reduce the vulnerability of existing energy facilities and infrastructure to extreme weather events. These investments should also consider projected future changes in climate and weather, especially for long lived assets. New facilities should be designed to be 'climate proof' with a view to projected future climate and weather characteristics.

However, the energy sector faces considerable challenges in mobilizing adaptation finance related to the long-term nature of infrastructure projects and the need to cost-effectively meet increasing energy demand. First and foremost, project developers lack the capacity to collect and integrate climate data into project design and are disincentivized from proactively investing in this capacity due to a lack of resilience mandate articulated in national infrastructure and energy master plans. This contributes to higher uncertainties in the quantification of climate-related financial risks, discouraging upfront investments as the benefits of resilient project design accrue long-term. Private investors are further discouraged from investing in larger projects such as hydropower plants given the mismatch of project lifespans and debt maturities offered by financiers. These specific barriers are further detailed below:

1. Capacity to collect and analyze relevant climate data: The lack of reliable and accessible information about climate risks and impacts to hydropower, combined with limited capacity to process available climate data in infrastructure modeling and translate findings into the necessary resilience measures makes it difficult to adapt proactively.¹⁷⁶
2. Risk attitudes of decision-makers: Given the long lifespan of energy infrastructure, ranging from 50 to 100 years for hydropower assets, it is critical to base expansions and new infrastructure investments on future climate projections. However, uncertainties around climate projections and the magnitude of associated revenue losses contribute to the lower risk perception of decision-makers. Moreover, decision-makers are not incentivized to make upfront capital investments as the benefits of resilience measures accrue over several years or decades.¹⁷⁷
3. Absence of climate resilience mandate: Long-term infrastructure plans and energy master plans that lack an explicit climate resilience mandate can discourage project developers and service providers from implementing resilience measures.¹⁷⁸
4. Revenue risk: Assessing revenue risks can be a significant challenge for project developers when expanding energy access to rural customers with no credit histories. As a result, energy access projects have been overwhelmingly dependent on donor grants, with limited private investor participation.
5. Currency and interest risk: The majority of Sub-Saharan African countries have underdeveloped capital markets, meaning the only viable option for financing infrastructure projects is through foreign currencies such as the dollar or euro.



4. INSTRUMENTS IMPLEMENTED IN THE ENERGY SECTOR

Innovative adaptation financing instruments in the energy sector aim to overcome barriers above through guarantees and concessional financing to crowd-in private capital, and support infrastructure projects over the long-term. Instruments that can offer longer-term maturities and local currencies are critical to encourage upfront investment in resilient project design and construction.

The summaries of the instruments below capture the basic structure of each instrument, the status of

implementation, the actors involved and the reasons the instruments were designed to engage those actors, and the factors at the country-level that make the instrument viable contexts: capturing market and policy enabling environment factors that can yield most success. The instruments assessed here are in order of level of concessionality required, corresponding to enabling environment requirements (where more concessional instruments have fewer requirements).¹⁷⁹ In the energy sector, main instruments captured include:

Instrument	Resilience/ Response/ Recovery	Risk Reduction/ Retention/ Transfer	Barriers Addressed
Guarantees: Green Aggregation Tech Enterprise (GATE)	Resilience	Risk Reduction	4
Project Finance – Currency Hedging: Long-term FX Risk Management (TCX)	Response	Risk Transfer	5
Financing Facility – Equity Fund: Climate Resilience and Adaptation Finance & Technology Transfer Facility (CRAFT)	Response	Risk Reduction	1,4

GUARANTEES – Green Aggregation Tech Enterprise (GATE)

Summary: GATE addresses the barrier of revenue risks associated with providing mini grids to rural customers lacking credit histories. A baseline level of revenue is guaranteed through the creation of a risk pool, to which mini grid developers pay a regular premium over a fixed coverage period. This enables mini grids to sufficiently service their debt obligations even when there is a revenue loss. By providing coverage to a diversified pool of mini grids operating across different geographies and customers, GATE can effectively and more accurately price risks compared to individual investors, while delivering returns to private investors.¹⁸⁰ Minigrids have climate resilience benefits because they can ensure energy users have access to power during long-term power outages caused by climate shocks that impact central grid systems. Minigrids are also effective for communities that are hard to reach from a centralized grid and can therefore offer access to energy towards adaptation solutions including cold storage of agriculture products during more frequent heat waves and communications devices to share early warning of storms and other climate shocks.

Stage of Implementation: The GATE mechanism requires a strong implementing partner to oversee and assess the risks associated with the provision and installation of mini grids to rural clients. Project implementers are currently in preparation stage to launch operations across southern Africa, starting with Zambia.

Actors involved:

- **Independent Power Producers:** Renewable energy mini grids, which can be powered by solar, wind, or solar, are key to rural energy access. It is estimated that around 140,000 more mini grids are needed in Africa to meet the goal of universal energy access by 2030. To achieve this scale of deployment, mini grids will need the support of private investors and commercial debt.
- **Developing finance Institutions:** DFIs can provide the grants and concessional financing necessary for working capital until the instrument can start generating revenues, as well as provide equity for cover the portfolio's payout liabilities.
- **Commercial banks:** Once the instrument's risk pool is sufficiently large enough and fully operational, the instrument can be used to crowd in commercial debt, which would otherwise not reach mini grid developers due to the perceived revenue risks.

Criteria for country-level market and policy enabling environment:

- **Robust electricity market:** In addition to managing the risk pool with premiums paid by mini grids, the implementing partner will cover purchaser default risks by securing alternative buyers and short-term trading on the Southern African Power Pool (SAPP). A robust regional electricity market and cooperation across countries' electricity companies will be critical to spread risks and secure the sustainability of mini grid operations.
- **Mandate or policies** for increasing energy access: Countries with a strong vision for achieving universal energy access are well suited for the instrument. To attract private investors, there must be long-term political commitment and stable policy framework to ensure the long-term sustainability of mini grids.¹⁸¹ The GATE instrument is supported by the Zambian Minister of Energy and will contribute to Zambia's vision for the electricity sector as laid out in the National Energy Policy 2019.

Applicable countries: Among the five power pools active in Africa, regional cooperation is greatest among countries in the Southern African Power Pool (SAPP). The continued preference for bilateral deals, lack of trust among states, and lack of generation and transmission capacity has hindered progress in the other regional power pools.¹⁸² Twenty countries have indicated improving energy access as a sectoral priority in their NDCs, of which four are in southern Africa- Lesotho, Malawi, Zimbabwe, and South Africa.

PROJECT FINANCE – Concessional finance: Long-term FX Risk Management (TCX)

Summary: TCX is a currency hedging solution that addresses two major financing barriers to energy investment in developing countries—currency risk and interest risk—by enabling investors to lock-in long-term finance in local currencies. TCX provides long-term fixed- and inflation-linked cross-currency swaps and interest rate swaps for climate investors, drawing on counterparties to improve leverage and contribute to long-term market development. This solution can help unlock further financing required for investing in resilient projects.

Stage of Implementation: Since launching in 2013, TCX has de-risked nearly USD 8.4 billion of external lending in emerging and frontier countries across 70 currencies and has contributed to market development by selling USD 1.5 billion of currency risk to international investors. Sub-Saharan Africa was the second most active region in 2020, accounting for 19% of de-risked finance (USD 187 million) across 18 countries. TCX also sold currency risk via the issuance and hedging of offshore local currency bonds in four countries in 2020.¹⁸³

Actors involved:

- **Domestic and foreign institutional investors:** Investors can benefit from the currency hedging solutions provided by TCX when investing in markets where commercial banks and other providers do not cover local currencies or long-term maturities. Investors may also purchase currency risk directly from TCX or through local currency bonds.
- **Governments:** Governments can participate as donors and investors to help increase coverage and improve leverage for the instrument. The German and Dutch government have provided support for TCX in the form of subordinated convertible debt and a first loss loan.
- **Microfinance and impact investors:** Microfinance and impact-oriented investors can become shareholders in TCX and offer currency solutions for inclusive finance institutions. Currently five privately managed microfinance investment vehicles are involved in TCX as shareholders and counterparties.
- **Development finance institutions:** DFIs can play a key role in de-risking this instrument by providing partial guarantees and leverage for a portfolio of cross-currency and interest rate swaps. 13 multilateral and bilateral DFIs are currently investors in TCX. The IFC has been a key collaboration partner by taking on credit risk as a triple-A rated counterparty, offering currency swaps and local currency loan products for clients.

Criteria for country-level market and policy enabling environment:

- **Capital markets in the early phase of development:** The instrument's core additionality is through the provision of local currency lending solutions in markets where local hedging markets are nascent or do not yet exist. However, certain preconditions are required for a functioning market, such as a basic legal and institutional framework, policy coherence, and an effective regulator.¹⁸⁴
- **Availability of counterparties with strong credit ratings:** As the swap provider, TCX is unable to take on credit risk and needs counterparties with strong credit rating to offer financial products that utilize TCX's solutions. Highly rated institutions such as DFIs or microfinance investment vehicles can take on this credit risk and connect TCX solutions to clients and institutions that target the most vulnerable communities.
- **Strong pipeline of SMEs, renewable energy, and infrastructure projects:** Around 70% of TCX supported financing in 2020 was in the microfinance and SME finance sectors, while infrastructure and renewable energy projects represented around 6%.

Applicable countries: TCX is already an active market player in Africa, having supported transactions in 20 countries across the continent in 2020, 18 of them in Sub-Saharan Africa.¹⁸⁵ Its solutions could be further applied in countries at the early stages of capital market development.

Financing Facility – Equity Fund: Climate Resilience and Adaptation Finance & Technology Transfer Facility (CRAFT)

Summary: CRAFT, from the Lightsmith Group, is the first commercial investment vehicle to focus on expanding the availability of technologies and solutions for climate adaptation and resilience. As a growth equity fund, CRAFT aims to invest in small and medium-sized enterprises (SMEs), located in both developed and developing countries, including in Africa, which have proven technologies and solutions for climate resilience and have demonstrated market demand and revenue. The fund is not purely energy sector focused, but many potential SMEs have energy sector relevance including SMEs that support energy availability and reliability and that develop risk forecasting to reduce energy sector climate risk.

Stage of Implementation: CRAFT reached first close with investments from the Rockefeller Foundation, KfW, and EIB alongside other public and private investors in 2019 and is fundraising towards final close. CRAFT has also identified 20 relevant climate resilience market segments totaling USD 130 bn+ of current spending and mapped more than 700 companies within these segments.

Actors involved:

- **Development finance institutions & government agencies:** The fund is structured with developing and developed country sleeves and the developing country sleeve will target public investors including multilateral and bilateral development banks and government ODA agencies for non-concessional equity and concessional equity and grants.
- **Institutional investors:** The fund targets institutional investors such as pension funds, insurance companies, endowments, foundations, and family offices.
- **SMEs:** There are many 100s of SMEs across Africa that have valuable adaptation solutions and have developed viable business models to implement those solutions. These SMEs include cooling technology developers, off-grid energy providers, and weather information providers to support infrastructure resilience.

Criteria for country-level market and policy enabling environment: CRAFT is targeting countries with high climate vulnerability and relatively low investment risk. Low investment risk is assessed based on a VC/PE attractiveness core, average domestic credit to the private sector, net DFI as a % of GDP, lending interest rate, and currency volatility criteria, among others.



VI. URBAN INFRASTRUCTURE

1. CLIMATE RISKS AND ADAPTATION ACTIVITIES IN THE URBAN INFRASTRUCTURE SECTOR

Africa is home to some of the fastest growing populations and urbanization rates in the world increasing its exposure to climate shocks. The current urban population of 587 million is expected to nearly triple to 1.5 billion by 2050,¹⁸⁶ and 22 countries have an urbanization rate greater than 50% (Annex). Many capital cities, especially in North and West Africa, are located along the coast, further exposing them to rising sea levels, flooding, and coastal erosion. Other cities must manage increasing vulnerabilities associated with the rapid influx of refugees and internally displaced populations.^{187,188}

The combination of increasing populations, migration, internal displacement and continued development along coastlines leads to the accumulation of climate risks in cities, posing threats to poverty reduction and other sustainable development goals. To avoid locking in unsustainable levels of exposures and vulnerabilities to climate shocks in cities, it is critical to mainstream resilience into the design and spatial planning of cities, including across critical infrastructure services such as water supply, drainage, energy, and transport.

Adaptation activities in the urban sector involve the provision and protection of a wide range of critical infrastructure services, from roads, water, sewage, drainage, waste management, to power, ICT, and urban greenery. For example, around 60% of Sub-Saharan Africa's urban population live in informal settlements that do not meet minimum standards for water and sanitation and are not serviced by the cities' infrastructure systems.¹⁸⁹ Municipal governments can promote the equitable distribution of infrastructure services through subsidies, mandates and strengthened governance of public and private utilities. Other relevant adaptation activities include the provision of urban green spaces, promoting balanced spatial planning that accommodates for the growing influx of migrants and refugees, as well as capacity building to better understand distributional impacts of climate change through improved data collection and utilization of urban planning tools.

2. CONTEXT OF BROADER INVESTMENT IN THE URBAN INFRASTRUCTURE SECTOR

African cities face a huge investment deficit, hindered by poor quality institutions, lack of decentralization and low levels of fiscal autonomy.¹⁹⁰ There is no reliable estimate on the level of the investment gap, however, as there is limited knowledge and assessment of the existing infrastructure stock and needs. Some research has indicated that around USD 92 billion annually may be required, which is double the level of current urban expenditures estimated at around USD 45 billion.¹⁹¹

The Infrastructure Consortium for Africa notes the World Bank and AfDB as the leading financiers of urban infrastructure across the continent, contributing around USD 2.3 billion in 2018. In recognition of the important role that subnational governments can play in supporting Africa's development goals, AfDB recently set out guidelines for subnational governments to enhance their ability to increase, diversify and better utilize their financial resources.¹⁹² The Bank also established an Urban and Municipal Development Fund in 2020 to support sustainable urban planning, project preparation and financing, secure private capital for infrastructure and develop new financial tools.¹⁹³ Applicants from regional member countries may request project-based support via the fund's regular window or small grants initiative. Complementing these efforts are recently launched initiatives that focus on building cities' capacities for scaling solutions for urban adaptation, such as the Cities Adaptation Accelerator (CAA), and the Africa Urban Water Resilience Program.

Approximately USD 120 million in adaptation finance tracked to the energy sector in Africa on average annually across 2017-18 from bilateral and multilateral DFIs (80%), international government ODA (11%), and other public funds (9%). Finance tracked to the sector was largely in the form of low-cost project debt (80%) while the remainder was in the form of grant funding (20%).



3. BARRIERS TO INVESTMENT IN THE URBAN INFRASTRUCTURE SECTOR

Some of the most significant underlying barriers to adaptation finance in the urban infrastructure sector in Africa are:

1. Availability of disaggregated climate data: Urban climate risks widely vary across different urban locations and sizes, between genders, ages, and income groups. However, because data on disaster losses are aggregated at the national or regional scales, these differences are usually obscured. Moreover, the impacts of smaller everyday hazards such as heatwaves, localized flooding, and infectious diseases that routinely affect the urban poor are not well understood. The death tolls associated with heatwaves and flooding, for instance, are likely to be concentrated in the urban peripheries and inner cities where infrastructure services are deficient compared to other parts of the city.
2. Lack of subnational fiscal autonomy: Local accountability and responsibility for managing and financing urban infrastructure is important for making decisions more efficiently at the local level. Subnational borrowing capacities for infrastructure and other capital needs are severely constrained, making long-term planning for climate resilience challenging and creating delays in responding and recovering promptly from disasters.
3. Misaligned incentives for upgrading infrastructure: Deployment of infrastructure upgrades to build resilience is limited by high upfront costs, uncertain returns from investments, and misaligned stakeholder incentives.

4. INSTRUMENTS IMPLEMENTED IN THE URBAN INFRASTRUCTURE SECTOR

Adaptation instruments for the urban sector can range widely from grants, debt, equity, and a wide range of risk-sharing mechanisms. Depending on the level of fiscal decentralization, subnational governments can and should play a bigger role in mobilizing and allocating finance to the communities and infrastructure services that need it most. The summaries of the instruments below capture the basic structure of each instrument, the status of implementation, the actors involved and the reasons the instruments were

designed to engage those actors, and the factors at the country-level that make the instrument viable in particular contexts: capturing market and policy enabling environment factors that can yield most success. The instruments assessed here are in order of level of concessionality required, corresponding to enabling environment requirements (where more concessional instruments have fewer requirements).¹⁹⁴ In the urban infrastructure sector, main instruments captured are:

Instrument	Resilience/ Response/ Recovery	Risk Reduction/ Retention/ Transfer	Barriers Addressed
Project Finance – Servitization: Cooling as a Service (CaaS)	Resilience	Risk Reduction	3
Financing Facility – Equity and Technical Assistance: Subnational Climate Fund	Resilience	Risk Reduction	1,2

Picture: ColdHubs



PROJECT FINANCE – Cooling as a Service (CaaS)

Summary: Urbanization is contributing to growing energy demand and costs associated with providing cooling in cities. CaaS aims to deploy efficient technologies at scale through a pay-per-service model that enables customers to pay per unit of cooling consumed and eliminates upfront investment in cooling technology. The service provider or financier owns and maintains the cooling equipment, and pays the utility bills, incentivizing the installation of the most energy efficient equipment. To achieve scale, a sale-leaseback model with banks can unlock more financing necessary to meet growing cooling demand. CaaS supports dual benefits projects across mitigation and adaptation – reducing emissions through cleaner cooling technology deployed and addressing underlying climate risks associated with increased heat.

Stage of Implementation: CaaS has already been successfully implemented across a range of applications including buildings and cold-chain storage. The proponents of CaaS, Basel Agency for Sustainable Energy (BASE), launched its first-ever matchmaking event in 2019 in Cape Town to connect South African providers, end-users, and funders of cooling technology. One current application of the CaaS model is in Nigeria where increased temperatures associated with climate change affect food storage capacity and will lead to increased harvest losses, increased food waste, and adverse health outcomes. The social enterprise ColdHubs in Nigeria designs, installs, commissions, and operates solar-powered walk-in cold rooms in produce aggregation centers and outdoor markets. Farmers and retailers pay a fixed price per 20kg crate per day to store their goods inside the cold room and ColdHubs owns all of the equipment with assets on their own balance sheet.¹⁹⁵

Actors involved:

- **Cooling service providers:** Under each cooling contract, the provider owns the equipment and is responsible for maintenance, repairs, and utility bill payments. This creates significant incentives for providing the best-in-class efficient technology and preventative maintenance.
- **Commercial banks:** When the cooling service provider needs recapitalization, for instance to scale multiple cooling contracts, the provider may engage banks in a sale-leaseback approach to unlock further capital. In this model, the bank purchases the equipment and leases it to the provider during the period of the CaaS contract.
- **Developing finance Institutions:** DFIs or insurance companies can provide grants and guarantees to enable the launch of operational contracts in new markets and customers.

Criteria for country-level market and policy enabling environment:

- **Basic legal and regulatory framework:** One of the most important components of the CaaS instrument is the cooling contract itself, which details the different roles and responsibilities of the cooling service provider, financier, and customer. A functioning legal and regulatory framework is necessary to reduce transaction fees and enforce the contract.
- **Dedicated policies and strategies for energy efficiency:** National policy frameworks can provide the incentives for both customers and service providers to benefit from the installation of energy efficient technologies.
- **Availability of local commercial banks:** To enable the scale-up of CaaS, it is important to attain the buy-in of local financiers that can provide commercial debt as well as participate in the sale-leaseback models.

Applicable countries: 21 countries indicated urban planning and infrastructure as a priority sector in their NDCs.¹⁹⁶ The SADC Center for Renewable Energy and Energy Efficiency (SACREEE), a member of the CaaS Alliance, recently launched an Industrial Energy Efficiency Program (SIEEP) which will run through 2018-2023 will involve providing training for bankers, creation of project pipelines, and seed funding. Participating countries in this program may be good candidates for CaaS.

FINANCING FACILITY – Equity and Technical Assistance: Subnational Climate Fund (SnCF)

Summary: A major barrier for cities in effectively addressing climate shocks is the low capacity and fiscal autonomy to allocate budgets towards resilience. Acknowledging that many climate solutions are within the reach of subnational authorities, SnCF aims to overcome barriers to mobilizing private capital at the subnational level, to encourage investments in climate resilient infrastructure. A Technical Assistance Facility is paired with a private equity fund, for project preparation, provide capacity building for local governments, and certify all investment projects for their climate and SDG impact. These projects would be aligned with countries' NDCs, articulate climate adaptation co-benefits, and incorporate Nature-based Solutions to enhance their climate resilience and long-term sustainability. The proof of concepts of investment projects will be made available to promote replicability and scalability, and granular methodologies and tools will be developed to continuously monitor and track adaptation co-benefits. The fund targets USD 750 million, of which USD 600 million will be commercial equity.

Stage of Implementation: SnCF is currently under implementation, after receiving approval from GCF in 2020 and will run through 2028. It expects to support around 40 subnational projects with a deal size of USD 5 million to 75 million.

Actors involved:

- **Development finance institutions:** DFIs can provide the anchor funding necessary to secure private investors' support and mobilize funding at scale. This can take the form of grants, for the TA facility, as well as concessional first-loss equity. SnCF will be receiving USD 150 million in concessional equity from GCF to unlock a further USD 600 million in private equity.
- **Institutional investors:** The combination of the technical assistance facility and concessional equity sufficiently de-risks investments for commercial equity to be mobilized at scale. SnCF expects to attract 80% in commercial equity for its fund.
- **Subnational governments:** Subnational governments are the main beneficiaries of this instrument, as it allows them to secure funding at more favorable terms than they would otherwise receive by borrowing from the capital markets. Governments may also benefit long-term from the TA facility, which will help build project pipeline and capacity for local authorities to design investments that are commercially attractive.

Criteria for country-level market and policy enabling environment:

- **Subnational governance capacity:** A minimum level of governance capacity is required for subnational entities to receive and efficiently allocate finance, as well as adequately monitor project impacts.
- **Policy framework for achieving climate and SDG impact:** Subnational entities that may not be able to borrow from international capital markets but have strong potential for achieving catalytic impact are good candidates for the instrument. Countries with a strong vision and mandate for achieving climate targets and SDGs provide incentives for subnational entities to invest in climate adaptation.

Applicable countries: Of the 42 countries involved in SnCF, 16 countries are in Africa: Burkina Faso, Cameroon, Côte D'Ivoire, Democratic Republic of the Congo, Gabon, Kenya, Mali, Mauritania, Mozambique, Morocco, Nigeria, Senegal, South Africa, Togo, Tunisia, and Uganda.

VII. COASTAL ECOSYSTEMS

1. CLIMATE RISKS AND ADAPTATION ACTIVITIES IN COASTAL ECOSYSTEMS SECTOR

Coastal ecosystems across Africa are at high risk of sea level rise, erosion, and flooding, which pose significant potential for impact to countries' economic activities, especially in the tourism sector. Increasing urbanized surface area and human activities including sand mining, water pumping, and pollution has degraded habitats important for marine biodiversity. In the Nile delta, for example, a one-meter sea level rise is projected to inundate 20% of the land area by 2100, and 0.5m sea level rise would displace 67% of the cities' populations. Related climate risks include saltwater intrusion into farmland, erosion and intensified flooding, fisheries decline, reduced availability of freshwater resources.

Coastal ecosystems and associated nature-based solutions are a significant contributor to climate adaptation in coastal countries and especially for small islands states. Coastal protection and limiting coastal erosion are critical to reduce impacts from severe weather events. Successful coastal and marine ecosystem management can support food security and the livelihoods

of coastal communities. Adaptation activities in the sector captured by this report include coastal wetland protection and restoration, beach and dune nourishment, coastal development setbacks, fisheries management and strengthening capacity, development of climate-informed tourism best management practices, and flood hazard mapping.

2. CONTEXT OF BROADER INVESTMENT IN THE COASTAL ECOSYSTEMS SECTOR

Africa is endowed with a vast network of aquatic resources and extensive interconnected oceans. The total length of Africa's coastal line is 26,000 km which makes the blue economy¹⁹⁷ particularly important for commercial, environmental, and developmental purposes. There are no reliable estimates available for the level of existing stock or investment gap in sustainable coastal ecosystems sector in Africa, though a recent UNEP report suggests that there is close to USD 5 billion annual investment gap in broader nature-based solutions (NBS) related financing in Africa.¹⁹⁸ Globally, the investments in NBS need to triple by 2030 and quadruple by 2050. Public sector financing dominates the landscape contributing over 85% of the funding while public international funding for NBS for adaptation in developing countries is only 1.5% of the total flows.

3. BARRIERS TO INVESTMENT IN THE COASTAL ECOSYSTEMS SECTOR

Some of the most significant underlying barriers to adaptation finance in the coastal ecosystems sector in Africa are:

1. Challenging economics: Adaptation in coastal ecosystems zone is often overlapping with flood risks management and land-use planning which have significant public good characteristics making it difficult to build an economic case.¹⁹⁹
2. Mixed public vs. private incentives: Coastal zones in the urban area often have high real estate and infrastructure value. In such cases, vested interests from private actors may obstruct the deployment of adaptation measures, especially when public perception of climate risks is low and may lead to conflict of interests.²⁰⁰
3. High costs: High cost of project preparation for large-scale infrastructure projects such as seawalls.
4. Lack of enabling environment: The policy and regulatory frameworks that incentivize sustainable enterprises or facilitate sustainable management practices are insufficient to attract private capital. In some cases, activities such as conventional fishing, shipping or fossil fuel extraction receive subsidies creating market distortions. Additionally, the economic evaluation methods for positive externalities of sustainable businesses are not sufficiently advanced to create an economic case.
5. Lack of project pipeline: There is a lack of high quality, investible projects with appropriate deal size and risk-return ratios to match the needs of the available capital. Many projects need grant capital or technical assistance to generate returns, which are also often low. Additionally, high relevance of context and natural diversity make scale and replication more complex than other sectors.²⁰¹



4. INSTRUMENTS IMPLEMENTED IN THE COASTAL ECOSYSTEM SECTOR

Numerous financial instruments have been designed and/or deployed across Africa to respond to climate risks facing coastal ecosystems and to build resilience. Given the largely non-commercial nature of the sector, the instruments discussed in this section are all blended or fully concessional instruments. These instruments all have a place in the ecosystem of financial solutions necessary to scale public and private finance in the sector to meet the enormous investment need.

The summaries of the instruments below capture the basic structure of each instrument, the status of implementation, the actors involved and the reasons the instruments were designed to engage those actors, and the factors at the country-level that make the instrument viable in particular contexts: capturing market and policy enabling environment factors that can yield most success. The instruments assessed here are in order of level of concessionality required, corresponding to enabling environment requirements (where more concessional instruments have fewer requirements).²⁰² In the coastal ecosystems sector, main instruments captured are:

Instrument	Resilience/ Response/ Recovery	Risk Reduction/ Retention/ Transfer	Barriers Addressed
Grants – Project Preparation Facilities: Enhancing Climate Change Adaptation in the North Coast and Nile Delta Regions in Egypt	Resilience	Risk Reduction	1-5
Project Finance – Grants + Concessional Debt: West Africa Coastal Areas Resilience Investment Project (WACA)	Resilience	Risk Reduction	1-4
Results-Based Finance – Debt for Climate Swaps (DFC): Seychelles DFC	Resilience	Risk Reduction	3,4
[External to Africa] Insurance: Restoration Insurance Service Company (RISCO)	Resilience	Risk Reduction & Risk Transfer	1-3

GRANTS – Project Preparation Facilities: Enhancing Climate Change Adaptation in the North Coast and Nile Delta Regions in Egypt

Summary: The Green Climate Fund (GCF) is co-financing the “Enhancing climate change adaptation in the North Coast and Nile Delta Regions in Egypt 2018-2025” project aimed to reduce coastal flooding risks in Egypt’s North Coast due to the combination of projected sea level rise and more frequent and intense extreme storm events. It focuses on two outputs: a) installation of 69 km of sand dune dikes along five (5) vulnerable hotspots within the Nile Delta and b) development of an integrated coastal zone management (ICZM) plan for the entire North Coast, to manage long-term climate change risks and provide Egypt with adaptability to impending flood risks. It will benefit 768,164 people directly in the coastal areas and 16,900,000 people indirectly. GCF is providing USD 31.4 million in grant to co-finance of the total project cost of USD 105 million. The rest 73.8 million will be contributed by the Ministry of Water Resources and Irrigation (MWRI), Egypt. eased frequency of extreme storm events. The project is aligned with GoE’s priorities as outlined in its Nationally Determined Contribution to the Paris Agreement.

Stage of Implementation: The project has a lifespan of seven years from 2017-2025. As of May 2021, USD 11.5 million have been disbursed from GCF. The project commenced in 2018. As per the latest project implementation report available, construction of coastal soft protection structures at the 5 vulnerable hotspot locations has started.²⁰³

Actors involved:

- **Climate Finance Fund:** The co-financing grant has been provided by the international climate fund, GCF. The climate funds have a high-risk appetite and dedicated climate adaptation mandate. They also play a role in providing technical assistance, project preparation and readiness support to the recipient countries.
- **Executing Partner Entities:** Buy-in and implementation support from the various government ministries and departments at the national and subnational level are key to the success of the project. Ministry of Water Resources and Irrigation, Ministry of Environment Ministry of Agriculture and Land Reclamation (MALR) as well as Coastal governorates and local communities in Port Said, Damietta Beheira, Dakhalia, and Kafr ElSheikh are involved in this project.
- **National Designated Authority:** Egyptian Environmental Affairs Agency is the NDA responsible for this project. National Designated Authorities (NDAs) are government institutions that serve as the interface between each country and the Fund. They provide broad strategic oversight of the GCF’s activities in the country and communicate the country’s priorities for financing low-emission and climate-resilient development.
- **Accredited Entity (AE):** UNDP is the AE for this project. AEs support the NDA on preparation and submission of the project proposal to the GCF. They also partner with GCF to implement projects. They have gone through the GCF accreditation process and have the technical and institutional capacity to complement the National Designated Authorities and other borrowers to successfully complete the project.

Criteria for country-level market and policy enabling environment: These enabling factors suggest environments in which the instrument could see most success:

- **Strong policy environment:** A strong policy environment with national adaptation planning and investment plans in place and regulations to enforce adaptation measures will facilitate project pipeline development to seek concessional finance and will help ensure that projects financed deliver successful adaptation outcomes
- **Existence of Accredited Entities/National Designated Authority to access GCF Funding:** Studies suggest that in Africa, reliance on International Accredited Entities constrains countries’ capacity building, thereby restricting direct access to the GCF funding. Therefore, for a more country-driven approach, existence of more domestic entities is crucial. Direct Access Entities which are subnational, national, or regional organizations that are nominated by the NDAs are an important step in that direction.

- **Technical and institutional capacity building:** Capacity building and readiness programs within the national stakeholders for project preparation, accessing and deploying funding and monitoring and evaluation.²⁰⁴

Applicable countries: Even though many African countries have National Designated Authorities (NDAs), government institutions that play as an interface between the country governments and the Fund, only four countries have national government ministries that are direct access entities which help access the funds directly at the country level namely Rwanda, Ethiopia, Uganda, and Benin.²⁰⁵

PROJECT FINANCE – Grants + Concessional Debt: West Africa Coastal Areas Resilience

Investment Project (WACA)

Summary: The WACA program is aimed at strengthening the resilience of targeted communities and areas in coastal Western Africa. It was developed in partnership with coastal communities in six Western African countries - Benin, Côte d'Ivoire, Mauritania, São Tomé and Príncipe, Senegal, and Togo. It is implemented through a portfolio of WACA Resilience Investment Projects which mainstream climate risks (i.e. SLR, flooding, temperature, extreme weather) and resilience measures into national policies and strategies.

The project also implements social and physical investments in three sectors particularly vulnerable (transport, urban, natural resources) in hotspot areas threatened by coastal SLR, floods and erosion. The WACA Platform is aimed at scaling collaboration, financing, knowledge, dialogue for coastal resilience in the region and at

mobilizing investments for coastal resilience through bilateral discussions with traditional development partners for concessional and grant financing. The program also includes a WACA Marketplace, a simplified investment mechanism that aims to match the demand for coastal resilience investments with the supply of partner financing.

Stage of Implementation: In 2018, the World Bank approved a total package of USD 222 million to six countries with USD 20 million grant from the Global Environmental Facility (GEF) and the Nordic Development Fund (NDF). The French Development Agency (AFD) and the French Fund for the Global Environment (FFEM) provided additional and coordinated support to the package under the WACA Program.

The project has a lifespan of five years from 2018-2023. As of June 2021, 17% of the committed amount has been disbursed.²⁰⁶ In Benin, 3,500 households are secured from coastal erosion and flooding.²⁰⁷ Co-financing agreements have been signed with 33 Biodiversity

Community Conservation Areas cooperatives for Income Generating Activities (IGAs) in the fields of animal husbandry, fish farming, market gardening and agri-food processing.²⁰⁸

Actors involved:

- **DFIs and the Climate Change Funds:** The World Bank, GEF and NDF are jointly funding the initiative. DFIs can take a role in de-risking projects and can also offer technical assistance in climate risk assessment and resilience building.
- **Project developers:** Project developers may be public, private, or joint (PPP) entities which will play a role in preparation and implementation of resilient project in the coastal ecosystems sector. Project developers have a relatively high-risk appetite, do not generally have climate mandates, and have limited independent capacity to raise capital.
- **Regional Economic Communities (RECs):** Various organizations contributing to the WACA program include the Abidjan Convention (ABC), Economic Community of West African States (ECOWAS), International Union for Conservation of Nature (IUCN), the West African Economic and Monetary Union (WAEMU). There are six officially recognized RECs²⁰⁹ which work closely with the African Union. Despite constraints, RECs are critical for regional integration and to promote cross-border coordination and economies of scale.²¹⁰

Criteria for country-level market and policy enabling environment: These enabling factors suggest environments in which the instrument could see most success:

- **Strong regional cooperation:** This type of instrument will see most success in regions where there is strong regional cooperation through a REC or similar organizing entity. The instrument will therefore also be most effective in regions with generally stable political environments for the sake of cross-national collaboration.
- **Project pipeline:** This instrument would be most valuable in regions in Africa with significant pools of coastal ecosystems pipeline where adaptation projects are identified and prioritized and there is sufficient climate risk analytics capacity to ensure the projects meet set climate adaptation criteria.
- **Currency stability:** Because of the cross-national nature of the instrument, it may function best in regions where countries have relatively stable currency markets or where there is a common currency across countries (i.e., the Southern African Customs Union – where all countries operate on the Rand).

Applicable countries: Considering the requirement of stable political system, strong regional cooperation and presence of bankable projects, countries in North Africa can be good candidates for update of this instrument.

RESULTS-BASED FINANCE – Debt for Climate Swaps (DFC Swaps): Seychelles DFC

Summary: In 2017, the Seychelles became the first country to successfully undertake a DFC swap aimed at specifically protecting the world’s oceans. The Nature Conservancy (TNC) acquired Seychelles’ foreign external debt at a discounted price and also raised additional donor funding worth USD 5 million from private actors. The government of Seychelles will repay the loans to a specially created Seychelles Conservation and Climate Adaptation Trust (SeyCCAT) by TNC. The private donor funding will also go SeyCCAT which will, in turn, conserve 13 Marine Protected Areas (MPAs) that cover more than 85% of the coral reefs and shallow waters in Seychelles.²¹¹

Stage of Implementation: Since 2017, SeyCCAT has indeed issued over USD 1.5 million in grants to more than 25 grantees implementing a total of 33 projects. The grants have benefited marine protected areas such as Curieuse Marine National Park, Aldabra, Bird Island, Alphonse Island and Farquhar and with baseline assessment of the marine biodiversity of Fregate island, an aspiring MPA. More than half of the funds have gone towards projects led by or benefited women and a third towards youth-led or projects where youth are the primary beneficiary. 23 projects have benefited small-scale artisanal fisheries.²¹²

Actors involved:

- **Debtor nations:** New debt can be issued by a debtor nation to replace existing debt with a commitment to use proceeds to address climate change through mutually agreed performance-linked incentives such as lower interest rates, grants, carbon offsets to service interest, etc.
- **Creditor:** Creditor is likely to be another sovereign, but private sector creditors are also encouraged to participate in a DFC swap.
- **Escrow or a transparent fund** - A separate non-government fund or trust like SeyCCAT needs to be established with its autonomy and independence to effectively manage the funds. It increases the investor confidence and fosters good governance and transparency.
- **Project developers:** Project developers may be public, private, or joint (PPP) entities which will play a role in preparation and implementation of resilient project in the coastal ecosystems sector. Project developers have a relatively high-risk appetite, do not generally have climate mandates, and have limited independent capacity to raise capital.

Criteria for country-level market and policy enabling environment: The DFC's blueprint suggests the following criteria for climate adaptation for debt swaps:

- **High Public Debt with conditions applied:** High level of public external debt held bilaterally by other sovereigns is an essential but with a condition of no imminent liquidity crisis. The country should be in a position to service their debt but have a limited fiscal capacity to mobilize domestic public climate finance.
- **Middle income countries:** Countries should ideally be a MIC (Middle Income Country), as per World Bank classification. However, Low Income Countries (LIC) that are not part of Debt Suspension Servicing Initiative (DSSI) can be considered. More than 70% of debt service in countries except the developed nations due in 2021 is owed by Upper MIC. LIC form a very small portion of due debt service. Additionally, the MICs are not eligible for the DSSI where bilateral official creditors are suspending debt service payments from 73 most vulnerable countries till December 31, 2021. Therefore, through MICs do not face an imminent liquidity crisis, they have distressed debt conditions and need support for economic stimulus for Covid-19 pandemic and for continuing climate action.
- **High-level political leadership and advocacy:** high-level political support and whole-of-government support from the debtor's government. Without this, there is high possibility of discontinuation or stalling the negotiations in case of change of government or lack of buy in for the activities' added value.

Applicable countries: Zimbabwe has held high in public external debt bilaterally (USD 2.7 billion, 12.8% of GDP). It is a middle-income country and not a part of the DSSI. It faces significant climate vulnerability and has relatively high carbon emissions considering (87% of the power generation from coal) but has expressed high political will to transition to low carbon economy through renewable energy deployment. Zimbabwe has also called for one of the largest investors, China to renegotiate its debt.²¹³

[EXTERNAL TO AFRICA – PHILIPPINES & VIETNAM] INSURANCE – Restoration Insurance

Service Company (RISCO)

Summary: RISCO is a first-of-its-kind social enterprise that overcomes existing barriers to mangrove protection by connecting the adaptation and mitigation values of mangroves to the beneficiaries of these values, most of whom do not have the knowledge or resources needed to protect mangroves—including insurance companies. RISCO will engage in mangrove conservation and restoration in partnership with local communities, selecting sites where mangroves provide high flood reduction benefits, and modeling that value. RISCO will then generate revenues based on modelled reduction benefits, with one option being insurance companies paying an annual fee for these services. RISCO will also generate and sell blue carbon credits to organizations seeking to meet voluntary or regulatory standards.

Stage of Implementation: RISCO is currently in the pilot phase in the Philippines and Vietnam and at the stage of selecting 2-3 pilot sites. Key barriers RISCO faces to its success include 1) identification of sites with sufficiently large mangrove cover to justify project development, 2) selection of regions with sufficient insurance penetration, and 3) potential challenges associated with securing legal rights to blue carbon credits.²¹⁴

Actors involved:

- **Coastal communities and women's groups:** Will benefit from the coastal protection of the mangroves themselves, the ongoing payments to protect mangroves (through conservation agreements), revenue sharing from the sale of blue carbon credits, and finally livelihood income derived from mangrove planting and maintenance, and improved fisheries.
- **Coastal asset owners:** Will benefit from the role that robust mangrove ecosystems play in erosion and flood control and fisheries support, and from access to insurance.

- **Insurance companies:** Will benefit primarily from lower risk exposure profiles and payouts in the event of storms, typhoons, and cyclones. Partnering with RISCO would also bring CSR benefits, and may open up new business opportunities previously deemed too risky.
- **Carbon credit buyers:** Will benefit from the emission reductions provided, as well as the co-benefits associated with blue carbon projects.
- **Blue carbon right holders:** Often the local or national government, these actors will receive a fixed fee payment to secure the blue carbon rights and/or a negotiated portion of the blue carbon revenue while ceding a portion to RISCO for implementing the project.²¹⁵

Criteria for country-level market and policy enabling environment: These enabling factors suggest environments in which the instrument could see most success:

- **Presence of mangrove cover and exposure to extreme events:** Sufficiently large mangrove cover or potential for large areas of mangrove restoration which are exposed to storms, cyclones and flooding will be most effectively served by this instrument.
- **Presence of legal and economic structure suitable for carbon credits:** High potential for developing blue carbon credits, including significant carbon content, and legal structures that allow for crediting.
- **Presence of a growing non-life insurance market:** Though the non-life insurance market in African countries is relatively small compared to global peers, it is growing at a fast pace especially in North and West Africa.²¹⁶

Applicable countries: Given the requirement of a growing non-life insurance market, presence of mangrove cover and coastal assets, Kenya is a good fit for replication of RISCO in Africa.





VIII. THE LAND USE AND FORESTRY SECTOR

1. REGIONAL CLIMATE RISKS IN THE LAND USE AND FORESTRY SECTOR

Some of the most significant impacts of climate change on this sector are desertification, habitat lost, habitat shifts, and loss of biodiversity. These issues have a tremendous impact on the livelihoods on the vast number of people on the continent who are dependent on the land for shelter and economic survival. North Africa is the region most impacted by water scarcity and desertification, with nearly 100% of the land mass is considered “dryland”, 80% of which is considered barren by the FAO.²¹⁷ West Africa and Central Africa are most impacted by droughts and unpredictable rainfall patterns which are leading to significant loss or shifting of habitats. In Southern Africa, forests account for 41% of total landmass. Droughts and altered fire regimes are leading to land degradation and deforestation in that sub-region. In East Africa, grasslands support 8 million people in East Africa. A combination of climate (prolonged droughts, increasing temperatures) and non-climate (overexploitation, population growth) are leading to degradation and desertification.

Activities in this sector largely focus on adaptation related to forest and non-agricultural habitat destruction, and efforts to conserve and more effectively and comprehensively manage land use in order to prevent further destruction. As much as possible, the analysis does not include agricultural or other human (non-climate change) related activities. Given the comprehensive, multi-sectoral approach required to address land use and forestry,

some overlap (particularly with the agricultural sector) will be difficult to avoid entirely. Adaptation activities covered in this sector include: forest protection (e.g., planting drought-resistant vegetation and invasive pest control), forest regeneration, biodiversity conservation and restoration, sustainable agro-forestry and live-stock practices, and sustainable harvesting of timber.

2. CONTEXT OF BROADER INVESTMENT IN THE LAND USE AND FORESTRY SECTOR

One of the major initiatives in the land use and forestry sector in Africa is the Great Green Wall initiative (GGW), which aims to restore 100 million hectares of degraded land and create up to 10 million green jobs via the development of a green barrier along a 7,000 kilometer stretch from Djibouti to Senegal. Until recently, GGW had largely been driven and funded by the 20 member countries, with total contributions estimated at around USD 1 billion out of an estimated USD 33 billion required.²¹⁸ In January 2021, a consortium of donors announced a USD 14 billion commitment to the initiative.²¹⁹ The UN Convention to Combat Desertification (UNCCD) will monitor these commitments and facilitate discussions on programming.

3. Barriers to Investment in the Land Use and Forestry Sector

Some of the most significant underlying barriers to adaptation finance in the land use and forestry sector in Africa are:

1. Siloed approaches where multi-sectoral, cross boundary solutions are needed: Land Use and Forestry transcend sectoral and geographic boundaries. This adds to the complexity in terms of matching the vested interests of multiple actors (communities, governments, businesses), as well as developing structures for implementing projects or interventions. Most governments, donors, and businesses are organized by sector, and National Adaptation Plans follow this siloed approach as well. There is a need to create multi-sectoral, multi-jurisdiction entities to implement projects in this sector.
2. Multi-stakeholder solutions can create complexity for channeling funding: Developing and implementing solutions in land use and forestry involves numerous actors (e.g., communities, local governments, businesses, etc.) and flows across sectors (e.g., agriculture, watersheds, etc.). The need for coordination across these sectors, communities, and other stakeholders can make the design and implementation of funding solutions quite complex, as there will be a need to agree on and appoint or create a new single entity to be responsible for fiduciary, technical, and legal oversight.
3. Need to balance ecosystem restoration with community needs for economic development: Efforts aimed at protection and/or restoration of damaged or diminished habitats can run in conflict with individual or community economic pursuits. A wildlife preserve might encroach on productive farmland or forest. Similarly, communities that earn income selling firewood (or burning wood for their own energy) could be opposed to efforts to limit harvesting. Diverse incentives need to be aligned.

4. Instruments Implemented in the Land Use and Forestry Sector

Financial instruments featured in this sectoral analysis span a range of actors and financial structures. The first instrument focuses on micro-forestry, encouraging sustainable forestry through empowering smallholder farmers. The second examines a private equity vehicle that focuses on companies throughout the timber value chain that are committed to sustainable practices. The final instrument featured highlights the complexity of integrated land management by examining a community-based approach to conservation.

The summaries of the instruments below capture the basic structure of each instrument, the status of implementation, the actors involved and the reasons the instruments were designed to engage those actors, and the factors at the country-level that make the instrument viable in particular contexts: capturing market and policy

enabling environment factors that can yield most success. The instruments assessed here are in order of level of concessionality required, corresponding to enabling environment requirements (where more concessional instruments have fewer requirements).²²⁰ In the land use and forestry sector, instruments captured are:

Instrument	Resilience/ Response/ Recovery	Risk Reduction/ Retention/ Transfer	Barriers Addressed
Results-Based Finance – Conservation Trust: African Conservancies Fund (ACF)	Resilience	Risk Reduction	1-3
Results-Based Finance – Adaptation Benefits: Adaptation Benefits Mechanism	Resilience	Risk Reduction	2,3
Financing Facility – Concessional Debt Facility: Komaza Smallholder Forestry Vehicle (SFV)	Resilience	Risk Reduction	2,3
Financing Facility – Private Equity Fund: Africa Sustainable Forestry Fund II	Resilience	Risk Reduction	1,3



RESULTS-BASED FINANCE – Conservation Trust: African Conservancies Fund (ACF)

Summary: The ACF was established by Conservation International (CI) with the objective to align economic and conservation objectives in the communities in and around the Maasai Mara in Kenya. Working with partners such as the Maasai Wilderness Conservation Trust (MWCT), the Big Life Foundation, and Apple, the ACF provides debt capital to the Trust to develop sustainable revenue generating activities such as eco-tourism, sustainable agriculture, and carbon credit generation. The loans are to be repaid from this revenue.

Stage of Implementation: To-date, CI and its affiliates have provided USD 500,000 in loan capital to the Trust and aims to increase this to USD 5 million over two years. CI is targeting USD 100 million as the initial capital post-proof of concept. CI has further plans to expand this model to other areas in Africa with rich potential for ecotourism or other sustainable revenue generating activities.

Actors involved:

- **MWCT:** The Trust was formed to protect the culture heritage and economic interests of the Maasai people, which includes habitat protection and restoration. The Trust will be the borrower in the ACF and will be responsible for designing and executing the planned activities.
- **Conservation International:** CI provides technical assistance to the Trust to identify and carry out the conservation plan. They also developed and structured the pilot instrument.
- **DFIs and impact investors:** Concessional capital providers with impact mandates are likely to be the main funders for this model initially, as the full commercial viability of the approach is still being proven.
- **Carbon markets:** Trusts that incorporate reforestation will realize a mitigation co-benefit of greenhouse gas reduction, which can be monetized and sold as carbon credits to governments or private companies.

Criteria for country-level market and policy enabling environment: These enabling factors suggest environments in which the instrument could see most success:

- **Private/local land ownership:** The Trust model relies on the authority of local communities to make decisions around how their land is managed, and to be able to earn income from activities carried out (or avoided) on the land. Areas under national government are less likely to be able to benefit from this highly local, highly participatory structure.
- **Legal framework for trust structure:** Trusts need to be able to incorporate and have authority to take investments, borrow money, distribute funds, and oversee and implement conservation and income generating activities.

Example countries: CI is looking at expanding the Fund concept to Sub-Saharan Africa.

RESULTS-BASED FINANCE – Adaptation Benefits: Adaptation Benefits Mechanism (ABM)

Summary: The Adaptation Benefits Mechanism (ABM) is a results-based financing instrument designed to catalyze private investment into adaptation projects through grants to project sponsors to repay commercial investors. Grant payments are based on a third party, non-market valuation of adaptation benefits generated by the project. While the mechanism is designed for many different types of adaptation projects, it is well suited to land use and forestry where benefits can be easily quantified, and subsidized capital can be catalytic in terms of bridging a gap between market terms and community ability to pay.

Stage of implementation: ABM is in its pilot phase, launched in 2019 and due to last through 2023. During this time, ABM will seek to deploy USD 50 million to projects in this phase.

Actors involved:

- **African Development Bank:** AfDB is leading the implementation of the pilot phase, and is responsible for hosting the Secretariat, leading operations, and fundraising for the mechanism.
- **Donors:** The ABM is able to accept funding from all types of funders to capitalize the facility for results-based payments to projects. These donors may include DFIs, philanthropies, and the private sector.
- **Project developers:** The ABM is flexible in that it can accommodate projects developed by both for-profit and non-profit entities.
- **Project investors:** Debt and equity investors provide the conventional funding for the individual projects. These include commercial or national development banks, private equity funds, and DFIs.
- **Third party verifiers:** ABM will contract with third party experts to verify and quantify the adaptation benefits generated by individual projects.
- **Project beneficiaries:** These are the individuals and communities who benefit from conservation of ecosystems and creation of sustainable economic activities supported by individual projects. ABM gives clear direction that beneficiaries should be included in the design, implementation, and monitoring of the projects.
- **Host country governments:** Host country governments may provide approval for projects if required by the ABM. In addition, host countries are able to report on adaptation benefits generated in the context of their NDCs.

Criteria for country-level market and policy enabling environment:

- **NDC/NAP focus on conservation efforts:** Countries that prioritize ecosystem conservation and other adaptation efforts will be more likely to support and develop a pipeline of projects that meet ABM criteria.
- **Presence of private sector investors:** For the results-based ABM financing to provide the greatest incentive, the commercial terms of the project-level debt or equity investment should be non- or minimally concessional. As such, project level lenders and investors should have confidence to invest in the country.

Example countries: While the ABM could be deployed in a number of countries, Ghana and Cote d'Ivoire have been the most supportive of the establishment of the mechanism, so likely to be active in proposing pilot projects.

FINANCING FACILITY – Concessional Debt Facility: Komaza Smallholder Forestry Vehicle

Summary: A forestry business based in Kenya whose mission is to move small-scale farmers out of poverty. SFV is an instrument that packages tree production partnership contracts with thousands of smallholder farmers and sells them to investors, providing farmers and forestry companies with access to low-cost, long-term finance while enabling institutional investors to access sustainable forestry investments. SFV is the only investment mechanism that enables private investors to invest in smallholder forestry in Africa, while also reducing capital costs for forestry companies that provide technical support and market linkages to smallholders.

SFV reduces transaction costs for investors and reduces some risks of plantation forestry. By segregating the risks of the individual tree assets from those of an operating company, SFV can achieve a lower cost of capital

while attracting a broader diversity of investors to participate than the operating company could achieve through traditional balance sheet finance.

Stage of Implementation: The instrument is in fundraising/pre-pilot stage. As of July 2020, Komaza had planted over 6 million trees and partnered with 25,000 farmers across Kenya. It raised a USD 28 million Series B round, with funding from Novastar Ventures, Novastar LPs AXA Investment Managers (through the AXA Impact Fund: Climate & Biodiversity), FMO and Mirova's Land Degradation Neutrality Fund.²²¹

Actors involved:

- **Farmers:** Farmers provide the land, labor, and security and manage the planting and harvesting of the wood, which is then sold to the company (Komaza).
- **Community leaders:** Community leaders confirms that farmers have the right to use the land for the purposes planned.
- **Impact investors:** Komaza has received funding from numerous impact investors including Conservation International to fund (via concessional debt) their initial lending activities and carry out the proof of concept.
- **Philanthropies:** Komaza has received grant funding from philanthropies including Ashoka and Kiva for technical assistance to develop a software platform and develop a system for tracking impact.

Criteria for country-level market and policy enabling environment: These enabling factors suggest environments in which the instrument could see most success:

- SFV is based on funding to and contracts with individual farmers. As such, the policy and enabling requirements at the country level are minimal.

Example countries: Komaza is currently based on the coast of Kenya. The instrument would be applicable in any setting where forest preservation and restoration are needed. Potential target markets for expansion include Ethiopia, Mozambique, Rwanda, Tanzania, and Uganda.²²²

FINANCING FACILITY – Private Equity Fund: Africa Sustainable Forestry Fund II

Summary: ASFFII is a private equity fund that invests in companies active in the sustainable forestry value chain. Managed by Criterion Africa Partners, the 10-year, USD150 million fund’s investors include the AfDB, BIO (Belgium), EIB, FinDev (Canada), and FMO (Netherlands). Investees must meet Forest Stewardship Council guidelines, and most investments include acreage set aside for conservation. This fund is an example of an instrument with mitigation and adaptation co-benefits. While significant focus is on reforestation and sustainable tree harvesting, the fund’s approach to conservation set asides and afforestation provides significant adaptation benefits.

Stage of Implementation: To-date Criterion has made investments in eight sustainable timber companies in eSwatini, Gabon, South/Southern Africa, Tanzania, and Uganda.²²³

Actors involved:

- **Private equity investors:** Calvert Impact Capital, a US-based impact investment firm, is a limited partner in the Fund, bringing private capital into the sustainable forestry space in Africa.
- **DFIs:** Five of the fund’s six limited partners are all DFIs (see list above). The instrument is a blended equity instrument. Five of six limited partners are DFIs, implying a certain level of concessionality. Assuming all LPs invest in equal proportions, the capital stack would look as follows:

Commercial (senior): Calvert Impact Partners		
Concessional (subordinate):		
• AfDB	• EIB	• FMO
• BIO	• FinDev	
- **Sustainable forestry companies:** The portfolio investments of the fund are concentrated in plantation rehabilitation and expansion, sustainable downstream manufacturing, and biomass.

Criteria for country-level market and policy enabling environment: These enabling factors suggest environments in which the instrument could see most success:

- **Currency stability and repatriation:** The Fund makes investments in USD, so a relatively stable currency environment is needed to avoid significant foreign exchange losses or hedging costs that would erode investor return. In addition, the ability to move capital in and out of the country without significant penalty or delay is needed.
- **Country commitment to sustainable forestry practices:** For its investments to be successful, the Fund must look to countries where there is both a sizeable timber industry, but also where sustainable forestry practices are promoted and supported by the national government such that its portfolio companies are not competing against companies that do not follow FSC guidelines.

Example countries: The Fund is currently invested in eSwatini, Gabon, South/Southern Africa, Tanzania, and Uganda. Other countries that could meet the investment criteria above include Botswana, Kenya, and Rwanda.

D. STRUCTURAL BARRIERS AND RECOMMENDATIONS TO ADVANCE ADAPTATION INVESTMENT

I. STRUCTURAL BARRIERS

Beyond the sector-specific barriers outlined in Section C, a number of common structural barriers stand out as hindering the mobilization of additional finance towards climate resilience in Africa. These barriers span near-term challenges due to COVID-19, capacity constraints, debt constraints, low sovereign credit ratings, lack of climate outcome metrics, challenges in disaggregating resilience and development outcomes, and a lack of robust climate risk data.

Near-term COVID-19 impacts compound climate

vulnerability: The impacts of COVID-19 compound the vulnerability of populations that are already highly exposed to climate change. In Africa, the pandemic has pushed up to 40 million people into extreme poverty.²²⁴ Working hours in Africa declined by around 7.7% in 2020, equivalent to the loss of around 29 million full-time jobs.²²⁵ Women, youth, and workers in the informal sector have been hit especially hard, also sharply increasing the number of people facing acute food insecurity. African finance ministers have called for external assistance of USD 100 billion annually over the next three years to close a financing gap of USD 345 billion to achieve a sustainable recovery.²²⁶ In the near-term, donors must not only deliver funding to meet COVID-19 relief and assistance, but also ensure that financing is being effectively allocated to meet the increased adaptation needs of those hit hardest by the pandemic.

Limited progress in articulating investment-ready

NAPs: Having a nationally articulated strategy for adaptation is critical for establishing long-term expectations, identifying priority actions across sectors, and

indicating areas for private sector participation. However, only six countries have submitted NAPs to date. 34 other countries have received funding or have submitted proposals to access funding from GCF and LDCF for NAP development. The time from proposal submission to funding approval from the GCF Readiness and Preparatory Support Programme can take more than 30 months, and average 16 months. Moreover, the NAPs submitted to date do not clearly articulate investment opportunities nor strategies for mobilizing finance. While NAPs identify a leading entity responsible for mobilizing funding (e.g. a facility jointly managed by the Ministry of Finance and Ministry of Environment in Kenya) and list the different funding sources that should be considered, an assessment of opportunities and incentives for mobilizing the private sector is missing.

Limited capacity to formulate science-based policy and projects:

There is a need to establish attribution between a climate impacts and the corresponding action/measure that aims to mitigate that impact. This attribution is challenging, requires substantial quantitative and science capacity and is often a critical factor for mobilizing adaptation finance. There is a substantial need to increase capacity to translate science into policy, and to translate policy into investment needs, for instance by utilizing climate resilience indicators to prioritize budget allocations. Resilience outcomes are also difficult to track against a moving baseline—for example, other development projects may have also contributed to improved social outcomes in a given region.

Insufficient capacity in financial structuring and metrics development: Adaptation work requires blending of public, private, domestic, and international finance and therefore calls for substantial financial engineering expertise. Donors are also increasingly requesting quantitative adaptation metrics, including data on physical infrastructure. It is very difficult to assess what volume of adaptation finance is needed and where it should be directed, due to the shortcomings of our current approach to aggregating adaptation finance flows. We currently discuss adaptation finance gaps in terms of aggregated finance volume (e.g. USD 30 billion annual average in 2017-18), which does not capture the efficacy of finance flowing. For example, USD 30 billion one year could do more than USD 35 billion the next in terms of responding to climate risks if the finance was more effective in delivering resilience outcomes.

Limited debt capacity: Even before the pandemic, external debt averaged 40% of GDP across the African continent. Gross debt-to-GDP ratios across Africa are projected to have increased by around eight percentage points in 2020, and by over 20 percentage points in the Republic of the Congo, Seychelles, Sudan, and Zambia.²²⁷ Four countries are already in debt distress,²²⁸ while 15 other countries are at high risk of external debt distress.²²⁹

Absent substantial global efforts to help reduce the debt burden, many countries are hesitant to take on additional debt to address climate risk. African finance ministers have called for external assistance of USD 100 billion annually over the next three years to close a financing gap of USD 345 billion to achieve a sustainable recovery.²³⁰ Many policymakers are seeking assurances that climate finance commitments from international donors in the form of grants or other non-debt instruments will be met.

For some countries, the participation of private creditors will be critical to relieve existing debt burdens. Of the total external debt stock held by African countries in 2019, 8% was held by private non-guaranteed sources.²³¹ Overall, non-official bilateral loans account for around 24% of the debt service burden faced by African countries in 2021.²³² The participation of non-Paris Club bilateral donors, such as China, will also be critical to deliver substantial debt relief. To allow more countries to benefit from the Debt Service Suspension Initiative, the Economic Commission for Africa (ECA) is advocating for the DSSI to be extended to 2022.

Figure 13. Debt Service Payments Due in 2021 by Official Bilateral Creditor Type (USD bn)



Absent or low credit ratings: Overall, African countries have low sovereign credit ratings from the three major credit rating agencies (CRA): Moody’s, Standard & Poor’s (S&P), and Fitch. A low sovereign credit rating raises the cost of debt and makes attracting foreign direct investment more challenging. Already low sovereign credit

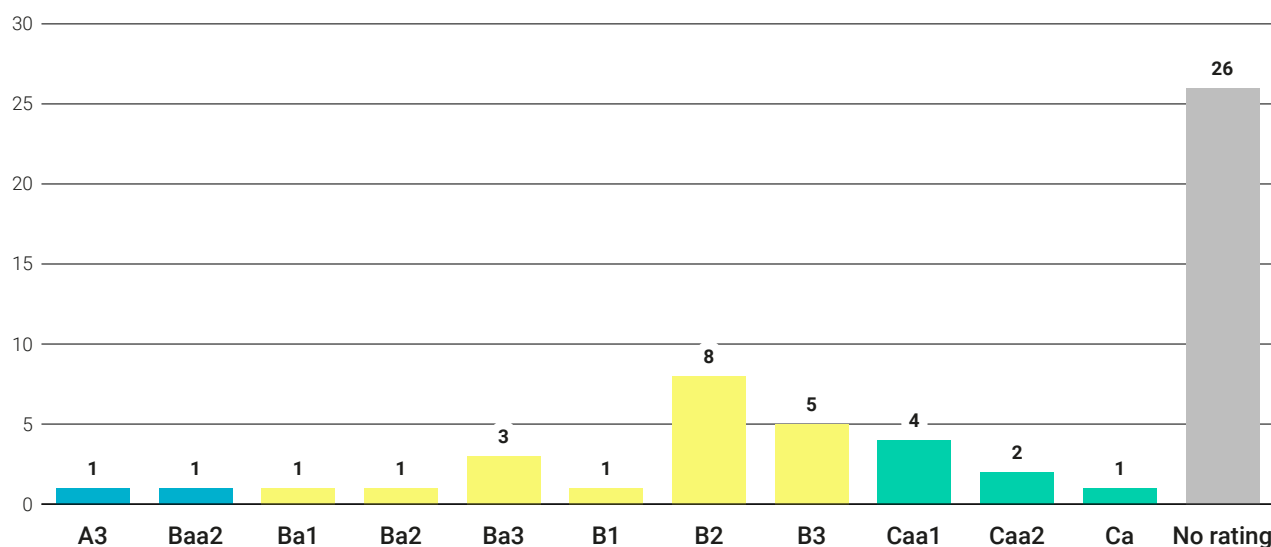
ratings are put further at risk by increasing climate-related risks as CRAs begin to incorporate such risks into their ratings. Some countries, such as Kenya, have foregone the opportunity to participate in DSSI due to concerns that it may impact their credit ratings.

As many African countries are highly climate vulnerable, increasing climate impacts and a lack of adaptation action pose significant risk to sovereign credit ratings across the region.²³³ A team from the University of Cambridge assessed the impact of projected climate change under an RCP 8.5 scenario²³⁴ and found that under that scenario, 63 nations could be downgraded by more than a notch (e.g., from AAA to AA+) on average by 2030. Of the eight African nations assessed in

the analysis, projected sovereign downgrades induced by climate risks by 2100 under an RCP 8.5 scenario ranged from 0.45 notches (Cape Verde) to 4.99 notches (Morocco).²³⁵

Moreover, based on Moody's ratings, which offers the most comprehensive coverage in Africa, 26 countries still lack a credit rating, which substantially bars their ability to tap into international capital markets.

Figure 14. Number of Countries per Sovereign Credit Rating (Moody's)



Lack of robust climate data: There is a critical lack of climate data in many parts of Africa which limits adaptation projects and leads to uncertainty about the optimal approach. The poorest countries have the most significant lack of climate data: either they are post-conflict or fragile states, or simply do not have the funding and technical resources to develop climate data such as 30-year times series data, groundwater baseline data, or 24–48-hour precipitation data.

Lack of quality climate data particularly limits some types of adaptation finance instruments. Resilience bonds or results-based performance instruments for example, require disaggregated data across hazards, exposures, and vulnerabilities to accurately inform outcome measurements. Another example illustrating the importance of spatially disaggregated data is in the water sector, where there may be sufficient water per capita at the country level, but climate impacts have disproportionately reduced water availability in some areas more than others.

Limited implementation capacity and bankability:

While not unique to climate adaptation projects, lack of implementation capacity for project sponsors and limited bankability of projects are major barriers in several sectors where adaptation is most needed. Many sectors—e.g., water, urban infrastructure, energy, and transport—focus significantly on infrastructure projects, which are difficult to implement, and typically offer only modest commercial returns even in the most ideal circumstances. Other adaptation projects—e.g., land use and forestry, coastal management, water—involve multiple stakeholders and often cross jurisdictions, adding to implementation complexity. Increasing risk and reducing investor appetite. Absent a community of qualified private developers, implementation and coordination of these complex initiatives falls to the local communities and municipalities, which tend to be limited in technical capacity and experience. Without significant support to bring in the private sector and augment marginal returns, many projects with significant adaptation impacts will not be realized.

II. STRUCTURAL RECOMMENDATIONS

1. Mainstreaming Resilience into Decision-Making

Many investors are already engaged in investment that has significant relevance to adaptation goals – but their investments are not yet climate resilient. For example, a multinational corporation investing along an agricultural supply chain or an infrastructure investor building a water treatment facility will be operating in a sector with substantial climate risk but may not be screening for climate risk nor mitigating that risk. To enable financial institutions to mainstream resilience into the investments they are making, the following steps are critical:

A. Increase access to robust climate data: Concessional funding is needed to increase increasing climate information collection, accessibility, and technical capacity to utilize the information. As highlighted in Section C, lack of robust climate data presents a persistent challenge for project implementers seeking funding for climate adaptation projects. Without robust climate information on hazards, exposures, and vulnerabilities, implementers in Africa are stuck in a vicious cycle where they cannot prove the adaptation-relevance of a project – and are also unable to access finance that would help them collect and utilize that climate information. More concessional finance, from DFIs, international governments, and foundations is needed to support policy makers and other implementers in collecting and providing access to sufficient data, as well as support collaboration and training on open-source models that can utilize the data. Across the board, there should be an emphasis on increasing access to high resolution climate data at low cost so that implementers may undertake climate risk assessments as a basis for future adaptation planning.

B. Approaches to financing adaptation must capture the full breadth of activities that build resilience to climate impacts. The climate reality is changing so swiftly – especially in Africa where many regions are so climate vulnerable – that nearly all sectors of the economy must be rapidly adapted to oncoming climate conditions. A narrow definition of adaptation finance across all types of financial actors – especially in engaging the private sector – risks missing the much larger universe of activities that build resilience or where the activities are part of broader efforts if only projects that can definitively prove their response to a predicted set of climate conditions are funded. Broadening targeted activities for adaptation

goals must be balanced with ensuring that the activities are robustly assessed for underlying climate risks when possible, to avoid maladaptation.

C. Build capacity of African financial institutions – such as Pan African Banks, locally based pension funds, and national development banks – to evaluate and act on climate risks. This could also include a concerted effort to increase their membership in international financial initiatives such as the UN Principles for Responsible Investment and Banking, and the International Development Finance Club – and to provide these institutions with the resources to participate actively. Capacity building could also include strengthening skills to apply for GCF funding in addition to accreditation.

D. Require disclosure of climate risks – via national legislation and/or via DFI on-lending. Domestic financial regulators in Africa should consider requiring all financial sector actors to disclose climate-related risks in line with the Task Force for Climate-related Financial Disclosures recommendations. Moody's has found that the 49 banks it rates across Africa have more than USD 200 billion in lending across sectors with high potential climate risk, so disclosure of climate risks is critical.²³⁶

E. Support SMEs that are offering adaptation-relevant products and services. There should be increased attention on the considerable potential value that SMEs hold in unlocking climate adaptation solutions and engaging the private sector. There are many 100s of SMEs across Africa that have valuable adaptation solutions and have developed viable business models to implement those solutions. These SMEs include drought-resistant crop developers, climate information system creators, inventors of small-scale wastewater treatment systems, and cooling technology developers. These kinds of SMEs hold substantial value to address local adaptation needs and can often be financed through straightforward solutions like on-lending, pools of funding from local banks, technical assistance and training, VC/growth finance, and equity finance. Lightsmith's CRAFT focuses on adaptation SMEs at the growth phase and is a valuable component of the SME investment ecosystem – but significantly more focus and finance is needed in this space to support the number of SMEs with potential to deliver adaptation solutions.



2. Build the Enabling Environment for Adaptation Investment

The enabling environment in a country will help determine the viability of certain types of instruments. In some cases, lack of financial sector development or lack of commitment to a particular climate adaptation priority will make certain investments difficult to implement. In these instances, there may be a stronger role for concessional capital from DFIs or foundations to facilitate the effective deployment of an investment. Enabling environment priorities to mobilize investment include the following:

A. Articulate investment-ready NAPs and mainstream climate resilience in government procurement: Having a nationally articulated strategy for adaptation is critical for establishing long-term expectations, identifying priority actions across sectors, and indicating areas for private sector participation. Only six countries in Africa have submitted NAPs to date while 34 other countries have received funding or have submitted proposals to access funding from GCF and LDCF for NAP development. Policymakers should ensure that adaptation planning is incorporated and mainstreamed into all relevant policy and procurements plans.

An increased focus on climate adaptation mainstreaming within procurement plans in particular is critical

to ensure that international infrastructure investment must screen for and build in resilience. In particular, approximately 25% (USD 26 billion) of all infrastructure investment in Africa in 2018 flowed from China²³⁷, including significant shares from Chinese state-owned financial institutions including the China Overseas Infrastructure Development and Investment Corporation, and the China-Africa Development Fund. To date, the vast majority of this investment has not been in adaptation activities, but the size of this investment is substantial and represents an untapped opportunity for an adaptation focus. Chinese FIs should endeavor to take up climate risk screening standards adopted by DFIs and to evaluate projects financed for future climate risks and set related targets to address those risks.

B. Build capacity to develop science-based policy and projects:

For much international public climate finance, there is a need to establish attribution between a climate impacts and the corresponding action/measure that aims to mitigate that impact. This attribution is challenging, requires substantial quantitative and science capacity and is often a critical factor for mobilizing adaptation finance. There is a substantial need to increase capacity to translate science into policy, and to translate policy into investment needs, for instance by utilizing climate resilience indicators to prioritize budget allocations. Resilience outcomes are also difficult to track against a moving baseline—for example, other development projects may have also contributed to improved social outcomes in a given region.

C. Improve macro-economic environments and adopt a multi-faceted approach to address debt burdens faced by African countries.

There is substantial reluctance among African policy makers to take on more debt to address climate risk because of substantial existing debt loads and the risk of an increasing cost of finance as underlying physical climate risk (and understanding of that risk) increases. Actions that should be considered to address debt challenges in African countries include:

1. Advance efforts to link credit ratings with reductions in climate risk to incentivize resilience and lower the cost of debt.
2. Develop a balance between loans and other financial instruments including equity, results-based finance, and grants to reduce reliance on debt alone to finance climate adaptation activities.
3. Continue implementation of the DSSI program and seek as many avenues as possible for alleviating debt strain on African countries as a key strategy to increase domestic adaptation finance.
4. Develop sovereign bonds with an adaptation component (i.e., Ghana's 2030 bond with an IDA guarantee of 40 percent).
5. Scale up sovereign debt-for-adaptation swaps to countries where conditions are viable.

3. Deploy Condition-Appropriate Finance Instruments

There is a wide array of available investment instruments, risk finance mechanisms, and broader finance-relevant solutions that financial actors are already mobilizing in support of climate resilience across Africa. The level of “concessionality” required for certain instruments will vary by market or policy environment. Financial instruments can be used to finance activities that build physical resilience to climate change impacts (reducing physical risk) and are also useful in responding to risks where physical climate impacts cannot or have not been eliminated (through risk transfer and risk reduction instruments).

It is critical to carefully select a financial instrument or structure that meets the conditions and activities targeted. Selection of appropriate financial instruments must be informed by the sectoral focus of the adaptation activity, underlying country-level policy and market conditions, and the stakeholders and actors engaged. Instruments will only function successfully when they target an appropriate context. Key factors that must be considered when designing an instrument include currency stability, strength of project pipeline, strength of debt capital markets, presence of strong policy environment, existence of a sovereign credit rating, existence of corporate bond market, robustness of climate information, and engagement/existence of a domestic private sector.

When the key factors above are missing or below the standard required for traditional commercial investments, the strategic use of blended finance instruments can help move projects and other climate adaptation initiatives forward. Technical assistance or development grants can help structure and improve the bankability of projects, concessional capital and results-based guarantees can enhance returns, and first loss debt or loan guarantees can protect investor capital, crowding in private investment.

E. CONCLUSION

African countries are among the most at risk of increasing frequency and severity of climate-related shocks and stressors. There is a pressing need to invest in climate change adaptation to support individuals, SMEs, municipalities, corporations, financial actors, and governments in building resilience to climate impacts. To date, climate adaptation finance is scaling far too slowly to build climate resilience while the costs of climate impacts rise.

To mobilize the levels of investment needed and to increase the resilience impact of that investment, a wider variety of sources of finance must be tapped. To mobilize these investors, a three-pronged strategy is needed to 1) mainstream resilience in investment decisions making, 2) build the enabling environment for adaptation investment, and 3) aggressively deploy innovative finance instruments at scale towards adaptation activities. Action taken now from across the range of sources of potential adaptation finance will be critical to determining the course of Africa's capacity to respond to present and oncoming climate impacts and to building a more climate-resilient and livable future.



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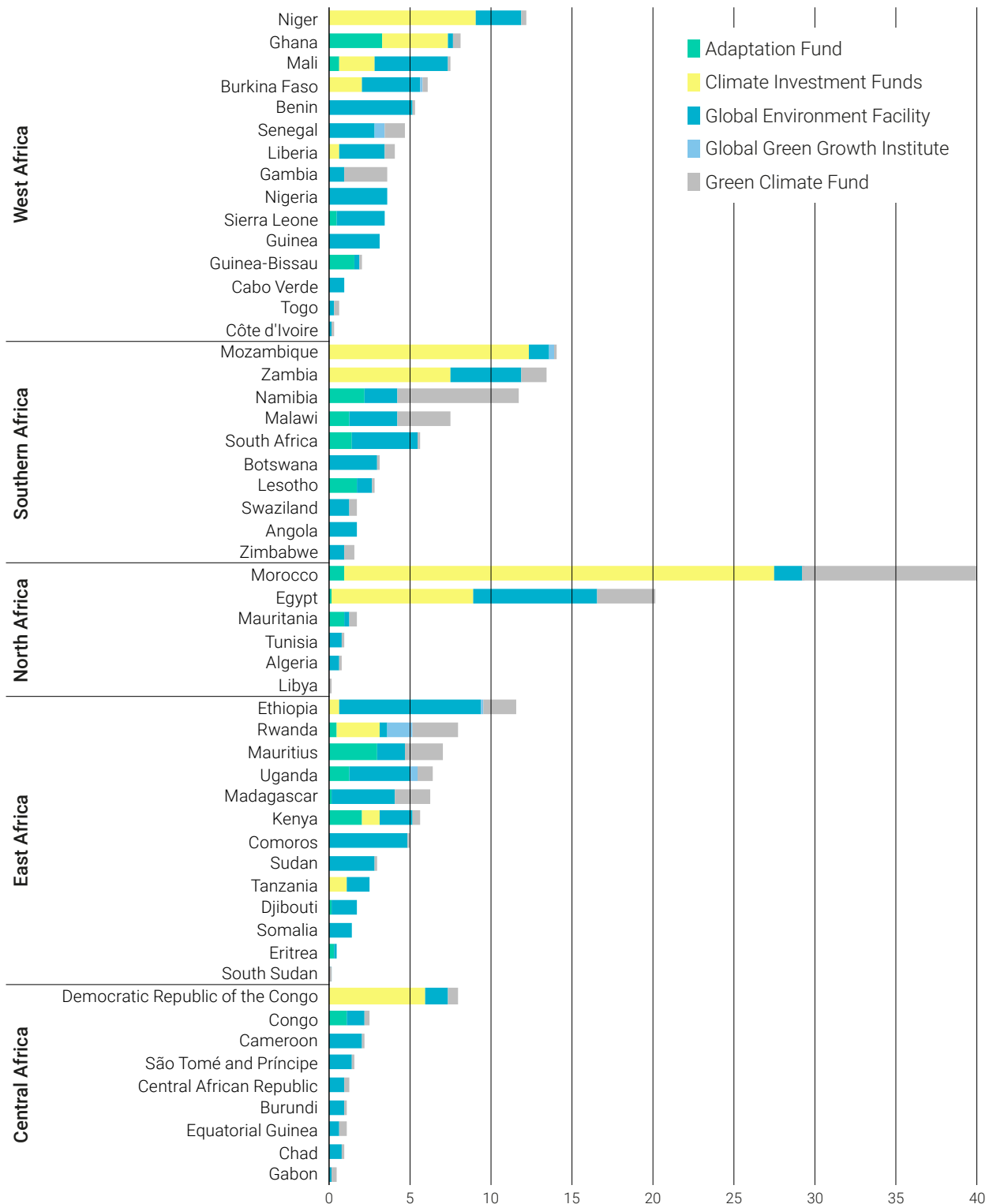
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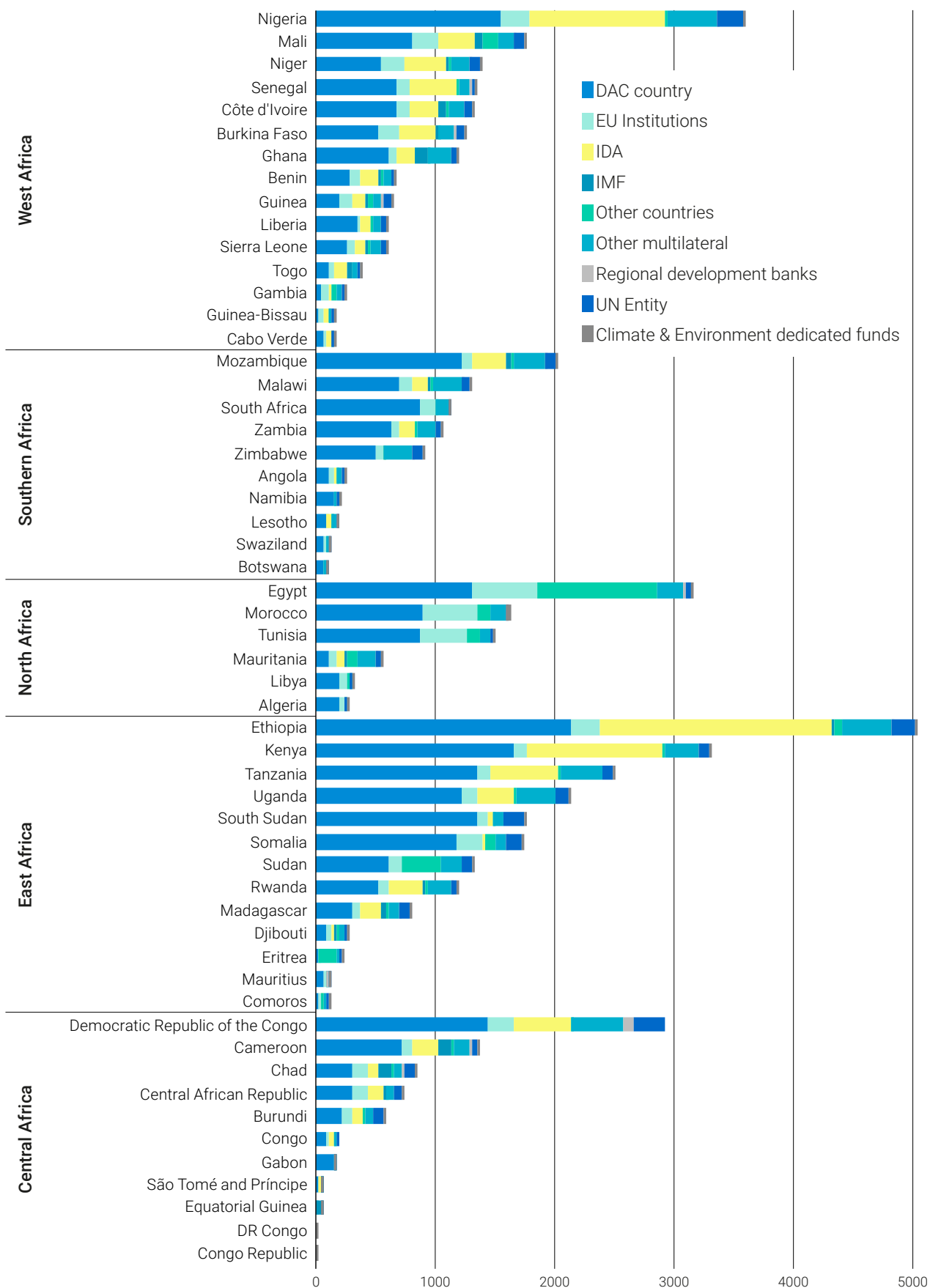
ANNEX

ANNEX I – EXPANDED FIGURES

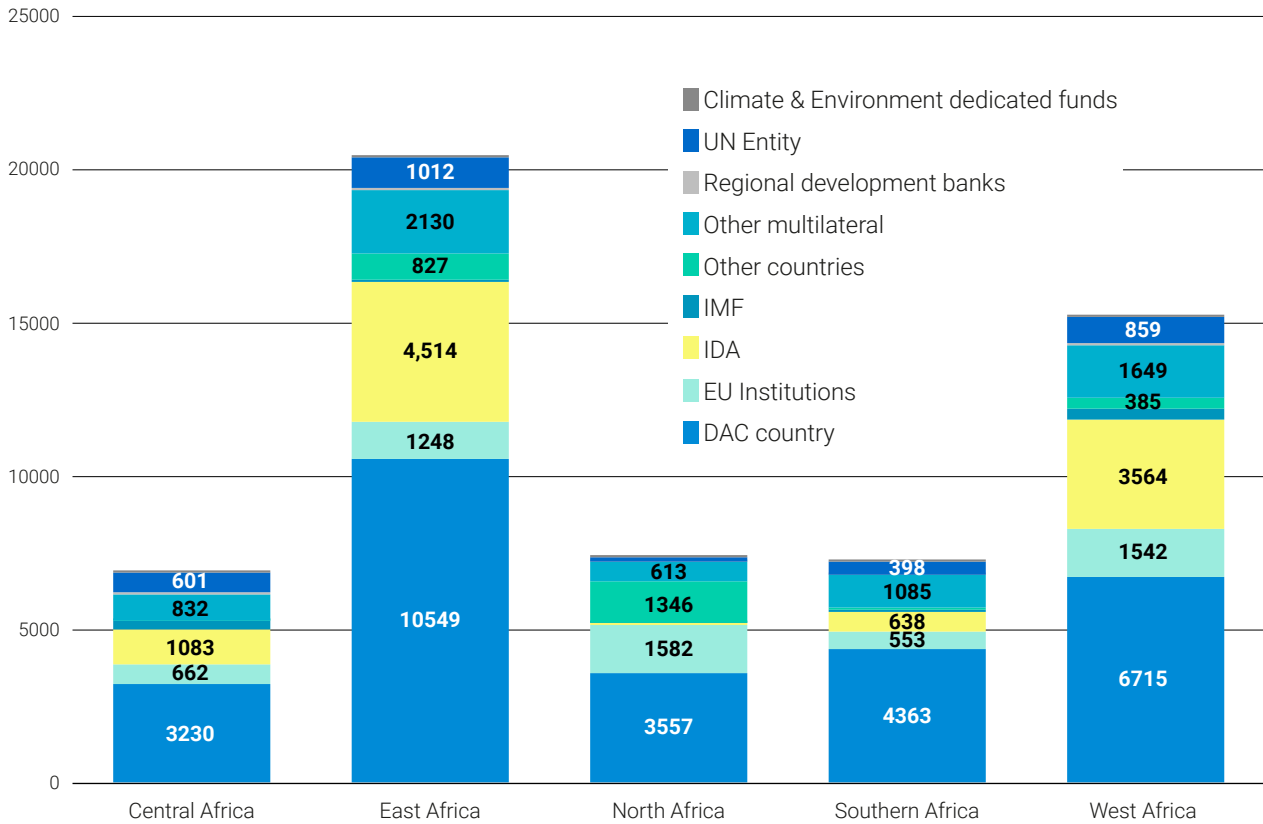
Gross ODA from Climate-Related Funds 2018/19 Average (USDmn)



Gross ODA from Climate-Related Funds 2018/19 Average (USDmn)



Gross ODA by Donor Type 2018/19 Average (USDmn)



ANNEX II – KEY CLIMATE PROGRAMS FROM THE AFRICAN DEVELOPMENT BANK

Alongside direct finance including grants and concessional debt, AfDB has a variety of programs in place to support the market environment for adaptation investment in Africa. Key programs and funds relevant to adaptation finance programming are below.

Training of trainers program: This program aims to train current and potential climate project implementers (including adaptation projects) to design proposals to enable access to climate finance from the Green Climate Fund. The program involves 120-hours of training and to date more than 70 individuals have been trained and equipped with the skills to train others.

Africa Climate Change Fund: Established in 2014, the Fund provides small grants to Africa governments, NGOs, and regional organizations to support climate-resilient transition and scale-up of access to climate finance.

African Financial Alliance for Climate Change: The Alliance aims to link African stock exchanges, pension and sovereign wealth funds, central banks, and other financial institutions to mobilize and incentivize the shift of their portfolios towards low carbon and climate-resilient investments.

African NDC Hub: A resource pool for African countries together with local and international support institutions - public and private, to deliver on the Paris Agreement commitments effectively and efficiently. Because many NDCs have not attached much importance to adaptation and resilience building, the Hub also notes that efforts need to be made to develop bankable projects that contribute to the NDCs in African countries and that will attract private sector investors.

Pilot Program for Climate Resilience: The program is funded by CIF with AfDB supporting African nations in pilots (Niger, Mozambique, Zambia). The program is designed to demonstrate ways that developing countries can make climate risk and resilience part of their core development planning. It helps countries build on their National Adaptation Programs of Action and helps fund public and private sector investments identified in climate-resilient development plans.

ClimDev Special Fund: The fund has invested to date EUR 36 million to modernize Africa's climate and weather observation networks, which is expected to provide access to satellite data and delivering services that offer timely and reliable weather and climate forecasts.

ANNEX III – CLIMATE RISKS AND ADAPTATION ACTIVITIES BY SECTOR

WATER SECTOR

Regional Climate Risks in the Water Sector

In one of the globe's most water stressed regions, countries across Africa face accelerating climate risks in the water sector. Per World Resources Institute's Aqueduct tool, three countries in Africa are ranked as having extremely high baseline water stress (Libya, Eritrea, and Botswana), another eight rank among countries with high water stress, and a further four face medium-high baseline water stress. Across the continent, climate change is leading to more erratic rainfall and a resulting increase in the risk of droughts and floods. Climate risks vary by region and projected physical climate impacts will differentially affect regions given varied geographies and existing infrastructure and water use.

Table 7. Key Climate Risks by Region in the Water Sector

Region	Key Climate Risks
North Africa	One of the most water scarce regions: has already seen a strong decrease in precipitation and a reduction in rainfall. 60% of the water resource flows in the region fall in transboundary regions which makes the region especially vulnerable to water shocks and resulting geopolitical conflicts.
West Africa	Many of West Africa's transboundary river basins are expected to experience declines in river flow by 2050. Heavy rainfall events will increase in frequency by up to 43% and intensity by up to 12% in much of the region, leading to more rapid runoff and flood events that will likely reduce water quality and groundwater recharge.
Central Africa	The Congo River has the largest riverine discharge volume in Africa and the region's population is highly reliant on groundwater and springs. Reduced surface water quality, increased damage to water infrastructure and transportation networks, and increasingly unreliable hydroelectricity production are projected to affect the water and wastewater sector in Central Africa.
Southern Africa	Climate risks associated with water and wastewater include increased variability of flows, reduced water quality, and salinization of coastal aquifers. Access to water and sanitation facilities is uneven, and the Covid-19 pandemic laid bare the consequences of inadequate access to water and sanitation.
East Africa	Shifting rainfall patterns are leading to both increased flooding and increased drought throughout the region. Inadequate water and wastewater facilities amplify this problem, leading to reduced water quality and supply, damage to land and property, infrastructure damage or collapse, and increased risk of waterborne diseases.

Adaptation Activities in the Water Sector

Approximately USD 1.2 billion in adaptation finance was tracked to the water sector in Africa on average annually across 2017-18 from DFIs (72%), international government ODA (14%), multilateral climate funds (9%), other public funds (5%), and commercial FIs (1%). Low-cost project debt constituted 54% of adaptation finance tracked to the water sector, followed by grants (28%), market rate project debt (14%), and project equity (3%). The share of water sector finance as a percentage of total adaptation finance varied by region: the majority of adaptation finance to North Africa was directed to the water sector (56%) while water finance as a share of total adaptation finance to the other four regions was lower – ranging from 10-23%.

Activities that build resilience to climate change impacts in the water sector vary widely across water, waste-water, and sanitation sector projects that reduce the severity of water shortages by improving residential and commercial infrastructure, strengthening resilience to climate risks, and enhancing water efficiency and quality. Because there is such substantial climate risk affecting the water sector in Africa, there is a sizeable pool of

activities in the sector that can build climate resilience. Activities in Table 8 represent the range of activities considered in this analysis. Effort will be needed to mobilize finance towards activities that best develop and strengthen safeguards to ensure high quality resilience outcomes. This analysis refers to all activities here as water sector activities – across water supply, treatment, sanitation, and harvesting.

Table 8. Adaptation Activities in the Water Sector

Sub-Sector	Activities	Examples of Adaptation
Water supply and treatment	Water collection	<ul style="list-style-type: none"> Expansion of reservoirs Household water safe storage Pump stations
	Water treatment	<ul style="list-style-type: none"> Water reuse Household water treatment Water reclamation
	Water supply	<ul style="list-style-type: none"> Construction and/or upgrade of water distribution networks Leakage management, detection, and repair in piped systems
Wastewater collection and treatment	Wastewater collection networks	<ul style="list-style-type: none"> Construction and/or upgrade of sewer systems Raw water supply
	Wastewater treatment facilities	<ul style="list-style-type: none"> Brine discharge facilities Pumped marine outfalls Construction and/or upgrade of wastewater treatment plants
	Sanitation	<ul style="list-style-type: none"> Composting of bio-waste Anaerobic digestion of sewage sludge (with low carbon impact)
	Water harvesting and irrigation ²³⁸	<ul style="list-style-type: none"> Rainwater harvesting from roofs Increasing water availability and efficiency of use

AGRICULTURE SECTOR

Regional Climate Risks in the Agriculture Sector

Agriculture is the most important economic sector in Africa in terms of proportion of the labor force and is among the most significant sectors by share of contribution to GDP. The sector is particularly vulnerable to the adverse impacts of climate change, and the status quo adaptive capacity of rural smallholder farmers is generally low. As shown in Table 9, climate risks vary across regions in ways that inform which adaptation activities are most valuable by region as well as selection of viable financial instruments.

Table 9. Key Climate Risks by Region in the Agriculture Sector

Region	Key Climate Risks
North Africa	Available land for agriculture in the region is limited and fast depleting: 45% of total agricultural land is exposed to risks from salinity, nutrient depletion, and erosion. Agriculture also consumes 85% of available freshwater resources in the region, indicating the importance of adopting sustainable agricultural practices not just for maintaining crop yields but also for managing water scarcity. Agriculture and fisheries contribute around 12% of GDP and employ approximately 40% of the population in Morocco (and 80% of the rural population), while it contributes around 12% of GDP and 30% of employment in Egypt. As only 2.8% of the land in Egypt is arable, the country is entirely dependent on the Nile for irrigation.
West Africa	The region's diverse ecosystems contribute to varied agriculture and livestock production, with smallholder farming serving as the main source of income and subsistence for 70% of the population. Despite increasing rainfall in some areas, it is expected that an overall rise in temperatures and evaporation rates will counter this such that overall water stress will increase by the 2050s. Above 2°C warming would potentially decrease cereal yields by 11%, and millet and sorghum yields by 15-25%. There is an increased risk of increased crop failure, reduced quality and yields due to heat and water stress, flooding, and waterlogging. There is also an increased incidence of crops and livestock pests and disease (e.g. locusts, Rift Valley Fever, oil palm fungal diseases).
Central Africa	More than half of the population of Central Africa works in the agricultural sector. Climate risks vary by agricultural activity and include changes in soil fertility and crop yield, increased pests and pathogens, increased postharvest losses, and increased food insecurity. Investment in adaptation in the agriculture sector may have significant potential for benefits across employment, social, and health outcomes as USAID notes, less than 20% of the DRC's arable land is under cultivation to there is substantial potential for investment in land under cultivation to increase food security and economic development.
Southern Africa	While a smaller component of the overall regional economy, in some countries, such as Malawi, Madagascar, and Mozambique, agriculture still comprises 25% or greater of GDP. Most agriculture in the region is rainfed, making it vulnerable to changing rainfall patterns. USAID climate risk projections include increased crop losses or failure and the potential for more pests, weeds, and pathogens. The AfDB projects decreased crop yields as a result of rising temperatures. In terms of land use, climate risks faced in the region include changes in species composition, increased degradation and deforestation, and altered fire regimes.
East Africa	More the 70% of the population in East Africa lives in rural areas where the predominant source of income and sustenance is agriculture. Of those countries with National Adaptation Plans, agriculture ranked as a top priority for all but one (South Sudan, where it was ranked third). Agriculture makes up 28% of the region's economy, meaning shocks in this sector could have disastrous economic consequences and could dramatically threaten food security. Climate risks for this sector include reduced yields, crop loss or failure, and increased risk of pests and diseases, all of which threaten the economic livelihood and public health.

Adaptation Activities in the Agriculture Sector

Approximately USD 2.1 billion in adaptation finance was tracked to the agriculture sector in Africa on average annually across 2017-18 from bilateral and multilateral DFIs (59%), international government ODA (24%), multilateral climate funds (5%), other public funds (11%), and commercial FIs (less than 1%). Finance to the sector was evenly split between grants and low-cost project debt (49% each) followed by market-rate project debt (2%) and project equity (less than 1%). The most common agricultural adaptation strategies employed are the use of drought-resistant varieties of crops, crop diversification, changes in cropping pattern and calendar of planting, conserving soil moisture through appropriate tillage methods, improving irrigation efficiency, and afforestation and agro-forestry. Activities in Table 10 represent the range of activities considered in this analysis.²³⁹

Table 10. Adaptation Activities in the Agriculture Sector

Activities	Sub-Activities (Examples)
Crop diversification and resilience	<ul style="list-style-type: none"> Provision of information on crop diversification options to farmers The use of improved strains and varieties of crops, which are adapted to the local soil and climate conditions (particularly to droughts and floods)
Soil health and erosion management	<ul style="list-style-type: none"> Enhancement of soil water retention (e.g. through use of cover crops, organic fertilizers, minimum tillage) Improved management of slopes and basins to avoid/reduce the impacts caused by increased soil erosion
Nutrient and pest control management	<ul style="list-style-type: none"> Integrated pest control measures (chemical and biological)
Water management	<ul style="list-style-type: none"> Promote adoption of climate resilience technologies to save water (e.g., water recycling) Significant on-farm water-storage capacity as a buffer against the effects of seasonal drought
Weather forecasting	<ul style="list-style-type: none"> Forecasting tools and systems
Infrastructure	<ul style="list-style-type: none"> Irrigation investments in contexts of climate-induced water scarcity and rehabilitation Farm facilities: Modified designs, siting and construction materials, deeper foundations, protective walls, vegetated contour bunding
Cross-Sectoral-Training, and monitoring	<ul style="list-style-type: none"> Capacity-building, e.g. for improved climate risk management Training in locally appropriate climate-smart/ climate-friendly agricultural practices
Research and development	<ul style="list-style-type: none"> Testing climate-friendly practices, inputs, adaptive crop varieties or technologies Research relating to climatic trends
Financial Services	<ul style="list-style-type: none"> Financial services, e.g. climate risk-based insurance Specific targeting of climate-vulnerable beneficiaries to receive financial services

Source: CPI, 2020, Examining the Climate Finance Gap for Small-Scale Agriculture

TRANSPORT SECTOR

Regional Climate Risks in the Transport Sector

The African transport sector is projected to be heavily impacted by climate change over the coming years. Climate change could increase road maintenance costs by up to 2.7x times across Africa due to precipitation, flooding, and temperature stress. Roads are at risk of damage across precipitation, flooding, and temperature climate stressors – and the impacts of those stressors differ between road types. Risks to roads include rutting of asphalt due to temperature increases, reduced load carrying capacity due to precipitation, and wash-aways of road infrastructure due to flooding.²⁴⁰

This analysis focused on key climate risks in the transport sector in Central and East Africa. To set boundaries on the analysis, this report most closely assesses four sectors for each of the five African Union regions – prioritizing sectors with opportunities for high triple dividends (across social, environmental, and economic priorities). Transport is a critical sector for Central and East Africa because of the particularly high risks faced in the sector in both regions. This determination was informed by analysis of where climate risks will manifest most significantly and where there are opportunities to deliver triple dividends.

Table 11. Key Climate Risks by Region in the Transport Sector

Region	Key Climate Risks
Central Africa	<p>Increased precipitation, flooding, and temperature stress are projected to increase road maintenance costs across Central Africa by more than 200%. Bridges are especially vulnerable to climate impacts, especially flooding which can cause bank erosion and make bridges unpassable, and impact costs are projected to rise 1.5-7 times from historic levels.</p> <p>Even without oncoming climate risks, the region already faces enormous transportation infrastructure challenges. The Democratic Republic of Congo, the largest country in the region by population and land area, has among the most infrastructure challenges in the world. Road networks have been damaged by conflict, rail infrastructure is dilapidated and has in some cases ceased operations, and the country's unique geography with vast forests and numerous rivers makes development of transportation infrastructure networks even more challenging.</p>
East Africa	<p>Transportation links like roads and railways are particularly vulnerable to climate change. Severe flooding can wash them out, leaving affected communities cut off from supplies, medical services, or unable to get to their places of employment. East Africa has nearly 15,000km of roads along 10 major corridors, including the Northern Corridor from Nairobi, Kenya to Bujumbura, Burundi, and the Central Corridor from Dar es Salaam, Tanzania to Kigali, Rwanda (one of three terminuses). The rail sector in the region covers nearly 8,000km, with the major companies located in Tanzania (3,676km), Kenya (2,778km), and Uganda (1,250km).</p> <p>The region—via the East African Community (EAC)—is party to the Tripartite Transport and Transit Facilitation Programme Eastern and Southern Africa (TTTFP), which also includes SADC and COMESA. The objective of the TTTFP is to support SDG 9, which aims to “build resilient infrastructure, promote sustainable industrialization and foster innovation”. TTTFP’s official vision is to: “Develop quality, reliable, sustainable and resilient infrastructure, including regional and trans-border infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all”.</p> <p>In addition to the TTTFP, other major initiatives in the transport sector include the Northern Corridor Integration Project (NCIP) and Central Corridor initiative, which have a focus on shipping logistics and rail, and Lamu Port South Sudan Ethiopia Transport (LAPSSET) Corridor—which will link Kenya with Ethiopia, Uganda and South Sudan. LAPSSET is a US\$25 billion infrastructure project, which includes rail, road, pipelines, fiber-optic cable, and other infrastructure to support the movement of people and goods. It does not have an adaptation mandate.</p>

Adaptation Activities in the Transport Sector

Across infrastructure sectors, this report defines adaptation activities as those which improve the climate resilience of existing infrastructure (building resilience of the asset), and which employ infrastructure to support systemic resilience (building resilience through the asset). In the context of the transport sector, this includes the following activities:

- Road rehabilitation and climate-proofing.
- Revision of design criteria (and building to those criteria) informed by climate information and risk.
- Implementation of slope protection and new plantation.
- Spot upgrades in crucial areas including elevating low-lying road links.
- Upgrade and asphaltting projects.
- Employment of soil technology to protect rural roads.

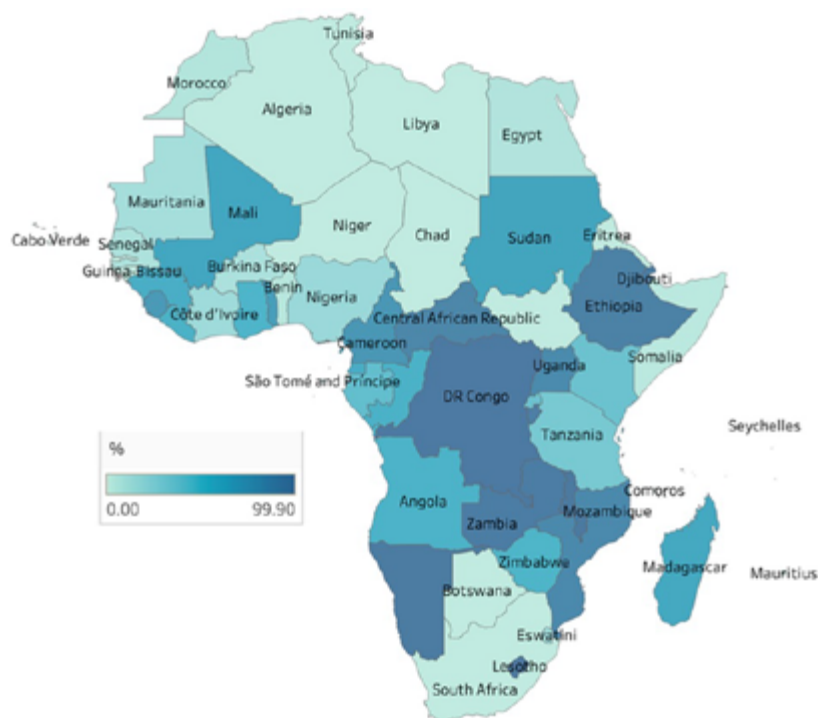
ENERGY SECTOR

Regional Climate Risks in the Energy Sector

Energy sector resilience is crucial to ensure undisrupted critical infrastructure services and minimize climate impacts to vulnerable communities. The dual challenge of meeting increasing energy demand and the shift towards increasing the share of low-carbon sources, especially hydropower generation, exposes countries to more climate risks. Expected loss of hydropower revenues range will range between 5-60% and increase consumer expenditure for energy by up to three times in dry scenarios.²⁴¹

Hydropower currently accounts for around 42% of electricity generation on average across the continent and exceeds 80% in 11 countries (Figure 15).²⁴² Climate risks to hydropower include increased variability of stream-flow, fluctuating basin water levels, and increased evaporation rates. These impacts will be spread unevenly across the continent. Nile basin countries are likely to see an increase, benefiting from more frequent heavy rainfall,²⁴³ whereas in West Africa, the hydropower potential of the Volta River Basin may decrease by around 50% by 2050.²⁴⁴ 70% of total hydropower capacity in eastern Africa and 59% in southern Africa will be dependent on areas with similar rainfall patterns by 2030, making the sector highly sensitive to future changes in rainfall variability.²⁴⁵

Figure 15. Share of Hydropower in Electricity Production



Finally, the persistence of high energy poverty rates across the continent continues to disproportionately impact vulnerable communities. Limited or no access to electricity means fewer economic and educational opportunities, limited access to information and overall reduced capacity to prepare, respond and recover from disasters. Currently, more than 600 million Africans in sub-Saharan Africa live without electricity, translating to an energy access rate of 53% compared to 87% globally. The access rate is as low as 25% in rural areas, and household access rates are higher than 75% in only six countries.²⁴⁶

Adaptation Activities in the Energy Sector

Approximately USD 250 million in adaptation finance tracked to the energy sector in Africa on average annually across 2017-18 from multilateral DFIs (95%) and international government ODA (5%). Finance to the sector was overwhelmingly in the form of low-cost project debt (91%) while the remainder was in the form of grant funding (9%).

Adaptation activities in the energy sector include climate-proofing power generation and transmission and distribution (T&D) assets, improving resilience of hydropower generation, and increasing access to reliable and affordable energy. Hard infrastructure measures can be complemented by soft measures such as identifying potential cascading risks in advance, establishing emergency protocols, integrating and prioritizing resilience into regional and national energy plans. Beyond strength-

ening national energy capacity, regional coordination through river basin organizations, power pools, and development banks should be enhanced to collectively manage shared water resources and power pools, as well as foster cross-border trade of energy. Meanwhile, increasing urban and rural access to clean, affordable, and reliable energy holds immense potential to decrease the exposure and vulnerability of communities and others living in energy poverty.

Table 12. Adaptation Activities in the Energy Sector

Sub-Sector	Activity Examples
Climate-proofing power generation and T&D assets	Increasing grid resilience through renovations, smart grid applications, installing back-up generation, creating redundancies, etc.
	Establishing emergency plans for maintaining power for critical infrastructure to minimize disruptions, identifying potential cascading impacts across different infrastructure sectors
	Improving the resilience of gas transmission and distribution networks for safety and energy system resilience
Hydropower	Improving reliability of hydropower generation through hardening and redesigning infrastructure
	Upstream management through catchment management and construction of upstream dams
	Regional coordination to collectively manage transboundary water resources, power pools, and foster cross-border trading of energy
Energy access and reliability	Improved access to clean, affordable and reliable energy, reducing vulnerability of low-income communities
	Increasing grid resilience through renovations, smart grid applications, installing back-up generation, creating redundancies, etc.

URBAN INFRASTRUCTURE SECTOR

Regional Climate Risks in the Urban Infrastructure Sector

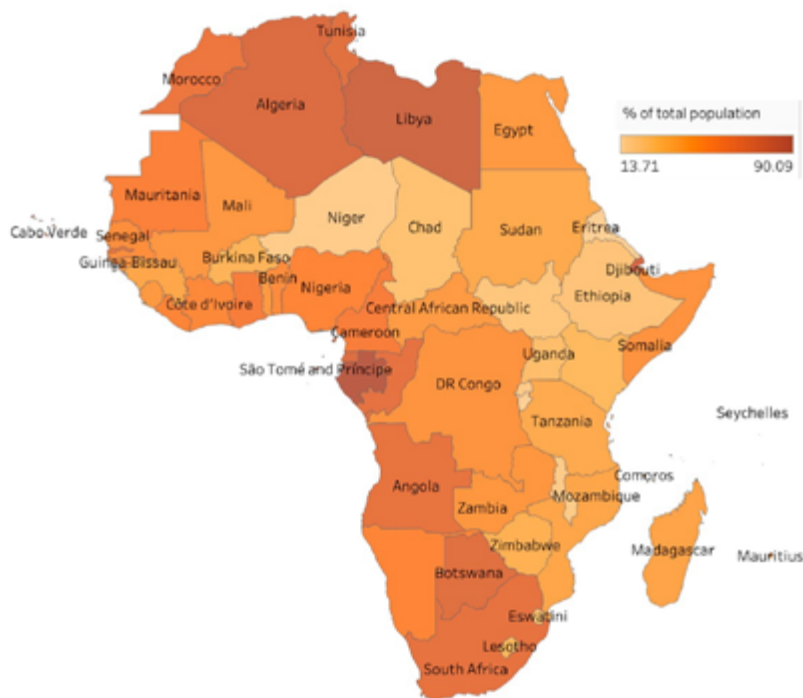
Africa is home to some of the fastest growing populations and urbanization rates in the world. The current urban population of 587 million that is expected to nearly triple to 1.5 billion by 2050, outnumbering the rural population.²⁴⁷ 22 countries have an urbanization rate greater than 50% (Figure 16). Despite an overall urbanization rate of 40%, Sub-Saharan Africa remains relatively poorer compared to other developing regions in the world when they had achieved a similar rate of urbanization.²⁴⁸ The bulk of Africa's urbanization is concentrated in smaller urban centers with weaker governance capacities, thus making cities a priority focus for adaptation interventions.²⁴⁹

The majority of capital cities in North and West Africa are located along the coast. Urban areas across North African countries, in particular Egypt, face immense pressure due to the increasing influx of internally displaced migrants and refugees fleeing ongoing conflicts in neighboring countries. Egypt currently hosts more than 256,000 refugees and asylum-seekers from 56 different countries, all in urban settings concentrated around Cairo, Alexandria, and Damietta.²⁵⁰ In Southern Africa, rapid urbanization is stressing urban infrastructure, affecting roads, bridges, and reducing the efficiency of flood protection mechanisms.²⁵¹

Beyond the accumulation of risks associated with the concentration of people in cities, urban climate risks widely vary across different urban locations and sizes, between genders, ages, and income groups. However, because data on disaster losses are aggregated at the national or regional scales, these differences are usually obscured. Moreover, smaller everyday hazards such as localized flooding and infectious diseases that routinely impact the urban poor are not well understood. Heatwaves disproportionately impact informal settlements, although these incidents are not being adequately monitored or reported.

Meanwhile, countries along the southeast coast, such as Malawi, Mozambique, and Zimbabwe, are exposed to intensifying cyclones originating from the southern Indian Ocean. In Mozambique, nearly 670,000 people remain displaced with over 100,000 living in resettlement sites due to three cyclones that hit the country in the past two years.²⁵² The combination of increasing populations, migration, internal displacement and continued development along coastlines leads to the accumulation of climate risks in cities, posing threats to poverty reduction and other sustainable development goals.

Figure 16. Urban Population as a Share of the Total, 2020



Adaptation Activities in the Urban Infrastructure Sector

Approximately USD 120 million in adaptation finance tracked to the energy sector in Africa on average annually across 2017-18 from bilateral and multilateral DFIs (80%), international government ODA (11%), and other public funds (9%). Finance tracked to the sector was largely in the form of low-cost project debt (80%) while the remainder was in the form of grant funding (20%).

Adaptation activities in the urban sector involve the provision and protection of a wide range of critical infrastructure services, from roads, water, sewage, drainage, waste management, to power and ICT. Around 60% of Sub-Saharan Africa's urban population live in informal settlements that do not meet minimum standards for water and sanitation and are not serviced by the cities' infrastructure systems.²⁵³ Municipal governments can promote the equitable distribution of infrastructure

services through subsidies, mandates and strengthened governance of public and private utilities. Other relevant adaptation activities include the provision of urban green spaces, promoting balanced spatial planning that accommodates for the growing influx of migrants and refugees, as well as capacity building to better understand distributional impacts of climate change through improved data collection and utilization of urban planning tools.

Table 13. Adaptation Activities in the Urban Sector

Sub-Sector	Activity Examples
Critical infrastructure	Construction or improvement of drainage systems to adapt to an increase in the frequency or severity of floods in main urban centers
	Rational and sustainable management of waste in urban areas
	Development and improvement of roads in main urban centers
	Improving service delivery to underserved communities
	Increased access to cooling centers and cooling technology to respond to high heat days
	Early warning / emergency response systems to adapt to increased occurrence of extreme events by improving disaster prevention, preparedness and management and reducing potentially related loss and damage
Urban green spaces	Promotion of green spaces and corridors in urban areas that provide urban ventilation and reduce urban heat island effect
	Urban farming and gardening (increasing water infiltration capacity of the soil and providing additional shading)
Spatial planning and human settlements	Balanced spatial development of urban centers
	Flood protection for human settlements
Capacity building	Strengthening of the institutional and regulatory framework concerning health and the environment in urban governance
	Establishment of disaggregated data collection systems, impact monitoring/evaluation mechanisms
	Development and implementation of urban planning tools

COASTAL ECOSYSTEMS SECTOR

Regional Climate Risks in Coastal Ecosystems sector

This analysis focuses on key climate risks to coastal ecosystems in North and West Africa. To set boundaries on the analysis, this report most closely assesses four sectors for each of the five African Union regions – prioritizing sectors with opportunities for high triple dividends (across social, environmental, and economic priorities). Coastal ecosystems are critical for North and West Africa because of the particularly high risks faced in the sector in both regions. This determination was informed by analysis of where climate risks will manifest most significantly and where there are opportunities to deliver triple dividends.

Table 14. Key Climate Risks by Region in the Water Sector

Region	Key Climate Risks
North Africa	<p>The northern coastline is at high risk of sea level rise, erosion, and flooding, which pose significant potential for impact to countries' economic activities, especially in the tourism sector. Increasing urbanized surface area and human activities including sand mining, water pumping, and pollution has degraded habitats important for marine biodiversity. According to the IPCC, the Nile Delta is among the top three most vulnerable regions in the world.</p> <p>Adaptive measures in the region currently focus on coastal defense structures and integrated coastal management, as recently supported by the GCF in projects enhancing climate change adaptation in the north coast and Nile delta regions in Egypt). A one-meter sea level rise is projected to inundate 20% of the land area by 2100, and 0.5m sea level rise would displace 67% of the cities' populations. Related climate risks include saltwater intrusion into farmland, erosion and intensified flooding, fisheries decline, reduced availability of freshwater resources.</p>
West Africa	<p>Sea level rise, coastal erosion, increased water contamination and flood damage to coastal infrastructure pose severe threats to countries dependent on the rich marine biodiversity, tourism and leisure industries as a major source of revenue. Nearly 37% of coastal land has been lost from 2005-2017 due to erosion and flooding. West Africa's urban population has increased from 8% in 1950 to 44% in 2015, and 12 cities have a population of more than 500,000. Much of this migration into urban zones was driven by Sahel droughts from 1960s through 1980s.</p>

Adaptation Activities in the Coastal Ecosystems Sector

Coastal ecosystems and associated nature-based solutions are a significant contributor to climate adaptation in coastal countries and especially for small islands states. Coastal protection and limiting coastal erosion are critical to reduce impacts from severe weather events. Successful coastal and marine ecosystem management can support food security and the livelihoods of coastal communities. The activities in Table 9 are representative of the kinds of adaptation measures that can be financed in the sector.

Table 15. Adaptation Activities in the Coastal Ecosystems Sector

Sub-Sector	Activity Examples
Functioning and Healthy Coastal Ecosystems	Coastal wetland protection and restoration which can serve as natural habitats for fisheries, ecosystems services for communities and their livelihood
	Marine protected areas Intertidal or subtidal terrain areas, their waters, flora, fauna, and cultural and historical features, of which part or all is protected
Built Environment	Beach and dune nourishment- Process of adding sand to enlarge and enhance coastal beach and dune features as well as, in many cases, planting grasses and native vegetation
	Building standards- minimum technical and safety requirements for the design and construction of residential and commercial structure
	Coastal development setbacks- Set distance from a coastal feature within which all or specific types of development are prohibited
	Living shorelines Structural shoreline stabilization
Diversified Livelihood	Fisheries sector good practices- fisheries management and strengthening capacity
	Mariculture best management practices- better efficiency and cost in the mariculture sector
	Tourism best management practices- minimizing the adverse effects on the environment and communities.
Human Safety and Safety Enhancements	Community- based disaster risk reduction- structural and non-structural measures that prevent, mitigate and/or help prepare for the effects of natural hazards
	Flood hazard mapping- in areas adjacent to water bodies to ensure landowners, insurers and regulators have relevant information on flooding risks.
Overarching Planning and Governance	Flood hazard mapping- in areas adjacent to water bodies to ensure landowners, insurers and regulators have relevant information on flooding risks., involving planning and decision-making geared to improve economic opportunities and environmental conditions for coastal communities

Source: Adapted from (USAID, 2019)²⁵⁴

LAND USE AND FORESTRY SECTOR

Regional Climate Risks in the Land Use and Forestry Sector

Some of the most significant impacts of climate change on this sector are desertification, habitat lost, habitat shifts, and loss of biodiversity. These issues have a tremendous impact on the livelihoods on the vast number of people on the continent who are dependent on the land for shelter and economic survival.

Table 16. Key Climate Risks by Region in the Land Use and Forestry Sector

Region	Key Climate Risks
North Africa	Dominated by the Sahara Desert, North Africa is the region most impacted by water scarcity and desertification, with nearly 100% of the land mass is considered “dryland”, 80% of which is considered barren by the FAO. ²⁵⁵ Nearly 70% of its “forested” land (2% of total land mass) is concentrated in the Atlas Mountains. ²⁵⁶
West Africa	Droughts and unpredictable rainfall patterns in the region are leading to significant loss or shifting of habitats to higher elevations. Guinean forests, which have high number of endemic species, are under threat. ²⁵⁷ In Burkina Faso—tree species are dying due to drought and over harvesting. ²⁵⁸
Central Africa	Like in West Africa, unpredictable precipitation patterns are leading to significant shifts in habitats in the region. The Congo Basin holds more than 50% of biodiversity on the continent ²⁵⁹ , and supports nearly 80 million people. ²⁶⁰ Recent studies show that 84 percent of forest disturbances in the Congo Basin region are due to small-scale, non-mechanized forest clearing for agriculture (FAO report).
Southern Africa	Forests account for 41% of the total landmass in Southern Africa. Droughts and altered fire regimes are leading to land degradation and deforestation. Increasing temperatures and frequency of extreme weather events are leading to a rise in pests and changes in species composition. ²⁶¹
East Africa	Grasslands support 8 million people in East Africa. A combination of climate (prolonged droughts, increasing temperatures) and non-climate (overexploitation, population growth) are leading to degradation and desertification. Similar factors are threatening forests in the region, leading to a decrease of 15 million hectares (nearly 20%) over a 20-year period (1990-2010). ²⁶²

Adaptation Activities in the Land Use and Forestry Sector

Activities in this sector largely focus on adaptation related to forest and non-agricultural habitat destruction, and efforts to conserve and more effectively and comprehensively manage land use in order to prevent further destruction. As much as possible, the analysis does not include agricultural or other human (non-climate change) related activities. Given the comprehensive, multi-sectoral approach required to address land use and forestry, some overlap (particularly with the agricultural sector) will be difficult to avoid entirely.

Table 17. Adaptation Activities in the Land Use and Forestry Sector

Sub-Sector	Activities	Examples of Adaptation
Sustainable forest management	Forest protection	<ul style="list-style-type: none"> Control forest fires Planting drought-resistant vegetation Invasive pest control
	Forest regeneration	<ul style="list-style-type: none"> Reforestation Control invasive species
Integrated Land Use Management	Biodiversity conservation and restoration	<ul style="list-style-type: none"> Reduction of habitat fragmentation (flora and fauna) through establishment of ecosystem corridors Establishment of protected and managed wildlife conservation areas
	Sustainable economic activities	<ul style="list-style-type: none"> Development of sustainable agro-forestry and livestock practices Sustainable use/harvesting of timber

ANNEX IV – MULTILATERAL CLIMATE FUNDS

Climate and environment funds represented 5% of adaptation finance tracked in the Landscape in 2017-18. Per Climate Funds Update, nine entities have funded adaptation activities in Africa to date, listed below with a summary of funding approved to date, number of countries targeted, and sectors to which the funding flowed.

Adaptation for Smallholder Agriculture Programme:

USD 168 million funding approved to date. To date, adaptation finance from the Programme has targeted 25 countries in Africa, with projects across agricultural water resources, agricultural policy and administrative management, livestock investment, and water sector policy. Programs financed include a program to reduce vulnerability in coastal fishing areas in Djibouti and a climate resilient agricultural livelihoods program in Kenya.

Adaptation Fund: USD 320 million funding approved to date. To date, the Adaptation Fund has targeted more than 30 countries in Africa, with projects across disaster prevention and preparedness, agriculture, water supply and sanitation, forestry, and education. Projects financed include work to scale up climate-smart agriculture in East Guinea Bissau, water resources management in Northern Ghana, and scale-up of climate-resilient rice production across West Africa. The Adaptation Fund provides funding across 4 pillars of action, innovation, learning and cross-cutting themes like the Readiness Program for Climate Finance. Among the 54 implementing entities accredited by the Adaptation Fund, 16 are based in Africa, consisting of 13 national entities,²⁶³ 2 regional entities,²⁶⁴ and 1 multilateral entity.²⁶⁵

Global Climate Change Alliance: USD 158 million funding approved to date. The Alliance has to date funded projects in 11 countries in Africa, with projects across flood prevention, agriculture, forestry, and energy. Projects financed include capacity building and knowledge building in Ethiopia, forest management in Mali, and management of coastal areas in Senegal.

Global Environment Facility: USD 963 million funding approved to date. Through the Least Developed Countries Fund (LDCF) and Special Climate Change Fund (SCCF), the GEF has to date funded adaptation projects across more than 45 countries in Africa. Projects financed through the LDCF include strengthening agro-ecosystem adaptive capacity in Chad, promotion of index-based weather insurance in Burkina Faso, and enabling activities for the preparation of a National Adap-

tation Plan of Action in Angola. Projects financed

through the SCCF include investment increasing productivity and adaptive capacity in mountain areas of Morocco, reducing wildfire hazard risks in South Africa, and drought management in Zimbabwe.

Green Climate Fund: USD 645 million funding approved to date. GCF has to date financed adaptation projects across at least 20 African countries with sectoral targets including disaster risk reduction, agricultural development, water security and supply, and flood prevention. Projects financed through GCF include ecosystem-based adaptation in Kenya's arid and semi-arid rangelands, scale-up of climate information and early warning systems in Malawi, and integrated flood management in Senegal. Almost all African governments are National Designated Authorities for the GCF.²⁶⁶ However, only 18 entities across Africa are direct access entities and only 3 of them are national governments.²⁶⁷

MDG Achievement Fund: USD 20 million funding approved to date. To date, the MDB Achievement fund has financed projects in four African countries: Egypt, Ethiopia, Mauritania, and Mozambique. The projects financed have all supported broad climate change risk management capacity building in the countries targeted, for example, mainstreaming local environmental management into planning processes in Mauritania.

Pilot Program for Climate Resilience: USD 287 million funding approved to date. To date, the PPCR has funded projects in three African countries: Mozambique, Niger, and Zambia. The PPCR has a USD 1.2 billion budget and aims to support developing countries in building adaptation to climate impacts by assisting governments in integrating climate resilience into strategic development planning and then providing concessional and grant funding to put the plans into action. Projects funded to date in Africa include a roads and bridge management and maintenance program in Mozambique, development of climate information and forecasting in Niger, and funding to engage the private sector for support for climate resilience in Zambia.

ANNEX V – ROLE OF KEY ACTORS

Table 18. Summary of comparative strengths and constraints of key actors in financing adaptation in Africa

Actor	Risk Appetite	Climate Mandate	Ability to Raise Funds	Ability to Deploy Funds
Commercial FI				
Private Equity and Venture Capital				
Institutional Investors				
Insurance				
Pan African Banks				
Large Corporations				
Multilateral DFIs				
Sub-regional & National Development Banks				
Multilateral Climate Funds				
National Climate Funds				
State-owned Financial Institutions				
African Governments				
Bilateral Foreign Governments (ODA)				
Philanthropy				

ENDNOTES

- 1 The focus of this analysis is on adaptation finance to address physical climate risks in Africa. It does not capture other important climate risks such as transition risks associated with the shift towards lower carbon economies.
- 2 ND-GAIN, Country Rankings 2018. Vulnerability and Readiness.
- 3 AfDB 2021a
- 4 CPI analysis, based on submitted NDC documents. As the methodologies for providing investment estimates widely varied, this aggregate figure should be considered only a rough estimate of the lower bound of investment needs, given 14 countries have not provided estimates and the scale of climate adaptation needs are likely to increase through 2030 beyond what is addressed by current finance levels. Authors have not identified any other robust estimates of future adaptation finance needs in Africa from other sources.
- 5 Angola, Benin, Central African Republic, Chad, Democratic Republic of the Congo, Eritrea, Ethiopia, Ghana, Kenya, Niger, Republic of Congo, Rwanda, Senegal, Sudan, Zimbabwe
- 6 Conditional refers to funding dependent on international support.
- 7 Alongside public finance tracked to adaptation, the private sector is a critical component of addressing the adaptation finance gap as public resources are limited and will not be sufficient to meet all adaptation needs alone. Private actors are investing in climate adaptation, but there is a lack of systematic data collection for climate-related private finance flows globally, due to lack of incentives for tracking, difficulties in identifying climate-related finance, restrictions based on confidentiality, and conceptual and accounting issues. While there are some nascent approaches and methodologies under development, there are currently no robust private sector adaptation finance estimates at the global, sectoral, or regional levels.
- 8 Per Climate Policy Initiative's (CPI's) Global Landscape of Climate Finance (Landscape). In order to determine what constitutes adaptation finance in the Landscape, CPI relies on current tracking practices from: i) the members of the OECD's Development Assistance Committee and publicly available through the Creditor Reporting System database; ii) dedicated reporting of the group of Multilateral Development Banks jointly reporting on climate finance and the members of the International Development Finance Club; and iii) Climate Funds.
- 9 Of the top 10 most vulnerable countries, per ND-GAIN, six received less adaptation finance than the median country (USD 90 million annually) – Chad, Guinea-Bissau, Liberia, Sudan, the Democratic Republic of Congo, and Eritrea.
- 10 CPI, GCA 2021
- 11 Center for Global Development 2021
- 12 UNCTAD 2021
- 13 New York Times 2021
- 14 World Bank 2020b
- 15 WHO 2021
- 16 EIB 2019
- 17 Center for Global Development 2021
- 18 ADB 2019
- 19 US IDFC 2021
- 20 UNECA 2021b
- 21 CIF 2016
- 22 Schneider, T. 2014
- 23 Bloomberg 2021a
- 24 UN 2021
- 25 Mozambique, Republic of the Congo, São Tomé and Príncipe, Somalia
- 26 World Bank 2021a
- 27 University of Cambridge Bennet Institute for Public Policy 2021
- 28 UNECA 2021b
- 29 Analysis of the debt-for-adaptation swaps including eligibility and condition criteria, principles for using proceeds from swaps, and concrete opportunities for using the redirected flows in select countries is available: <https://www.climatepolicyinitiative.org/publication/debt-for-climate-swaps/>
- 30 Burkina Faso, Cameroon, Cabo Verde, Gabon, Gambia, Ghana, Kenya, Lesotho, Malawi, Mauritania, Mauritius, Mozambique, Nigeria, Rwanda, Seychelles, South Africa, South Sudan, Tanzania, Togo, Uganda, Zambia.
- 31 Climate Smart Agriculture 2017
- 32 AfDB 2021a
- 33 ND-GAIN, Country Rankings 2018. Vulnerability and Readiness.
- 34 For determining what constitutes adaptation finance in the Landscape, we rely on current tracking practices from: i) the members of the OECD's Development Assistance Committee and publicly available through the Creditor Reporting System database; ii) dedicated reporting of the group of Multilateral Development Banks jointly reporting on climate finance and the members of the International Development Finance Club; and iii) Climate Funds
- 35 IADB 2019
- 36 World Bank 2019a
- 37 IMF 2021a
- 38 Republic of Kenya: Ministry of Environment and Forestry 2018
- 39 This includes agriculture corporations Olam and Mondelez with substantial operations in Africa, which have recognized growing physical climate risks to supply chains and report investments in climate resilience practices for crops like cocoa and wheat (CDP, 2020).
- 40 Reuters 2021
- 41 US IDFC 2021
- 42 Coalition for Climate Resilient Investment. 2021. <https://resilientinvestment.org/about-us/>
- 43 ICA 2018
- 44 World Bank 2021d
- 45 Adaptation finance is defined in the Landscape as: "resources directed to activities aimed at reducing the vulnerability of human or natural systems to the impacts of climate change and climate-related risks, by maintaining or increasing adaptive capacity and resilience."

- 46 Significant data and reporting challenges limit CPI's ability to fully capture global adaptation finance flows in the Landscape. Adaptation investment is difficult to track due to challenges associated with context dependency, the uncertain causality of investments made, a lack of impact metrics, and confidentiality and reporting requirements. Adaptation finance flows discussed in this report should be understood as the best available information on the finance that exists, but not a determinative picture of all finance flowing to address global climate risks.
- 47 Due to data availability, this report uses mainly data from 2017-2018 in its analysis. According to CPI's updated view on the Global Landscape of Climate Finance 2019, preliminary estimates suggest a 6-8% increase in climate finance for 2019 compared to the 2017-2018 average. Additional analysis of the future of adaptation finance flows beyond 2017-2018 is available in Section B.III.
- 48 Green Climate Fund, Global Environment Fund (including Least Developed Countries Fund), Adaptation Fund, Climate Investment Funds.
- 49 CIF 2016
- 50 Constraints arising from the lack of definition and taxonomy to identify adaptation activities as well as the lack of universally accepted impact metrics make it challenging to account for the efforts from public and private actor at the regional and national level.
- 51 Bloomberg 2021a
- 52 World Bank 2019b
- 53 Ecobank Transnational (Tago) has a presence in a maximum number of countries (33), while Standard Bank (South Africa) has the largest consolidated assets.
- 54 ODI 2021
- 55 IMF 2015
- 56 African Private Equity and Venture Capital Association 2020
- 57 [There is no universal definition of institutional investors and can include investment funds, insurance companies, pension funds, sovereign wealth funds, private equity funds, hedge funds, mutual funds etc. In this paper, we include sovereign wealth funds, insurance and pension funds.](#)
- 58 AfDB 2019b
- 59 Sovereign Wealth Fund Institute
- 60 International Forum of Sovereign Wealth Funds 2021
- 61 Bloomberg 2021b
- 62 Nascent countries: Angola, Algeria, Tunisia, advancing countries: South Africa, Morocco, Mauritius, Namibia, and promising countries: Egypt, Ghana, Kenya, Botswana, and Nigeria. For more details, refer to: <https://www.pwc.lu/en/asset-management/docs/pwc-am-africa-2020.pdf>
- 63 AfDB 2019b
- 64 World Bank 2020a
- 65 Ibid.
- 66 CDP. 2021. <https://www.cdp.net/en/>
- 67 For example, in 2012, Mondelēz, the world's largest chocolate company launched an initiative called Cocoa Life and invested USD 400 million to support farmers to improve yields and earn higher income across the tropical rainforest countries globally including Ghana in Africa.
- 68 For the purpose of this analysis, information on climate funds is separated given the uniquely adaptation-targeted nature of that finance.
- 69 CPI 2018
- 70 IISD 2020
- 71 CIF, PPCR 2016
- 72 IMF Policy Paper 2021
- 73 ICA 2015
- 74 ECOWAS 2020
- 75 ICA 2015
- 76 AFD 2018
- 77 Ibid.
- 78 World Bank 2017a
- 79 ODI 2020
- 80 GCF 2021
- 81 IISD 2019
- 82 Fonta, William M., Elias T. Ayuk & Tiff van Huysen. 2018
- 83 AfDB 2021b
- 84 Convergence 2019
- 85 FONERWA
- 86 UNFCCC 2021
- 87 AfDB 2020b
- 88 <https://seyccat.org/>
- 89 World Bank 2019c
- 90 Commission Climat Du Bassin Du Congo 2021
- 91 ICA 2018
- 92 ACPC 2017
- 93 Ibid.
- 94 UNDP, Africa 2018
- 95 UNECA 2017
- 96 CPI 2021b
- 97 CPI 2021a
- 98 Gates Foundation 2018
- 99 CPI, GCA 2021
- 100 Center for Global Development 2021
- 101 UNCTAD 2021
- 102 NYT 2021
- 103 World Bank 2020b
- 104 WHO 2021
- 105 EIB 2019
- 106 AfDB 2020a
- 107 Center for Global Development 2021. Does not include AfDB as data were not available.
- 108 ADB 2019
- 109 Reuters 2021
- 110 ARC 2020
- 111 UNECA 2021a
- 112 UNECA 2021b
- 113 UNEP 2020
- 114 For the full list, visit <https://www4.unfccc.int/sites/ndcstaging/Pages/LatestSubmissions.aspx>

- 115 CPI analysis, based on submitted NDC documents.
- 116 Conditional refers to funding dependent on international support.
- 117 Bangladesh Journal of Agricultural Research 2015
- 118 World Bank 2013
- 119 Making Finance Work for Africa. "Agricultural Finance".
- 120 PYMNTS 2019
- 121 CPI 2020
- 122 IDRC, CRDI 2013
- 123 UNDP. "Barriers to Investment in Adaptation".
- 124 In all sectors, these instrument are illustrative examples of the universe of available instruments being implemented or planned in the sector, but the examples in each sub-section are not intended to cover all existing instruments that exist in each sector for adaptation activities in Africa.
- 125 World Bank 2017b
- 126 IDA. "Crisis Response Window". <https://ida.worldbank.org/financing/crisis-response-window>. Early Response Financing is intended for slower-onset events which are identified as having the potential to escalate into major crises but are still in the early stages of progression. Early response financing is also intended to support and incentivize resilience-building.
- 127 FAO 2014
- 128 WFP 2019
- 129 Though ARC is not a purely agriculture sector-focused instrument, it is included in this sector because its drought focus to date has largely been relevant to agriculture sector actors.
- 130 Subsidized impact Investors get their capital primarily from concessional sources e.g., donors/ foundations/ private donations. They typically require subsidies to remain sustainable, but some do end up making financial returns. Most have the ability to utilize TA funds (usually in-house funds, but some outsourced TA models exist. For more details refer to <https://www.convergence.finance/resource/de129779-4d9d-4dd8-bfb8-200f279259c3/view>
- 131 Seed potatoes are high-quality tubers which are used to multiply the next generation of potatoes. Seed potatoes need to be grown under specific conditions to produce disease free, high-grade tubers. As such, seed potatoes are a key input for Zambian farmers growing potatoes for consumption (ware potatoes).
- 132 AgDevCo 2017
- 133 FCDO 2021
- 134 World Bank 2021b
- 135 The Energy and Resources Institute 2019
- 136 World Bank 2016
- 137 GSMA 2021
- 138 Mureithi, Carlos 2021
- 139 Conférence Interafricaine des Marchés d'Assurances (CIMA) region is an integrated organization of the insurance industry which comprises 14 African member countries in Central and West Africa (Benin, Burkina Faso, Cameroon, Central African Republic, Congo, Côte-d'Ivoire, Gabon, Guinea Bissau, Equatorial Guinea, Mali, Niger, Senegal, Chad, Comoros and Togo).
- 140 World Bank 2015
- 141 One Acre Fund. "Crop Insurance Can Improve Food Security in Africa".
- 142 WFP 2021
- 143 UNFCCC. "Rural Resilience Initiative (R4)".
- 144 WFP 2018
- 145 Anand, Mansi, Richard Choularton 2013
- 146 Clarmondial 2021
- 147 https://www.icafrica.org/fileadmin/documents/IFT_2018/ICA_Infrastructure_Financing_Trends_in_Africa_-_2018_Final_En.pdf
- 148 Approximately USD 1.2 billion in adaptation finance was tracked to the water sector in Africa on average annually across 2017-18 from DFIs (72%), international government ODA (14%), multilateral climate funds (9%), other public funds (5%), and commercial FIs (1%). Low-cost project debt constituted 54% of adaptation finance tracked to the water sector, followed by grants (28%), market rate project debt (14%), and project equity (3%). The share of water sector finance as a percentage of total adaptation finance varied by region: the majority of adaptation finance to North Africa was directed to the water sector (56%) while water finance as a share of total adaptation finance to the other four regions was lower – ranging from 10-23%.
- 149 In all sectors, these instruments are illustrative examples of the universe of available instruments being implemented or planned in the sector, but the examples in each sub-section are not intended to cover all existing instruments that exist in each sector for adaptation activities in Africa.
- 150 Global Construction Review 2017
- 151 Global Innovation Lab for Climate Finance. 2021. <https://www.climatefinancelab.org/>
- 152 Burundi, Cameroon, Djibouti, Ethiopia, Kenya, Madagascar, Malawi, Mauritius, Morocco, Nigeria Senegal, Tunisia, Uganda, Zambia.
- 153 Cervigni, Raffaello 2016
- 154 https://www.icafrica.org/fileadmin/documents/IFT_2018/ICA_Infrastructure_Financing_Trends_in_Africa_-_2018_Final_En.pdf
- 155 In all sectors, these instrument are illustrative examples of the universe of available instruments being implemented or planned in the sector, but the examples in each sub-section are not intended to cover all existing instruments that exist in each sector for adaptation activities in Africa.
- 156 World Bank 2017c
- 157 World Bank 2017d
- 158 World Bank 2021c
- 159 Negotiation Support. "Public Private Infrastructure Advisory Facility (PPIAF)".
- 160 ICA 2018 Table 3.2
- 161 AfDB 2016
- 162 Burundi, Central African Republic, Djibouti, DR Congo, Ethiopia, Lesotho, Malawi, Mozambique, Namibia, Uganda, Zambia.
- 163 Cervigni, Raffaello. 2016
- 164 As an example, see <https://www.unescwa.org/regend>
- 165 ICA 2018 Table 3.2 https://www.icafrica.org/fileadmin/documents/IFT_2018/ICA_Infrastructure_Financing_Trends_in_Africa_-_2018_Final_En.pdf
- 166 Ibid.
- 167 Including 21 new renewable energy projects.
- 168 AfDB 2017
- 169 NSEnergy 2020
- 170 Brookings 2018

- 171 Ibid.
- 172 AfDB 2018
- 173 NSEnergy 2020
- 174 Ibid.
- 175 Ibid.
- 176 IPCC 2014
- 177 OECD 2018
- 178 IEA 2020
- 179 In all sectors, these instruments are illustrative examples of the universe of available instruments being implemented or planned in the sector, but the examples in each sub-section are not intended to cover all existing instruments that exist in each sector for adaptation activities in Africa.
- 180 African Power Platform 2020
- 181 UNIDO 2021
- 182 ECDPM 2019
- 183 TCX 2020
- 184 Demekas, D. and Nerlich A. 2020
- 185 Algeria, Tunisia, Niger, Burkina Faso, Nigeria, Cameroon, Cote d'Ivoire, Senegal, Sierra Leone, Ghana, Benin, Uganda, Kenya, Rwanda, Tanzania, Malawi, Zambia, Mozambique, Madagascar, South Africa.
- 186 UNDESA 2018a
- 187 UNHCR. "Refugee Context in Egypt".
- 188 Reliefweb 2021
- 189 Hommann, Kirsten, and Somik V. Lall. 2019.
- 190 Dziobek et al. 2011
- 191 ICA 2018
- 192 AfDB 2019a
- 193 AfDB 2020c
- 194 In all sectors, these instruments are illustrative examples of the universe of available instruments being implemented or planned in the sector, but the examples in each sub-section are not intended to cover all existing instruments that exist in each sector for adaptation activities in Africa.
- 195 CaaS Initiative 2020
- 196 Burkina Faso, Cameroon, Cabo Verde, Gabon, Gambia, Ghana, Kenya, Lesotho, Malawi, Mauritania, Mauritius, Mozambique, Nigeria, Rwanda, Seychelles, South Africa, South Sudan, Tanzania, Togo, Uganda, Zambia.
- 197 The African Union defines a blue or ocean economy as "sustainable economic development of oceans using such techniques [sic] as regional development to integrate the use of seas and oceans, coasts, lakes, rivers and underground water for economic purposes, including, but without being limited to fisheries, mining, energy, aquaculture and maritime transport, while protecting the sea to improve social well-being".
- 198 UNEP 2021
- 199 Schneider, T. 2014
- 200 Beatley, T. 2012
- 201 Nature 2021
- 202 In all sectors, these instrument are illustrative examples of the universe of available instruments being implemented or planned in the sector, but the examples in each sub-section are not intended to cover all existing instruments that exist in each sector for adaptation activities in Africa.
- 203 GCF 2019
- 204 WRI 2021
- 205 GCF 2021
- 206 World Bank 2018
- 207 Ibid.
- 208 World Bank 2020c
- 209 These are the Arab Maghreb Union (AMU), Community of Sahel-Saharan States (CEN-SAD), Common Market for Eastern and Southern Africa (COMESA), East African Community (EAC), Economic Community of Central African States (ECCAS), Economic Community of West African States (ECOWAS), Inter-governmental Authority on Development (IGAD), and Southern African Development Community (SADC).
- 210 ECDPM 2019b
- 211 For more information on the structure of the DFC Swaps instrument and key learnings from the instrument implementation, please refer to the blueprint published Climate Policy Initiative in May 2021 available at <https://www.climatepolicyinitiative.org/wp-content/uploads/2021/05/Debt-for-Climate-Swaps-Blueprint-May-2021.pdf>
- 212 Panorama 2021
- 213 IIGF Green BRI Center 2021
- 214 The Lab 2019
- 215 Ibid.
- 216 McKinsey 2020
- 217 FAO 2019
- 218 Landscape News 2021
- 219 African Development Bank (USD 6.5 billion), the World Bank (USD 5 billion) and the European Commission (USD 2.5 billion).
- 220 In all sectors, these instruments are illustrative examples of the universe of available instruments being implemented or planned in the sector, but the examples in each sub-section are not intended to cover all existing instruments that exist in each sector for adaptation activities in Africa.
- 221 BusinessWire 2020
- 222 The Lab 2018
- 223 Criterion Africa Partners. "Investments". Individual investment amounts not disclosed.
- 224 World Bank 2021e
- 225 ILO 2021
- 226 UNECA 2021b
- 227 UN 2021
- 228 Mozambique, Republic of the Congo, São Tomé and Príncipe, Somalia.
- 229 World Bank 2021a
- 230 UNECA 2021b
- 231 World Bank International Debt Statistics.
- 232 Updated Jan 21, 2021. World Bank Debtor Reporting System.
- 233 University of Cambridge and Bennett Institute for Public Policy 2021
- 234 RCP 8.5 represents a business as usual or worst-case scenario for emissions trajectories.

- 235 University of Cambridge and Bennett Institute for Public Policy 2021
- 236 Bloomberg 2021a
- 237 https://www.icafrica.org/fileadmin/documents/IFT_2018/ICA_Infrastructure_Financing_Trends_in_Africa_-_2018_Final_En.pdf
- 238 Though this analysis divides financial instruments assessed by sector, there are substantial overlaps between sectors in implementation of adaptation activities. For example, significant water resources are directed to the agriculture sector – so building resilience in water and wastewater can have considerable co-benefits for agriculture. Instruments identified by sector are allocated to the sector with which they most closely align, but this analysis acknowledges the co-benefits and overlaps that exist in practical application.
- 239 Bangladesh Journal of Agricultural Research. 2015. "Agricultural adaptation strategies to climate change impacts in Africa: a review". <https://www.banglajol.info/index.php/BJAR/article/view/21984>
- 240 Cervigni, Raffaello. 2016. "Enhancing the Climate Resilience of Africa's Infrastructure". <https://www.greengrowthknowledge.org/research/enhancing-climate-resilience-africa%E2%80%99s-infrastructure>
- 241 Cervigni, Raffaello. 2016. "Enhancing the Climate Resilience of Africa's Infrastructure". <https://www.greengrowthknowledge.org/research/enhancing-climate-resilience-africa%E2%80%99s-infrastructure>
- 242 Burundi, Central African Republic, Djibouti, DR Congo, Ethiopia, Lesotho, Malawi, Mozambique, Namibia, Uganda, Zambia.
- 243 Ibid.
- 244 USAID. 2018. "Climate Risk Profile West Africa". https://reliefweb.int/sites/reliefweb.int/files/resources/West_Africa_CRP_Final.pdf
- 245 Conway et al. 2017. "Hydropower plans in eastern and southern Africa increase risk of concurrent climate-related electricity supply disruption". https://www.nature.com/articles/s41560-017-0037-4?WT.feed_name=subjects_energy-security
- 246 Cabo Verde, Gabon, Ghana, Mauritius, Seychelles, South Africa. World Bank, 2019.
- 247 UNDESA. 2018. "World Urbanization Prospects: The 2018 Revision". <https://population.un.org/wup/Publications/Files/WUP2018-Report.pdf>
- 248 Brookings. 2020. "Urban economic growth in Africa: Analyzing constraints to agglomeration". <https://www.brookings.edu/blog/africa-in-focus/2020/10/30/urban-economic-growth-in-africa-analyzing-constraints-to-agglomeration/>
- 249 UN-Habitat. 2020. "Breaking Cycles of Risk Accumulation in African Cities". United Nations Human Settlements Programme (UN-Habitat).
- 250 UNHCR. "Refugee Context in Egypt". <https://www.unhcr.org/eg/about-us/refugee-context-in-egypt>
- 251 USAID. 2018. "Southern Africa Climate Risk Profiles". <https://www.climatelinks.org/resources/climate-risk-profile-southern-africa>
- 252 Reliefweb. 2021. "2 years since Cyclone Idai and Mozambique has already faced an additional 3 cyclones". <https://reliefweb.int/report/mozambique/2-years-cyclone-idai-and-mozambique-has-already-faced-additional-3-cyclones>
- 253 Hommann, Kirsten, and Somik V. Lall. 2019. "Which Way to Live-able and Productive Cities? A Road Map for Sub-Saharan Africa". International Development in Focus. Washington, DC: World Bank.
- 254 USAID. 2009. "Adapting to Coastal Climate Change". <https://www.crc.uri.edu/download/CoastalAdaptationGuide.pdf>
- 255 FAO. 2019. "Trees, forests and land use in drylands: the first global assessment". <http://www.fao.org/documents/card/en/c/ca7148en/>
- 256 Ibid.
- 257 International Union of Forest Research organizations. 2009. "Making African forests fit for climate change: A Regional View of Climate-Change Impacts on Forests and People, and Options for Adaptation".
- 258 Ibid.
- 259 Ibid.
- 260 USAID. 2018. "Climate Risks in the Central Africa Regional Program for the Environment (CARPE) and Congo Basin".
- 261 USAID. 2016. "Climate Changes Risk Profile: Southern Africa".
- 262 USAID. 2012. "Climate Change Adaptation in East Africa".
- 263 Morocco, Niger, Senegal, Namibia, Zimbabwe, Côte d'Ivoire, Benin, Rwanda, Ethiopia, Uganda, Kenya, Tanzania, South Africa.
- 264 BOAD, Sahara and Sahel Observatory (OSS).
- 265 African Development Bank.
- 266 GCF. "What are NDAs?" [https://www.greenclimate.fund/about/partners/nda?f\[\]=field_country%253Afield_region:318](https://www.greenclimate.fund/about/partners/nda?f[]=field_country%253Afield_region:318)
- 267 GCF. 2021. "GCF Spotlight Africa". <https://www.greenclimate.fund/sites/default/files/document/gcf-spotlight-africa.pdf>



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