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Green Bonds for Climate Resilience

State of Play
and Roadmap
to Scale

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This report was produced under the guidance of Professor Patrick Verkooijen, CEO of the Global Center on Adaptation

This report was prepared by the Climate Bonds Initiative for the Global Center on Adaptation, in cooperation with the EBRD.



The Climate Bonds Initiative is an investor-focused, not-for-profit organisation working to mobilise debt capital markets for climate change solutions, to accelerate a global transition to a low-carbon and climate-resilient economy.



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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.



This publication has been produced with the assistance of the EBRD. The contents of this publication are the sole responsibility of the Global Center on Adaptation and the Climate Bonds Initiative and do not necessarily reflect the views of the EBRD.

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The authors wish to thank the Steering Group members Craig Davies from EBRD, and Felipe Larrain from GCA and the Climate Resilience Bonds Expert Group Members: Isabelle Laurent (EBRD), Stephanie Simon and Keith Werner (AFDB), Steve Hammer and Denise Odaro (World Bank), Ahmed Al Qabany (IsDB), Peter Odhengo (National Treasury, Kenya), Arindom Datta (Rabobank India), Andres Perez (Ministry of Finance, Chile), Abyd Karmali (Bank of America), Carlos Sanchez and John Firth (WTW), Alexandre Chavarot (Climate Finance 2050), Paul Munday (S&P Global Ratings), Daisy Streatfield (IIGCC), Virginie Fayolle (UNEP), Chiara Trabacchi and Alexander Vasa (IADB), Michael Hugman (CIFF), Nambi Appadurai (WRI). We would also like to thank colleagues at GCA that reviewed and supported this work including Sara Ahmed, Seyni Nafo, Jaehyang So, Fleur Wouterse, Jamal Saghir, Anthony Nyong.

EXECUTIVE SUMMARY

INTRODUCTION

This paper aims to deepen current understanding of the state of play of green bonds that are financing climate resilience-related assets, projects, and activities (hereafter referred to as **Green Bonds for Climate Resilience**). The report contains an overview of the global state of play of green bonds with resilience-related use of proceeds, including highlights from select regions¹. The barriers for issuing resilience-related green bonds in four case study countries² are identified and recommendations on how to address them are proposed. An analytical tool, the Green Bonds for Climate Resilience Capacity Assessment Framework, has been developed to inform this analysis and can in turn be used by public and corporate issuers to assess their internal capacity and external enablers to issue Green Bonds for Climate Resilience. Based on the analysis and findings, a roadmap to scale-up this promising tool is presented.

BOX 1: DEFINITIONS

Climate resilience: This document uses the definition of climate resilience in the context of investment as set out in the Climate Bonds Initiative's Climate Resilience Principles (CRPs), namely: resilience investments improve the ability of assets and systems to persist, adapt and/or transform in a timely, efficient, and fair manner that reduces risk, avoids maladaptation, unlocks development and creates benefits, including for the public good, against the increasing prevalence and severity of climate-related stresses and shocks. Note that in the paper resilience is at times used as shorthand for climate resilience.



GREEN BONDS FOR CLIMATE RESILIENCE

This paper uses the term 'Green Bonds for Climate Resilience' as shorthand for a green bond in which some portion (or all) of its proceeds is allocated to investments that support climate adaptation and increase resilience to physical climate risks. A Green Bond for Climate Resilience enjoys the same benefits as conventional green bonds (i.e., those focused on low-carbon investments). Notably, the benefits of green bonds include:

- providing issuers access to low-cost capital to finance their investment pipelines
- broadening of the investor base, as demand for green bonds far outstrips supply
- well-suited to large-scale projects that require capital investment ahead of revenues
- helping to unlock discounted finance through blended finance facilities and funds
- bringing visibility and recognition to resilience features within the bonds
- Positive impact on internal processes that enhance risk management and strengthen internal relationships and commitment to sustainability.

THE CLIMATE FINANCE EMERGENCY

Physical climate risks are rising and climate shocks have become more frequent and severe. Even if emission-reduction efforts succeed and the world meets the goal of holding average temperature increases to well below 2°C and limited to 1.5°C, there are some changes already locked into planetary systems that will have unavoidable consequences. In the coming decades, climate shocks are set to become the norm. Preparing for these shocks requires the deployment of trillions of dollars from a variety of different sources of finance and presents an enormous investment opportunity.

There is an urgent need to increase finance for climate adaptation and resilience. Despite international recognition that both mitigation and adaptation efforts are essential, adaptation funding remains a far smaller portion of total climate finance. UNEP estimates that by 2030, adaptation and resilience (A&R) needs could reach USD300bn per year in developing countries, while the Climate Policy Initiative found that A&R finance flows measured in 2018 reached only USD30bn, of which only USD500mn was from private sources.

Global communities cannot afford to wait decades for A&R investments. For this reason, in recent years, António Guterres, Secretary-General of the United Nations, has been calling all nations and development finance institutions to urgently raise A&R finance to 50% of total climate finance, while also mainstreaming A&R into all financial decision-making, and improving access for the most vulnerable.

Economic and social disruptions caused by COVID-19 have severely impacted emerging markets, whose real gross domestic product (GDP) is projected to be 6 percent lower in 2022 (World Bank, 2021). These disruptions are expected to reverse two decades of progress on poverty reduction worldwide, with 8 out of 10 of the “new poor” living in middle-income countries. Significant efforts to recover from the pandemic will be needed, particularly in emerging markets; actions taken now will be critical to determining the course of the recovery and the pathway toward a more climate-resilient, sustainable future.





AN OPPORTUNITY FOR A RESILIENT RECOVERY

The green bond market can be an effective tool for a resilient recovery. USD100tn is currently outstanding in global fixed income markets. The surge of green bonds has been effective (particularly for investment grade issuers) in raising finance for infrastructure projects that deliver positive environmental impact. Since the first labelled green bond in 2007 by the European Investment Bank (EIB), USD1.5tn of labelled green bonds have been issued worldwide from a diverse range of issuers, spearheaded by supnationals and followed by sovereigns, municipalities, national development banks, financial institutions and corporates. Green bonds are highly attractive to investors looking to fulfil their growing green mandates, enabling issuers to widen their investor base and in some cases to attract cheaper financing due to strong demand for these bonds.

Investor demand for thematic bonds has grown as a result of the pandemic. Since the onset of the pandemic, investor interest in social bonds, a derivative of the green bonds “use of proceeds” format, have soared and similar COVID-19 bonds have emerged as a new way to tap capital markets to finance COVID-19 recovery stimulus measures while simultaneously delivering social benefits. The volume of social bonds issued in 2020 jumped to USD249bn – a 10-fold increase from 2019. The French government alone issued USD22bn to tackle unemployment, while Bank of America issued USD1bn for lending to not-for-profit hospitals, nursing homes and manufacturers of healthcare equipment. This rapidly growing socially and environmentally responsible bond market can be unified by a common value proposition that Green Bonds for Climate Resilience

offer: investments that engender more resilient economies, ecosystems, and communities. Resilience provides a lens through which social, ecological, and economic resilience can be captured and there are substantial synergies with the broader United Nation’s Sustainable Development Goals (SDGs). By placing resilience at the heart of sustainability, a broader investor base can be reached.

Supnationals are particularly well positioned to invest in A&R, especially in climate vulnerable regions and emerging markets.

The African Development Bank (AfDB), for example, dedicated 68% of their climate finance to A&R in 2020 in order to support Africa, the most vulnerable continent, to become more resilient to climate shocks. Supnationals and international development cooperation have the opportunity to crowd-in more private capital by increasing their share of A&R investments through anchor investments in the green bond market, along with support for broadening the number and type of green bond issuers

Green Bonds for Climate Resilience could offer a diversified source of funding for public sector investment grade issuers to mainstream resilience in COVID-19 recovery efforts.

While many governments have recognized the need for a sustainable and resilient recovery, most governments have not adequately used economic stimulus to invest in climate change or long-term resilience. Yet there is a tremendous opportunity for COVID-19 recovery stimulus finance to act as a catalyst for mainstreaming adaptation and resilience across a range of financial instruments, including bonds.

STATE OF PLAY OF GREEN BONDS FOR CLIMATE RESILIENCE

Climate resilience is already being financed. A share of 16.4% (1,265) of deals in the global labelled green bond market (7,725 deals) up to September 2020 have included activities related to A&R, mostly in the water and water-related sectors. From these, 79% of the issuances have come from developed markets, 15% from supranational institutions, and only 6% from emerging markets. With respect to issuer, 12% of the green bonds that included A&R activities were issued by sovereigns and local governments, 65% by government-backed entities, 16% by development banks, 4% by financial corporates, and 3% by non-financial corporate organizations. The first green bond fully dedicated to support climate-resilient infrastructure, climate-resilient businesses, and climate-resilient agriculture and ecological systems – labelled as ‘Climate Resilience Bond’ – was issued by the European Bank for Reconstruction and Development (EBRD) in January 2020.

Infrastructure projects with large capital expenditure and resilience benefits present clear premises for issuing Green Bonds for Climate Resilience, however, programmatic approaches can enable issuance for other

activities such as sustainable landscapes, agriculture, and watershed management as well. Investors demand for green bonds exist and is growing quickly, however, supply of credible A&R investments is low and investors’ demand remains untapped. By identifying pipelines of eligible projects and programmes, this demand can be effectively harnessed.

Positioning resilience-related bonds squarely within the green bond market will facilitate investment.

Climate resilience is integral to climate goals, and is already part of the green universe. Existing international standards already allow for the inclusion of A&R initiatives into green bond frameworks and there are a number of thematic labels and financial tools that can be used to market resilience investments and attract investors. However, by leveraging the credibility, scale, momentum and liquidity that the green bond market has achieved over the past 10 years, the opportunity to scale becomes palpable. It is therefore important that resilience-related bonds are clearly positioned within the green bond universe to effectively tap into high investor demand in that market.

CAPACITY ASSESSMENT FRAMEWORK FOR ISSUING GREEN BONDS FOR CLIMATE RESILIENCE

Issuers interested in Green Bonds for Climate Resilience are at different stages of market readiness with varying degrees of necessary capacities and enabling contextual factors including awareness, governance, resilience pipelines, investment-ready projects, capacity to issue, and long-term credibility. Analysis of issuances in the Latin America and the Caribbean (LAC) and Africa regions, along with a deeper analysis of issuance experiences in four African countries – Kenya, Morocco, Nigeria and South Africa – revealed that, despite differences in context, countries in EMs tend to face similar experiences, barriers, and opportunities on their path to issuing Green Bonds with A&R components. Examples include:

- There is limited knowledge and capacity to assess climate risk and identify eligible projects;
- Investment pipelines are not fully developed or large enough for meaningful screening against resilience criteria;
- Resilience screening guidelines are still high-level and lack metrics and as a result, issuers struggle to identify eligible projects;
- Resilience projects are often too small in scale compared to the minimum bond issuance size typically required by institutional investors, therefore they need to be bundled with mitigation projects to achieve scale;
- Most international investors will only invest in hard currency, whereas issuances in these countries is mostly in local currency and do not always display a high enough level of credit quality.

ROADMAP TO SCALING GREEN BONDS FOR CLIMATE RESILIENCE

To seize the opportunity to grow the market for Green Bonds for Climate Resilience, the immediate priority is to **build momentum**. Engaging and supporting existing and potential new sovereign and sub-sovereign bond issuers poised to supply the market with Green Bonds for Climate Resilience, while concurrently engaging with institutional investors demonstrating demand is a key first step. Second, **the integrity of the market needs to be safeguarded and enhanced** by expanding and refining standards while monitoring compliance

to ensure investments are credibly contributing to stated resilience goals. Third, governments must create the policy and regulatory frameworks that enable the **achievement of scale and sustainability**. The roadmap presents key actions under these three priority areas that are applicable to policymakers, government institutions, standard-setting bodies, financial institutions, development finance institutions, multilateral banks, civil society, NGOs, bond issuers, and investors.

PRIORITY 1: BUILDING MOMENTUM

- 1. Technical Assistance (TA) and Green Bonds for Climate Resilience support programmes.** TA from supranationals and international cooperation should support the added cost of issuing Green Bonds for Climate Resilience, namely structuring of green bond frameworks, the governance structure responsible for selection of resilience criteria and reporting, the development of metrics and reporting platforms, as well as benchmarking processes against industry best practice and evolving standards.
- 2. TA for the identification of ready-to-finance A&R pipelines.** In developing countries and emerging economies, TA from supranationals and international cooperation can be effectively applied to develop tools that prioritize investments that integrate A&R indicators into national budgets. Furthermore, TA can be provided through project preparation facilities that aim to finance pre-investment activities (i.e. project feasibility studies; value-for-money analyses that comprise climate risk assessments) needed to develop more robust pipelines of A&R investments.
- 3. Raise awareness of potential issuers through training on A&R in the context of green bond guidelines.** Awareness raising is needed to allow existing issuers and potential new issuers to better consider future climate risks – thereby stimulating Green Bonds for Climate Resilience issuances.
- 4. Boost blended and concessional finance solutions, as well as guarantee and risk-transfer mechanisms, to increase the number of issuers and issuances.** Supranationals and international cooperation should set up dedicated investment funds to support the issuance of Green Bonds for Climate Resilience, especially for sovereigns and sub-nationals with low credit ratings by (i) providing the anchor investment for first time issuers; (ii) de-risking mechanisms such as credit guarantees or political risk insurance for below investment grade issuers; (iii) enabling debt conversion swaps for countries with limited fiscal space, or (iv) hedging instruments such as cross currency swaps for sub-sovereign entities.
- 5. Engage and activate investor demand.** An investor survey that involves both quantitative and qualitative analysis of investor demand for Green Bonds for Climate Resilience could provide an effective tool for (i) raising awareness and engaging investors on this issue; and (ii) ensuring standards, reporting, and disclosure is fit-for-purpose in terms of attracting investors and meeting their needs. An investor statement specifically expressing demand for Green Bonds for Climate Resilience can bring much needed visibility to resilience in the green bond market. Engaging investors to expand their green mandates to include resilience goals can similarly have a catalytic impact.

PRIORITY 2: SAFEGUARDING CREDIBILITY

- 6. Develop more granular and context-centric A&R guidelines.** Due to the unique nature of climate adaptation, it is fundamental to develop guidelines and frameworks for context-specific adaptation taxonomies. In order to ensure international harmonization, these may build on existing relevant taxonomies. The Climate Resilience Principles³ (CRPs) as well as some of the work in the EU Taxonomy for Sustainable Finance⁴ and continuing work of the associated EU Platform on Sustainable Finance⁵ may serve as starting points for advancing more granular and context-centric resilience guidelines. New or revised guidelines should also address gaps of the existing guidance, which still lack process metrics to ensure the quality of risk assessment activities; sector-specific guidance for issuers; impact reporting metrics; standardised benefit quantification methodologies; and methodologies for evaluating trade-offs between mitigation and adaptation, or any other environmental or social objectives.
- 7. Report and track on resilience investments.** Accurate tracking of Green Bonds for Climate Resilience can help investors identify opportunities available and drive greater capital flows toward investments in A&R; support government agencies in developing policies and regulatory guidance around labelling, issuing and reporting; and can ensure continued integrity of the green bond market as a whole. Online platforms such as LuxSE's Luxembourg Green Exchange⁶ and the Inter-American Development Bank's Green Bond Transparency Platform⁷ are essential instruments to ensure the transparency and the comparability of Green Bonds that are needed to ensure greater level of confidence to existing investors.
- 8. Monitor, review and critique deals.** Local civil society organisations can be critical in monitoring and reviewing the local market to highlight any issues or local best practice. This is critical in helping the local market to maintain credibility and in providing investors with greater visibility within the local market.
- 9. Respond to investor demand for entity-level credentials.** The lack of standard definitions of what makes a bond 'green' has led to uncertainty over whether all green bonds really are 'green'. The mainstreaming of investing based on environmental, social, and governance (ESG) principles is motivating fund managers and investors to increasingly look past the green bond label and assess the bond issuer's overarching green credentials and targets. Clear adaptation targets in National Determined Contributions (NDCs), robust National Adaptation Plans (NAPs) and strong climate policies are key to build a good reputation and ensure the quality of the credentials of sovereign and sub-national bond issuers.



PRIORITY 3: SCALING-UP

- 10. Harmonise domestic guidelines with global taxonomies and standards.** Consistency of definitions is critical for investors, particularly for international investors. At the same time, resilience measures also need to be locally relevant and specific. Expressing local needs and priorities in a compatible vernacular shall bolster the credibility of issuers and provide confidence to investors to scale up investments.
- 11. Support the development of more robust NAPs.** Government engagement is fundamental to prioritize investments and financial instruments for climate resilience. Frameworks and tools that enable the prioritization of A&R programs and projects in national budgets are needed. Through robust NAPs and mainstreaming climate resilience in national budgets, a pipeline of investments can be established – the lack of which are a key barrier to issuing Green Bond for Climate Resilience.
- 12. Establish mandatory climate risk disclosure in targeted sectors.** Currently, green bond issuers absorb the additional transaction costs associated with external review and certification. Governments can level the playing field for transparency, disclosure and reporting costs between green and non-green bond issuance by extending the focus on disclosure requirements on green credentials to all fixed income issuances.
- 13. Provide regulatory incentives for resilience investments.** A variety of incentives can be used to accelerate the pace of issuance including tax-exemptions, preferential withholding tax rates, preferential treatment in asset purchasing and collateral programs for Green Bonds for Climate Resilience by the financial regulator, etc. .
- 14. Support financial product innovation around aggregation** to enable small projects and issuers to access capital through the green bond markets. This includes aggregation, green securitization and green covered bonds. These product innovations require putting in place a robust legal and regulatory framework that allows the instruments to be created and used.



PART I GREEN BONDS FOR CLIMATE RESILIENCE: AN OPPORTUNITY FOR URGENT CLIMATE ACTION

2020 brought the world not just the worst pandemic of the century – but also the highest global temperatures on record, alarming heat and record wildfires in the Arctic, and a record 29 tropical storms in the Atlantic. In addition to multiple shocks resulting from COVID-19, more than fifty million people worldwide have also been affected by floods, droughts or storms. Land degradation, wildlife exploitation, intensive farming and climate change are driving the rise in zoonotic diseases that can be passed from animals to humans. The COVID-19 pandemic is the first of what is likely to be a **century of shocks** related to climate change and environmental degradation, and has exposed how acutely vulnerable we are to the cascading and multiple impacts of climate change.

Economic and social disruptions caused by COVID-19 have severely impacted emerging markets, whose real gross domestic product (GDP) is projected to be 6 percent lower in 2022 (World Bank, 2021). These disruptions are expected to reverse two decades of progress on poverty reduction worldwide, with 8 out of 10 of the “new poor” living in middle-income countries. Significant efforts to recover from the pandemic will be needed, particularly in emerging markets; actions taken now will be critical to determining the course of the recovery and the pathway toward a more climate-resilient, sustainable future.

Combating climate impacts will require significant resources. While the scale of future adaptation needs will depend on the success of current mitigation efforts, there exists a huge investment gap to address the climate impacts that are already locked-in. The annual adaptation costs for developing countries alone are estimated to be in the range of USD140bn to USD300bn per year by 2030, and between USD280bn and USD500bn per year by 2050 in order to adapt to a 2°C future (UNEP, 2016). However, these estimates are likely underrepresenting the real need when taking into account the capital requirements for making existing and planned infrastructure investments

resilient to climate change. Globally, the need for infrastructure investment, is forecast to reach USD94tn by 2040, and a further USD3.5tn will be required to meet the United Nations’ Sustainable Development Goals (SDGs) for electricity and water (Oxford Economics, 2017). Assuming that all of these infrastructure investments will require resilience features, **the adaptation finance gap is likely to be in the scale of trillions** rather than billions.

In the face of these needs, adaptation finance flows remain woefully insufficient. Total tracked public and private investment in climate adaptation in 2018 was USD30bn worldwide (Climate Policy Initiative, 2019). There is widespread acknowledgement that public finance will be insufficient to meet adaptation financing needs. While there is very limited data on private investment flows, it is clear that securing private investment for adaptation remains a challenge and that the **vast majority of climate finance is aimed at mitigation**. In 2018, mitigation finance accounted for 93% of total climate-related investment flows globally (Climate Policy Initiative, 2019).

Green bonds are a promising vehicle for financing adaptation needs and break new ground in leveraging of private investment (Box 2 for more details on the benefits of green bonds). As policymakers seek a sustainable recovery from the COVID-19 crisis, governments and companies are expected to issue USD500bn in green debt¹ in 2021, nearly half the total that has been raised since the asset class’ inception, according to a projection from Swedish bank SEB. Furthermore, the IFC estimates that green bonds issuance in emerging markets will double in the next three years compared to the previous three, and the market will cross the USD100bn mark of annual issuance by 2023.

¹ Other tools in the market include Insurance-linked Securities (ILS) such as catastrophe bonds, parametric solutions, and debt-for-nature swaps. While these are also promising tools, the scope of this paper is on exploring the rapidly evolving green bond market and the potential to mainstream resilience within it.

Moreover, investor demand for thematic bonds has grown as a result of the pandemic. Since the onset of the pandemic, investor interest in social bonds, a derivative of the green bonds “use of proceeds” format, have soared and similar COVID-19 bonds have emerged as a new way to tap capital markets to finance COVID-19 recovery stimulus measures while simultaneously delivering social benefits. The volume of social bonds issued in 2020 jumped to USD163bn from USD13bn in 2019. The French government alone issued USD22 billion to tackle unemployment, while Bank of America issued USD1bn for lending to not-for-profit hospitals, nursing homes and manufacturers of healthcare equipment. This

rapidly growing socially and environmentally responsible bond market can be unified by a common value proposition that Green Bonds for Climate Resilience offer: investments that engender more resilient economies, ecosystems, and communities. Resilience provides a lens through which social, ecological, and economic resilience can be captured – climate resilience underpins all sustainable development, and there are substantial synergies with the broader SDGs. By placing resilience at the heart of sustainability, a broader investor base can be reached and Green Bonds for Climate Resilience can become a prominent tool for directing capital flows towards Adaptation and Resilience (A&R).

BOX 2: WHY GREEN BONDS FOR CLIMATE RESILIENCE?

This paper uses the term ‘Green Bonds for Climate Resilience’ as shorthand for a green bond in which some portion (or all) of its proceeds is allocated to climate adaptation and resilience to physical climate risks. A Green Bond for Climate Resilience may include the strengthening of assets to withstand climate impacts (e.g. infrastructure hardening) and infrastructure specifically designed to reduce climate risks to entire systems and localities (e.g. seawalls, reservoirs, natural infrastructure, etc.). A Green Bond for Climate Resilience would enjoy the same benefits as conventional green bonds (i.e., those focused on low-carbon investments). Notably, the benefits of green bonds include:

- providing issuers access to low-cost capital to finance their investment pipelines;
- broadening of the investor base, as demand for green bonds far outstrips supply; well suited to large-scale projects that require capital investment ahead of revenues, and which generate modest revenue over a longer investment horizon;
- helping to unlock discounted finance through blended finance facilities and funds;
- bringing visibility and recognition to resilience features within the bonds;
- positive impact on internal processes that enhance risk management and strengthen internal relationships and commitment to sustainability.

Positioning resilience-related bonds squarely within the green bond market will facilitate investment. Climate resilience is integral to climate goals, and is already part of the green universe. There are a number of thematic labels and financial tools that can be used to market resilience investments and attract investors. However, by leveraging the credibility, scale, momentum and liquidity that the green bond market has achieved over the past 10 years, the opportunity to scale becomes palpable. It is therefore important that resilience-related bonds are clearly positioned within the green bond universe to effectively tap into high investor demand in that market.

In just over a decade, the fledgling green bond market has matured into one of the biggest innovations in sustainable finance. Yet only a fraction of the USD1tn cumulative green bonds issuance has been used to finance projects that address resilience. With global sustainable investment growing at a double-digit rate, **we cannot allow another decade to pass before harnessing the momentum of the green bond market to mobilise trillions of dollars for a more resilient society.**

The first green bond was issued in 2007, but the market only took off in 2013. In its early years, it was important to build momentum and experience by keeping things simple. Early issuances had a narrow focus on low-carbon assets, which are by nature less complex to identify and report against, allowing the market to grow rapidly. The market has matured and diversified significantly since then, with a wide variety of issuers, sectors, environmental objectives and labels in variations of the green bond format being successfully created, illustrating the **market readiness and appetite for greater diversity and complexity.** This natural progression presents a huge opportunity, particularly in the context of the COVID-19 pandemic and the emerging consensus to build forward better. It also represents an opportunity for investors to secure more stable long-term returns that are resilient to climate shocks.

Moreover, there has historically been a sharp imbalance of action on mitigation over adaptation, especially in developed markets where the majority of green bonds have been issued. In recent years, António Guterres, Secretary-General of the United Nations, has been calling all nations and development finance institutions to urgently raise adaptation finance to 50% of total climate finance, while also mainstreaming adaptation into all financial decision making, and improving access for the most vulnerable. In developed and emerging markets alike, much greater attention is now being paid to climate resilience due not only to the direct adverse impacts already experienced, but also due to the urgent need to address the inevitable climate related shocks and stresses in the century ahead.

Green Bonds for Climate Resilience are an alternative source of financing for public sector investment grade issuers. Sovereigns and sub-nationals could diversify their sources of financing and investor base while ensuring the resilience of assets, communities and the environment. Supranationals are also well positioned

to invest in A&R, especially in emerging markets, as well as to support developing countries advance their readiness to issue Green Bonds for Climate Resilience. Undoubtedly, Multilateral Development Banks (MDBs) have been increasingly investing in climate, especially in climate vulnerable regions. The African Development Bank (AfDB), for example, dedicated 68% of their climate finance to A&R in 2020 in order to support Africa, the most vulnerable continent, to become more resilient to climate shocks.

Awareness amongst institutional investors on climate risks is also growing and they are becoming more comfortable with investing in resilience, in part due to their greater exposure to such investments as a result of the points mentioned above, but also because of the increasing policy and regulatory push for climate risk disclosure. Most notable are the Task Force on Climate-related Financial Disclosures² (TCFD) framework, the EU Sustainable Finance Taxonomy³, and the responses of Central Banks to the destabilising impacts of climate change on financial systems. More broadly, investors are hungry for green bonds, with demand currently outstripping supply. By expanding the universe of these bonds to include resilience, supply of bonds can be scaled to meet demand.

The Global Center on Adaptation and the Climate Bonds Initiative, in cooperation with the European Bank for Reconstruction and Development (EBRD), have produced this paper with the intention to deepen current understanding of the state of play of green bonds that finance resilience-related assets, projects, and activities in order to chart a path to scale-up this promising instrument.

² Focused on market transparency and stability, the Task Force on Climate-related Financial Disclosures develops recommendations for more effective climate-related disclosures that could promote more informed investment, credit, and insurance underwriting decisions and, in turn, enable stakeholders to understand better the concentrations of carbon-related assets in the financial sector and the financial system's exposures to climate-related risks. <https://www.fsb-tcfd.org/about/>

³ The EU Taxonomy is a classification system, establishing a list of environmentally sustainable economic activities. It is an important enabler to scale up sustainable investment and to implement the European Green Deal. Notably, by providing appropriate definitions to companies, investors and policymakers on which economic activities can be considered environmentally sustainable, it is expected to create security for investors, protect private investors from greenwashing, help companies to plan the transition, mitigate market fragmentation and eventually help shift investments where they are most needed. https://ec.europa.eu/info/business-economy-euro/banking-and-finance/sustainable-finance/eu-taxonomy-sustainable-activities_en

PART II GREEN BONDS FOR CLIMATE RESILIENCE: GLOBAL OUTLOOK

2.1 GLOBAL OVERVIEW OF GREEN BONDS FOR CLIMATE RESILIENCE

Unlike climate change mitigation, which has the relatively clear goal of greenhouse gas reduction, climate resilience can encompass a very broad number of activities. In the early stages of the green bond market development, a focus on low-hanging fruit for climate mitigation (e.g. renewable energy) was necessary for scaling-up. Now that the green bonds market is well-established, more difficult areas, such as transition and resilience, are being tackled.

Granular analysis reveals a total of 16.4% of green bond deals have resilience-related use of proceeds



From the 7,725 global deals listed in the Climate Bonds Initiative's database by October 2020, 1,265 deals (16%) were identified as having resilience-related use of proceeds¹. It must be noted though, that this number is skewed by the multiple issuances by US government-sponsored enterprise Fannie Mae², which issued 761 deals, or 60%, of the deals identified. There are only 84 issuers of green bonds resilience-related themes globally and the water sector represents the largest investment theme. By number of deals, water efficiency accounts for 77% of the bonds identified, water treatment accounts for 5%, waste water treatment for 4%, and flood control for 2%.

¹ Data analysis includes labelled bond issuances from May 2014 – September 2020

² Fannie Mae's deals target energy or water efficiency improvement from baseline performance on existing properties. While Fannie Mae's large presence does skew results, the fact that such an important issuer is already raising capital to finance resilience-related projects is worth highlighting.

BOX 3: LIMITATIONS OF SCREENING METHODOLOGY FOR IDENTIFYING GREEN BONDS FOR CLIMATE RESILIENCE

The methodology applied in this work to identify green bonds with adaptation and resilience-related use of proceeds has limitations related to data availability and tagging practices (Annex 1 provides further details on the methodology used). Disclosure and tagging practices must evolve before we can accurately capture and track adaptation and resilience-related finance in the green bond market. For now, however, it was found that a) resilience is only featured in a minority of green bond issuances; and b) there is a “hidden” market for resilience which is not being labelled as such.

FIGURE 1: Percentage of resilience-related green bonds issued by Emerging Markets, Developed Markets, and Supranationals

DISTRIBUTION OF RESILIENCE-RELATED GREEN BONDS BY MARKET TYPE AND SUPRANATIONALS

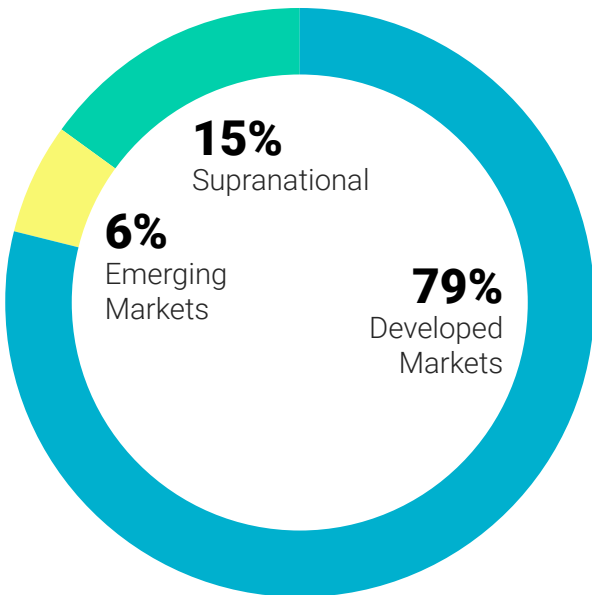
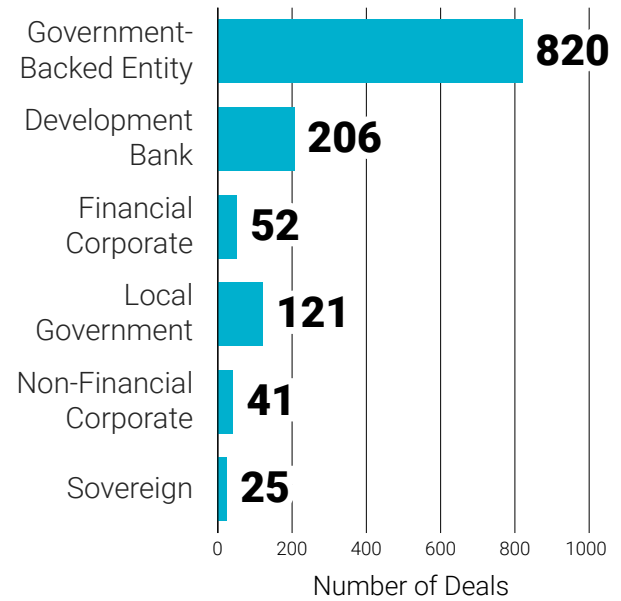


FIGURE 2: Types of issuers of bonds with resilience components (by number of deals).

GREEN BONDS FOR CLIMATE RESILIENCE BY ISSUER TYPE



As depicted in Figure 1, out of the 1,265 green bonds with resilience components identified, 79% has come from developed markets and only 6% (or 76 deals) was issued in emerging markets. The remaining 15% was issued by supranationals. Twenty-five (2%) of these green bonds were issued by sovereigns, 121 by local governments (10%), and 820 by government-backed entities (65%). Although these are global numbers, it is important to highlight that i) the identified green bonds with resilience components were issued by 63 different local governments, of which 47 (75%) were US municipalities or State Agencies; and ii) of the 820 green bonds with resilience components issued by government-backed entities, 761 (93%) were issued by the US enterprise Fannie Mae (93%). These facts demonstrate that the majority of green bonds with resilience-related use of proceeds have been issued in the US.

SOVEREIGN ISSUERS

Sovereign green bonds with resilience components can demonstrate leadership on adapting to climate change and enhancing sustainability. Sovereigns such as Fiji, Netherlands, France and Indonesia, for example, have included climate resilience components in their green bond framework.

BOX 4: FIJI ISSUES ONE OF WORLD'S FIRST RESILIENCE-FOCUSED SOVEREIGN GREEN BOND



Fiji was the first emerging market to issue a sovereign green bond, raising FJD100mn (USD50mn) to support climate change mitigation and adaptation. It was also one of the first sovereign bonds where the majority of the bond proceeds was allocated to build resilience in highly vulnerable areas (coastal and riverine) and sectors (agriculture, health and education infrastructure, rural housing and community driven development). The project identification process was a collaborative effort across ministries and the Reserve Bank of Fiji. With high-level political endorsement, the bond allowed Fiji to reach an untapped international investor base and encouraged domestic investors to help finance green projects through this bond.

SUB-SOVEREIGN ISSUERS

An examination of the use of proceeds of green bonds issued by sub-national entities reveals that a diverse range of activities related to resilience are being financed. Examples include:

- State of Michigan's multiple green bonds have financed environmental and natural resources protection programs that would clean up and redevelop contaminated sites, protect and improve water quality, prevent pollution, abate lead contamination, reclaim and revitalise community waterfronts, make state park infrastructure improvements, enhance local recreational opportunities, and clean up contaminated lakes, rivers and streams;
- New Jersey Infrastructure Bank's multiple green bond issuances aim to improve wastewater treatment;
- Iowa Finance Authority's green bonds provide loans under the 'Iowa Water Pollution Control Works and Drinking Water Facilities Financing Program';
- Société Nationale des Chemins de fer Français (SNCF), France's national state-owned railway company, has used green bonds to finance the protection of natural resources and biodiversity in addition to low carbon transport and rail energy efficiency;
- City of Malmo in Sweden, one of the earliest municipal green bond issuers, used two issuances to raise funds for climate adaptation and resilience measures for sustainable management of water, wastewater, land and natural resources;
- Kommunalbanken (KBN), a Norwegian local government funding agency owned entirely by the Norwegian government, has been active in financing resilience and represents best practice in terms of reporting on adaptation and resilience.

BOX 5: NORWEGIAN KOMMUNALBANKEN'S GREEN BOND ISSUANCE (2019)

Amount: NOK1.35bn/USD1.64bn

Eligible use of proceeds categories: renewable energy, energy efficiency existing buildings, energy efficiency new buildings, waste management, land use, low carbon transportation, water and wastewater management, and climate change adaptation.



Kommunalbanken is a Norwegian local government funding agency which finances essential societal services through low-cost credit provision to municipal and other local authorities. KBN's green bond framework includes a wide array of eligible projects split across eight categories (see above). The issuer aims to use green financing for projects that promote the transition to a low-carbon and climate-resilient public sector in Norway. Both mitigation and adaptation to climate change are cross-cutting themes and requirements for KBN's on-lending as outlined in its eligible green project selection criteria for on-lending to municipalities.

Projects with intended resilience outcomes mainly fit within the category of infrastructure that is built or reinforced to withstand physical climate impacts, such as flooding and sea level change. Preventative measures like natural disaster warning systems and landslide security systems are also eligible. In addition, KBN funds the reinforcement of water infrastructure to withstand increased rainfall.

As an example, the bond has been used to finance the installation of seven siren masts in the town of Sykkylven to alert the population to tsunamis caused by rockslides from unstable mountain terrain. KBN has also financed the construction of a number of landslide and flood protection and diversion measures across the country. This example illustrates that local governments can and should consider an integrated and comprehensive approach to climate risk in their green financing; one that also covers relevant measures to enhance the adaptive capacity and resilience specific to each area.

SUPRANATIONALS

Supranational entities (i.e. MDBs) commonly play an important role of becoming early adopters of innovative financial instruments that target climate change mitigation and adaptation, as well as overall sustainability. The European Investment Bank (EIB), for example, launched the world's first ever green bond in 2007. In January 2020 EBRD launched the first labelled 'Climate Resilience Bond', a green bond fully dedicated to support climate resilient infrastructure, climate-resilient businesses, and climate-resilient agriculture and ecological systems (Issuance: 01/2020; USD1.15bn to date). The Asian Development Bank (ADB) also issued a bond in 2019 which prominently featured adaptation and resilience activities (see Box 6). As the value of green bonds is now widely accepted, MDBs need to work further to create awareness on green bonds, and shape the thematic bond market to incorporate resilience.

BOX 6: ASIAN DEVELOPMENT BANK'S GREEN BOND (2019)**Amount: SEK1.25bn/USD132mn**

Eligible use of proceeds categories: renewable energy, energy efficiency, sustainable transport and climate change adaptation



The Asian Development Bank (ADB) is a regional development bank focused on providing finance to foster prosperous, inclusive, and resilient growth in its member countries in the Asia-Pacific region. ADB's green bond programme has the three-fold objective of i) mitigating greenhouse gas emissions; ii) adapting to the consequences of climate change; and iii) delivering environmentally sustainable energy-efficient growth that reduces poverty and improves people's quality of life.

Many projects involve reducing the physical climate vulnerability of transport and urban infrastructure, including for example re-routing exposed stretches of road/rail, increasing the heights of embankments and bridge clearances, and improving storm water drainage and absorption to avoid catastrophic flooding and associated disruptions to mobility.

ADB tracks its financing in accordance with the Joint MDB Mitigation and Adaptation Finance Tracking Approaches. Thus, the links to building adaptive capacity and resilience, and reduced vulnerability are clearer than in most green bond documentation from issuers that seek to achieve these outcomes indirectly.

ADB has funded a number of projects with clear resilience outcomes in some of the world's poorest and most vulnerable areas. For example, the "Ulaanbaatar Green Affordable Housing and Resilient Urban Renewal Sector Project" in Mongolia involves building 10,000 liveable, energy-efficient, and low-carbon housing units as part of 20 new eco-districts. The development also involves constructing key infrastructure like roads, water and sewerage, heating pipes, greenhouses for urban farming, public and green spaces, social and public services, rooftop solar panels, and a smart system for monitoring building performance.

Other examples include the Resilient Community Development Project spanning 17 townships across Myanmar, and the Jilin Yanji Low-Carbon Climate-Resilient Healthy City Project in Yanji City, China. Both are clear demonstrations of ADB's commitment to integrated low-carbon and resilient solutions with multiple social and economic co-benefits. Coupled with high levels of transparency and regular disclosure, ADB is a leader in leveraging green bonds to financing resilience outcomes.

2.2 REGIONAL HIGHLIGHTS

As shown in the map below, while global coverage of green bonds is expanding in developed countries, there remain regions with very low green bond issuance, particularly across much of Africa, parts of Latin America, and Southeast and Eastern Europe.

Countries that are in the early stages of green bond market development have the opportunity to integrate resilience across green bond guidelines and policies as they are formulated. Moreover, highly vulnerable geographies require rapid scaling of adaptation finance and green bonds may offer a sorely needed source of

financing. The International Finance Corporation (IFC) and Amundi’s recent publication “Emerging Market Green Bonds Report 2020” informs that, amongst emerging markets (excluding China), Latin America and the Caribbean (LAC) region has the most developed green bond market, while Africa (presented in the report separately as Sub-Saharan Africa, and Middle East and North Africa) has the least developed green bond market. In order to provide an overview of Green Bonds for Climate Resilience in emerging markets and the potential for South-to-South cooperation, we have selected the LAC and African regions for further analysis.

FIGURE 3: Global distribution of green bonds in 2019

USD259BN OF GREEN BONDS IN 2019

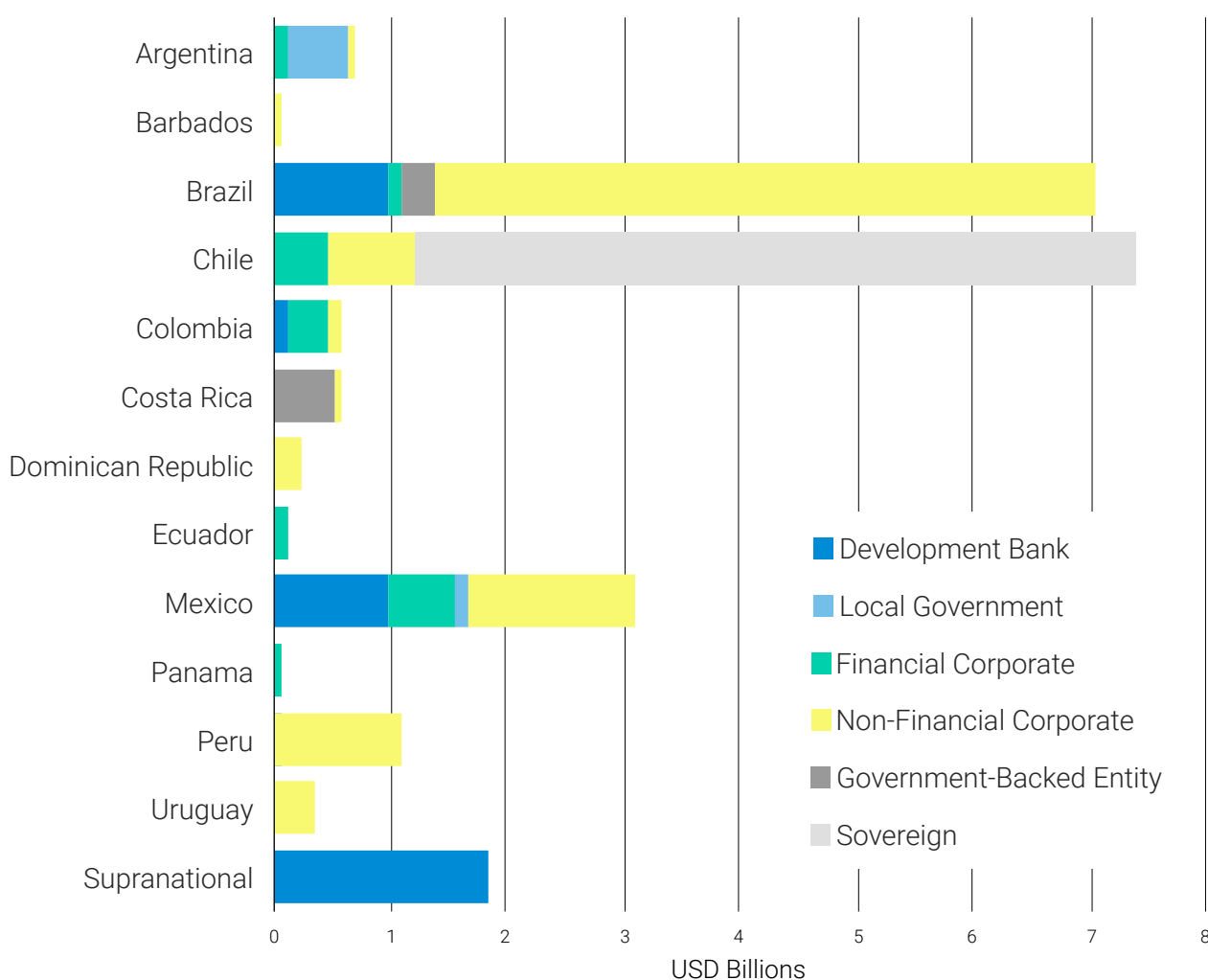


LATIN AMERICA AND CARIBBEAN

LAC's green bond issuance only represents 2% of the total global green bond market and only 12 countries have seen green bond deals. There are significant differences in issuer types between countries. For example, Brazil is dominated by non-financial corporates, Chile by sovereign deals, Mexico by development banks, and Argentina by local governments. More diversity in each market and the region overall would be a welcome development. Peru and Colombia have already indicated potential future sovereign issuances.

FIGURE 4: Cumulative Green Bond Issuance by country and issuer type in the LAC region (2015-2020)

CUMULATIVE GREEN BOND ISSUANCE BY COUNTRY AND ISSUER TYPE (01/2015-09/2020)



Climate resilience screening revealed that only 10 out of the 110 deals in LAC were resilience-related, presented in Table 1 below. The green bond issued by Corporación Andina de Fomento (CAF) is noteworthy as it is the first development bank in Latin America to issue green bonds in Swiss Francs, Euros, US dollar and Colombian Pesos, looking to capture a growing investor base interested in buying debt for environmentally friendly projects.

CAF's Green Bond program supports the NDCs undertaken by country members. Looking at their green bond framework, the key resilience projects are found within the water management use of proceeds category and includes sustainable equipment, development, manufacturing, construction, operation and maintenance of drinking water, wastewater treatment and sustainable urban drainage systems, as well as flood and drought protection.

BOX 7: FIRA IN MEXICO TAKES THE LEAD IN LENDING TO SMALL-HOLDER FARMERS

The Fideicomisos Instituidos en Relación con la Agricultura (FIRA) is a Mexican second-tier development financial institution that offers credit and support to the agricultural and fisheries sectors and promotes rural industrial development.



FIRA has issued three green bonds totalling MXN8bn (USD418mn) to finance or refinance loans within its portfolio that it has identified as environmentally beneficial, particularly in forestry, solar energy, water efficiency and environmentally sustainable agriculture. Their first green bond was issued in October 2018 with a portfolio composed of hundreds of small, medium, and big projects distributed throughout Mexico. Their green bond includes two major project categories: 1) sustainable agriculture, including protected agriculture and 2) efficient use of water, including dripping, sprinkling and micro-sprinkling irrigation systems. In 2019 FIRA issued their second green bond with 237 water infrastructure projects and 57 photovoltaic system projects in its portfolio.

FIRA has successfully demonstrated how aggregating small loans can help unlock finance in debt capital markets for smaller scale low carbon and climate-resilient assets. The public sector, particularly national development banks, have a key role to play to scale-up small-farmer adaptation loans through Green Bonds for Climate Resilience. To credibly do so, they should have appropriate tools and criteria/taxonomy to classify their loan portfolios.

Grupo Rotoplas, a corporate entity in Mexico, has also used green bonds to finance resilience. Grupo Rotoplas provides innovative water solutions in markets where clean water is scarce due to droughts, water pollution and unreliable water infrastructure. In 2017, Rotoplas issued a MXN10bn (USD523mn) green bond to refinance and finance projects that improve access to water and sanitation among underserved populations and increase water use efficiency.

Rizoma-Agro, a Brazilian company, issued a BRL25mn (USD4.5mn) green bond to finance regenerative agriculture. This is the only bond in the region dedicated to regenerative practices. The bond will finance row crops and agroforestry (working capital and machinery and infrastructure), irrigation systems, post-harvest infrastructure, research and development and agriculture management software.

TABLE 1: Summary of Green Bonds for Climate Resilience in LAC

Issuer Name	Country	Amount	Use of Proceeds
Corporacion Andina de Fomento (CAF)	Regional	USD\$494m	Renewable energy, clean transportation, sustainable management of living natural resources and land use, waste management, water management and energy efficiency sectors.
Grupo Rotoplas	Mexico	USD\$524m	This bond was labelled as a 'sustainability bond' but is included in the CBI green bond database as it meets green eligibility criteria. The use of proceeds includes projects in drinking water supply, sanitation, water and wastewater treatment. The bond is intended to create social impact by using bond proceeds to finance only projects that serve vulnerable or underserved communities, where access to water and sanitation is lacking. To define eligibility, Rotoplas uses government and non-profit organizations' analysis on infrastructure gaps, public health issues and underserved populations; market intelligence studies and investment banking research e.g. on bottled water consumption and use of private water storage and delivery services; and reports on access to clean water and sanitation from international organizations e.g. from WHO, UNICEF, OECD, World Bank.
Corporación Interamericana para el Financiamiento de Infraestructura (CIFI)	Regional	USD\$27m	Renewable energy (hydropower, solar power, wind power, geothermal power, and co-generation from biomass) and waste management (wastewater and effluents treatment, waste-to-energy from municipal solid waste, recycling & waste diversion) sectors.
Athon Energia S.A.	Brazil	USD\$10.7m	Small-scale, distributed solar PV plants. The focus on distributed generation of solar energy is important as it can increase network resilience and add independence for end users.
Trust Funds for Agricultural Development (FIRA)	Mexico	USD\$418m	Water efficiency and protected agriculture (greenhouses). This is a Climate Bonds-certified bond and thus meets adaptation and resilience requirements for both water and protected agriculture.
Rizoma-Agro	Brazil	USD\$4.6m	Agricultural production, infrastructure, agroforestry, and research and development. This is the world's first bond certified by CBI under its Agriculture Criteria, which include adaptation and resilience criteria.
Aguas Andinas	Chile	USD\$149.4m	Drinking water production capacity, either through the construction of new facilities or through the expansion / improvement of existing infrastructure; projects to increase the hours of autonomy of the drinking water supply service; and projects to increase sewage treatment capacity, either through the construction of new facilities or through the expansion / improvement of existing infrastructure through the expansion / improvement of existing infrastructure.
Esval	Chile	USD\$61m	Drinking water supply; resilient infrastructure that provide greater security to drinking water production systems in the case of natural events, allowing more hours of autonomy; sewage treatment; company expansion projects, which allow the provision of potable water and/or sewage services to urban or rural sectors that currently do not have such services; projects that reduce water losses or produce energy and fuel savings, reducing carbon footprint due to lower energy demand, but preserving quality and access to sanitary services.

AFRICA

The African Green Bond Market has grown in recent years but is still in a nascent stage and has not experienced the same levels of investment flows seen in other markets, despite the clear and imminent risk that climate change poses to the continent as a whole. The diversity of issuers is increasing, possibly related to greater awareness of the asset class as well as the increasing investor interest in the region.

Total green bond volume issued in Africa between January 2010 to September 2020 amounts to USD6.6bn, covering 8 countries and composed of 18 issuers (Table 2). The AfDB and South Africa have the highest green bond issuance figures totalling USD2.63bn and USD2.6bn respectively. This is followed by Egypt (USD750mn), Morocco (USD356mn), and Nigeria (USD136mn). Smaller economies such as Namibia and Seychelles have also issued green bonds, but have smaller issuance sizes. The majority of these bonds have been issued in local currency to reduce currency risk, reliance on foreign currency borrowing, and exposure to exchange rate risks. In the long-term, and as these markets develop, innovation in terms of de-risking and hedging instruments could attract more international investment flows. This is discussed in detail in subsequent chapters of this report.

The Government of Nigeria can claim first-mover status as both the first sovereign green bond in Africa as well as the first Climate Bonds Certified sovereign green bond. Since its first Sovereign issuance in 2017, Nigeria has issued a second tranche and is currently working on a third issuance to finance both mitigation and resilience projects under its NDC strategy. A well-established regulatory framework is in place in Nigeria, which has motivated the private sector to issue green bonds in Nigeria. Access Bank and North South Power have issued green bonds to finance both mitigation and adaption projects (flood defence and renewable energy respectively). The Nigerian experience highlights the demonstration value that sovereigns, sub-nationals and supranational issuances can have, and the impact that a supportive policy environment has on building momentum and scaling-up.

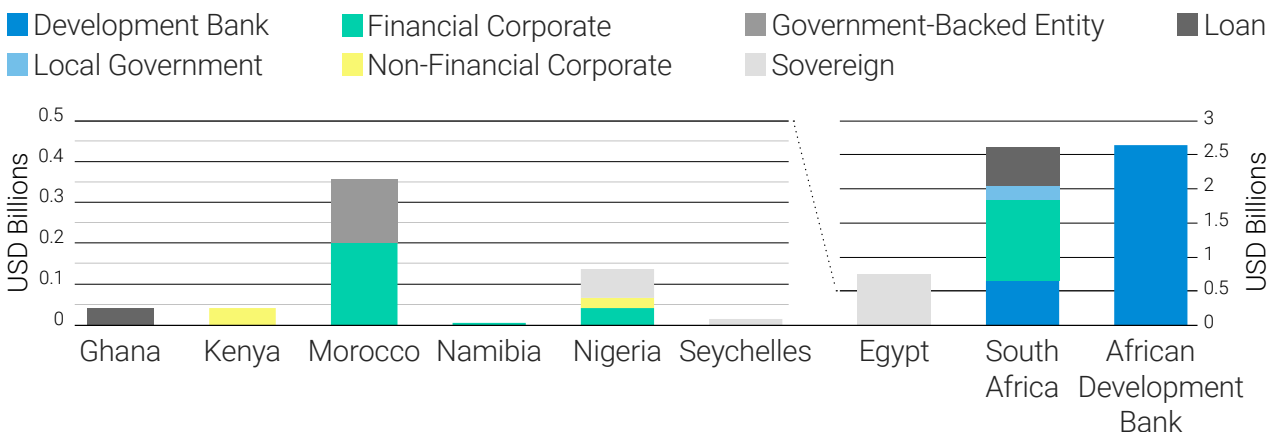
TABLE 2: African green bond issuances (USD) between 2010 – 2020 (CBI, 2020).

Country	Amount Issued*	Issued Currencies
AfDB (supranational)	2.6bn	USD/SEK/AUD
South Africa	2.6bn	ZAR
Morocco	356mn	MAD/EUR
Nigeria	136mn	NGN
Ghana	42mn	EUR
Kenya	41mn	KES
Seychelles	15mn	USD
Namibia	5mn	NAD
Egypt	750mn	USD

*USD Equivalent

The chart below shows the distribution of the green bonds across countries, as well as a break-down of the types of issuers.

FIGURE 5: African green bond issuances by country and issuer type between 2010 – 2020 (CBI, 2020).



Eight of these green bonds have been identified as including resilience-related components (Table 3). These were not all captured through the database screening, but rather through interviews and review of bond prospectuses and green bond frameworks, highlighting the needs for better tagging and tracking of resilience in the green bond market in Africa.

TABLE 3: African green bonds with adaptation and resilience components

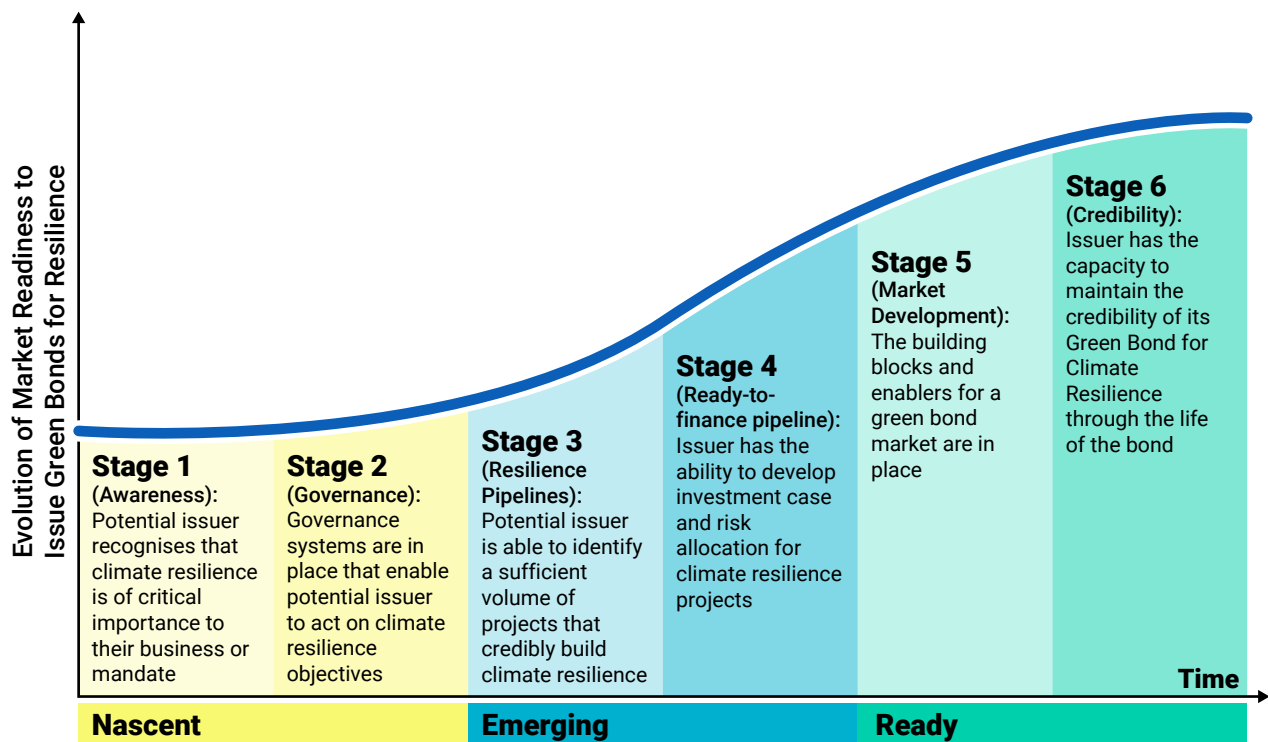
Issuer	Motivation for including resilience-related activities
City of Cape Town, South Africa	The City of Cape Town project selection was heavily influenced by the drought event which occurred between 2015 and 2017, leading to a majority of the proceeds to be used for water assets to build resilience to drought impacts.
Access Bank, Nigeria	Proceeds from this bond are allocated to coastal flood defences to protect against sea level rise in Eko Atlantic City, a new coastal urban development near Lagos. The flood defences are constructed in a manner that protects the development against flood hazards of higher magnitudes.
Ghana, Sovereign Bond Issuance	The Government of Ghana's green bond aims to deliver water projects to rural and peri-urban communities to reduce climate vulnerability through improved water security. The funds intend to deliver clean drinking water to rural communities and small towns and will alleviate up to 225,000 people from daily water poverty.
Bank Windhoek, Namibia	Use of proceeds are directed towards climate smart agriculture in response to climate variability. For example, greenhouses are financed due to their lower climate-sensitivity, thereby protecting agriculture yields.
Seychelles, Sovereign Bond Issuance	Seychelles has issued a blue bond to expand marine protected areas, promote sustainable fisheries through ecosystem-based adaptation, and to build the resilience of coastal ecosystems and the communities that depend on them.
Nigeria, Sovereign Bond Issuance	The Nigerian sovereign bond includes investments in sustainable agriculture, fishery, aquaculture, forestry, and climate-smart farming.
Egypt, Sovereign Bond Issuance	Egypt's green financing instruments include six green eligible categories: renewable energy, energy efficiency, clean transportation, pollution prevention and control, climate adaptation, and sustainable water and wastewater management. The climate adaptation category includes adaptation projects across sectors including early warning systems, development of crop species resistant to salinity and temperature increase, coastal zone management, etc.
AfDB (Supranational)	The green bond framework defines eligible projects as those that target the reduction in the vulnerability of human or natural systems to the impacts of climate change related risks by maintaining or increasing adaptive capacity and resilience.

PART III GREEN BONDS FOR CLIMATE RESILIENCE: CAPACITY ASSESSMENT FRAMEWORK

This section of the paper presents an assessment framework that can support issuers, policy-makers, government institutions, MDBs, Civil Society Organisations (CSOs) and other relevant stakeholders to identify supportive actions to scale-up Green Bonds for Climate Resilience. As presented in the previous sections, resilience is already being financed through green bonds to some extent by a range of issuers and across geographies, although with uneven distribution and uptake. The framework as depicted in the figure below provides an analytical tool to rapidly assess the capacities, enabling contextual factors, and barriers that potential issuers may encounter on their journey to issuing Green Bonds for Climate Resilience. Note that not all factors are in the control of specific issuers but are wider market factors and require concerted efforts by a range of public and private stakeholders.

The capacity assessment framework delineates three stages of capacity development and readiness: nascent, emerging, and ready. In practice, the evolution of enabling factors and stages of development will not be linear but this framework is designed to show how each stage of capacity development and readiness is predicated on the achievement of the previous enabling factors. For example, an issuer is unlikely to identify a pipeline of climate resilience project (Stage 3) before a certain level of awareness of climate change risks is present amongst decision-makers (Stage 1).

FIGURE 6: Capacity Development Stages to Issuing a Green Bond for Climate Resilience



ENABLING COMPONENTS OF GREEN BONDS FOR CLIMATE RESILIENCE

The key components that enable issuance of Green Bonds for Climate Resilience include: awareness, governance, climate resilience projects pipelines, ready-to-finance projects and programs, market development, and credibility. The figure depicted above is purely representational of the evolution of capacity that enables the issuance of Green Bonds for Climate Resilience. Below is a description of what achieving each stage of capacity development may look like in terms of both issuer capacity and enabling policy and market infrastructure.

Awareness: Climate adaptation and resilience considerations are well-mainstreamed into governance or organizational structures, environmental processes, disclosure statements, or financial decision-making. Overall, there is good understanding of climate risks and green bonds.

Governance: Climate policies are in place addressing adaptation and resilience (either at national level, or entity level) including National Adaptation Plans (NAPs), NDCs, corporate ESG strategies, etc. Additionally, sustainable finance policies, tools and green bond guidelines are being developed or already in place.

For public sector issuers, national and sub-national vulnerability and risk assessments have been conducted and adaptation actions have been prioritized. In the case of private sector issuers, especially those that rely on long-lived fixed assets or have complex supply chains, the materiality of climate impacts on the short-, medium-, and long-term on the companies' financial, economic, environmental and social performance have been assessed. With respect to lending institutions, climate risk assessments have been conducted to determine risks across lending portfolios.

Climate Resilience Projects Pipelines: Pipelines of resilience projects have been identified, ideally linked to national development plans and/or sectoral strategies. Such pipelines can translate countries' overall policy objectives into coherent sets of initiatives and climate resilience is mainstreamed, in a proportionate way, throughout the full pipeline of projects, ensuring that they are consistent with future climate change scenarios. Integrating climate resilience across sectoral investment pipelines promotes interaction and cooperation among a wide variety of institutions or departments, facilitating the achievement of climate goals.

Potential public and private sector issuers have screened their investment pipelines, portfolios, balance sheets, etc., against climate resilience goals and have identified eligible projects to be financed through Green Bonds for Climate Resilience (based on available standards and criteria).

Ready-to-Finance Projects and Programs: Resilience pipelines are either: 1) being developed into ready-to-finance projects that have undergone appropriate project appraisals, feasibility studies, and financial modelling, or 2) being identified for refinancing¹.

Green bonds have been identified and selected as a feasible financing tool for the pipeline. Sometimes investments are entirely equity-funded, but typically, the financing package has a component of equity and a more significant amount of debt. There are a wide variety of debt instruments that are available and can be labelled as green, including secured or unsecured senior loans or bonds, secured or unsecured subordinated mezzanine loans or bonds, structured finance and securitisation, etc. Issuers have the capacity or external support to select an appropriate instrument and structure their bond accordingly².

Market Development: Capital markets are relatively well-developed and are able to access both domestic and international investors. National green bond guidelines are in place and issuers have the knowledge and capacity to develop green bond frameworks. Appropriate monitoring and reporting frameworks are in place, and third-party verification providers are present or accessible.

¹ Note that green bonds (and bonds in general) are largely used to refinance existing projects given that bond investors do not generally take on project risk. Refinancing initial bank loans with bonds can provide borrowers with a lower cost of capital. This is particularly crucial for many resilience-related projects that require significant upfront capital investment but will operate for a number of years. Given that there may already be infrastructure/activities in place that directly address physical climate risks, there is significant potential for refinancing assets that are operational and where the initial high-yield debt can be refinanced by more risk-averse investors looking for stable, lower-risk longer-term investments.

² Note that during the structuring phase, the issuer can seek support from providers of financial services, - including investment banks, guarantee providers and specialised facilities - to identify the best avenue to pursue, but these often require significant time, resources, and external support.

Credibility: Green bonds are successfully being issued and on-going reporting and verification is being carried out, providing credibility and trust in new thematic labels such as Green Bonds for Climate Resilience. The common perception of lack of transparency associated

with investing in emerging markets is being addressed through reliable post-issuance reporting and issuers are providing impact reporting (which is currently not required by the green bond market, but is considered best practice).

Some suggested criteria to assess these components at a country level are described below. These were selected as a simple and relatively rapid method to provide a snapshot of the country capacity and readiness, as well as to highlight areas for deeper research and analysis. It has been observed that sovereign, sub-national and supranational issuances can act as catalysts for private sector green bond issuance. Therefore, while the criteria presented here can be adapted for use by any type of issuer, they have been designed specifically to assess the capacity of sovereign and sub-national issuers.

1. Degree of technical capacity to assess climate risks and resilience needs:

Knowledge, skills, and capacities to define, structure, and issue a green bond with resilience-related assets is a strong indicator of readiness. Fundamental to this is the technical capacity to carry out climate risk assessments that can then be translated into screening criteria for identifying climate resilience pipelines. Market stakeholders have shown a willingness to embrace technical assistance where such intervention has been offered, and MDBs are playing a critical role in emerging markets to enhance these capacities.

2. Number and type of climate policies and plans in place:

The presence of climate adaptation policies and plans enables issuers to demonstrate alignment with country/context-specific needs. Moreover, the process of formulating NDCs, NAPs, and setting up dedicated institutions to coordinate climate change priorities enables countries to identify the climate risks along with the associated adaptation needs; explore adaptation solutions; and subsequently prioritize adaptation measures for the short, medium and long-term. This process thus provides a natural entry point for assessing the adaptation finance landscape and crafting a blueprint for how best to accomplish the objectives delineated through the planning process (UNFCCC, 2019).

3. Number and type of local green bond policies in place:

A strong governance and regulatory framework that underpins the green bond market is critical for credible green bond issuance. These policies can provide clarity about which activities and assets can be eligible for inclusion. The presence

of a sustainable finance taxonomy that includes resilience activities is a powerful indicator of growth and scale. Because most international investors will require 'Do No Significant Harm' (DNSH), or other ESG criteria, to be fulfilled in order to meet growing internal mandates and policy and regulatory requirements, it is paramount that local principles, guidelines and standards are – where possible – aligned with international standards. In the EU, for example, the provision that all investments 'Do No Significant Harm' to any of the objectives of the EU Taxonomy will require that European investors report under the new taxonomy regulation, which sets criteria for what can be considered as sustainable investments. The implications of these requirements could impact issuers of Green Bonds for Climate Resilience in emerging markets. Even if the project/asset is highly beneficial for adaptation, if it does not meet the EU Taxonomy criteria it will fail to attract European and other international investors with similar ESG requirements. Therefore, though developing localised policies and taxonomies can be very effective – they must be harmonised with international standards or there will be a risk of losing a large proportion of global investors and essentially losing the prospect of a viable green bond market.

4. Degree to which climate resilience investment pipelines are in place:

Clarity about investment pipelines is essential for scaling up private sector investment in green bonds (and other investment vehicles). Clarity about resilience project pipelines among the investor community allows investors to perceive the real size of the market for A&R and

plan investments accordingly and, consequently, it provides issuers with the certainty that there will be investors ready to provide capital to issuances.

Note that the small-scale nature of critical resilience projects is a significant barrier to Green Bonds for Climate Resilience. The minimum bond issuance size typically required by the majority of institutional investors can be a hurdle limiting small-scale green projects to tap the bond markets without suitable aggregation mechanisms. In developed bond markets, investors typically look for issuance sizes of USD200mn and above, preferably USD1bn deals, while in emerging markets smaller sizes of USD100mn are acceptable. Many adaptation projects are much smaller than this, particularly in developing countries' agricultural sector, which is characterised by small-scale farmers that are highly vulnerable to climate variability and change. Investment aggregation mechanisms and country-wide programs can support investors in these cases.

5. A&R investment pipelines are ready to be financed with enough size to reach capital markets:

Converting project proposals into economically attractive investment opportunities that clearly identify risk allocation is key for unlocking private finance. Designing an optimal risk-sharing protocol at the project development phase is at the crux of ensuring bankability.

6. Degree of capital market development or ability to issue in international markets:

Having a relatively vibrant and efficient bond market is a necessary pre-requisite to the development of a green bond market, and in turn the issuance of Green Bonds for Climate Resilience. Moreover, in order to tap global debt capital markets and reap the benefits of green bonds, the ability to issue in hard currency is important.

7. Presence of blended finance, guarantee products and de-risking mechanisms:

Blended finance is defined as the strategic use of public or

philanthropic development capital for the mobilisation of additional external private commercial finance for SDG-related investments. Public finance sources can be used in a number of ways to support green bond issuances focused on adaptation including: i) funding technical assistance for the structuring of adaptation projects; ii) de-risking investments through guarantees; or, iii) financing of adaptation mainstreaming initiatives. In emerging markets context, there may also be North-South blended finance opportunities to increase the availability of hedging instruments or otherwise support the issuance of local currency bonds. The blended finance approach is critical for growing green bond markets in general, but more so for the adaptation sector due to the nature of many resilience projects where revenue streams are not generated from the assets themselves, but rather through other mechanisms such as government taxes and subsidies.

8. Number of previously issued green bonds:

Issuance of green bonds in the country (by any issuer) is a proxy indicator on the readiness of the market as a whole to issue Green Bonds for Climate Resilience. Where no green bonds have been issued to date, awareness levels of green bonds remain low and issuers are less likely to pursue them as a financing option for their resilience needs.

9. Number of previously issued green bonds with resilience-related assets or services:

Similar to issuing a conventional green bond (i.e. bonds focused on low-carbon activities), the lack of experience within the country to issue a green bond that is partially or fully dedicated to resilience impedes first-time issuers to come to market. Expertise in issuing Green Bonds for Climate Resilience may require specialised knowledge, screening tools, verifiers, and reporting methodologies that the issuer may access and build on. While experience in issuing green bonds generally is paramount, as a next step, familiarity with the types of projects included as resilience infrastructure greatly improves local readiness.

PART IV CASE STUDIES: APPLYING THE ANALYTICAL FRAMEWORK

With the aim of contributing to the development of a roadmap for scaling Green Bonds for Climate Resilience in emerging markets, the criteria for country issuance readiness were analysed in four case study countries in Africa using primary and secondary research methods. Africa was selected given it is one of the most vulnerable continents to climate change and climate variability, a situation aggravated by the interaction of 'multiple stresses', occurring at various levels, and low adaptive capacity (IPCC, 2018). Moreover, Africa's infrastructure deficit provides a compelling case for economic growth while offering investors attractive returns. However, this infrastructure needs to be resilient, which sometimes comes at a short-term cost. Green Bonds for Climate Resilience can reduce the cost of capital and justify this additional cost while also creating greater access to concessional finance.

Nigeria, Morocco, South Africa and Kenya have been selected for this research due to their relatively high level of capital market development, already established green bond markets and infrastructure growth trajectories when compared to other countries in the region. This analysis shall provide initial inputs for MDBs, international cooperation and countries themselves to feed broader studies and activities to expand and develop green bond markets, with a particular focus on A&R.

Overall, the research revealed similar experiences, barriers and opportunities across the four countries and for this reason, the discussion below is organised by capacity development stages and the analysed criteria, rather than a country by country presentation of findings. Each section includes an analysis of the state of play and recommendations to overcome barriers to harness Green Bonds for Climate Resilience opportunities.



4.1 AWARENESS

4.1.1 TECHNICAL CAPACITY TO ASSESS CLIMATE RESILIENCE

STATE OF PLAY

Limited knowledge, capacity and tools to conduct climate risk assessments, identify eligible assets, quantify resilience benefits, and structure green bonds is prevalent across the four case study countries and stakeholder groups (i.e. issuers, investors, public sector agencies). Some potential issuers that were interviewed were knowledgeable on green bond guidelines, but were unsure how to translate the high-level guidance into practical screening tools to identify projects in a credible, consistent way and had even less of an understanding of how resilience fits within that. The investors interviewed had limited knowledge on the value of investing in resilience and financial institutions that were contacted did not have a strong understanding of how climate risks relate to the projects financed by them.

RECOMMENDATIONS

TECHNICAL ASSISTANCE

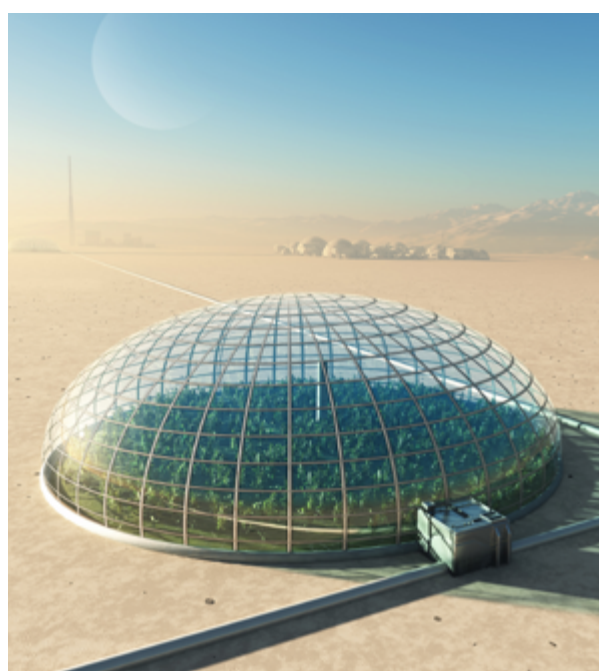
Partnerships between potential issuers in the four case study countries should be developed between MDBs, consultants and sustainable finance initiatives to provide technical assistance and capacity building services to issuers. MDBs have played an invaluable role in supporting the expansion of green bonds in emerging markets. Some issuers interviewed highlighted the role that MDBs have played clarifying the “greenness of the projects” in their past green bond issuances. It is critical for MDBs and their initiatives to support green bonds not only to be further expanded, but to also to include a greater emphasis on climate adaptation and resilience. Targeted TA and consultancy services to support sovereign issuers to issue Green Bonds for Climate Resilience need to be developed, supporting widespread uptake of climate risk assessments as a way to identify activities in a robust, credible and evidence-based way.

It is important to note that currently most TA is targeted to the pre-issuance phase of green bonds, leaving capacity building for impact monitoring significantly lacking. This is particularly relevant for adaptation projects, where post-issuance monitoring is ever more critical given the complexities of measuring adaptation benefits and the need to build investor confidence in the impact of their investments. Capacity building efforts need to include more emphasis in this regard.

SOUTH-SOUTH AND PEER-TO-PEER LEARNING

Partnerships are critical in facilitating knowledge sharing. Given the context for Green Bonds for Climate Resilience can be significantly different for issuers in emerging markets and developed markets, partnerships between stakeholders in the Global South offer a promising opportunity for effective learning. In Nigeria, for example, government officials highlighted a successful initiative whereby they worked closely with Brazilian counterparts to learn from their experiences in issuing a sovereign green bond. It is recommended that international organisations and MDBs facilitate and support these connections and cross-learning.

Peer-to-Peer learning also offers a promising strategy to effective information exchange and capacity building. This learning involves individuals exchanging knowledge and experience with each other, and diffusing this learning back to their organisations. Some initiatives along these lines are already underway. For example, Access Bank in Nigeria participates in numerous committees on sustainable banking which meet quarterly in facilitated exchanges. We propose that an “African Green Bonds for Climate Resilience Issuer’s Club” be developed with the twin objectives of 1) exchanging information and learning from their peers on past experience; and 2) supporting new issuers in the region through knowledge exchange.



4.2 GOVERNANCE

4.2.1 CLIMATE PLANS AND POLICIES

National climate change policies and dedicated climate institutions are critical to catalysing large-scale finance for adaptation. The climate policy landscape is well developed across Kenya, Nigeria, Morocco and South Africa with 14, 9, 15, 15 climate laws and polices established in these countries, respectively (Table 4). For reference, this compares with 9 laws and policies in China, 37 in the EU, 18 in Australia and 15 in the US (Climatelaws.org, 2020).

Undoubtedly, the number of policies does not indicate their robustness, effectiveness or level of implementation – but this indicator serves as a proxy that demonstrates the degree to which climate action is at the forefront of national agendas. Assessing the quality of these plans and policies can be a resource intensive process and using a proxy can be beneficial for rapid assessments such as the one presented here.

TABLE 4: Climate policies and laws across Kenya, Morocco and Nigeria and South Africa.

Type of Plan	Kenya	Morocco	Nigeria	South Africa
National Climate Plans	National Climate Change Action Plan 2018 – 2022 A Climate Risk Management Framework for Kenya National Climate Change Response Strategy National Adaptation Plan National Climate Change Framework Policy (2010, 2013 – 2017)	Policy on National Climate Change and Biodiversity Commission Climate Change Policy of Morocco National Plan Against Climate Change UNFCCC National Communications (2001, 2010, 2016) UNFCCC NDC submission National Adaptation Plan (Forthcoming)	National RE and EE policy National Policy on Climate Change National Adaptation Strategy and Plan of Action on Climate Change for Nigeria	National Climate Change Response White Paper National Adaptation Strategy National Climate Change and Health Adaptation Plan 2014-2019 National Greenhouse Gas Emissions Reporting Regulations Drought Management Plan UNFCCC NDC Submission
Sectoral Plans	National Wildlife Strategy 2030 Kenya Climate Smart Agriculture Strategy (2017 – 2026)	Energy Security Plan and National Energy Strategy Vision 2030	National Gas Policy Flare Gas regulations Nigerian Biofuel and Incentives	National Energy Efficiency Strategy
Cross-cutting Plans	National Policy on Climate Finance National Environment Policy (2013) National Disaster Plan National Policy for Disaster Management Green Economy Strategy and Implementation Plan (GESIP)	Policy on the Strategic (National) Committee for Sustainable Development National Strategy of Sustainable Development 2020 and 2030 Green Investment Plan	Nigeria Economic Sustainability Plan Economic recovery and growth plan Nigeria Vision 2020	Integrated Resource Plan National Development Plan 2030

Source: CRB Project Research and LSE (2020).

4.2.2 GREEN BOND GUIDELINES, PRINCIPLES AND STANDARDS AND THEIR ALIGNMENT WITH INTERNATIONAL APPROACHES

STATE OF PLAY

Having a high number of green bond guidelines and policies, while a useful proxy indicator, does not indicate the efficacy of these policies, nor how well they are implemented or understood. Yet, the presence of such documents (and the processes by which they are developed) often creates greater awareness, knowledge and motivation for domestic bond market actors to engage with green bonds and also activate investor interest.

All four countries performed well on this indicator with guidelines, frameworks and policies focused on green bonds present in Kenya, Morocco, Nigeria and South Africa. However, a close examination of these green bond guidelines and policy documents has revealed that none of them include specific guidance on the types of adaptation and resilience projects that can be considered. The policies in the four case study countries are summarized in the table below.

TABLE 5: Summary of sustainable finance and green bond policy documents across Kenya, Morocco, Nigeria and South Africa.

Kenya	Morocco	Nigeria	South Africa
Sustainable Finance Initiative (SFI) Guiding Principles	Green bond/debt guidelines	Stock Exchange Segment	Market development committee
Kenya Green Bond Guidelines	Green, Social and Sustainability bonds guide	Green bond/debt guidelines	Demonstration issuance
Kenya Green Bond Programme		Green bond lists requirements	ESG guidelines
Policy Guidance Note (PGN) on Issuance of Green Bonds		Green Finance Taxonomy	Green bond/debt guidelines
Memorandum of Understanding between Abu Dhabi and Kenya		Sustainable Finance Paper	Sovereign Green bond Framework
		Nigerian Green Bond Market Programme	Sustainability Disclosure Guidelines
			South Africa Sustainable Finance Taxonomy (draft)

A remarkable recent initiative is South Africa's forthcoming national Sustainable Finance Taxonomy, which addresses mitigation, adaptation and other environmental goals. The taxonomy is based on the EU Taxonomy but also accounts for development concerns specific to the South African context by introducing additional criteria and/or adjusted thresholds.

For example, it may negatively screen - and make ineligible for financing – certain types of long-lived projects that are vulnerable to physical climate risk as identified by projections for South Africa. While a national taxonomy is expected to greatly improve awareness and momentum in the South African market, capacity building of a wide range of potential issuers and regulators will be necessary to ensure the taxonomy is understood and implemented by market participants.

Also in South Africa, the City of Cape Town's Green Economy Committee (GEC) is a committee that was created to plan capital allocation for projects where mitigation and adaptation objectives are balanced with green job creation.

RECOMMENDATIONS

SUPPORT THE DEVELOPMENT OF NATIONAL TAXONOMIES THAT INCLUDE RESILIENCE AND ARE HARMONISED WITH INTERNATIONAL STANDARDS

The four countries still need to develop local taxonomies with adaptation and resilience as a key aspect. Moreover, as most international investors will require DNSH, ESG criteria and other requirements to be fulfilled in order to meet their internal mandates, as well as policies and regulatory requirements that are emerging. International support mechanisms from MDBs, climate finance providers and other multilateral sustainable finance initiatives, can provide the advisory support needed to those involved in the development of national taxonomies in order to help them map how local objectives can be translated into criteria and benchmarks that remain compatible with global standards.

Of particular concern is the provision in the EU Taxonomy that all investments 'Do No Significant Harm' to any of the objectives of the EU Taxonomy which could have implications on Green Bonds for Climate Resilience (See Box 8 for more details). Even if the project/asset is highly beneficial for adaptation, if it does not meet mitigation criteria it will fail to attract European investors (and likely others with similar ESG requirements). Therefore, though developing localised taxonomies can be very effective – they must be harmonised with international standards or face the risk of losing a large proportion of global investors and essentially losing the prospect of a viable green bond market.

BOX 8: ADDRESSING COMPLEXITIES AROUND TRADE-OFFS BETWEEN ADAPTATION AND MITIGATION

Ideally, resilience interventions would have negligible associated emissions, delivering both adaptation and mitigation benefits. However, when trade-offs between mitigation and adaptation do exist, their alignment with the EU Taxonomy and other standards might be difficult to achieve. For example, the elevation of roads or construction of new roads may be critical to provide an evacuation strategy for some coastal communities, yet they may lead to increased emissions from land transport (unless fully electrified). Another example is investments in electricity grids, which are critical for ensuring the resilience of cities prone to disasters, but some of these grids may be powered by a combination of fossil and renewable power. Investments would need to ensure that carbon-intensive grids are not being locked in, while balancing with the resilience goals of the resilience-related bond.

Cases like these will become more prevalent as resilience features more prominently in the green bond market. A recent example comes from Central Nippon Expressway Co., Ltd. (NEXCO Central), a public company fully owned by the Japanese government. NEXCO Central issued a green bond in 2020 to strengthen its disaster prevention functions by upgrading aging road infrastructure to withstand rising climate-related risks. This issuance demonstrates the potential trade-offs between mitigation and adaptation, whereby financing road infrastructure may lock-in transportation modes with large GHG emissions, but enhance the resilience of communities. Taxonomies must include guidance for how to address such trade-offs.



4.3 RESILIENCE PIPELINES

4.3.1 CREDIBLE CLIMATE VULNERABILITY AND RISK ASSESSMENT INSTRUMENTS AND STANDARDS

STATE OF PLAY

Potential issuers in all four countries were unaware of specific standards that can be used to identify resilience activities. This is largely because they are only recently emerging. Most current green bond guidelines allow for A&R investments to be included, but offer no specific criteria or metrics. Most resilience-related bonds to date have relied on Second Party Opinion providers to assess their resilience credentials in an ad hoc, non-standardised manner.

RECOMMENDATIONS

EXISTING AVAILABLE GUIDANCE CAN BE USED UNTIL MORE DETAILED, COUNTRY-SPECIFIC GUIDELINES AND METRICS ARE DEVELOPED

The Climate Bond Initiative's Climate Resilience Principles were developed recently to address this barrier and provides a methodology for selecting adaptation projects that can be included in a green bond. Given that this methodology is relatively new, work is required to ensure its uptake in the market. The Climate Bonds Initiative intends to develop sector-specific criteria to simplify and standardise the process for identification of resilience activities that are eligible for green bond financing. This should incentivise bond issuers to mainstream climate resilience into all green bond frameworks.

The EU Sustainable Finance Taxonomy is another tool that can be used immediately by issuers as guidance to identify projects for inclusion into their green bonds. The EU Taxonomy holds that an economic activity can be considered to be making a substantial contribution to adaptation objectives if i) all material physical climate risks identified for the economic activity are reduced to the extent possible and on a best effort basis; and/or ii) it reduces material physical climate risk in other economic activities. Moreover, the methodology is complex and requires significant technical capacity and resources by issuers to carry out climate vulnerability and risk assessments and incorporate potentially complex monitoring systems on a project-by-project basis.

Several other guidelines exist that emerging markets can look to, including International Capital Market

Association's (ICMA) Green Bond Principles, the Joint MDB Methodology for Climate Finance Tracking and the China Green Bond Endorsed Project Catalogue. The Lightsmith Group with the support of the Inter-American Development Bank (IDB), Conservation International and the Global Environment Facility (GEF), also recently released a peer-reviewed Adaptation SME Accelerator Project (ASAP), which sets out a process for identifying small and medium-sized enterprises (SMEs) involved in adaptation and climate resilience ("Adaptation SMEs"). The ASAP is consistent with the EU Sustainable Finance Taxonomy and other approaches to identifying opportunities to invest in and finance SMEs and other corporates engaged in adaptation and climate resilience.

4.3.2 ADAPTATION AND RESILIENCE INVESTMENT PIPELINES

STATE OF PLAY

All four countries perform poorly on this indicator, though some early stage actions are underway. For example, at the provincial level in South Africa, the Western Cape Government is developing a Sustainable Infrastructure Development and Financial Facility (SIDAFF) Programme¹ (see Box 9 below). At the municipal level, the City of Cape Town has mainstreamed climate adaptation and resilience considerations into the planning and governance structure of the city and, aiming to guarantee the proper assessment of projects, nominated the City's Climate Change Strategy Committee to drive the selection of the projects to be developed. This has allowed for the creation of a project pipeline of roughly ZAR2bn that includes climate change resilience considerations based on the strategic objectives of the city.

In Nigeria, a "top-down" selection process is used to develop pipelines of projects where Ministries, Departments and Agencies (MDA) are allocated thresholds from the annual budget that can be used for sovereign issuance, which is then used by agencies as a basis to develop a list of projects. The Department of Climate Change assesses the projects against sector-specific green criteria before submitting to the Ministry of Finance for approval and inclusion into the Sovereign

¹ Coordination at the national level remains inadequate.

Green Bond. The challenge however is that potential green projects are not captured due to a lack of capacity at the MDAs to identify eligible assets. This applies to both low-carbon assets as well as resilience-focused assets, but is further complicated for the latter given the lack of guidelines on how to identify these.

In Morocco, adaptation planning is led by the Ministry of Environment whereas the development of the green bond market is led by the Moroccan Capital Markets Authority (AMMC). Coordination between these two

institutions is critical to advance resilience-related bond issuance, but is currently limited.

In Kenya, green bond pipelines remain a major hurdle for sovereign issuance due to a lack of capacity to identify projects that are aligned with green bond criteria, which have largely looked at low-carbon assets in the transport and buildings sector. Bringing in resilience may help to expand the pipeline given the vulnerability of the country to climate risks, but the capacity to identify these is perhaps even greater than for 'green-only' projects.

BOX 9: SUSTAINABLE INFRASTRUCTURE DEVELOPMENT AND FINANCIAL FACILITY – IDENTIFYING PIPELINES AND BLENDING FINANCE

The Sustainable Infrastructure Development and Financial Facility (SIDAFF) Programme is currently being developed by the Western Cape Provincial Government in South Africa as a way to support the Provincial Strategic Plan and Municipal Integrated Development Plans (IDP). SIDAFF aims to create opportunities for growth and jobs while enabling a resilient environment fostered on good governance, partnerships and integrated service delivery. More specifically, SIDAFF aims to coordinate local municipalities in the province through the development of an integrated pipeline of sustainable, catalytic and impactful infrastructure projects and programmes.

SIDAFF focuses on the development of blended financing structures to access debt capital markets. Selection of potential projects are needed to inform the structure of the vehicle, define material factors for future project selection, and pool a suitable portion of debt to use for green bond/green finance applications. One of the components embedded in SIDAFF is the inclusion of green investment and the raising of green financing.

Currently, sustainability is included as one of the five criteria which will be used to assess projects. Other project selection criteria focus on infrastructure service, project geography, project replicability and scale. Within the sustainability criteria appraisal, green finance projects will be compared to business as usual scenarios. Furthermore, project assessments include evaluations of total lifetime cost of projects, which will consider climate risks. For Green Bonds for Climate Resilience, it will be important to also include appraisal criteria that are specifically aimed at identifying resilience-related projects.

RECOMMENDATIONS

Broad support for the identification of eligible country-level resilient projects and programs opportunities is needed. The development of project pipelines should be a focal point in efforts to implement climate and development commitments. In the short-term, dedicated facilities and initiatives should be created to support the development and publication of country-level resilience investment opportunities reports for the four case study countries. These will not only help identify investment pipelines to issuers, but can be used to engage and attract investors. In the process of developing such reports, governments can also review and update their planning processes and coordination between financial regulators and institutions mandated with climate adaptation and resilience. In the medium-term more systemic efforts are required including support for mainstreaming of climate risks in financial planning, green tagging of assets by banks and public sector entities, and targeted resilience project preparation facilities.

LEVERAGE CLIMATE POLICIES AND INSTITUTIONS TO IDENTIFY PIPELINES OF RESILIENCE INVESTMENTS

National agencies can devise a list of strategic projects and work with investor and development bank partners to structure projects and bring them to market. These coordinating institutions can mobilise private sector investors with investment “one-stop shops” to provide information, direction and coordination on green bond issuance. It is critical to support the integration of private sector approaches and finance into climate agencies and polices in African countries.

Regulatory reforms and new policies can also create a self-sustaining market for adaptation and resilience assets and services. Initiatives to support such reforms need to be linked with private sector financing opportunities, including Green Bonds for Climate Resilience.

DISCLOSURE POLICIES AND REGULATIONS

From the perspective of corporate issuers, motivation for asset-level adaptation and resilience investments is driven by a combination of factors including the imminence of climate change-related risks, exposure of assets and the value of the asset being protected. It is difficult to justify some resilience investments where up-front costs are high, benefits are diffuse and extend far into the future, and the probability of extreme losses is low. Mandatory risk disclosure can catalyse companies to identify upstream and downstream resilience projects. The Task Force on Climate-related Financial Disclosures has created momentum for better risk disclosure (see the Box 10 below) and provides a basis for further action, noting that further progress is still required to understanding best practice in disclosure of physical risks.

BOX 10: RECOMMENDATIONS FROM THE FINANCIAL STABILITY BOARD’S TASK FORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES (TCFD) (FSB, 2017, 2019).

The TCFD was established by the Financial Stability Board (FSB) in 2015 with the primary aim of developing a set of voluntary, consistent disclosure recommendations. The recommendations which were finalized in 2017 are envisioned to be used by companies allowing for these entities to provide information regarding their climate-related financial risks to investors, lenders and insurance companies. More specifically, the disclosure recommendations are intended to be used within annual financial filings and be integrated to decision-making, facilitating the transition to a low-carbon economy.

The recommendations are presented around four core elements –governance, strategy, risk management and metrics and targets. In terms of the climate-related risks, the task force has created two categories: 1) risks related to the transition to a lower-carbon economy and 2) risks related to the physical impacts of climate change. Regarding physical risks, these may be driven by acute or chronic climate patterns. Physical risks may have financial implications by affecting the utility of assets or by disrupting the supply chain of organisations. Acute physical risks refer to sudden onset events such as cyclones, hurricanes, or floods while chronic physical risks refer to more gradual climate triggers such as sustained higher temperatures or sea-level rise.

It is likely that the need to integrate resilience and adaptation within green bond issuances will be heightened as disclosure practices improve and the requirement for disclosure is made mandatory by more regulators. While progress is rapidly developing around best practice for disclosure of transition risks, more work is needed to develop understanding of how best to report on the direct physical risks associated with climate impacts. This could include guidance on which climate models and warming scenarios to draw from, how to assess risks spread through a disperse supply chain, and how to price risks, among other issues. Some efforts in this space are emerging, for example, UNEP FI and the GCA have collaborated alongside a leading group of financial institutions through the Physical Risks and Resilience Commitment, to enhance understanding of physical risk disclosure approaches.



4.4 READY-TO-FINANCE PROJECTS AND PROGRAMS

4.4.1 ADAPTATION AND RESILIENCE INVESTMENT PIPELINES OF SUFFICIENT SIZE TO REACH CAPITAL MARKETS

STATE OF PLAY

Resilience projects and programs are not being developed into ready-to-finance pipelines

The governments of all four countries face challenges in converting project proposals into economically attractive investment opportunities, or investment-ready projects. Interviews and research revealed that there is a complete dearth of ready-to-finance resilience pipelines in the four case study countries. Nevertheless, it is possible and likely that projects do exist but have not been identified as resilience-related, particularly in the water and wastewater sectors.

Moreover, across all four countries, the small-scale nature of critical resilience projects also poses a significant barrier to generating appropriate pipelines. The minimum bond issuance size typically required by the majority of institutional investors can be a hurdle, limiting small-scale green projects to tap the bond markets without suitable aggregation mechanisms. In developed bond markets, investors typically look for issuance sizes of USD200mn and above, preferably USD1bn deals, while in emerging markets smaller sizes of USD100mn are acceptable. Many adaptation projects are much smaller than this, particularly in the African agricultural sector characterised by small-scale farmers that are highly vulnerable to climate variability and change. Other investments aimed at enhancing the resilience of existing or planned assets to withstand shocks also involve smaller, incremental costs. Yet, these are the areas that critically need support and finance.

RECOMMENDATIONS

PROJECT PREPARATION FACILITIES AND TECHNICAL ASSISTANCE FOR CREATING INVESTMENT-READY PROJECTS

Project Preparation Facilities for Green Bonds for Climate Resilience should be created to provide support for undertaking project feasibility studies, including value-for-money analysis, developing procurement documents and project concessional agreements, undertaking climate risk assessments, designing a clear financial planning and risk allocation strategy and creating awareness among stakeholders. Critical consideration should be given to social, economic, financial, technical, environmental and administrative factors, including the existence of revenue streams to support the repayment of debt. Existing infrastructure project preparation facilities can also help connect their clients and partners to information and resources on green bonds.

AGGREGATION AND SECURITIZATION

Aggregation, securitization and covered bonds are established mechanisms for addressing these issues in the conventional bond market. However, the approach has been adopted for green bonds predominantly for individual projects in developed countries. Yet, nowhere it is more needed than in some developing countries that suffer from chronic shortages of funds. This would support the much-needed adaptation flows to smaller agricultural producers, as well as to micro, small and medium-sized enterprises (MSMEs) vulnerable to climate change risks and impacts. Their size makes it very difficult for them to utilize green bonds unless they are packaged into a single security of sufficient size. Aggregation and securitization in emerging markets will likely require other tools side-by-side to lower their credit risk.

4.5 CAPITAL MARKET DYNAMICS

CAPITAL MARKET DEVELOPMENT

STATE OF PLAY

Underdeveloped Capital Markets

Most bond markets in Africa are still at a nascent stage of development with limited capital market depth and underdeveloped financial market infrastructure, presenting a critical hindrance to issuing Green Bonds for Climate Resilience. Africa's public markets fall into three major segments – local currency denominated government bonds, Eurobonds (hard currency-denominated sovereign and corporate bonds) and stocks. While almost all African countries issue some kind of local currency fixed income instrument, only about ten markets are regularly traded internationally, which include our case study countries. Kenya, Morocco and Nigeria have relatively small and nascent bond markets, whereas South Africa is slightly more advanced. In countries with even less developed markets, expectations on the potential of utilising Green Bonds for Climate Resilience must be tempered.

Currency and credit risk challenges

The risk (perceived or real) associated with local currency issuance is a major limiting factor in the flow of much needed capital to Africa. There are few corporates in Africa and other emerging markets that have the capacity to issue in hard currencies² and few international investors that are able to take on both asset and currency risk (i.e. will only invest in hard currencies), irrespective of whether it is green or vanilla bond. Therefore, most of the bonds are issued in domestic currencies and attract only domestic investors. Green bonds issued in domestic currency are also considered to be illiquid.

RECOMMENDATIONS

DEVELOPMENT OF BOND MARKETS THAT CHANNEL INVESTMENTS TO GREEN FROM THE VERY START

Within this context of relatively underdeveloped capital markets, the opportunity to leverage green bonds to finance resilience priorities can only be catalysed with requisite support to overall debt market development with climate goals mainstreamed from the beginning. In the medium to long-term the direction of change in

African finance is positive and Africa's glaring infrastructure deficit will look to bond markets for investments. Further, the pressure to create green financing might intensify the urgency of – or possibly act as a catalyst for – broader bond market reform. Emerging economies are where the majority of investments for low-carbon and climate resilient assets and services are needed in the coming years. The urgency of the climate change challenge means countries cannot wait until they have mature bond markets to channel investments to green.

DEVELOP INNOVATIVE FINANCIAL PRODUCTS TO ADDRESS CURRENCY CHALLENGES

There is an opportunity to develop financial innovations to address the currency challenge. For example, the Currency Exchange Fund (TCX), a hedging facility developed in partnership with the IFC and Dutch government and shareholders including AfDB, was specifically designed to mitigate currency and interest rate risks in order to attract and lock in long-term private equity and private debt in local currency. Through risk-mitigating financial instruments, the TCX intends to enable and scale climate change mitigation investments in emerging markets, with a focus on Africa. TCX considers infrastructure projects that contribute to climate change mitigation, such as renewable energy and energy efficiency projects, as eligible for assistance. It remains unclear why TCX and other similar facilities do not include adaptation and resilience projects within their eligible assets. Blended finance that aims to leverage debt capital markets must take into account resilience as a matter of urgency.

4.5.2 BLENDED FINANCE FUNDS, GUARANTEES AND DE-RISKING MECHANISMS

STATE OF PLAY

According to the State of Blended Finance report published in 2020, Sub-Saharan Africa remains the most targeted region for blended finance, accounting for 33% of all blended finance transactions that occurred between 2017 – 2019. Transaction sizes for Sub-Saharan Africa have a median size of USD52.5mn with solutions focused mainly on agricultural inputs and farm processing, and climate resilient/sustainable agriculture.

² USD, EUR, JPY, GBP, CHF, AUD and CAD

For example, Aceli Africa provides financial incentives, including first-loss capital and technical assistance, to lenders who finance agri-SMEs in East Africa. Another example is the African Agricultural Capital Fund, a USD20mn fund which injects risk capital into agricultural supply chains in East Africa to support small-holder farmers and leverage additional financial and human capital in the sector. There is significant momentum in Africa on blended finance that can be leveraged to grow green bond markets.

RECOMMENDATIONS

EXPLORE VALUE CAPTURE TO CATALYSE LONG-TERM AND STABLE INVESTMENT OR GENERATE REVENUES

Since green bonds are borrowed against balance sheets, there is no obligation to show revenue generation.

Notwithstanding, financial viability is a crucial element to ensure project attractiveness to investors. Revenue sources of a project are a key consideration and may require support from the government in terms of revenue guarantees to complement and cover any shortfalls in market demand. This is particularly relevant for adaptation projects, which often do

not generate cashflows but provide socioeconomic benefits to the public. Governments are often willing to prioritise adaptation projects and provide necessary guarantees to attract private investors.

Technical analysis of the beneficiaries of a resilience investment and subsequent engagement can also help identify and stimulate demand for those services which may lead to the creation of new revenue streams to supplement broader repayment of debt. Ready-to-finance projects can be developed by fully understanding who derives benefits from these investments. For example, a flood wall between a neighbourhood and the sea or a river clearly reduces risk to the residents. If in addition to the neighbourhood, the flood wall protects a public hospital, a fire station, water treatment plant and private businesses, the calculation of costs and benefits becomes more complex. However, by estimating the costs and benefits holistically, equitable distribution of them is enabled. See Box 11 below, which uses the case of the City of Copenhagen to demonstrate the way financial models can be structured to capture the benefits of resilience investments and help to create investment-ready projects.



BOX 11: VALUE CAPTURE THROUGH STORMWATER CHARGES

Copenhagen experiences pluvial flooding during high precipitation events and is exposed to storm surge risks exacerbated by sea-level rise. Copenhagen initiated a Cloudburst Management Plan in 2012 to set initiatives that create public spaces that increase water drainage during major precipitation events. The city planning department undertook a cost-benefit analysis comparing grey infrastructure drainage solutions, such as underground drainage tunnels, with green infrastructure that used urban roads and parks for drainage. It was found that green infrastructure was capable of reducing the overall costs of protecting the city from cloudburst flood risk significantly. The investment costs were estimated at DKK3.8bn (EUR510mn) in present value in 2012 over a 20-year period (City of Copenhagen, 2012).



The financing structure of infrastructure measures in the plan involved two sources: water charges from the utility and taxes from the city (C40, 2020). The value of flood risk reduction benefits was captured through a water user surcharge earmarked for direct investments in the Cloudburst Management Plan (C40, 2020). The value of co-benefits of improved environmental amenities due to increased green space were captured to an extent through property taxes on increased real estate values for properties in close proximity to the newly created green public spaces (C40, 2020).

Increase blended finance to catalyse investment in Green Bonds for Climate Resilience in emerging markets and support to improve market readiness.

The use of blended finance vehicles and instruments like guarantees, technical assistance grants, currency hedging and risk insurance are gaining traction with private investors, who can use a small amount of development capital to mitigate a range of risks and to crowd in private sector actors. This can be useful in the context of green bonds focused on resilience where credit risk has been identified as a significant issue and also where project generate significant public good but do not generate sufficient cash flow or returns. Blended finance can also help reduce both real and perceived risks in an investment, which send positive signals to the market and help pave the way for private capital to come in later.

Credit-enhancement schemes are another opportunity to mitigate myriad risks of investing in emerging markets (e.g. political risk, regulatory risk, interest rate risk, environmental risk, technological risk, etc.) and increase investor confidence. Common tools include guarantees, which are used to stabilize financing and reassure investors they will be repaid, first-loss provisions designed to protect investors from a defined initial amount of losses, and many other well-established mechanisms. Internationally, entities well placed to provide credit enhancement for green bonds include development banks, green banks, ministries of finance, the Green Climate Fund (GCF) and other similar entities, such as the recently launched Commonwealth Green Finance Facility.

4.6 CREDIBILITY

4.6.1 PREVIOUS EXPERIENCE IN ISSUING GREEN BONDS AND/OR GREEN BONDS FOR CLIMATE RESILIENCE

STATE OF PLAY

Among the case study countries, Morocco, Nigeria and South Africa all perform well on this factor with each having had issuance from multiple local issuers (see Section 2). Kenya has only issued one such bond to date and may benefit from demonstration issuance from a large issuer. Moreover, corporate issuance is currently very limited in Africa, not just for green bonds – but bonds in general. Only four green corporate bonds have been issued according to the Climate Bonds Initiative's database which include North South Power Company in Nigeria, Acorn Holding in Kenya and Redstone Solar Plant in South Africa³.

It has been noted that in the green bond market more widely where 'easy green' areas (renewable energy and energy efficiency) were the initial focus while more challenging green areas have grown as criteria, experience and understanding have increased. Ensuring that demonstration issuance occurs across different sectors and types of projects remains a challenge to scale the market. Only two of the case study countries (South Africa and Nigeria) had green bonds with resilience-related use of proceeds issued locally.

RECOMMENDATIONS TO ADDRESS BARRIERS

Most investors adjust their allocations gradually in certain markets and asset classes over time as trust and experience develops. Technical Assistance to support demonstration issuance of Green Bonds for Climate Resilience can catalyse the wider market. Global experience has shown that demonstration issuance from development banks, national or sub-national governments can raise awareness of green bond's benefits and lead the way for corporate issuers. As the number of green bond issuers and deals increases, so too does the network of services that are established and become available to host different issuers and to expand the types of projects that are included. Furthermore, issuers in the case study countries mentioned having benefited from the 'first mover' status as it resulted in brand value and credibility improvements.

³ None of these have focused on building resilience, though it is possible that resilience considerations may have been integrated at the design phase.

ENCOURAGE CORNERSTONE INVESTMENTS

Cornerstone investments from development banks is a type of public green bond investment that can boost the Green Bond for Climate Resilience market by reducing perceived risk for private investors. Cornerstone investments happen when one or more investors agree in advance to subscribe for a certain number of shares in a forthcoming initial public offering (IPO). For example, IFC is investing up to USD325mn in the Green Cornerstone Bond Fund, which will buy green bonds issued by banks in developing countries.

RESPOND TO INVESTOR DEMAND FOR ENTITY-LEVEL CREDENTIALS

The lack of standard definitions of what makes a bond 'green' has led to uncertainty over whether all green bonds really are 'green'. The mainstreaming of investing based on ESG principles is motivating fund managers and investors to increasingly look past the green bond label and assess the complete bond issuer's green credentials and targets. Clear adaptation targets in NDCs, robust NAPs and strong climate policies are key to build a good reputation and ensure the quality of the credentials of sovereign and sub-national bond issuers.

PART V CONCLUSIONS

1. Climate resilience is sustainability. Climate resilience is integral to climate goals, and is already part of the green universe. Resilience provides a lens through which social, ecological and economic resilience can be captured – climate resilience underpins all sustainable development, and there are substantial synergies with the broader SDGs. Investors are increasingly looking for green, social and sustainability considerations, and regulators are requiring it (e.g. EU Sustainable Finance Taxonomy). Concomitantly, the global green bond market has been on a consistent rise, there has been a broadening of the 'green bond' issuance landscape, and further expansion of the issuance of thematic bonds, in particular social bonds.
2. Climate resilience is already being financed. The analysis of the green bond market using resilience screening criteria has demonstrated that investments in resilience are already flowing through the green bond market, albeit at an insufficient scale and speed. 1,265 bonds with at least a share of proceeds used for resilience-related activities have been issued to date. This represents 16.4% of all green bond deals to date¹.
3. The opportunity to grow is promising. While not all types of projects are suitable for green bonds financing, the potential for expanding the universe of types of projects included in green bonds is huge. Governments and companies are expected to issue USD500bn in green debt in 2021, nearly half the total that has been raised since the asset class' inception, according to a projection from Swedish bank SEB. Furthermore, the IFC estimates that green bonds issuance in emerging markets will double in the next three years compared to the previous three, and the market will cross the USD100bn mark of annual issuance by 2023.
4. It is critical to build momentum in the market by supporting the inclusion of activities that easily lend themselves to a bond structure (low-hanging fruit). Infrastructure projects with large capital expenditure and resilience benefits present clear premises for issuing Green Bonds for Climate Resilience, however, programmatic approaches can enable the financing of other sectors such as sustainable landscapes, agriculture and watershed management (i.e. food security programs) through Green Bonds for Climate Resilience as well. Investor demand exists and supply of credible investments can be improved to capture this demand. More complex projects such as those that require aggregation and those with large operational expenditures can surely fit into a green bond, but are more complex and will require further innovations.
5. Positioning resilience related bonds squarely within the green bond market will facilitate investment. There are a number of competing labels that can be used to market resilience investments. To scale adaptation finance, we must take advantage of the credibility, scale, momentum and liquidity that the green bond market has achieved over the past 10 years. Whichever label is used, it is important that resilience-related bonds are clearly positioned within the green bond universe to effectively tap into high investor demand in that market.



¹ Analysis includes all issuances up to September 2020

6. Reaching real scale requires addressing the following barriers:
- Limited knowledge and capacity to assess climate risk and identify eligible projects;
 - Investment pipelines are not fully developed or large enough for meaningful screening against resilience criteria;
 - Resilience screening guidelines are still high-level and lack metrics and, as a result, issuers struggle to identify eligible projects;
 - Resilience projects are often too small in scale compared to the minimum bond issuance size typically required by institutional investors;
 - Resilience projects sometimes require concessional capital to become “financially viable” and in the absence of concessional or PPP structures, resilience projects often don’t have a clearly defined, stable and regular revenue stream to attract infrastructure investors;
 - Most international investors will only invest in hard currency, whereas emerging markets issuances are mostly in local currency and do not always display a high enough level of credit quality;
 - Trade-offs between mitigation, adaptation and other social and environmental goals are difficult to assess. Do No Significant Harm criteria need to balance, especially in terms of mitigation components otherwise resilience needs will continue to be overlooked.

The table below summarises the capacity constraints to issuing Green Bonds for Climate Resilience and suggests strategies to address them.

Table 6: Summary of Capacity Barriers and Strategies for Addressing Them

Readiness Classification	Capacity Component	Barriers to achieving stage	Strategies to address barriers
Nascent	Stage 1 (Awareness): Potential issuer recognises that climate resilience is of critical importance to their business or mandate.	Limited awareness on climate change risks Limited knowledge, capacity and tools to carry out climate risk assessments	Build general awareness on climate risks, adaptation and resilience Mainstream climate considerations into governance or organizational structures, environmental processes, disclosure statements and/or financial decision-making Produce sectoral climate risk assessments that can inform stakeholders
	Stage 2 (Governance): Governance systems are in place that enable potential issuer to act on climate resilience objectives. These include internal governance systems of the issuer as well as external, market level governance architecture.	Lack of climate adaptation plans and policies Lack of green bond policies International green bond standards and guidelines not always fit-for-purpose for emerging markets and local ones are needed National and global green bond policies and guidelines are either too high-level or impractical to apply due to data constraints	Enact policies that address adaptation and resilience (e.g. NAP and NDC, for governments; ESG strategies for corporates; climate finance tracking for MDBs) Enact policies, regulations and guidelines aimed at developing the green bond market (for public sector) or securing internal commitment to issuing green bonds through corporate policies and processes (for private sector) Develop local green bond taxonomies that are harmonised with international standards and include resilience Develop further guidance on how to evaluate trade-offs, whereby investments do not lock-in carbon-intensive activities while balancing with the resilience needs

Readiness Classification	Capacity Component	Barriers to achieving stage	Strategies to address barriers
Emerging	<p>Stage 3 (Resilience Pipelines): Potential issuer is able to identify a sufficient volume of projects that credibly build climate resilience.</p>	<p>Investment pipelines are either absent or too small for bond issuance</p> <p>Lack of common metrics and benchmarks for eligibility inhibit the development of resilience pipelines</p> <p>Capacity to use existing metrics to identify pipelines of credible asset-level or system-level resilience is lacking</p>	<p>National and sub-national vulnerability and risk assessments to identify adaptation activities to reduce risks</p> <p>Develop practical, user-friendly tools and guidance to enable usability of taxonomies as well as the development of standards and reporting metrics</p> <p>Assess the materiality of climate impacts in the short-, medium- and long-term on financial, economic, environmental and social performance</p> <p>Screen investment pipelines, portfolios, balance sheets, public budgets, etc. to identify projects using existing green bond guidelines and standards</p> <p>Leverage climate policies to identify pipelines of resilience investments through greater coordination</p> <p>Establish dedicated facilities and initiatives for the development of country-level resilience investment opportunity reports</p> <p>Capacity building support for mainstreaming of climate risks in financial planning, green tagging of assets by banks and public sector entities</p> <p>Support from supranationals, industry associations or national development banks to aggregate projects to increase volume</p> <p>Technical assistance and capacity building on green bonds and resilience, including post-issuance reporting</p> <p>South-South and Peer-to-Peer learning</p>
	<p>Stage 4 (Ready-to-finance pipeline): Issuer has the ability to develop investment case and risk allocation for climate resilience projects.</p>	<p>Governments face challenges in converting project proposals into economically attractive investment opportunities, or investment-ready projects</p>	<p>Project preparation facilities to turn resilience projects into investment-ready projects with appropriate project appraisals, feasibility studies and financial and risk modelling.</p> <p>Identify alternative sources of financing that can support the business case, including leveraging blended finance and value-capture models</p>

Readiness Classification	Capacity Component	Barriers to achieving stage	Strategies to address barriers
Ready	<p>Stage 5 (Market Development): The building blocks and enablers for a green bond market are in place.</p>	<p>Limited capital market depth and underdeveloped financial market infrastructure</p> <p>Green bond markets are seen as tools for financing low-carbon projects only</p> <p>The risk (perceived or real) associated with local currency issuance is a major limiting factor in the flow of much needed capital to Africa</p> <p>Lack of previous experience in issuing green bonds and/or Green Bonds for Climate Resilience</p> <p>Small project sizes require innovative structuring</p>	<p>Support mainstreaming of climate resilience into sustainable finance and debt market activities from the beginning</p> <p>Mandatory risk disclosure to level the playing field for green bonds</p> <p>Develop financial innovations to address the currency challenge such as credit enhancement and hedging facilities</p> <p>TA for demonstration issuances by the private sector</p> <p>Cornerstone investment from development banks</p> <p>Develop innovations around aggregation, securitization and covered bonds</p>
	<p>Stage 6 (Credibility): Issuer has the capacity to maintain the credibility of its Green Bond for Climate Resilience through the life of the bond.</p>	<p>Lack of guidance on impact reporting on resilience</p> <p>Costs associated with monitoring impact</p> <p>Lack of incentives for reporting impact</p>	<p>Integrate regular reporting on the green bond use of proceeds allocation into internal processes</p> <p>Include impact reporting into annual company reports</p> <p>International standards bodies issue a more coherent set of guidance around impact reporting, building on the work of the ICMA in 2020</p> <p>TA and grants to support the establishment of Measurement, Reporting and Verification (MRV) systems</p>

PART VI ROADMAP TO SCALE

As countries allocate their resources to alleviate the healthcare emergency and provide economic relief, fewer public resources are available for investment in climate resilience. Emerging markets will require enormous efforts to recover from the pandemic and actions taken now will be critical to determining the course of the recovery and the pathway toward a more climate-resilient, sustainable future.

Green bonds can offer a valuable instrument to help countries truly achieve the expected resilient recovery. The market-driven growth of green bonds in developed markets has spurred policymakers around the world to engage on supporting further green bond growth, both internationally and by growing domestic green bond markets. MDBs and international development institutions have the knowledge and resources to support emerging markets to advance their capacity and readiness to issue green bonds and, in particular, Green Bonds for Climate Resilience. To that end, it is necessary to allocate more resources to increase the share of resilience investments in the green bond market, along with supporting emerging markets to broaden the number of issuers and issuances of green bonds.

Seizing the opportunity to grow the Green Bond for Climate Resilience market can best be achieved by adopting a three-phased approach. While these phases are overlapping and synergistic, broad conceptual sequencing allows for the definition and prioritization of actions. The immediate priority is to build momentum by engaging and supporting sovereign and sub-sovereign bond issuers poised to supply the market with Green Bonds for Climate Resilience while concurrently engaging with institutional investors demonstrating demand. Second, the integrity of the market needs to be safeguarded and enhanced by expanding and refining standards while monitoring compliance to ensure investments are credibly contributing to stated resilience goals. Third, governments must create the legal and regulatory frameworks that enable the achievement of scale and sustainability.



PHASE 1: BUILDING MOMENTUM

1. TA and support programmes. TA and/or direct support can help create momentum for Green Bonds for Climate Resilience through demonstration issuances. Support can be in the form of advisory services, training, or direct subsidy to cover the expenses related to external reviews and consultants. TA should support the development of green bond frameworks, resilience criteria, impact reporting metrics and specifications for the management of proceeds including project selection and evaluation, fund management processes and controls, and benchmarking processes against industry best practice and evolving standards.
2. Capacity building to develop ready-to-finance resilience pipelines. Capacity building efforts, particularly on the identification of ready-to-finance resilience pipelines, are essential. It is fundamental to design an optimal risk-sharing protocol at the project development phase. If the risks are not allocated to the right parties during the conceptualization of the project, the ultimate consequence is the inability to find investors and lenders. To support this, project preparation facilities for Green Bonds for Climate Resilience should be created to provide support for undertaking project feasibility studies, including value-for-money analysis, developing procurement documents and project concessional agreements, undertaking climate risk assessments, and creating awareness among the stakeholders.
3. Raise awareness through resilience training in the context of green bond guidelines. Awareness raising is needed to target those at the 'nascent' stage of market readiness (Stage 1, Stage 2) to enhance understanding of resilience concepts in the context of green bond guidelines and allow for issuers to better consider future climate risks - thereby stimulating Green Bonds for Climate Resilience issuances. These efforts may need to be regionally specific given the localized nature of adaptation as well as the familiarity of bond market stakeholders with resilience-related investments. Training should specifically focus on various user-friendly risk assessment methods, existing guidelines on resilience and decision-tools to support the integration of risk assessments into financial planning. Another key aspect is to communicate to issuers what investors expect regarding assessment and management of physical climate related risks and how these expectations can be addressed in engagement strategies and considered in post-issuance impact reporting.
4. Increase blended finance solutions to channel capital to climate resilience investments and activities. This could range from blended finance facilities supported by development banks and developed country governments to risk mitigation measures.

Another approach, which the Climate Bonds Initiative's Green Infrastructure Investment Opportunities (GIIO) programme has successfully applied, is to support public sector stakeholders to assess investment opportunities that are aligned with green bond standards. The GIIO programme comprises the development of a series of reports that identify and demonstrate green infrastructure investment opportunities and, in the process, raises awareness and build capacity of public sector agencies. The process of development of these reports also facilitate engagement between project owners and developers, and investors. A similar series of engagements at the country or municipal level that focus on resilience investment opportunities that meet global resilience guidelines can help unlock opportunities. Moreover, the reports are created collaboratively with stakeholders and help to institutionalize knowledge.

For governments, it could include both the use of regulation, the mandating of national development banks to support resilience-related projects and the use of public finance.

Public finance sources can be used in a number of ways to support Green Bonds for Climate Resilience including:

- i. funding TA for the structuring of A&R projects;
- ii. de-risking investments through guarantees;
- iii. financing of A&R mainstreaming initiatives within green projects. In emerging markets' context, there may also be North-South blended finance opportunities to increase the availability of hedging instruments or otherwise support the issuance of local currency bonds.

A wide range of credit enhancement tools are already available and are familiar to the public sector. The challenge now is to take the instruments that are already being used and replicate the process for Green

Bonds for Climate Resilience. This can be done by supporting green bonds in existing suitable credit enhancement schemes, replicating and greening successful existing non-green credit enhancement and cornerstone investment schemes.

5. Engage and activate investor demand. Huge demand for green bonds is already present, particularly from mainstream institutional investors, specialist ESG investors, corporate treasuries, and retail investors. However, a full picture of the demand for resilience-related bonds is relatively unknown. Investor demand can be assessed and boosted by:
 - Investor survey to assess investor demand for Green Bonds for Climate Resilience. A public survey can i) engage investors on this issue and ii) ensure standards and reporting are fit-for-purpose to meet investor needs;
 - A public investor statement could engage and crowd in issuers. Climate Bonds Initiative has facilitated investor statements supporting the growth of the green bond market. An investor statement specifically on Green Bonds for Climate Resilience has the potential to bring visibility to the mainstreaming of climate risk and resilience into green bonds;
 - Investor mandates that include climate resilience goals. Green mandates have been critical in driving the green bond market by providing a ready source of capital to invest in the growing supply of investment opportunities. Investors should set goals in relation to investment in A&R. For example, asset owners should expand their mandates for asset managers to integrate resilience risks. By specifically expanding these to include resilience opportunities and requirements, it will pave the way for a large resilience-related bond market.

PHASE 2: SAFEGUARDING CREDIBILITY

6. Develop granular adaptation guidelines. The growth of a resilience-related bond market relies on the existence and then adoption of clear and consistent global criteria and guidance for climate resilience investments. There is already a starting point in the form of the Climate Resilience Principles (CRPs), as well as some of the work in the EU Taxonomy and continuing work of the EU platform. Existing standards, frameworks, and guidelines need to be extended to include much more granular detail specifically on process metrics to ensure the quality of risk assessment processes, sector-specific guidance for issuers, impact reporting metrics and standardised benefit quantification methodologies.
7. Report and track on climate resilience investments. Accurate tracking of Green Bonds for Climate Resilience can help to identify opportunities available to investors and drive greater capital flows toward investments in A&R. Better data can also support policy development and regulatory guidance around labelling, issuing and reporting, and can ensure continued integrity of the green bond market as a whole. Online platforms such as LuxSE's Luxembourg Green Exchange¹ and IDB's Green Bond Transparency Platform² are essential instruments to ensure the transparency and the comparability of green bonds that are needed to ensure greater level of confidence to existing investors.
8. Monitor, review and critique deals. Local civil society organisations can be critical actors for monitoring and reviewing the local issuances to uncover green-washing as well as highlight local best

1 Luxembourg Green Exchange (LGX) is a platform dedicated entirely to sustainable securities that provides visibility to issuers who raise funding for green and sustainable investment projects. Issuers wishing to display their financial security on LGX first need to comply with the platform's stringent eligibility criteria and then commit to ongoing reporting on their investments. LuxSE established partnership agreements with important institutions in Africa, Asia and South America to promote the sustainable finance agenda and strengthen cross-border collaborations in support of sustainable development. <https://unfccc.int/climate-action/momentum-for-change/financing-for-climate-friendly-investment/luxembourg-green-exchange>

2 Green Bond Transparency Platform is an initiative developed by the Inter-American Development Bank (IDB) with the objective of supporting the harmonization and standardization efforts on LAC green bond reporting. Its goal is to contribute to transparency and comparability, helping attract new investors to the region and providing a greater level of confidence to existing investors. <https://greenbondtransparency.com/>

practice. This is critical in helping the local market to maintain credibility and in providing investors with greater visibility.

9. Respond to investor demand for entity-level credentials. The lack of standard definitions of what makes a bond 'green' has led to uncertainty over whether all green bonds really are 'green'. The mainstreaming of

investing based on ESG principles is motivating fund managers and investors to increasingly look past the green bond label and assess the bond issuer's overarching green credentials and targets. Clear adaptation targets in NDCs, robust NAPs and strong climate policies are key to build a good reputation and ensure the quality of the credentials of sovereign and sub-national bond issuers.



PHASE 3: SCALING-UP

10. Harmonise domestic guidelines with global taxonomies and standards. Governments should adopt international guidelines/best practice on climate resilience. Consistency of definitions is critical for international capital flows. At the same time, resilience measures also need to be locally relevant and specific. By developing and implementing domestic green bond policies that take international guidelines and make them applicable at the local level, harmonised standards can be established. Green Bond Market Development Committees at the country or regional level are already exploring whether country-specific green bond definitions/standards are needed. These need to be further supported, but with greater emphasis on resilience-related climate goals.
11. Support the development of more robust NAPs. Government engagement is fundamental to prioritize investments and financial instruments for climate resilience. Frameworks and tools that enable the prioritization of A&R programs and projects in national budgets are needed. Through robust NAPs and mainstreaming climate resilience in national budgets, a pipeline of investments can be established – the lack of which are a key barrier to issuing Green Bond for Climate Resilience.
12. Establish mandatory climate risk disclosure in targeted sectors. Governments need to implement mandatory climate risk disclosure requirements to address critical climate risks and grow the Green Bonds for Climate Resilience market. Currently, green bond issuers absorb the costs associated with green external review and certification. Governments can level the playing field by extending the disclosure requirements on green credentials to all fixed income issuance. This would mean that non-green bonds would also have to provide information on use of proceeds and environmental impacts, particularly on climate resilience. Mandatory disclosure should focus, at least initially, on those sectors that are dealing with materialising risk – namely the banking and insurance sectors. The insurance sector in particular has already been very active in this space, particularly through re-insurance markets, but this is not yet visible in local insurance markets. Mandatory disclosure could bring in a much wider set of local insurance companies to consider climate-related risks.
13. Provide regulatory incentives for climate resilience investments. Lessons from the broader green bond market have shown that incentives can help to kick-start and scale bond markets both in developed economies and emerging markets. For example, Brazil allows tax-free bonds to be issued for large infrastructure investments, construction conglomerates, and wind farm developers. Many governments, including from the US, Mexico and India, allow municipal bond issuances to be tax-exempt. Tax incentives can also be established to attract foreign investors into domestic bond markets through preferential withholding tax rates for green bonds. Central banks can play a critical role through various actions such as allocating reserves, exploring cheaper liquidity operations and preferential treatment in asset purchasing and collateral programs for Green Bonds for Climate Resilience.
14. Support financial product innovation around aggregation to enable small projects and issuers to access capital through green bond markets. This includes aggregation, green securitization and green covered bonds. The nature of such vehicles will differ depending on the characteristics of local capital markets and international investor risk appetite. These product innovations require putting in place a robust legal and regulatory framework that allows the instruments to be created and used.

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ANNEX

ANNEX 1: METHODOLOGY & OUTPUTS

The methodological approach for this research includes four primary components:

1. Data analysis of green bonds
2. Semi-structured interviews with green bond market actors including issuers, investors, policy-makers and regulators (List of interviewees provided in Annex 3)
3. Literature review and research on selected green bond frameworks and Second Party Opinion (SPO) documentation
4. Peer review conducted by various groups including:
 - 1) Green Bonds for Climate Resilience Steering Committee comprised of individuals from the Climate Bonds Initiative, GCA, and EBRD; 2) Green Bonds for Climate Resilience Expert Group comprised of 23 members; 3) Other peer reviewers. Details of the reviewers of this document are provided in Annex 2.

CBI'S GREEN BOND DATABASE METHODOLOGY

To identify which green bonds have climate adaptation and resilience components, we have used our Climate Bonds Initiative Green Bond Database to conduct our data analysis on Green Bonds for Climate Resilience. The Climate Bonds Initiative screens self-labelled debt instruments to identify bonds and similar debt instruments as eligible for inclusion into the Green Bond Database¹.

There are three overarching prerequisites to be included:

- i. Must be a debt instruments, including but not limited to bonds, asset-backed securities and loans
- ii. Must be self-labelled, defined as a conscious decision by the issuer to label the instrument. Deals, which finance green assets, projects and activities, but are not self-labelled by the issuer, are not included.
- iii. Public disclosure must be sufficient to (1) determine if the financed assets / projects / activities are "green" and (2) allow inclusion of the debt instrument, most notably an amount outstanding and closing / settlement confirmation (issue date).

¹ For detailed information on the methodology for CBI's Green Bond Database please visit: <https://www.climatebonds.net/market/green-bond-database-methodology>

SCREENING METHODOLOGY

The description of the use of proceeds is based on information made public through bond final terms, prospectuses, news releases or any other reliable sources. The process relies on the issuers' public disclosure and standardised reporting. For these reasons, our keyword search can miss bonds if the description of the use of proceeds is not granular enough or explicitly defined as adaptation or resilience.

We have addressed this gap in data through primary research carried out for this project in Africa and LAC region. Given that the number of bonds in these regions is relatively low, a systematic look into each one was a practical endeavor under this project. However, at a global level, the result of our analysis is likely to under-represent the actual finance being directed to adaptation and resilience through green bonds.

ANNEX 2: PEER REVIEWERS

Green Bonds for Climate Resilience Expert Group		
Institution	Name	Title
EBRD	Isabelle Laurent	Financial markets Lead
African Development Bank (AfDB)	Stephanie Simon	Chief Treasury Officer
	Keith Wener	Senior Treasury Officer
World Bank (WB)	Steve Hammer	Advisor, Global Partnerships and Strategy (Climate Change)
Islamic Development Bank (IsDB)	Ahmed Al Qabany	Head of Climate Team
Kenya Finance Ministry	Peter Odhengo	Senior Policy Advisor Climate Finance, National Treasury, Kenya (Sherpa, Coalition of Finance Ministers)
Rabobank India	Arindom Datta	Executive Director, Rural & Development Banking
Ministry of Finance, Chile	Andrés Pérez	Head of International Finance, Ministry of Finance, Chile
The Lightsmith Group	Jay Koh	Managing Director & Co-Founder at The Lightsmith Group
Bank of America Merrill Lynch	Abyd Karmali	Managing Director, Climate Finance
Inter-American Development Bank (IADB)	Maria Chiara Trabacchi	Climate and Sustainable Finance Specialist
CCRI	Carlos Sanchez	Director, Climate Resilience Investment
	Alexandre Chavarot	Director, Climate Finance 2050
S&P Global Ratings	Paul Munday	Associate Director, Climate Adaptation and Resilience
The Institutional Investors Group on Climate Change (IIGCC)	Daisy Streatfield	Investor Practices Programme Director
Independent	Virginie Fayolle	Independent
Acclimatise	John Firth	CEO
WRI	Nambi Appadurai	Director, Climate Resilience Practice

Expert Peer Reviewers

COP 26 Private Finance Hub	Sini Matikainen	Policy Lead
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ANNEX 3: INTERVIEWS CONDUCTED

Name	Institution and Country	Research Category
Daniel Sullivan	City of Cape Town (South Africa)	Issuer
Nilesh Moodley	Government Employee Pension Fund (GEPP) (South Africa)	Local Investor
Joroen Verluen	PGGM (Netherlands)	Foreign Investor
Ruan Bestbier	Windhoek Bank (Namibia)	Issuer
Sarah McPhail	National Treasury (South Africa)	Policymaker (Potential Issuer)
Hillary Korir	National Treasury (Kenya)	Issuer and Policymaker
Gregory Jobome	Access Bank (Nigeria)	Issuer
Oladela Afolabi	Ministry of Finance	Issuer
Halima Bawa-Bwari	Department of Climate Change	Policymaker
Paul Muthaura	Independent Market Development (Kenya)	Regulator
Sule James	Ministry of Finance (Nigeria)	Issuer and Regulator
Timothy Gotara	African Risk Capacity (Africa wide)	Investor (Capital Reserve Side) and Issuer (XCF)
Robert Bunyi	Kenya Water Pool Fund (Kenya)	Issuer
Gray Macquire	Western Cape Government (South Africa)	Issuer
Amal Benaissa	Bank of Africa	Issuer
Nuin-Tara/Amanda Hansen	California Governor's Office	Issuer
Vineil Narayan	Government of Fiji	Issuer
Raphael Eckmann	Aethon Energia S.A	Issuer
Alan Elizondo	FIRA	Issuer
Alexandre de Arruda Botelho	Rizoma Agro	Issuer

ANNEX 4: LIST OF KEYWORDS FOR SCREENING OF GREEN BOND DATABASE

Sector	Keywords/Phrases	
General Adaptation and Resilience terms	Adaptation	Hazard
	Resilience	Climate proofing
	Adaptive	Vulnerability
	Resilient	Redundancy
	Climate risk	Redundant
	Exposure	TCFD
	Hardening	
Social Resilience and Well-being	Social Protection	Disease surveillance systems
	Welfare	E-Health
	Livelihoods	Rapid diagnostic tests
Disaster Risk Management and Insurance	Early warning system	Relocation
	Weather monitoring	Managed retreat
	Weather forecast	Climate Information System
	Flood forecasting	Parametric insurance
	Drought monitoring	Index insurance
	Climate monitoring	Catastrophe insurance
	Climate modelling	
Water	Drinking water	Wastewater treatment
	Stormwater drainage	Desalination
	Water treatment	Flood control
	Water loss reduction	Irrigation efficiency
	Water conservation	Leakage management
	Hydro-meteorological monitoring	Water efficiency
	Rainwater harvesting	
Energy	Distributed Generation	Energy Storage
	Distributed PV	Underground cabling
	Microgrids	Structural Strengthening
	Minigrids	

Sector	Keywords/Phrases	
Agriculture, forestry, land use, and natural resource management	Soil conservation Climate-smart agriculture Agricultural insurance Climate-resilient rural infrastructure Drought resistant crops Non-perennial crops Regenerative agriculture Soil sequestration Wild brush clearing Species diversification Afforestation and reforestation	Mangrove conservation and replanting Restoration of natural habitats Pest control measures Regeneration or extension of natural forests Sustainable aquaculture Ecosystem-based adaptation Integrated water resources management Ecosystem Services Soil Erosion Biodiversity Evapotranspiration Land degradation
Infrastructure and built environment	Green roofs and walls Water retention gardens Porous pavements Reduce urban heat zones Grid resilience Back-up generation and storage, etc. Increased cooling requirement	Urban flood protection Climate-resilient urban infrastructure Resilient shelters Natural infrastructure Green infrastructure Natural assets
Coasts	Coastal natural buffer zones Flood warning systems Coastal Setbacks Managed realignment Flood shelter	Cyclone shelter Slope management Coastal protection Wetland protection Marine protected area Artificial reef
Industry	Supply chain resilience Business continuity planning	Climate-related physical risk assessment Climate-related transition risk assessment

ENDNOTES

- 1 Africa and LAC were selected due to their vulnerability and the potential for south-south cooperation and sharing of lessons from more advanced green bond markets in LAC to emerging ones in Africa. The analysis does not represent the analysis of all Emerging Markets (EMs) where Green Bonds for Climate Resilience may be issued.
- 2 The selection of countries for the African Case Studies was based on their climate vulnerability, degree of capital market development, presence of green bonds, and infrastructure growth trajectories. However, the study was constrained to the selection of 4 case studies and the case studies do not represent all countries in the African region that fit these Criteria.
- 3 The Climate Resilience Principles, developed by the Climate Bonds Initiative, require that issuers must demonstrate that for the assets and activities (re)financed via a green bond they: 1) Understand the climate risks faced by the asset, activity or system in question; 2) Have addressed those risks by undertaking risk-reduction measures and adopting flexible management plans that take account of inherent uncertainties around climate change, ensuring that the asset, activity or system is robust, flexible and fit-for-purpose in the face of that uncertainty; 3) Can deliver resilience benefits over and above addressing identified risks (for system-focused investments); and 4) Are undertaking regular (re)evaluation of the asset and/or system's climate resilience performance, adjusting to risk reduction measures over time as needed. <https://www.climatebonds.net/climate-resilience-principles>
- 4 The EU Taxonomy for Sustainable Activities is a classification system, establishing a list of environmentally sustainable economic activities. It is an important enabler to scale up sustainable investment and to implement the European Green Deal. Notably, by providing appropriate definitions to companies, investors and policymakers on which economic activities can be considered environmentally sustainable, it is expected to create security for investors, protect private investors from greenwashing, help companies to plan the transition, mitigate market fragmentation and eventually help shift investments where they are most needed. https://ec.europa.eu/info/business-economy-euro/banking-and-finance/sustainable-finance/eu-taxonomy-sustainable-activities_en
- 5 The Platform on Sustainable Finance brings together the expertise on sustainability from the corporate and public sector, from industry as well as academia, civil society and the financial industry join forces. As a permanent expert group of the European Commission that has been established under Article 20 of the Taxonomy Regulation, the Platform will assist the Commission in developing its sustainable finance policies, notably the further development of the EU taxonomy. https://ec.europa.eu/info/business-economy-euro/banking-and-finance/sustainable-finance/overview-sustainable-finance/platform-sustainable-finance_en
- 6 Luxembourg Green Exchange (LGX) is a platform dedicated entirely to sustainable securities that provides visibility to issuers who raise funding for green and sustainable investment projects. Issuers wishing to display their financial security on LGX first need to comply with the platform's stringent eligibility criteria and then commit to ongoing reporting on their investments. LuxSE established partnership agreements with important institutions in Africa, Asia and South America to promote the sustainable finance agenda and strengthen cross-border collaborations in support of sustainable development. <https://unfccc.int/climate-action/momentum-for-change/financing-for-climate-friendly-investment/luxembourg-green-exchange>
- 7 Green Bond Transparency Platform is an initiative developed by the Inter-American Development Bank (IDB) with the objective of supporting the harmonization and standardization efforts on LAC green bond reporting. Its goal is to contribute to transparency and comparability, helping attract new investors to the region and providing a greater level of confidence to existing investors. <https://greenbondtransparency.com/>



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