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UNITED REPUBLIC OF TANZANIA

Background Note on Assessing Climate Risks and Opportunities for the Financial Sector in Tanzania

World Bank Group

COUNTRY CLIMATE AND DEVELOPMENT REPORT

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COUNTRY CLIMATE AND DEVELOPMENT REPORT

TABLE OF Contents

Acknowledgments v

Executive Summary 1

Introduction 5

1. Financial Sector and Climate Change Context 7

1.1 Financial sector context 7

1.2 Climate change context 10

Physical risks of climate change 10

Transition risks of climate change 11

2. Assessing and Managing Climate-related Financial Risks 14

2.1 The banking sector's exposure to climate-related financial risks 15

Exposure to climate physical risks 16

Exposure to climate transition risks 24

2.2 Overview of the current banking sector response to climate risks 25

Strategy, governance, and capacity building 26

Risk management 26

Disclosure and reporting 27

2.3 Policy recommendations for assessing and managing climate-related financial risk 29

Governance, strategy, and capacity building 29

Climate risk analysis and monitoring 30

Climate risk supervision 31

3. Identifying Opportunities to Scale Green Finance 33

3.1 Current role of the financial sector in supporting climate action 34

3.2 Barriers to climate finance from the financial sector 36

3.3 Policy recommendations for stimulating green finance markets 37

Governance, strategy, and capacity building 37

Foster transparency by issuing a green taxonomy and enhancing climate disclosure requirements 38

Catalyze market instruments and investors to mobilize finance for climate action 40

Greening National Development Financial Institutions 44

List of Tables

Table 1: Potential impacts of floods and droughts on sectors to which banks are exposed 17

Table 2: Summary of policy recommendations for climate-related financial risk management 32

Table 3: Summary of policy recommendations for green finance markets 46

List of Figures

Figure A: Overview of the CCDR policy recommendations for the financial sector 4

Figure 1: Scope of the background note's analysis 6

Figure 2: Structure of Tanzania's financial sector, 2023 7

Figure 3: Business environment constraints in Tanzania 9

Figure 4: Key natural disaster hazard statistics for Tanzania 1980–2020 and number of people affected 10

Figure 5: GHG emissions by sector (2000–2022) 12

Figure 6: Exports of goods by destination, 2022 (USD millions) 13

Figure 7: Potential impact of CBAM regulations on African economies 13

Figure 8: Climate-related risks and transmission channels to the financial sector 14

Figure 9: Scope of the climate risk analysis 15

Figure 10: Credit exposure breakdown, 2022 17

Figure 11: Spatial distribution of agricultural credit of one sampled bank, 2023 19

Figure 12: Drought risk map for Tanzania 19

Figure 13: Average credit exposure masks wide variations within banks (Range of the percentage of gross loans in surveyed Tanzanian banks) 20

Figure 14: Geographical credit distribution of select NBFI in Tanzania 22

Figure 15: Geographical credit distribution of select microfinance bank in Tanzania 22

Figure 16: Geographical credit distribution of select commercial banks in Tanzania 22

Figure 17: Spatial distribution of self-reported mortgage credit 23

Figure 18: High-risk flood areas also have a high presence of financial access points in Tanzania 25

Figure 19: Banks in Tanzania are in various stages of integrating climate financial risks into their operations 27

Figure 20: Overview of climate risk assessment approaches 30

Figure 21: Green bond issuances in emerging markets 2021–2023 (cumulative) 33

Figure 22: Scope of the climate finance analysis 34
Figure 23: Main areas of the Central Bank of Jordan's green finance strategy (2023–2028) 38
Figure 24: Overview of Malawi's national disaster risk financing strategy 42
Figure 25: Carbon credit issuance and retirement in Tanzania (1996–2024) 44
Figure 26: Breakdown of carbon credit project type 44

List of Boxes

Box 1: Potential sources of international transition risks 13
Box 2: Scope of assessment and data limitations 16
Box 3: Analyzing the impact of drought risk on agricultural credit of one Tanzanian bank 19
Box 4: Climate-related financial risks from real estate investments 21
Box 5: Analyzing the geographical distribution of mortgage credit in Tanzania 23
Box 6: Illustrative example of how banks could analyze climate-related operational risks 24
Box 7: Managing unintended consequences of climate risk management on financial exclusion 32
Box 8. Case study: CRDB's climate engagement 35
Box 9: Interlinkages between greening the financial sector and financial inclusion 37
Box 10: Malawi DRF strategy 41
Box 11: Examples of climate risk insurance programs 42

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Executive Summary

Tanzania, a vibrant East African nation nestled along the Indian Ocean coastline, is increasingly grappling with the devastating impacts of climate change. Its capital, Dar es Salaam, is vulnerable to rising sea levels, coastal erosion, and extreme weather events. Tanzania's economy is also heavily reliant on sectors such as agriculture and tourism that are directly exposed to climate risks. Despite the relatively small size of Tanzania's capital market and domestic banking sector, financial institutions can help channel resources towards climate action by integrating climate considerations into their lending, investment, and risk management practices. Crucially, domestic financial institutions can also serve as conduits for channeling international investments into Tanzania. If not adequately managed, climate impacts such as droughts and floods could also lead to an array of financial risks, such as credit defaults and asset losses, undermining Tanzanian financial institutions' ability to provide critical services to green projects and the broader economy. The objective of this note is to delve deeper into these aspects and analyze the role that the financial sector can play in supporting Tanzania's climate and development goals. Since the Tanzanian financial sector is dominated by banks, the analysis mainly focuses on the banking sector, while some aspects of the capital markets and non-bank financial institutions are covered. This note is intended to serve as background to the *Tanzania Country Climate and Development Report (CCDR).*

Assessing and managing climate risks for Tanzania's financial sector

Preliminary estimates suggest that about 54 percent of bank credit could be exposed to sectors that are vulnerable to climate physical impacts. For example, sectors such as trade, agriculture, and manufacturing (which represent more than one third of banks' lending portfolio) could be affected by the impact of extreme events such as floods and droughts. Self-reported data from nine banks also suggest that Dar es Salaam accounts for the largest proportion of bank credit, a region that is highly susceptible to climate disasters.[1] While transition risks may be manageable overall, given the country's small greenhouse gas (GHG) emission profile, some banks could still be exposed to climate transition risks if they are lending to carbon-intensive sectors that are slow to respond to growing regulatory, consumer, and investor pressures to reduce emissions (e.g., industries related to livestock agriculture or fossil fuel companies).

The Bank of Tanzania's (BOT's) supervisory guidelines on climate-related financial risk management, launched in 2022, have played an important role in raising banks' awareness of climate change. However, most banks are still at a nascent stage of managing climate-related risks. For example, even though 78 percent of surveyed banks reported that they have incorporated climate change into their long-term strategies, only 44 percent of surveyed banks have conducted climate risk assessments, and the approach and granularity of such analysis varied due to the lack of harmonized tools, data, and detailed guidance.

Several policy actions are recommended to further improve Tanzanian banks' climate risk management

- ***Strategy and governance:*** Capacity building, of both banks and supervisors at BOT, is an important starting point. BOT should also continue to take steps to develop the governance and strategic framework, for example, by identifying board representatives within BOT to make key decisions around climate risk management and developing a strategy to prioritize policy actions. When developing such a strategy, BOT could focus on banks that may be especially vulnerable to climate risks. For example, BOT could focus on banks that have high exposure to the agriculture sector or focus on credit activities (including mortgages) in Dar es Salaam.

1 This data is self-reported by banks and should therefore be interpreted with caution. It is possible that the amount of credit located in Dar es Salaam is overestimated because the company borrowing the credit may be headquartered in the capital, even though the production unit is located elsewhere in the region.

- ***Assessing and monitoring climate risks:*** A climate scenario analysis could be conducted by BOT to better understand climate risks' transmission channels to banks, although critical data gaps must be addressed. For example, more granular data on the regional and sectoral breakdown of credit is critical. It may also be helpful to collect additional data from borrowers to understand the extent to which they are taking mitigation measures to reduce their exposure to climate physical and transition risks (e.g., reducing emissions from their operations through renewable energy or energy efficiency measures, or investments to improve climate resilience such as flood protection). In addition, environmental agencies could develop modeling capabilities to estimate damages caused by climate change for different sectors and regions. This could be used as a basis to understand how climate risks could translate into losses for financial institutions. Over time, BOT could delve deeper into the interlinkages between climate and nature risks in relation to the banking sector, given the economy's strong reliance on natural assets, such as coral reefs, fisheries, and forests.
- ***Climate risk supervision:*** In the long run, BOT could further integrate climate risk in the supervisory tools and methodologies for banks. As initial steps on climate risk analysis have not yet been enacted, integration of climate risk in supervisory monitoring and mitigation may be premature. Nonetheless, as practices and capacity develop, BOT should consider integrating these aspects in its on- and off-site supervision. This may initially include monitoring the actual implementation of climate risk supervisory guidelines. At a later stage, integration in the country's CAMELS[2] supervisory rating system may be appropriate. The impact of climate risk policy measures on financial exclusion also needs to be carefully assessed and managed, since marginalized segments of the economy (e.g., rural households) are often more at risk from climate change. For example, targeted training and support could be provided to micro, small, and medium enterprises (MSMEs) so they can better respond to climate risk disclosure requirements or risk management due diligence by banks.

Mobilizing climate finance from financial institutions

In the absence of a national green taxonomy, it is not possible to track financial institutions' overall contribution to climate finance in Tanzania. Nonetheless, consultations suggest that some domestic banks are increasingly active in the climate agenda. For example, CRDB Bank, the largest bank in Tanzania in terms of asset size, was accredited by the Green Climate Fund (GCF) and is launching various financial products to improve the climate resilience of local agribusiness, including a dedicated credit line for climate adaptation technologies and practices, a credit guarantee facility, and a weather-indexed insurance product. Green finance markets are still nascent, with only a handful of green, social, sustainable and sustainability linked (GSSS) bonds issuance in the country. Issuance of GSSS loans in line with international principles has also been limited. The green equity market is similarly underdeveloped, with no known environmental, social, and governance (ESG) indexes or ESG funds in the country. In addition, insurance offerings to respond to climate-related shocks are limited. For example, Tanzania's agricultural insurance sales reached TZS 2.4 billion in 2022, only about 0.3 percent of the country's total insurance sales that year.[3] This is lower than its neighboring countries of Kenya and Uganda.

Several barriers deter financial institutions' engagement in climate finance. For example, much like in many other developing countries, Tanzania suffers from a lack of a green taxonomy and limited data, which hamper investors' ability to make informed decisions around climate projects. Some projects (e.g., mangrove restoration) may not generate sufficient revenue to attract large-scale commercial investors, while some projects (e.g., solar) face infrastructural challenges (e.g., grid connection). Currency risk is also a key constraint for foreign green investments, since projects generate revenue in local currency. In addition, the lack of guidelines, technical assistance, and incentives act as a key barrier for the issuance of green finance

2 CAMELS refers to capital adequacy, asset quality, management capability, earnings, liquidity, and sensitivity to market risk. Details of Bank of Tanzania's supervisory methodology and tools are provided here.

3 Tanzania Insurance Regulatory Authority, "Annual Insurance Market Performance Report," 2023.

instruments such as green bonds and loans. Some instruments (e.g., green bonds) also have high upfront fixed costs (e.g., reporting and second party opinion) that could deter smaller issues. The relatively small size of the domestic capital market and the limited awareness and capacity of domestic institutional investors, such as pension funds, also limit investors' ability to leverage long-term capital to support climate action.

Several policy actions are recommended to stimulate the financial sector's contribution to climate finance. These policy actions aim to both channel domestic capital and stimulate foreign green investments:

- ***Roadmap for greening the financial sector:*** A roadmap could be jointly published by relevant financial sector authorities to identify policy priorities for stimulating green finance. Since climate change will likely disproportionately affect marginalized segments of the economy such as women and MSMEs, the roadmap should call for close consideration on how green finance could complement the country's financial inclusion agenda. It would also be important for such a roadmap to cover actions that are needed to attract foreign investors towards green investments in Tanzania.
- ***Enhance transparency:*** Important steps have already been taken to enhance climate disclosures. For example, the Dar es Salaam Stock Exchange launched Guidelines to Sustainability Reporting (approved by the Capital Markets and Securities Authority [CMSA] in 2021) to compel listed companies to include sustainability considerations in their strategic planning and reporting.[4] Furthermore, the National Board of Accountants and Auditors (NBAA) has set ambitious targets to implement the International Financial Reporting Standards (IFRS) Sustainability and Climate Reporting Standards (S1 and S2). In addition to disclosures, Tanzania should start with a simplified version of a sustainable finance taxonomy and combine it with sufficient capacity building (especially to MSMEs) to ensure they can comply.
- ***Catalyze market instruments:*** Building on international principles (and a sustainable finance taxonomy, if this becomes available), authorities could develop national guidelines for GSSS loans and bonds to harmonize the process for issuing these instruments and avoid greenwashing. Incentive mechanisms could be put in place to stimulate the use of these instruments. For example, partial credit guarantees and government support for project preparation and aggregation could be considered to stimulate GSSS loans. For GSSS bonds, other countries have explored the use of tax incentives (e.g., Thailand). Some regulators also work with stock exchanges to provide capacity building for potential issuers. in Tanzania, CMSA could explore ways to expand interest from domestic retail and institutional investors (e.g., through outreach and investor guidelines). In addition, work is already underway by the Ministry of Finance (MOF) and other partners to explore the issuance of a sovereign GSSS bond. If this is aligned with its debt management strategy, such issuance could signal the government's interest in the agenda, mobilize public funding for climate action, and demonstrate the feasibility of such an instrument to other corporate issuers. It should, however, be noted that broader reforms on capital market development are necessary to ensure that GSSS bonds are successfully scaled over time. Since the local currency capital market is nascent, it will likely only be able to play a marginal role in supporting Tanzania's climate agenda in the short and medium term. In addition, authorities could explore the extent to which climate risks could be transferred to the private sector through insurance markets. To this end, the Ministry of Finance should continue its efforts to develop a disaster risk finance strategy to explore the use of different risk instruments (including insurance) to respond to climate shocks.
- ***Greening national development financial institutions (NDFIs):*** NDFIs, namely the Tanzania Agricultural Development Bank (TADB) and the Tanzania Investment Bank (TIB) Development Bank, could play an important role in scaling climate finance given their development mandate. However, a strong corporate governance framework is an important prerequisite for such an engagement. As a first step, MOF could help build NDFIs' capacity and knowledge on climate finance, including

4 See attachment 4 of Dar es Salaam Stock Exchange (DSE), "Dar es Salaam Stock Exchange PLC Rules, 2022," 2022.

building expertise on how to develop a green project pipeline and navigate the funding processes for climate funds such as the Green Climate Fund. As NDFIs' climate expertise builds over time, they can develop a climate finance strategy and integrate climate considerations into their investment processes. In the long run, NDFIs could test the use of financial instruments to mobilize capital (including from the private sector) for climate action (e.g., through partial credit guarantees and blended finance investment funds).

Figure A: Overview of the CCDR policy recommendations for the financial sector

	Climate risk management		Green finance	
Near Term (Less then 1 year)	BOT internal governance framework for climate risk management	BOT	Capacity building on green finance for FIs and regulators	BOT, MOF, or TBA
	Capacity building for banks and supervisors	BOT	Capacity building on climate disclosures for FIs and supervisors	CMSA, NBAA
Shot Term (1–3 years)	BOT climate risk institutional strategy/roadmap	BOT	Roadmap for greening the financial sector	Multi
			Disaster risk finance strategy	MOF
			Sustainable finance taxonomy	CMSA
	Climate risk/nature risk exposure analysis	BOT	Sovereign sustainable finance framework	MOF
			Lebelling of assets	MOF
Medium Term (3–5 years)	Climate risk scenario analysis/ stress test	BOT	GSSS bond and loan guidelines and incentives	CMSA, BOT, MOF
	Climate risk supervisory tools and actions	BOT	Greening NDFI	TIB, TADB

Source: Authors. Note: BOT = Bank of Tanzania; MOF = Ministry of Finance; TBA = Tanzania Bankers Association; FIs = financial institutions; CMSA = Capital Market Securities Authority; NBAA = National Board of Accountants and Auditors; TIB = Tanzania Investment Bank; TADB = Tanzania Agriculture Development Bank.

Introduction

Financial institutions have a critical role to play in scaling climate finance in Tanzania, given the limited amount of concessional and public resources available for climate action. The investment needs for climate mitigation, adaptation, and resilience in Tanzania are substantial—the Government of Tanzania estimated the total budget for Nationally Determined Contribution (NDC) implementation to be approximately US$19.23 billion.[5] Of this amount, the World Bank's CCDR estimates that the financing gap remains large (more than US$12 billion) and is a significant share (89 percent) of the 2023 gross domestic product (GDP). These needs cannot solely be met by the limited public and concessional resources available, and financial institutions (both domestic and international) have a key role to play in closing the climate finance gap. Against this backdrop, the key objectives of this background note are to identify the main barriers that limit financial institutions' engagement in climate finance so far and identify policy actions that could be implemented to address these barriers and stimulate green finance over time.

In addition, financial institutions could be exposed to climate physical risk (financial risks stemming from the effects of climate change) as well as transition risks (financial risks originating from the realignment of the economy with climate goals). The background note therefore also aims to analyze the policy actions that financial supervisors can take to help financial institutions better manage climate risks at the institutional, project, and portfolio levels (Figure 1).

Ultimately, the objective of the analysis is to inform Tanzania's Country Climate and Development Report (CCDR), which is the World Bank Group's core diagnostic for assessing the interplay between climate and development and identifying priority climate actions across all key sectors. Since the Tanzanian financial sector is dominated by banks, the analysis mainly focuses on the banking sector. However, capital markets and non-bank financial institutions (including those outside of Tanzania) are also considered, especially when analyzing climate-related opportunities for financial markets.

The analysis is high-level in nature and could be refined over time. The analysis is based on initial discussions with the Ministry of Finance (MOF), Bank of Tanzania (BOT), and Capital Markets and Securities Authority (CMSA), as well as stakeholder consultations and surveys that were carried out with the support of the Tanzania Bankers Association (TBA). The analysis also builds on global guidance on the topic, including the World Bank's Toolkits for Policymakers to Green the Financial System.[6]

5 The United Republic of Tanzania Vice President's Office, "Nationally Determined Contribution," 2021.
6 World Bank, "Toolkits for Policymakers to Green the Financial System," 2021.

Figure 1: Scope of the background note's analysis

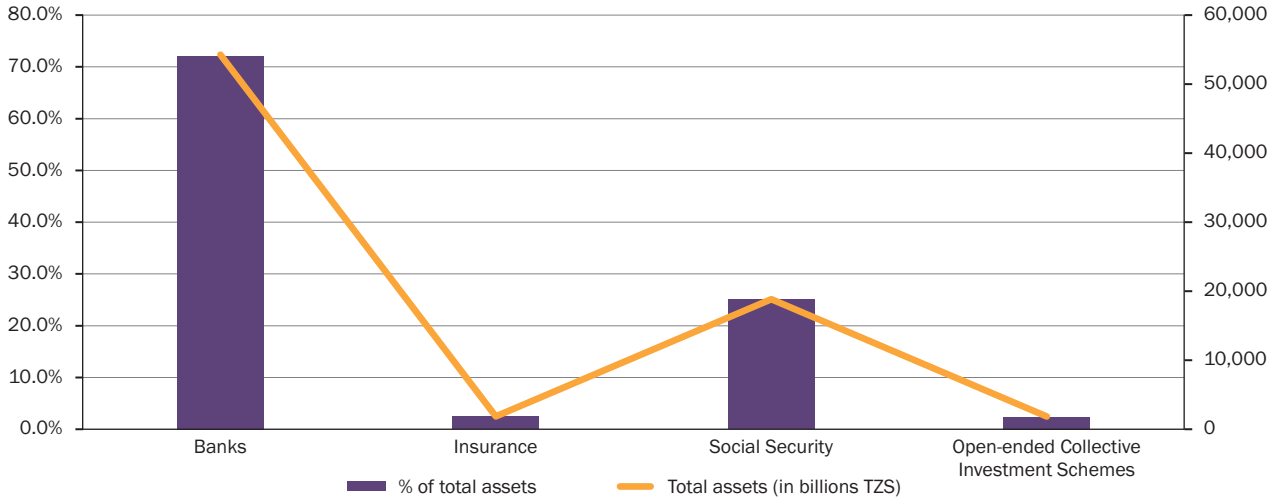
Source: Authors.

1. Financial Sector and Climate Change Context

1.1 Financial sector context

Tanzania's financial sector is shallow and dominated by banks. As of 2023, total financial sector assets stood at about 44.2 percent of GDP.[7] The size of the financial sector is small relative to some regional peers. For example, financial sector assets represented 177 percent of GDP in South Africa, 61 percent in Kenya, and 63 percent in Rwanda. In Tanzania, banks constituted over 70 percent of the total financial system assets and about 32 percent of GDP in 2023 (Figure 2).[8] This is followed by institutional investors (social security [public sector] and pension funds [private sector]) at about 25 percent of financial system assets and about 11.1 percent of GDP.[9]

Figure 2: Structure of Tanzania's financial sector, 2023



Source: Staff calculations based on Bank of Tanzania Financial Stability Report 2023.[9]

The banking system is concentrated in a few banks and dominated by commercial banks. The 10 largest banks (out of 45 banking institutions) account for 77.4 percent of total assets, 78.9 percent of total loans, and 77.9 percent of deposits and are categorized as systemic by the BOT. Of the 34 commercial banks in Tanzania, while the majority were foreign owned, local banks had most of the assets. In 2023, total assets of commercial banks accounted for 97.6 percent[10] of total assets of banking institutions, with locally owned commercial banks accounting for 60.5 percent of assets and foreign owned commercial banks accounting for 36.7 percent of assets. Banks follow a traditional business model based on lending and a high reliance on deposit funding.[11]

Bank asset quality has improved by 2022 and has remained consistent since, although there is significant variation across banks. Banks' average non-performing loans (NPL) ratio reached 5.8 percent in 2022 compared with 8.5 percent recorded in the preceding year, and in recent years the ratio has stayed

7 Bank of Tanzania, "Tanzania Financial Stability Report 2023," 2024.
8 Bank of Tanzania, "Tanzania Financial Stability Report 2022," 2022.
9 Bank of Tanzania, "Tanzania Financial Stability Report 2023," 2024.
10 Breakdown of the remining 2.4 percent is as follows: development banks (1.9 percent), microfinance banks (0.4 percent), and community banks (0.1 percent).
11 The asset side of banks' balance sheets is dominated by credit, which accounts for 56.5 percent of systemwide bank assets. Banks also hold sizeable investments in debt securities, accounting for 17.5 percent of their assets. Balances with the Bank of Tanzania and other banks account for 14.5 percent of bank assets. The liability side of banks' balance sheets consists of 83.1 percent of deposits. Majority of the bank deposits are in local currency.

closer to the desired benchmark of not more than 5.0 percent.[12] A banking sector analysis conducted by EY also suggests that the average NPL figure in Tanzania's banking sector conceals significant disparities, with larger banks often reporting NPL ratios below 5 percent—under the industry baseline—while non-bank financial institutions (NBFIs) and regional and other small and medium-sized banks can experience rates exceeding 10 percent.[13]

Banks are interconnected with other financial institutions in Tanzania. For example, banks are vulnerable to potential withdrawal of pension fund and mobile network operators' deposits.[14] The mandatory social security schemes offer generous defined-benefit pensions, which have consistently exceeded contributions in recent years, triggering liquidation of assets, including bank deposits.[15] Similarly, but on a smaller scale, the insurance sector had nearly TZS 450 billion in 2022 in term deposits.[16]

Capital markets in Tanzania are shallow, which could constrain long-term investments. The total market capitalization of domestic companies in Tanzania is only 8.8 percent of GDP in 2022, compared to 14.2 percent in Kenya and 289.1 percent in South Africa.[17] As of 2023, the Dar es Salaam Stock Exchange (DSE) consists of 27 listed equity companies, 16 licensed brokers, and 6 custodian banks.[18] In addition to six cross-listed companies (mostly from Kenya), the DSE has also managed to diversify financial instruments on the market with derivatives, government and corporate bonds, and real estate investment trusts. The corporate bond market in the country remains small at about TZS 144 billion in 2022 compared to TZS 34,000 billion of total value of investments in the capital market.[19] Overall, the capital market faces low issuances and turnover, and generally low levels of participation of investors and issuers. The development of a benchmark yield curve for government bonds will help grow the capital markets by providing a reference for corporates to price their issuances. The current yield curve is limited to long-term issuances and does not reflect rates on a range of securities e.g., medium and short-term.

Financial inclusion has improved rapidly over the past decade, but key challenges remain. The share of the adult population in Tanzania that has access to financial services increased to 52 percent in 2021 from just 17 percent in 2011.[20] Proliferation of mobile money services (used by 45 percent of adults in 2021) dramatically increased the share of financially included adults.[21] Despite this progress, marginalized segments of the economy (e.g., rural population, MSMEs, youth, and women)—who also happen to be most vulnerable to climate change[22]—remain underserved by the formal financial sector.[23] Commercial banks focus primarily on large corporate borrowers, civil servants, and the government, leaving smaller enterprises, particularly MSMEs, widely underserved. According to the World Bank Enterprise Survey (WBES-2023), 39.7 percent of firms in Tanzania rated access to finance as the biggest obstacle, with around 41 percent rating it as a major or severe obstacle. According to the BOT, loans to SMEs accounted for only 12 percent of the total loan portfolio of banks in 2023 (amounting to TZS 3.63 trillion). Two-fifths of formal enterprises in Tanzania identify access to finance as a significant constraint to doing business, more than 10 percentage points higher than regional average (Figure 3).[24]

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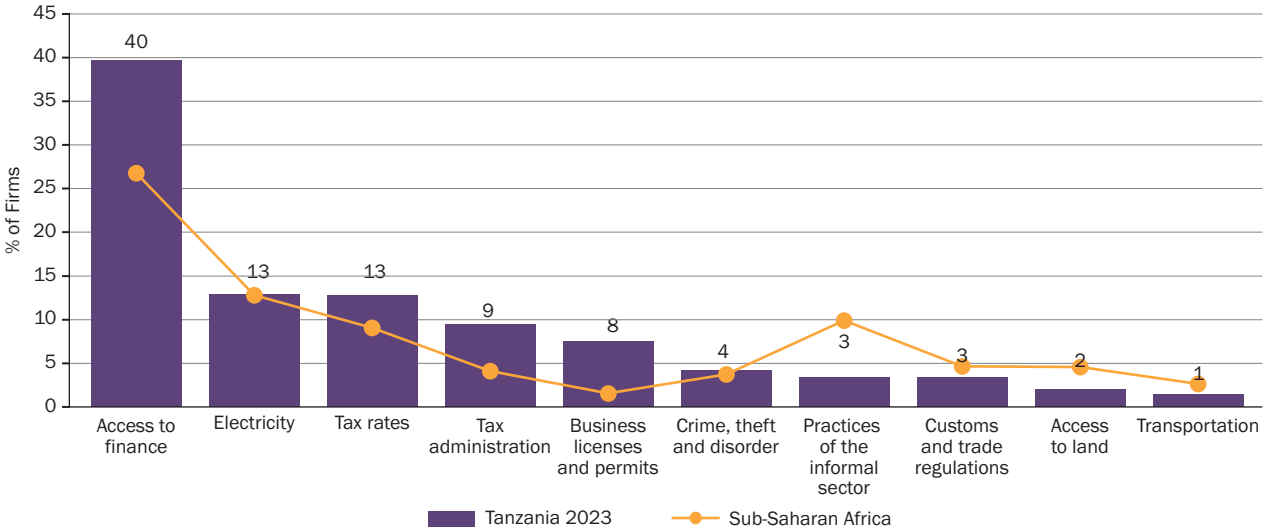
12 Bank of Tanzania, "Tanzania Financial Stability Report 2022," 2022.
13 EY, "Tanzania Banking Sector Report," 2022. Note that the EY report suggests NPL ratio to be 4.8 percent for the year 2022.
14 Bank of Tanzania, "Tanzania Financial Stability Report 2022," 2022.
15 International Monetary Fund, "United Republic of Tanzania's 2018 Financial System Stability Assessment," 2018.
16 Bank of Tanzania, "Tanzania Financial Stability Report 2022," 2022.
17 World Bank, "Market Capitalization of Listed Domestic Companies (% of GDP)—Tanzania, Kenya, South Africa," 2022.
18 TanzaniaInvest, "Tanzania's Capital Markets Executive Summary," last updated July 2023.
19 Bank of Tanzania, "Tanzania Financial Stability Report 2022," 2022.
20 World Bank, "The Global Findex Database 2021," 2022.
21 Mobile money is largely used for person-to-person transfers, but the platform has not yet been exhaustively utilized to upgrade consumers from transactional services to full financial services; in particular, saving and credit services.
22 World Bank, "Social Dimensions of Climate Change," last updated April 2023.
23 World Bank, "Tanzania Financial Sector Assessment Program," 2019.
24 World Bank, "Enterprise Surveys: Tanzania 2023 Country Profile," 2023.

Figure 3: Business environment constraints in Tanzania



Source: World Bank Enterprise Survey 2023: Tanzania Country Profile.[25]

The BOT, the National Social Security Regulatory Authority (NSSRA), the CMSA and the Tanzania Insurance Regulatory Authority (TIRA) are the key regulators of the financial sector and there are two national development banks.[26] BOT is responsible for overseeing and regulating all banking entities, financial institutions, and currency exchange operations within the country. Additionally, it is responsible for the oversight and regulation of financial aspects pertaining to all social security plans in Tanzania, including pension corporations, the National Health Insurance Fund, and the Workers Compensation Fund. The CMSA is responsible for supporting the growth of Tanzania's capital market by promoting efficiency, sustainability, and fairness. This includes developing guiding principles for industry, protecting investors, and ensuring market integrity. The organization is responsible for licensing and regulating entities such as stock exchanges and investment advisors, as well as advising the government on securities industry policies to support the market's orderly expansion. Meanwhile, the NSSRA is tasked with overseeing, regulating, and encouraging the development of the social security sector in Tanzania. TIRA is responsible for strengthening the institutional infrastructure of the insurance sector. Lastly, there are two national development banks in Tanzania, namely the Tanzania Agricultural Development Bank (TADB_ and the Tanzania Investment Bank Development Bank (TIB), which provide capital for economic development projects.[27]

Tanzania's biggest pension funds hold an important amount of assets under management, but their investment portfolios are suboptimally managed. As a result, their investment performance is subpar, and with a weakened liquidity position, their participation in the local capital markets is limited to government's debt securities. Strong capacity building in investment management and risk-based investment, enhanced governance to contain directed lending, and strong supervision are among the key actions to help put pension funds on a stronger footing and play a larger role in the capital market especially in green investments.

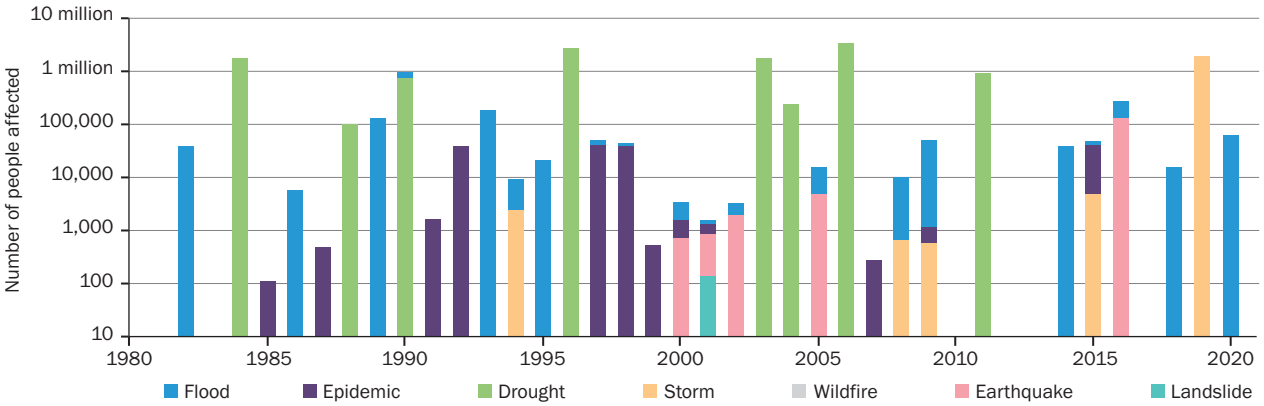
25 World Bank, "Enterprise Surveys: Tanzania 2023 Country Profile," 2023.
26 Bank of Tanzania, "List of Licensed Institutions."
27 Bank of Tanzania, "List of Licensed Institutions."

1.2 Climate change context

Physical risks of climate change

Tanzania is highly vulnerable to climate change and climate shocks, ranking 145th in the Notre Dame Global Adaptation Initiative (ND-GAIN) index and 67th in the 2019 Climate Risk Index.[28] Overall, Tanzania is among the top 10 countries in Sub-Saharan Africa in terms of frequency of natural disasters.[29] Floods and droughts are two major natural disaster threats that affect a large share of the country's population. Over the last 40 years, floods have represented approximately two-thirds of all natural disasters (Figure 4), with their frequency rising from an average of 0.8 occurrences annually from 1980 to 2010 to 1.8 occurrences annually in the period from 2011 to 2022.

Figure 4: Key natural disaster hazard statistics for Tanzania 1980–2020 and number of people affected



Source: EMDAT via World Bank Climate Change Knowledge Portal.

Tanzania is already experiencing severe negative impacts from natural disasters such as droughts and floods, and these impacts will likely worsen with climate change. As this report is being drafted, the country is still reeling from the impacts of El Niño including through floods and landscapes, which has affected over 200,000 people and more than 51,000 households.[30] Based on multi-model ensembles used by the World Bank for Tanzania's climate projections, Tanzania is expected to face a range of 0.4-4.3°C increase of mean temperature by the end of the century, relative to the 1995–2014 baseline, which could further exacerbate natural disasters such as floods and droughts.[31] Rising temperatures may also lead to heatwaves and subsequent mortality. One study found that under certain projected conditions, the population affected by heatwaves at least once a year will increase to 19 percent in 2080 from just 2 percent in 2000.[32] Heat-related mortality could also increase to 6.5 deaths from 1.8 deaths per 100,000 adults per year under certain projections.[33]

Major segments of the Tanzanian economy will be affected by climate change, not least because of the country's reliance on natural assets. For example:

28 The ND-GAIN Country Index summarizes a country's vulnerability to climate change in combination with its readiness to improve resilience. Countries are ranked from 1 (lower risk) to 185 (higher risk). Tanzania ranks 145th. The 2019 Climate Risk Index score is based on the impacts of extreme weather events and its associated socioeconomic data. Countries are ranked from 1 (higher risk) to 182 (lower risk). Tanzania ranks 67th with a score of 66.5.

29 International Monetary Fund, "Building Resilience to Climate Change" 2023.

30 Alfred Lasteck, "Tanzania Floods and Landslides Kill More than 150—PM Kassim Majaliwa," British Broadcasting Corporation, April 25, 2024.

31 World Bank, "Climate Change Knowledge Portal"

32 GIZ, "Climate Risk Profile: Tanzania."

33 GIZ, "Climate Risk Profile: Tanzania."

- The agriculture sector, which represented 24.3 percent of GDP[34] and 66 percent of employment in 2022,[35] will likely be severely affected by climate change due to crops' dependence on increasingly unreliable rainfall.[36]
- Coastal and marine resources in Tanzania are also susceptible to the impacts of climate change. For instance, coral reefs, which play a vital role in supporting marine biodiversity and climate adaptation, are affected by climate impacts such as rising sea temperatures. Furthermore, Tanzania's coastal zones are experiencing heightened vulnerability to extreme weather events, including more severe storms, coastal erosion, and flooding. These impacts could indirectly affect key economic sectors such as tourism and fishery, as well as urban centers like Dar es Salaam.
- Wildlife as well as forests and woodlands (which cover about 55 percent of Tanzania's land area[37]) are under pressure from unsustainable use (e.g., household energy and cooking), land use conversion (e.g., agriculture) and climate change impacts such as floods, droughts, and changes in the hydrological cycle and water availability. This could in turn affect key sectors such as the tourism sector.
- High precipitation and flooding could adversely impact transport infrastructure, especially in the coastal areas, while high temperatures can cause roads, bridges, and protective structures to develop cracks and degrade more quickly. This could indirectly affect the commuting paths of many economic sectors, especially since Tanzania has one of the lowest paved-road densities in Africa.[38]
- Hydropower plants, which are an important part of Tanzania's current[39] and future generation mix,[40] are vulnerable to hydrological changes, including those resulting from climate change, reducing the reliability of power supply.
- Climate change could instigate internal climate migration and increase health risks (e.g., due to increased water and vector borne diseases and heat stress). This could in turn lead to broader systemic impacts, such as reduced labor productivity.

Transition risks of climate change

Tanzania's exposure to climate transition risk is likely limited in the short run given its small GHG emission profile. Transition risk is the potential cost to the society and economy from the low-carbon transition. These risks could arise from several factors such as policy changes, technological innovation, and changes in investor and consumer sentiment. In the short run, Tanzania's exposure to climate transition risk is likely limited since the country contributed only 0.31 percent of global emissions.[41] However, exposure to transition risk could increase over time if the country follows a carbon-intensive development pathway.

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34 Includes contribution to GDP by associated sector including fishing and forestry.

35 World Bank, "Employment in Agriculture (% of Total Employment) (Modeled ILO Estimate)—Tanzania," 2022.

36 Under projected climate conditions, production losses are estimated to rise for most crops (they are notably large for bananas, cassava, maize, sweet potatoes, and beans). UN Office for Disaster Risk Reduction, "Tanzania Disaster Risk Profile," 2019. Another study found that production of maize, the main staple crop nationally and a major export commodity, is projected to decrease by 8–13 percent by 2050. "US Agency for International Development, "Climate Risk Profile: Tanzania," 2018.

37 Food and Agriculture Organization of the United Nations, "Global Forest Resources Assessment: United Republic of Tanzania," 2020.

38 According to the *Tanzania Country and Climate Development Report* (CCDR,) the direct and indirect risks for the critical road transport network and direct risks for rail average US$84 million per year, and are expected to rise to US$136–143 million by 2030, US$266–409 million/year by 2050, and US$1.2–4.3 billion by 2080, with losses expected to be concentrated in "heavy tail" flood events. According to the US Agency for International Development, Dar es Salaam's infrastructure assets, which have an estimated value of US$5.3 billion, are increasingly at risk from flooding and sea level rise.

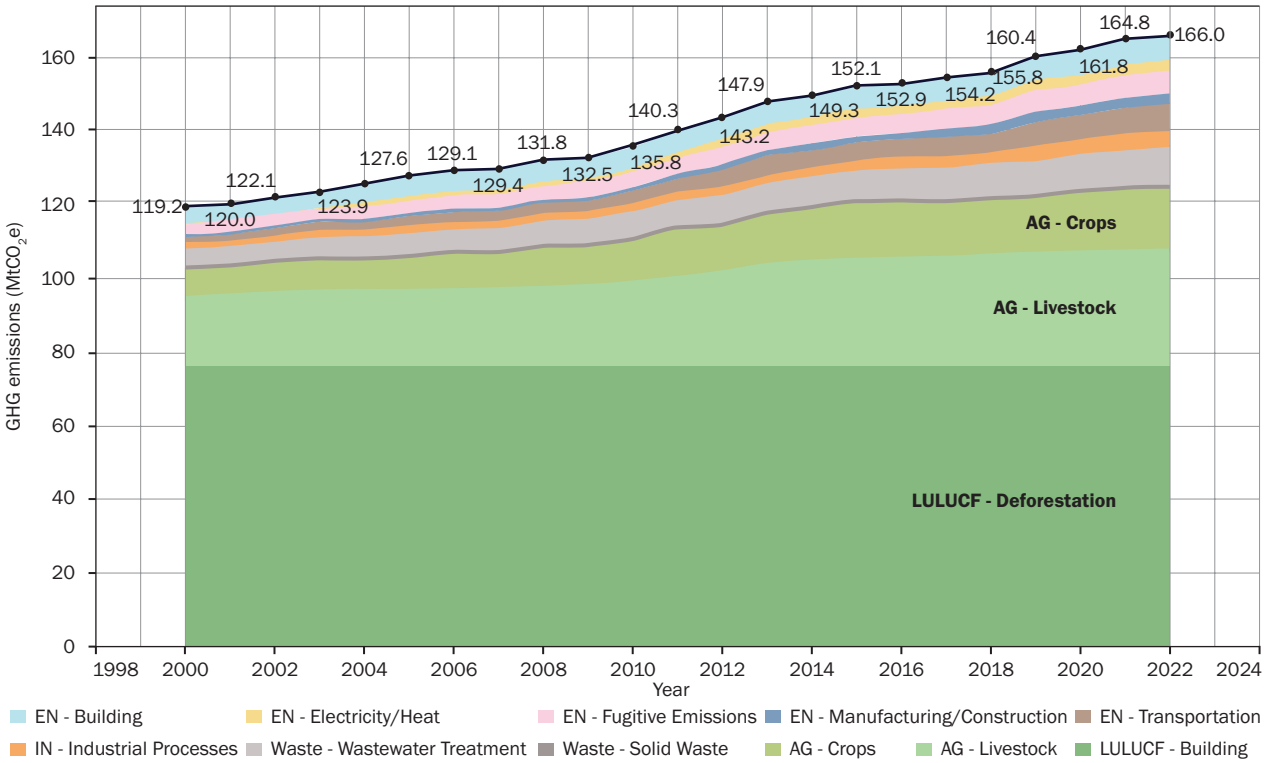
39 According to US International Trade Administration, in 2022, about 45 percent of Tanzania's electricity was generated via hydropower in 2022.

40 According to US International Trade Administration, Tanzania hydropower capacity stands at 562 megawatts in 2022, and estimates of potential capacity are as high as 4.7 gigawatts. Most of the hydro power water sources in Tanzania are rivers.

41 World Bank, "Tanzania: Country Climate and Development Report," 2024.

Some carbon-intensive sectors (e.g., land use change and forestry as well as agriculture, as shown in Figure 5) could still be vulnerable to transition risk if they are unable to respond to regulatory and business pressures to decarbonize.[42] For example, under Tanzania's NDC, the government has committed to decarbonizing its economy, reducing GHG emissions by 30 to 35 percent by 2030 compared to business-as-usual, particularly in the energy, forestry, transport, and waste management sectors. The CCDR identifies various priorities to support this emission reduction target. For example, in the energy sector, the country could tap into the abundant potential of hydro, solar, and geothermal resources to increase the share of renewable energy generation in the energy mix. Tanzania could also curb deforestation and forest degradation, increase forest restoration, and implement methane emission reduction efforts through more productive agricultural practices, sustainable or reduced use of wood energy, forest conservation, and control of illegal activities.

Figure 5: GHG emissions by sector (2000–2022)



Source: CCDR (2024).

Transition risks could grow if the country expands its coal production. Furthermore, increasingly stringent climate and environmental regulations on exports could lead to transition risks in the future. The CCDR notes that Tanzania has vast deposits of one of the world's best-grade coal, and exports to Europe have boomed since 2022. Globally, there has been an upsurge in both demand for, and price of, thermal coal, with Europe willing to pay more than twice as much in 2022 as the previous year. While this is generating short-term opportunities, the global low carbon transition could lead to stranded coal-related investments. Furthermore, through integration in international value chains, Tanzania may be exposed to transition risk stemming from international trade mechanisms designed to reduce carbon leakage and deforestation, such as those introduced by the EU. However, preliminary analysis suggests that the impact of recent EU regulations is unlikely to be material in the short run (Box 1).

42 Tanzania emitted 155 metric tons of carbon dioxide equivalent in 2019, which is approximately 1.5 kilotons of carbon dioxide equivalent per USD million of GDP and 2.67 tons of carbon dioxide equivalent per capita. Tanzania was the 46th largest global emitter in 2019.

Box 1: Potential sources of international transition risks

Tanzania may face increased costs as countries impose tariffs at the border for products that are deemed to have a higher carbon footprint or contribute to environmental degradation. For example, in 2022, the European Council agreed to the Carbon Border Adjustment Mechanism (CBAM), which puts a carbon price on selected carbon-intensive imports. Since Euro area is among the top five trading partners of Tanzania (Figure 6), the CBAM could increase the costs for Tanzania's exports which currently enter the EU duty-free. Nonetheless, given the scope of EU's CBAM and the nature of Tanzanian exports to the EU, preliminary analysis suggests that in its current state, the regulation will likely have limited impact on the country's GDP (Figure 7[43]). Similarly, in 2023, the EU proposed the Regulation on Deforestation-Free Products. Under this regulation, any operator or trader who places commodities (e.g., cattle, wood, cocoa, soy, or palm oil) on the EU market must prove that the products do not originate from recently deforested land and have not contributed to forest degradation. Nonetheless, the regulation in its current state may only affect certain types of industries. Per World Bank calculations, only 1.46 percent of total exports of Tanzania (primarily coffee) will likely be subject to the EU's deforestation regulation.[44] Nonetheless, companies could still be exposed to international transition risks even if they are not affected by international regulations, for example, if they sell or trade with eco-conscious consumers and investors that have voluntary environmental commitments (e.g., on net zero or avoiding deforestation).

Figure 6: Exports of goods by destination, 2022 (USD millions)

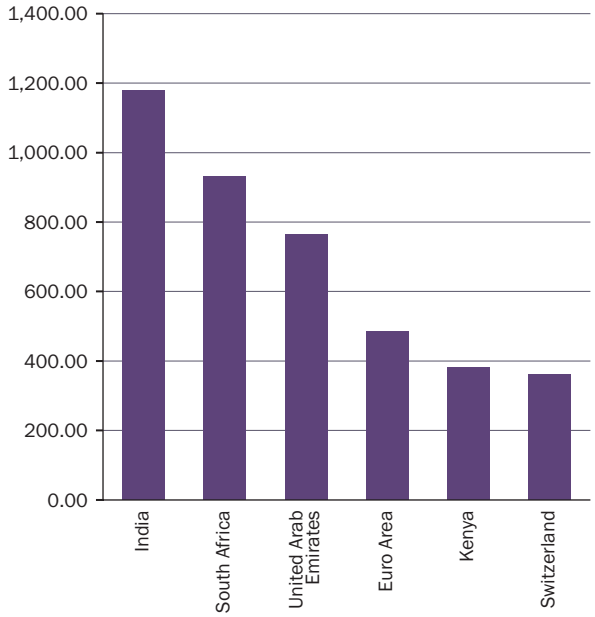
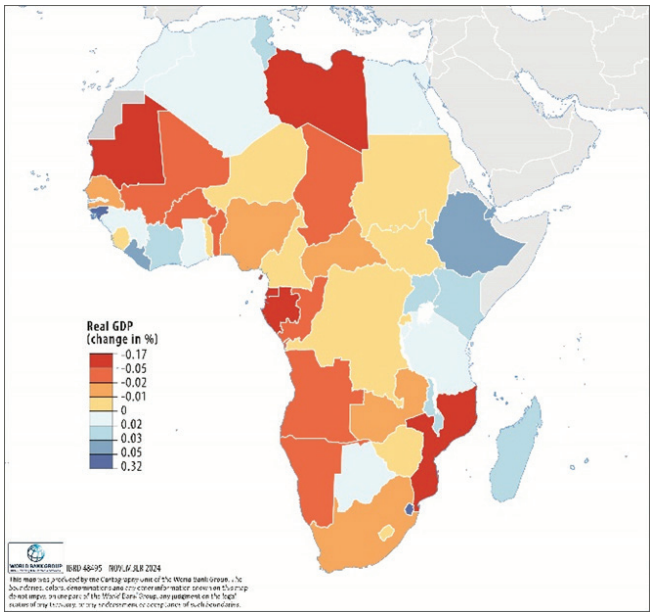


Figure 7: Potential impact of CBAM regulations on African economies



Source: (left) International Monetary Fund Direction of Trade Statistics; (right) African Climate Foundation and the Firoz Lalji Institute for Africa, 2023.

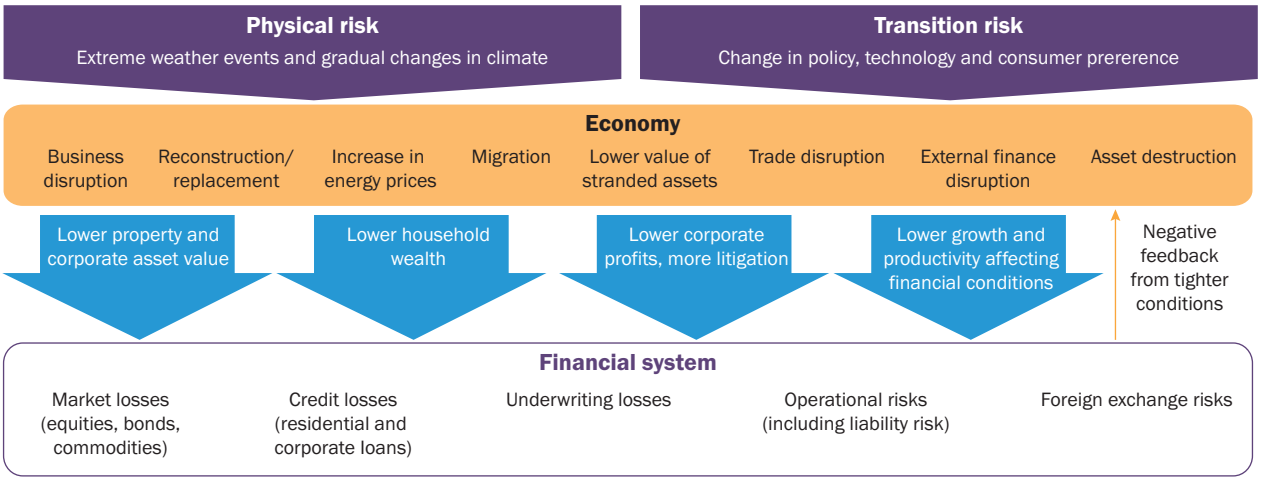
43 African Climate Foundation (ACF) and the Firoz Lalji Institute for Africa at the London School of Economics and Political Science (LSE), "Implications for African Countries of a Carbon Border Adjustment Mechanism in the EU," 2024.

44 World Bank, "Trade and Development Chart: Impact of the EU Deforestation Regulation," 2023.

2. Assessing and Managing Climate-related Financial Risks

There is growing recognition globally that climate physical and transition risks could lead to material impacts on the financial sector. Physical risks stem from both the chronic and acute impacts of climate change and natural disasters—such as sea level rise, droughts, and floods—on the value of real assets and their financial instruments. Transition risks originate from efforts to mitigate climate change and improve environmental conditions by greening the economy, which may create economic adjustment costs in a broad range of sectors. These costs can create financial risks for banks that did not anticipate the transition and can ultimately jeopardize the functioning and stability of the financial system. Figure 8 illustrates the transmission channels through which climate physical and transition risks could translate into financial risks for banks. To respond to these risks, an increasing number of central banks and supervisors, including the BOT, are starting to integrate climate risks into their supervisory framework to encourage financial institutions to better assess, disclose, and manage climate risks. Standard setting bodies are also starting to introduce guidance and principles to promote a common understanding around how climate-related financial risks can be effectively managed. Notably, the Basel Committee on Banking Supervision (BCBS) recently issued key principles for the effective management and supervision of climate-related financial risks, which provides an important baseline for banks' and supervisors' practices related to climate responses against global and regional best practices.

Figure 8: Climate-related risks and transmission channels to the financial sector



Source: International Monetary Fund (2019).[45]

The climate risk assessment follows three steps (Figure 9):

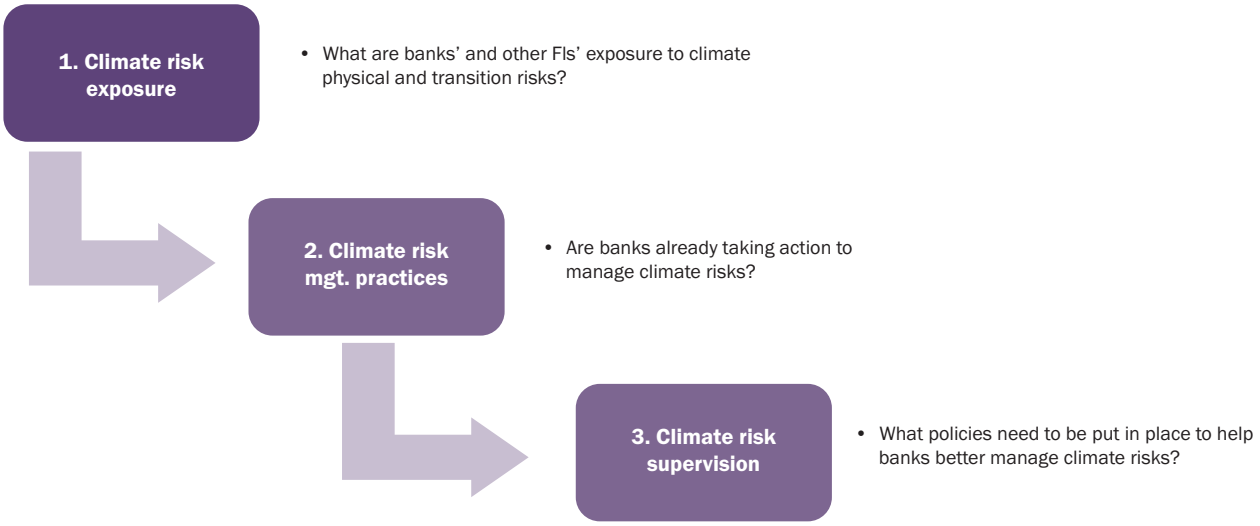
- Based on the CCDR's broader analysis of the macro and sectoral impacts of climate change (as summarized in section 1.2), the first step is to analyze how climate change could lead to financial risks for banks. Given data and resource limitations, the analysis focuses on a high-level exposure analysis and a qualitative analysis of transmission channels for climate-related financial risks.
- The second step is to review banks' current practices around climate risk management and potential challenges that need to be addressed by policymakers. This step is informed by a series of stakeholder consultations and a survey that was distributed to banks with the support of TBA.[46]

45 International Monetary Fund, "Central banks and financial regulators are starting to factor in climate change," 2019.

46 Responses from the following banks and development financial institutions are included in the assessment: CRDB Bank, Maendeleo Bank, Amana Bank, NMB Bank, UBA Tanzania, Access Microfinance Bank, GT Bank, I&M Bank and Diamond Trust Bank.

- The third and final step is to benchmark Tanzania's key policy actions against global and regional good practices. It builds on the consultations conducted and analysis of this report as well as various global guidance and good practices, including the World Bank Toolkits for Policymakers to Green the Financial System, as well as publications from the Network for Greening the Financial System (NGFS) and other standard setting bodies.[47] This diagnosis is intended to be a starting point for further discussion with authorities and should be deepened and refined over time through future technical assistance, data availability, and advisory support.

Figure 9: Scope of the climate risk analysis



Source: Authors.

2.1 The banking sector's exposure to climate-related financial risks

This section analyzes the banking sector's potential exposure to climate-related financial risks vis-à-vis credit exposure. Climate-related *credit risks* facing the banks consist of the impact of climate physical and transition risks on firms' credit standing and ability to borrow money. Since Tanzania is likely more vulnerable to climate physical risks than to transition risks (as noted in section 1.2), we will focus here on assessing banks' exposure to physical risks. These risks stem from the extent to which bank credit is exposed to *regions* and *sectors* that could be vulnerable to the impacts of climate change. For transition risks, the analysis is brief and focuses on assessing banks' exposure to *sectors* that may be impacted by the transition towards a low-carbon, green economy.

Moving forward, more granular data should be collected to refine the analysis. To get a holistic picture of the overall banking system, this analysis primarily relies on publicly available data from BOT to analyze total credit breakdown per sector. This is supplemented by bank-by-bank self-reported data via a survey that was distributed with the support of TBA. Data on credit breakdown per region is not published by BOT so this analysis solely relies on the self-reported data provided by banks.

The analysis could be improved in the future by conducting a more in-depth scenario analysis to understand how climate-related financial impacts could vary under different future scenarios. Physical risks for future climate scenarios are creating deep uncertainty and nonlinearity. For transition risk, there are also uncertainties around how technologies and regulatory actions will develop in the future. The rapid,

47 World Bank, "Toolkits for Policymakers to Green the Financial System," 2021.

Box 2: Scope of assessment and data limitations

While the survey provided more granular bank-by-bank data to inform the analysis, one of the key limitations of the survey is that it only includes a sample of nine banking sector institutions. The sample represents a mix of commercial banks, a microfinance bank, and an NBFI,[48] which allows us to provide insights on how risks may manifest differently for different types of banking institutions. The institutions that provided data via the survey accounted for only 52 percent of total banking sector assets in 2022. Moving forward, it is recommended for the BOT to further refine the climate risk analysis using bank-by-bank data from a more complete sample of banks. It should also be noted that the data from the survey is self-reported by banks and has not been verified. Furthermore, data on the sectoral and regional breakdown of NPLs, which is needed to understand which banks are likely most vulnerable to climate risks, was not available. The analysis also does not consider the role of insurance and potential climate adaptation, or resilience measures used by projects that may help to reduce climate risk to the banking sector.

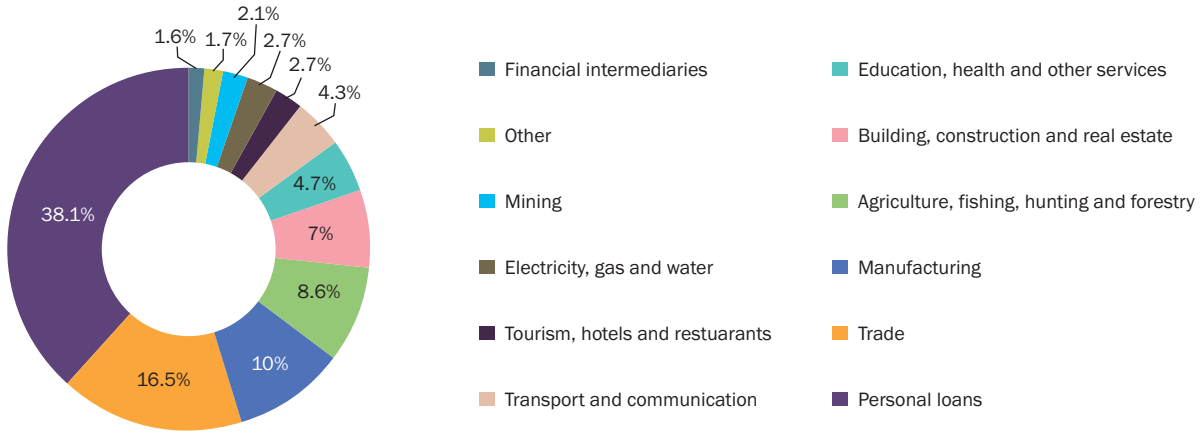
unexpected cost reduction for renewable energy reflects this. This analysis note primarily relies on a qualitative analysis of banks' exposure to climate risks, without modeling potential interlinkages and compounding effects across different future macroeconomic, financial, and climate scenarios. This will require availability of more granular data, as proposed in Box 2.

Exposure to climate physical risks

About 54 percent of bank credit could be directly exposed to sectors that are vulnerable to climate physical impacts such as floods and droughts. Table 1 illustrates the different transmission channels that droughts and floods could translate into financial risks for key sectors that banks are exposed to. For example, sectors such as trade, agriculture, and manufacturing (which represent more than one-third of the lending portfolio) could be affected by elevated temperatures and humidity levels, which can diminish labor productivity (Figure 10). Heat and humidity could also shorten expiry dates of products, particularly in the context of insufficient cooling storage. This not only increases the costs associated with cooling and energy but also leads to equipment damage. Consequently, the potential economic costs include increased operational expenses and losses due to spoiled goods and damaged equipment. In addition, as noted in section 1.2, climate impacts such as high precipitation could impact transport infrastructure, which could indirectly affect key commuting and transport paths for sectors such as manufacturing and trade. Seven percent of bank credit also goes towards building, construction, and real estate, which, depending on the location of the borrower's asset, could be vulnerable to climate physical risks such as floods. Tourism, hotels, and restaurants (which represent nearly 3 percent of bank credit) could also be indirectly affected by reduced food production caused by droughts, as well as biodiversity loss caused by climate change and other related environmental concerns such as deforestation. Finally, as shown in Figure 10, a high percentage of credit (38.1 percent) goes towards "personal loans." While data is not sufficiently granular to assess where personal loans are located, consultations suggest that most people who obtain personal loans use the funds for investments in sectors like the agriculture sector, which as noted, is susceptible to climate change.[48]

48 The inclusion of the non-bank financial institution (NBFI) in the banking sector analysis is attributed to the availability of its data, which was provided by Tanzania Bankers Association with the intention of being incorporated into the analysis. Furthermore, the NBFI aligns with the banking sector's vision, positioning itself as a Tanzanian bank, and was issued a license number to carry out banking business.

Figure 10: Credit exposure breakdown, 2022



Source: Authors based on data from Bank of Tanzania Annual Report, 2022.

Table 1: Potential impacts of floods and droughts on sectors to which banks are exposed[49]

Sector	% of gross loans	Potential impact droughts	Potential impact of floods
Agriculture, forestry, fishing, and hunting	8.6%	***Direct and indirect.*** Droughts directly impact crop production and deplete livestock herds.	***Direct and indirect.*** Floods can destroy crops and cause livestock losses. E.g., Exacerbated by El Niño which caused heavy rains in spring 2024, approximately 34,000 hectares (84,000 acres) of crops were damaged in Rufiji district.[49]
Mining	2.1%	***Direct***, particularly for mining operations with high water consumption.	Direct. Floods can disrupt the production and flow of goods by directly affecting production sites and infrastructures.
Manufacturing	10%	***Indirect***, particularly for agroindustry (via impacts on the agriculture sector) and industries with high water consumption such as textile (via impacts on the water sector).	***Direct and indirect***. Floods can disrupt production and flow of goods by directly affecting production sites and infrastructures, as well as by affecting workers' capability to work or to reach the site of work.
Electricity, gas, and water	2.7%	***Direct and indirect***. Drought can reduce the availability and quality of water supplies and increase demand. Drought can cause disruptions in the energy supply (e.g., hydropower) and increase energy demand.	Direct and indirect. Floods can disrupt the production and distribution of energy and damage water treatment and distribution infrastructure.
Building, construction, and real estate	7%	***Direct***. Drought can generate damage to buildings due to soil desiccation.	***Direct and indirect***. Floods can generate physical damage and affect workers' ability to work or to reach the site of work. Positive impacts may also appear in the medium term with the increase in demand for the reconstruction of destroyed buildings and infrastructures.
Trade	16.5%	***Indirect***, particularly for food trade.	***Direct and indirect***. Floods can disrupt the flow of goods and impact storage facilities and commercial spaces.

49 National Aeronautics and Space Administration Earth Observatory, "Destructive Floods Afflict Tanzania," 2024.

Sector	% of gross loans	Potential impact droughts	Potential impact of floods
Tourism, hotels, and restaurants	2.7%	***Indirect***. Drought can disrupt the flow of services, particularly those connected to the food industry; lower water levels can affect the availability of recreational activities and associated tourism. Reduced agriculture production caused by droughts could also indirectly reduce food availability.	***Direct and indirect***. Floods can damage the infrastructure of hotels and restaurants. Floods can disrupt the flow of services.
Transport and communication	4.3%	***Direct***. High temperatures can cause roads, bridges, and protective structures to develop cracks and degrade more quickly.	***Direct and indirect***. Floods and extreme precipitation could damage transport and communication infrastructure.

Source: Authors adapted from World Bank (2024).[50]

Banks' exposure to the agriculture sector and related sectors, such as the food and hospitality industry, could be severely impacted by climate physical shocks. As shown in Figure 10, agriculture, forestry, fishing, and hunting industries represented 8.6 percent of bank credit in 2022, and the demand for agricultural loans is only growing, increasing by 20 percent in the past two years to 10.3 percent in January 2024.[51] CRDB, the largest commercial bank by asset base with nearly a quarter of the market share, is the country's largest lender to the agricultural sector, with 19 percent of its credit portfolio exposed to agriculture in 2023.[52] Several incentive mechanisms have been put in place by the government of Tanzania to scale lending to the agriculture sector, which could partially explain this surge. For example, BOT lowered the statutory minimum reserve requirement for banks that offer lower rates for agriculture loans.[53] TADB also introduced credit guarantee schemes for agricultural loans.[54] Banks' increasing exposure to the agriculture sector could increase their vulnerability to climate physical risks. For example, extreme heat and unpredictable precipitation caused by climate change could directly affect crop yields. Indirect impacts such as pest infestation and soil erosion could also indirectly impact the agriculture sector. These impacts could in turn reduce farmers' ability to repay loans to banks by disrupting supply chains or destroying borrowers' collateral assets, leading to increased credit risks for banks. Banks' vulnerability to climate physical risks could be even more significant for sectors that are interconnected with agriculture (e.g., tourism, restaurants, hotels, and wholesale and retail trade). Box 3 illustrates how drought risks could impact an individual bank as a case study, using anonymized data provided by the banking survey.

50 World Bank, "Double Trouble? Assessing Climate Physical and Transition Risks for the Moroccan Banking Sector," 2024.
51 Bank of Tanzania, "Monthly Economic Review: February 2024."
52 CRDB, "3Q2023 Investor Briefing," 2024.
53 Bank of Tanzania, "Public Notice: Policy Measures to Promote Credit to Private Sector and Lower Interest Rates," 2021.
54 TADB, "Smallholder Credit Guarantee Scheme,"; Daily News "TADB, Exim Bank Partner to Boost Agri Loan," Tanzania Agricultural Development Bank (TADB), May 17, 2024.

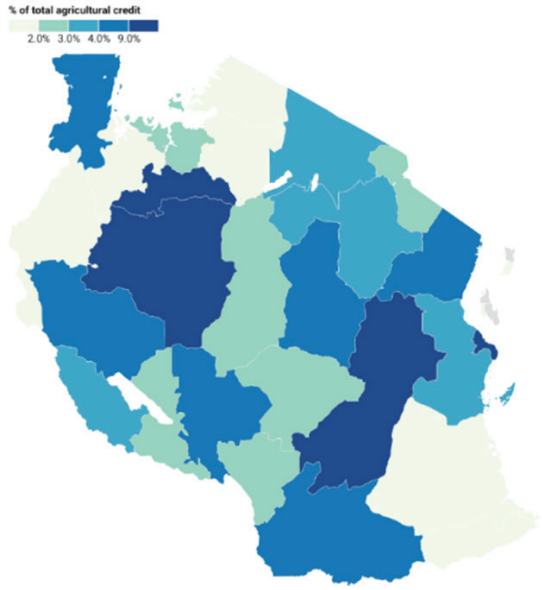
Box 3: Analyzing the impact of drought risk on agricultural credit of one Tanzanian bank

The UN Natural Disasters Research Institute has identified the northern and central regions of Tanzania, specifically the areas encompassing Arusha, Manyara, Shinyanga, Simiyu, and Dodoma, as particularly vulnerable to drought conditions. This vulnerability is depicted in Figure 12, which is identified by characterizing hazard and lack of adaptive capacity. Juxtaposing this data against the geographical distribution of agricultural credit provided by Bank "A," as shown in Figure 11, a concerning pattern emerges. Approximately 22 percent of the agricultural credit extended by the bank is allocated to regions that are particularly vulnerable to droughts. This translates to more than one-fifth of the bank's agricultural lending as exposed to the potential adverse effects of drought, which could impact loan repayment capacity of the borrowers. Depending on the share of banking sector assets held by this bank, such concentration risks in climate vulnerable regions could become even more material.

Furthermore, the exposure to drought risk is likely exacerbated, considering the types of crops cultivated in these regions. For instance, according to the UN Office for Disaster Risk Reduction's (UNDRR's) 2019 Disaster Risk Profile for Tanzania, crops such as bananas, cassava, maize, sweet potatoes, and beans are particularly susceptible to drought conditions.[55] The cultivation of these crops in high-risk areas may increase the vulnerability of the agricultural sector to climate change, potentially leading to crop failures and economic hardship for farmers, which in turn could affect the bank's credit portfolio.

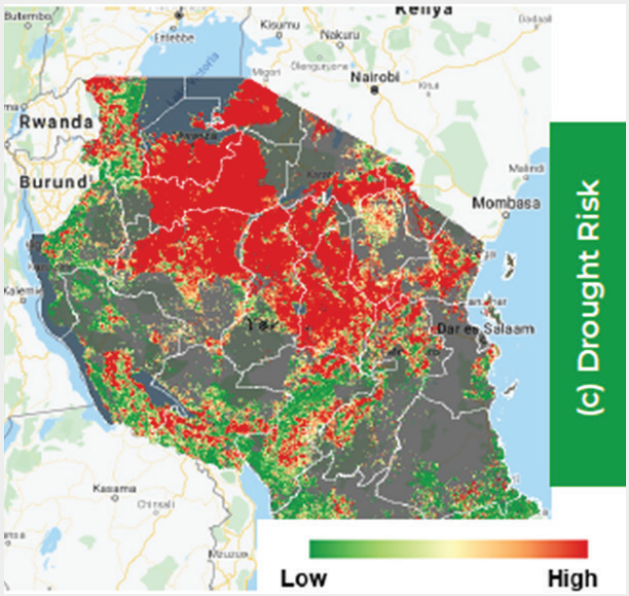
However, to accurately assess the potential impact of climate change on agricultural credit, it is essential to have detailed data, including a sub-sectorial mapping of the specific crops grown in the affected areas. The reported location of agricultural lending in the BOT data may not be reflective of the actual location of crop production, which limits the utility of analyzing banking sector exposures by overlaying the data with data on the geographical distribution of drought risk indicators. Moreover, it is crucial for banks to conduct their own risk assessments. Such assessments should consider the unique composition of each bank's credit portfolio, as well as the specific environmental and socioeconomic contexts in which they operate.

Figure 11: Spatial distribution of agricultural credit of one sampled bank, 2023



Source: Authors based on data from Tanzania Bankers Association; graph boundaries by Datawrapper.

Figure 12: Drought risk map for Tanzania[56]



Source: SADRI.

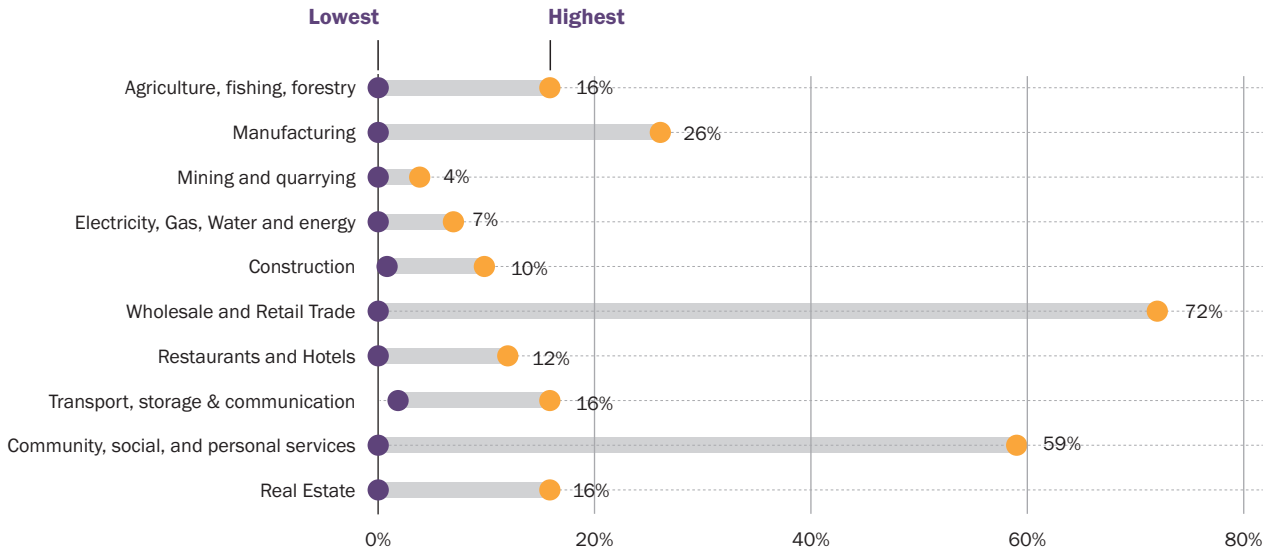
55 UN Office for Disaster Risk Reduction, "Disaster Risk Profile—Tanzania," 2019.

56 SADRI defines drought risk by characterizing hazard and exposure to vulnerability, and the lack of adaptive capacity.

Low levels of insurance could reduce banks' ability to mitigate damage caused by extreme climate events. Insurance penetration in Tanzania (life and non-life) remains at 2 percent in 2021/2022.[57] Agricultural insurance has been contributing to less than 1 percent of the total insurance market. Insurance companies typically focus on named-peril crop insurance only for medium and large-scale agribusiness with linkage to bank credit, excluding smallholder farmers from the insurance market. Weather index and crop insurance products are also largely missing from the market, either due to an absence of a sufficient number of agricultural extension officers that would provide advice to farmers or due to the lack of awareness among farmers about these products. However, the government has introduced the Tanzania Agriculture Insurance Consortium, which aims to provide affordable and accessible insurance solutions to smallholder farmers and businesses.[58] The government is also taking an initiative to develop disaster risk insurance and livestock insurance and there is interest in further expanding low-cost, accessible insurance through mobile network operators in the future. Section 3.3 discusses opportunities to scale climate risk insurance products in more detail.

While aggregate data summarized above illustrates how the overall banking sector may be vulnerable to climate physical and transition risk, these impacts will likely vary widely among individual banks. Some banks in Tanzania have highly concentrated credit portfolios, which means they could feel the impacts of climate physical and transition risks more acutely than banks that have more diversified portfolios. Hence, relying solely on the average concentration of credit portfolios across the banking sector can obscure the substantial differences that exist between individual banks. For example, exposure to the trade sector ranges from practically nonexistent in one bank to over 70 percent in another (Figure 13). Another example is CRDB Bank's exposure to the agriculture sector, which stands at about US$450 million, equivalent to 43 percent of agricultural financing in Tanzania.[59]

Figure 13: Average credit exposure masks wide variations within banks (Range of the percentage of gross loans in surveyed Tanzanian banks)



Source: Authors based on data from Tanzania Bankers Association.

57 Tanzania Insurance Regulatory Authority (TIRA), "Annual Insurance Market Performance Report 2022," 2023. Insurance penetration indicates how much the insurance sector as a whole contributes to the national economy. It is the portion of country's GDP allocated to insurance premium.

58 TIRA, "Annual Insurance Market Performance Report."

59 CRDB, "Exploring Africa's Solutions for a Better Tomorrow."

Box 4: Climate-related financial risks from real estate investments

The pension and insurance sectors in Tanzania place substantial assets in real estate, a sector highly vulnerable to climate change. For instance, in 2023, 10 percent of the insurance sector's assets were in real estate, making it the third highest allocation in its portfolio; 11.4 percent of the assets of the pension sector were also in real estate.[60] Physical risks such as sea level rise and coastal flooding, inland flooding, extreme storms and wind, wildfires, subsidence, and heat and water stress are significant concerns for the real estate sector (although the exact level of climate risks depends on where the asset is located). These risks can lead to substantial property damage, higher repair and maintenance costs, and increased operating costs due to the need for new cooling solutions for buildings and higher water prices. To effectively gauge the impact of climate change on these assets, precise location data is vital. This granular data helps pinpoint at-risk assets, enabling better risk management and strategic planning. This note focuses on analyzing climate risks for banks, but additional work could be conducted in the future to analyze the impact of climate change on pension funds and insurers.

Based on the survey response from nine banking sector institutions, the figures provided below offer an initial visualization of the self-reported spatial distribution of bank credit, segmented by the type of banking institution. Out of the nine banks that contributed data, the composition was varied, including one NBFI (Figure 14), one microfinance entity (Figure 15), and seven commercial banks (Figure 16). Among the commercial banks, two did not submit spatially disaggregated credit data, which is consequently absent from the maps. While these maps serve as a preliminary step in understanding credit distribution patterns, they should be interpreted with caution. The data is self-reported and may not always represent the actual location of the asset.[61] The data has also undergone analysis to achieve a standardized format across submissions. As more banks begin to collect and report their data, these maps should be further refined, enhancing the accuracy and utility of the spatial distribution insights they provide.

According to the survey results, Dar es Salaam accounts for the largest proportion of banking credit. The data indicates a significant centralization of credit in Dar es Salaam among various banking institutions in Tanzania. The surveyed NBFI reported that a vast majority, about 94 percent, of its credit is concentrated in the coastal areas, including Dar es Salaam and Zanzibar. In the case of the surveyed microfinance bank, the trend is somewhat similar but less pronounced, with Dar es Salaam holding nearly half (48 percent) of its credit portfolio. Commercial banks, which are the most extensive class of banking institutions in Tanzania, distribute credit across the country but disproportionately favor Dar es Salaam, where nearly 40 percent of their total credit is allocated. Other regions, including Arusha, Mwanza, Morogoro, the coastal region of Pwani, and Dodoma, each receive a smaller share of the total credit, ranging from 3 to 7 percent.

The high level of credit concentration in Dar es Salaam could be a cause for concern, considering the city's high susceptibility to climate-related disasters.[62] The city is already feeling the impacts of climate-related shocks. For example, in 2019, the city experienced nine significant flood incidents that led to the displacement of 1,215 families, destruction of infrastructure, and the loss of 1,560 homes, while also heightening the risk of waterborne diseases and livelihood loss. Despite the typical association of extensive flooding with the long rainy season from March to May, unexpected heavy rainfall on October 13, 2020, resulted in a severe flood that claimed at least 12 lives, swamped 800 homes, and caused 107 homes to collapse due to riverbank erosion. Future climate predictions for Dar es Salaam suggest an increase in average rainfall of up to 6 percent by the year 2100 during the prolonged rainy period. As one of the

60 Bank of Tanzania, "Tanzania Financial Stability Report," 2023.

61 The physical location of the asset could be different from the location of the borrower. For example, a company headquartered in the capital could take a loan to finance a production unit in a region.

62 World Bank, "Dar es Salaam Metropolitan Development Project—Msimbazi Basin Development (P169425): Project Appraisal Document (PID)," 2022.

largest coastal cities in Africa, Dar es Salaam faces a significant threat from sea-level rise. Without proper adaptation measures, a 20-centimeter rise in sea level could amplify the average annual flood losses in the city by 10 times, soaring from US$62 million to an estimated US$624 million. The city's infrastructure is particularly vulnerable as its two major traffic arteries and the first bus rapid transit corridor—which serves around 100,000 commuters daily—traverse the primary floodplain and are frequently shut down due to flooding.

Figure 14: Geographical credit distribution of select NBFI in Tanzania

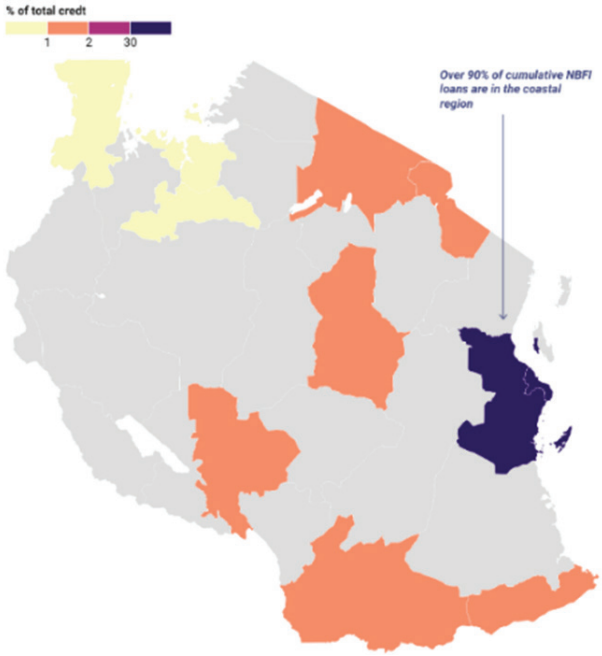


Figure 15: Geographical credit distribution of select microfinance bank in Tanzania

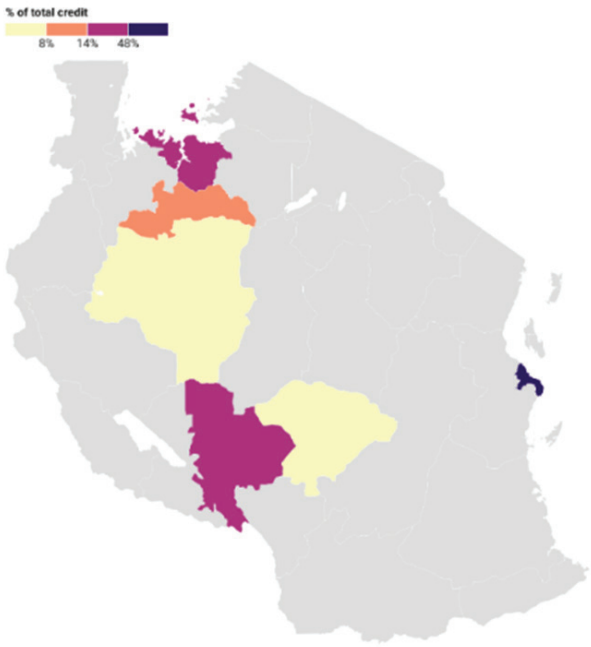
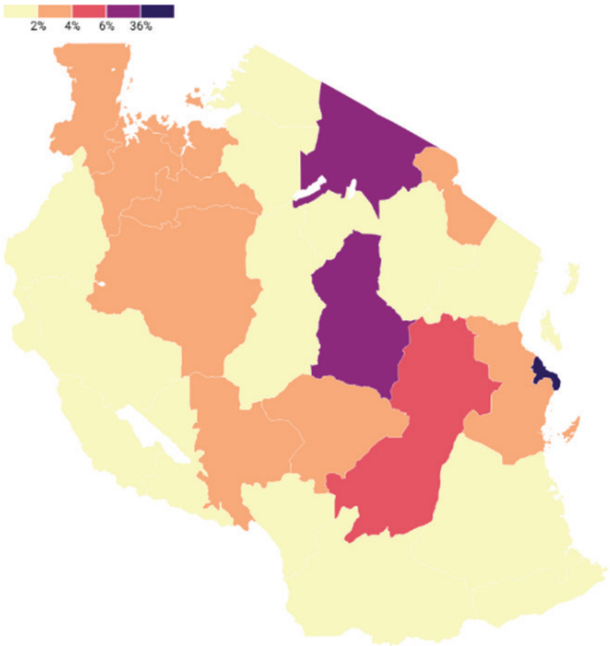


Figure 16: Geographical credit distribution of select commercial banks in Tanzania



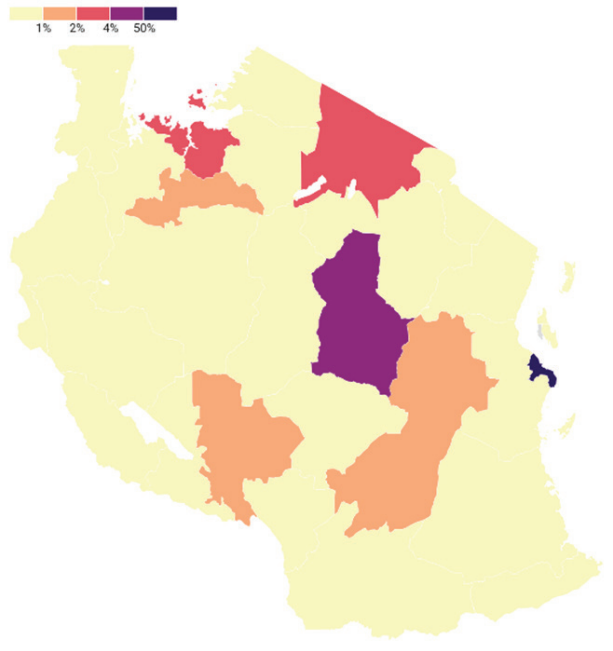
Source: Authors based on data from Tanzania Bankers Association.

Box 5: Analyzing the geographical distribution of mortgage credit in Tanzania

Mortgage lenders, loan servicing companies, and regulatory bodies are becoming more cognizant of the credit risks that climate change induced extreme weather events pose. Historically, loss models have focused on two primary factors of mortgage credit risk: the borrower's profile—including their credit history, debt levels, property, and type of loan—and the fluctuations of the economic cycle.[63] However, the advent of extreme weather due to climate change is emerging as a third factor of mortgage credit risk. Events such as hurricanes, wildfires, and floods can interrupt the cash flow of households, thereby increasing the chances that homeowners will default on their mortgage payments. Furthermore, depending on where the property is located, the destructive nature of these weather events such as floods can lead to a decrease in property values. Homeowners may lack the financial motivation to continue mortgage payments on a home that has been significantly damaged or destroyed. Moreover, lenders are vigilant about property values because a decline can diminish their recovery from selling repossessed properties after a default.

Mortgage financing is concentrated in Dar es Salaam, which as noted, is highly vulnerable to climate risks. BOT reports that nearly 80 percent of refinanced mortgages are in the Dar es Salaam area.[64] Survey data provided by four banks further reinforce the trend that the banking sector is geographically concentrated (Figure 17), with over 80 percent of mortgage credit portfolio from the four sampled banks concentrated in Dar es Salaam, followed by 5 percent in Dodoma.[65] The high concentration of mortgage loans in these areas is not unexpected, given their urbanized nature and the greater availability of financial services. As noted in the previous paragraph, Dar es Salaam could be vulnerable to climate shocks, such as flooding and coastal erosion. Research suggests that some lenders are adjusting to rising sea levels by increasing interest rates or demanding larger down payments, and there is a risk of offloading flood risk to government-backed entities, potentially leading to higher loan guarantee fees and stricter insurance requirements.[66] These changes could restrict credit and devalue high-risk properties, harming homeowners but also potentially trapping low-income residents in vulnerable zones. Policymakers should continue to navigate the delicate balance between homeownership access and climate risk, ensuring community voices guide regulatory responses.

Figure 17: Spatial distribution of self-reported mortgage credit



Source: Authors based on banking survey; graph boundaries by Datawrapper

63 Moody's Analytics, "Climate Impact on Mortgage Credit Losses–A Portfolio Example," 2023.

64 Bank of Tanzania, "Tanzania Mortgage Market Update—30 September 2023," 2023.

65 Based on the survey response, it has been observed that only four institutions maintain and record geographic distribution data for their mortgage loans. These four banks account for 44 percent of the mortgage market in 2023. The remaining five banks have presented survey responses that are either blank or explicitly indicate a lack of data collection in this area, or they have indicated that they do not distribute mortgage loans. It is important to note that this is a sample of the banking sector, representing only four banks. Consequently, the analysis provided here is preliminary and should be refined and expanded as more comprehensive data becomes available.

66 Jesse Gourevitch,"What Climate-related Financial Risk Means for Communities: Part 2—Housing & Mortgage Markets," Environmental Defense Fund, February 7, 2024.

For a comprehensive assessment of physical risks in Tanzania by geography, more detailed data modeling and analysis of critical transmission channels and indirect impacts would be necessary. Key data gaps need to be addressed to obtain precise estimates of the effects of climate-related physical risks in the financial sector. For example, while some literature exists, there are no regular modeling assessments that map the socioeconomic impacts of climate physical risk for different subregions within Tanzania. The analysis is further constrained by the lack of granular mapping of the geographical location of credit (including details on the location of the asset, not just the location of the headquarters, as well as associated sectors). Over time, these data gaps could be addressed to further refine the analysis of climate risks for the banking sector.

Exposure to climate transition risks

Overall, banks' exposure to climate transition risk may be manageable in the short run due to the country's small GHG emission profile. However, some banks could still be vulnerable to transition risks if they are lending to carbon-intensive sectors that are slow to respond to growing regulatory, consumer, and investor pressures to reduce emissions. As noted in Figure 13, some banks have relatively high exposure to agriculture, fishing, and forestry sectors (at 16 percent of their credit portfolio). Agriculture and forestry represent the lion's share of GHG emissions in Tanzania (Section 1.2, Figure 5), and could therefore be impacted if the country introduces increasingly stringent climate regulations. Furthermore, banks may face the risk of loan defaults from carbon-intensive businesses in the trade and manufacturing sectors, if these companies are unable to effectively green their supply chains and fail to respond to increasing consumer and investor demand for more environmentally sustainable products. Some banks' exposure to manufacturing is high, standing at 26 percent of overall credit exposure (Figure 13). More granular data is needed, however, to better understand the carbon footprint of these businesses that banks are exposed to. Another example is banks' exposure to oil, natural gas, and coal industries. As noted in section 1.2, Tanzania has vast deposits of one of the world's best-grade coal, which could increase risks of stranded assets if the country faces more stringent climate regulations that require it to phase out coal. Banks' exposure to fossil fuel companies is unknown so it is difficult to analyze the extent to which banks are exposed to these transition risks. In addition, increasingly stringent international climate regulations could also directly impact banks. For example, banks with higher exposure to goods that are subject to the EU CBAM and the EU deforestation regulation (e.g., coffee) may be more vulnerable to international transition risks compared to banks with lower exposure to these goods. More detailed data on supply chains, carbon footprint, and credit exposure is needed, however, to understand banks' exposure to these risks.[67]

Box 6: Illustrative example of how banks could analyze climate-related operational risks

Operational risk is defined in the Basel Capital Framework as the "risk of loss resulting from inadequate or failed internal processes, people and systems or from external events."[67] Climate-related hazards could lead to operational risks for banks in several ways. For example, climate-related hazards such as floods could disrupt transportation facilities and telecommunication infrastructures, thereby indirectly affecting banks' operational ability. Corporates and banks may also be exposed to legal and regulatory compliance risks associated with climate-sensitive investments and businesses. Overall, there are limited studies around banks' climate-related operational risk since publicly available information on the topic is scarce. Even though the focus of this note's analysis is on the impact of climate change on credit risks, this box provides an illustrative example of how climate risks could also lead to operational risks for banks in Tanzania.

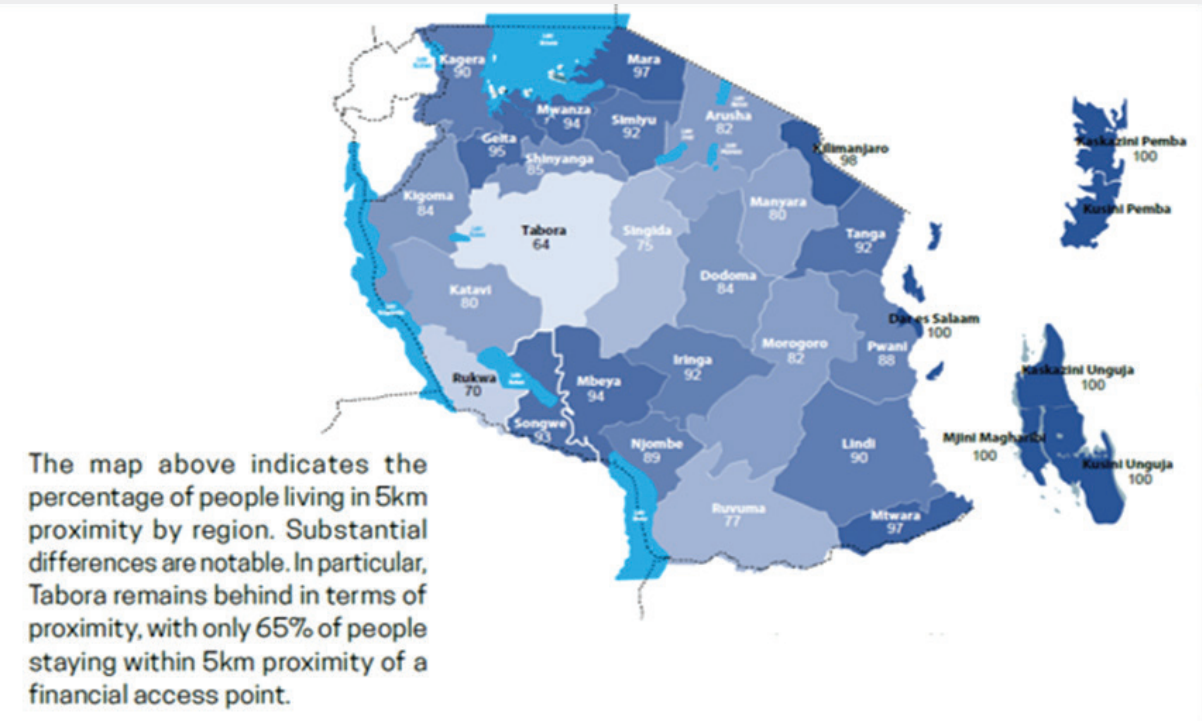
Bank branch locations in Tanzania, like many other structures, are susceptible to the physical risks associated with climate change. For example, flooding can damage the physical infrastructure of bank

67 Basel Committee on Banking Supervision (BCBS), "Climate-related Risk Drivers and Their Transmission Channels," 2021.

Box 6: Contd...

branches, and cause liquidity shock through extensive withdrawals and repayment delinquencies, asset quality deterioration, and managerial problems driven by operational risks. Additionally, the overall increase in temperatures can lead to higher operational costs, for example, due to the need for additional cooling. A map of financial access points provided by Finscope suggests that Hanang district in Manyara, Mwanza, Lindi, and Morogoro are all regions with high distribution of financial access points (Figure 18).[68] These regions are located in areas that are also highly vulnerable to flood risks. It should be noted, however, that this representation is intended merely as an illustrative example of the type of analysis that can be conducted on the operational risks faced by banks, underscoring the necessity for more granular data to draw definitive conclusions.

Figure 18: High-risk flood areas also have a high presence of financial access points in Tanzania



Source: Finscope Tanzania 2023.

2.2 Overview of the current banking sector response to climate risks

Stakeholder consultations and a survey analysis, facilitated by TBA, were carried out to better understand Tanzanian banks' climate risk management practices. This section provides the main findings on the Tanzania banking sector's approach to climate risk across the following areas: strategy, governance, and capacity building; risk identification and management; and climate-related risk disclosure. The section below provides preliminary insights based on the survey results from the same nine banks (Figure 19). It should be noted that this survey represents a snapshot in time and should be updated over time to track banks' progress with climate risk management practices. The survey results should also be interpreted with caution because the data is self-reported by banks and has not been validated.

68 FSDTanzania, "Finscope Tanzania," 2023.

Strategy, governance, and capacity building

Almost all banks that responded to the survey acknowledge that climate change presents both risks and opportunities for banks. While most banks—78 percent—are beginning to develop strategies to manage climate financial risks and promote green finance, only 44 percent of surveyed banks indicated that they are familiar with the BCBS principles for effective management and supervision of climate-related financial risks. This indicates a gap between recognizing the importance of climate risks at a high level and fully incorporating climate risks into banks' risk management practices.

Most banks are still in the early stages of evaluating the impact of climate risks, but steps have been taken to integrate climate risks into banks' broader governance frameworks. On the survey, 78 percent of banks reported that they have board responsibility for climate-related risks, and 78 percent of banks have long term strategies that incorporate climate financial considerations. This indicates a positive trend, with commitment to climate risk management at the highest level of governance. Some banks have also established committees to inform the board about climate risks. These committees can take various forms, such as dedicated risk and compliance committees with expanded mandates to include climate risks. Larger banks also have dedicated units undertaking broader climate-related mandates such as environmental and social risk management by the credit department, and a broader sustainability agenda overseen by an investors' relations department, overall bolstering the monitoring and evaluation of climate risks by the bank. The variation in committee structures likely reflects the different stages of maturity in climate risk management across banks.

A third of the banks surveyed have dedicated full-time equivalent staff to address climate-related financial risks and green finance. This commitment indicates a positive shift towards integrating climate change considerations into core business strategies. Additionally, over half of the banks are actively promoting good practices, such as conducting awareness campaigns and capacity-building events, which are crucial for fostering a culture of sustainability within the banking sector.

Risk management

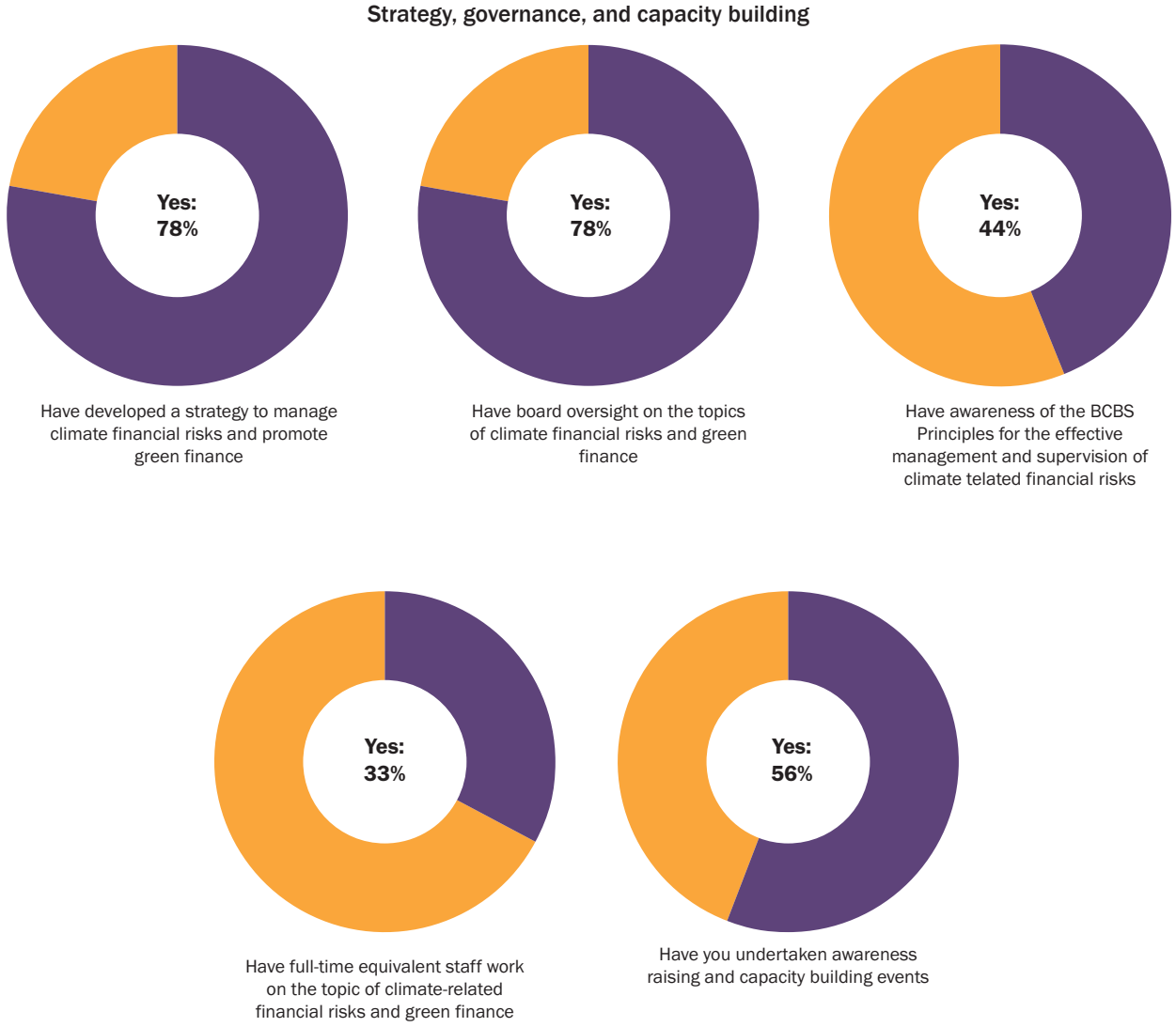
Many banks have started integrating climate change into their risk management framework. A significant number of banks (78 percent of surveyed banks) reported beginning to incorporate climate change considerations into their risk management frameworks. This result was somewhat surprising since only 44 percent of surveyed banks reported being familiar with BCBS climate risk principles. Also, even though banks reported having incorporated climate risk management framework, only a minority have established specific objectives, instruments, or benchmarks to gauge these risks effectively. The full integration of climate considerations into risk management practices is hindered by several challenges: the unpredictable and potentially severe long-term effects of climate change; a shortage of specialized knowledge in this area; and the overarching need for additional resources to support these initiatives. Furthermore, even though BOT has already developed climate risk supervisory guidelines for banks, banks noted that the absence of uniform tools, data, and metrics have led to significant diversity in banks' approach in evaluating and managing climate risks.

44 percent of the banks surveyed have conducted a climate risk analysis. However, banks reported that these analyses are often high-level, and data limitation was identified as one of the key challenges, especially in terms of granularity. Other challenges include the need for standardized and approved methodologies to assess and manage climate risks.

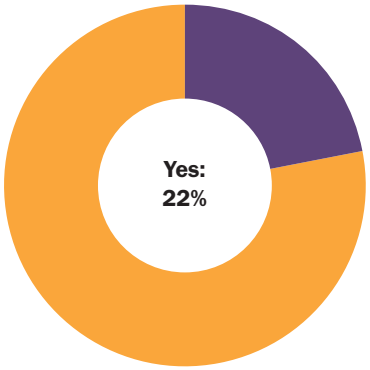
Disclosure and reporting

The progress on climate risk financial disclosure among banks is still in the nascent stages. Only 22 percent of banks have made internal or public disclosures regarding climate risks, indicating a significant gap in transparency and information availability. This figure underscores the varying degrees of maturity and commitment to climate-related financial disclosure and reporting among Tanzania's banking institutions, with a clear need for enhanced efforts and standardization in this area.

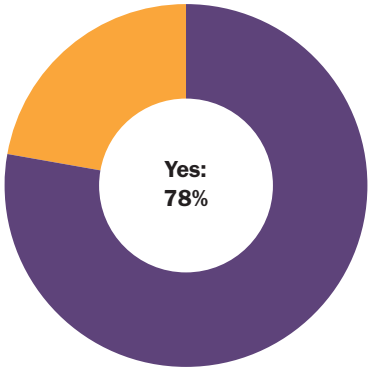
Figure 19: Banks in Tanzania are in various stages of integrating climate financial risks into their operations



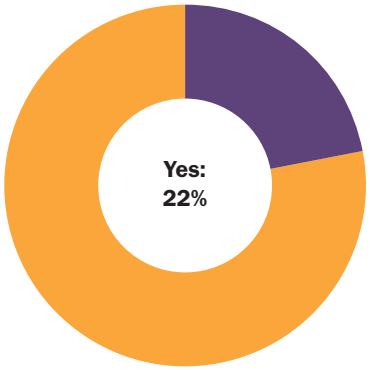
Risk management



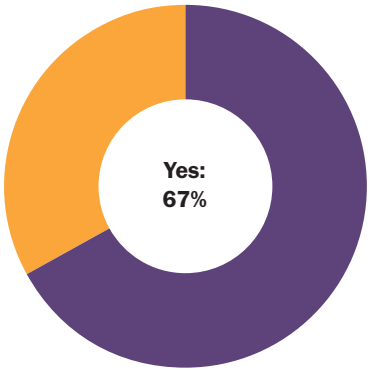
Have climate requirements in loan origination



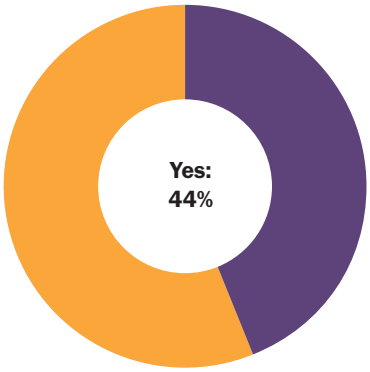
Have integrated climate-related firancial risk in risk management frameworks



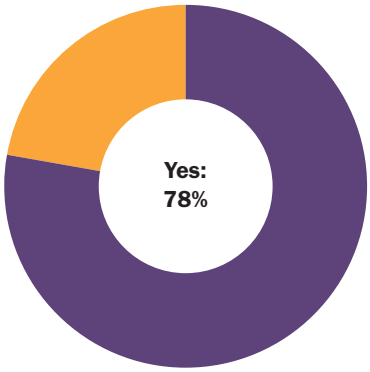
Excludes financing of non-climate friendly projects



Have assessed the implact of climate risks on its portfolio

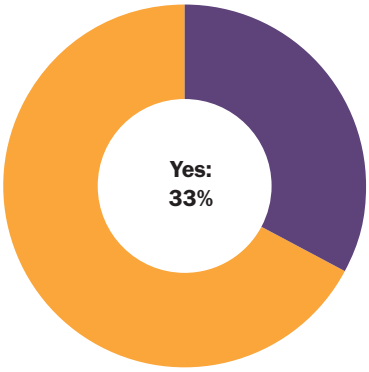


Conducted scenario analysis or stress testing to assess climate risk

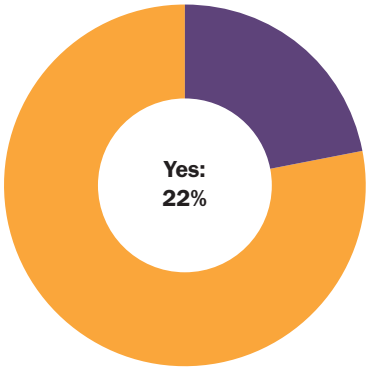


Long term strategy incorporates climate financial risk considerations

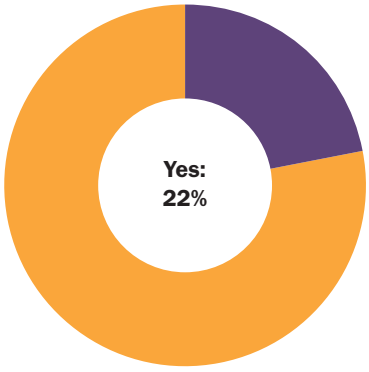
Disclosure and reporting



Track green/climate finance volumes across its activities



Use a classification system to tag/identify green projects and activities



Report on climate-related risk and opportunities

Source: Authors based on data from Tanzania Bankers Association.

2.3 Policy recommendations for assessing and managing climate-related financial risk

BOT, in its role as the banking regulator, is taking an increasingly active role in managing climate-related risks. In 2022, BOT released its guidelines on climate-related financial risks management. The guidelines aim to address the potential risks arising from climate change (including physical and transition risks) and efforts to mitigate it. To this end, BOT emphasizes the importance of incorporating sound governance and risk management frameworks within banks and financial institutions to better understand, identify, assess, monitor, and mitigate these risks. The guidelines are also aligned with the BCBS Principles for Effective Management and Supervision of Climate-Related Financial Risks.[69] Building on these efforts, this section highlights ways in which BOT could further support climate risk management for banks.

Governance, strategy, and capacity building

The BOT Board of Directors could continue to develop the governance framework around climate risk and green finance. BOT could appoint board and senior management representatives to be responsible for tracking and making strategic decisions around climate risk and green finance. BOT could also establish a cross-organizational working group to bring together relevant departments such as financial stability, financial deepening and inclusion, and financial sector supervision to discuss and agree on key action items related to climate risk management with clear reporting lines to the responsible board members. Over time, and as the topic is better integrated in its operations, BOT could consider a more permanent solution, including a dedicated unit to cover and coordinate climate and broader sustainable finance issues across units.[70]

Given the nascency, complexity, and cross-cutting nature of climate risk management, capacity building should be prioritized in the short run to build BOT and bank expertise on the topic. As shown in section 2.1, analyzing and managing climate risks for banks could be a resource intensive process, considering the complex interlinkages between climate, economic, and financial transmission channels. One of the short-term priorities should therefore be to scale capacity building and training for financial authorities and financial institutions to build their expertise on climate risks. This could be supported by dedicated capacity building programs and training seminars organized by BOT with the support of development partners such as the World Bank. It could also involve joining international initiatives such the International Finance Corporation (IFC) Sustainable Finance and Banking Network. The survey responses highlight banks' strong desire for more comprehensive guidance and assistance in areas such as scenario analysis, stress testing, governance, risk management, and disclosure processes. To bolster their climate risk analysis capabilities, banks are also requesting more accessible data, proxies, tools, and case studies.

As BOT builds capacity and expertise on climate risks, BOT could develop an institutional strategy to prioritize internal actions, coordinate their implementation, and signal authorities' commitment to the agenda. To ensure accountability, the strategy should be endorsed by the respective board and senior management and include details on, for example (a) how climate risks would be integrated into supervisory frameworks, risk assessments, reporting and disclosure, capacity building etc.; (b) the internal organization and governance structure for managing climate risks; and (c) expected resources to be allocated to address climate risks. It may also be relevant to include a set of actions related to the broader role authorities can play in greening the financial sector, including its catalyzing role in supporting the financing of climate actions (see section 3.3). Learnings on the development of a climate strategy can be drawn from the work of the NGFS

69 The Basel Committee on Banking Supervision (BCBS), which is the standard setting body for banks, also launched climate risk principles in 2022, which mark the global baseline for improving banks' risk management and supervisors' practices in this area.

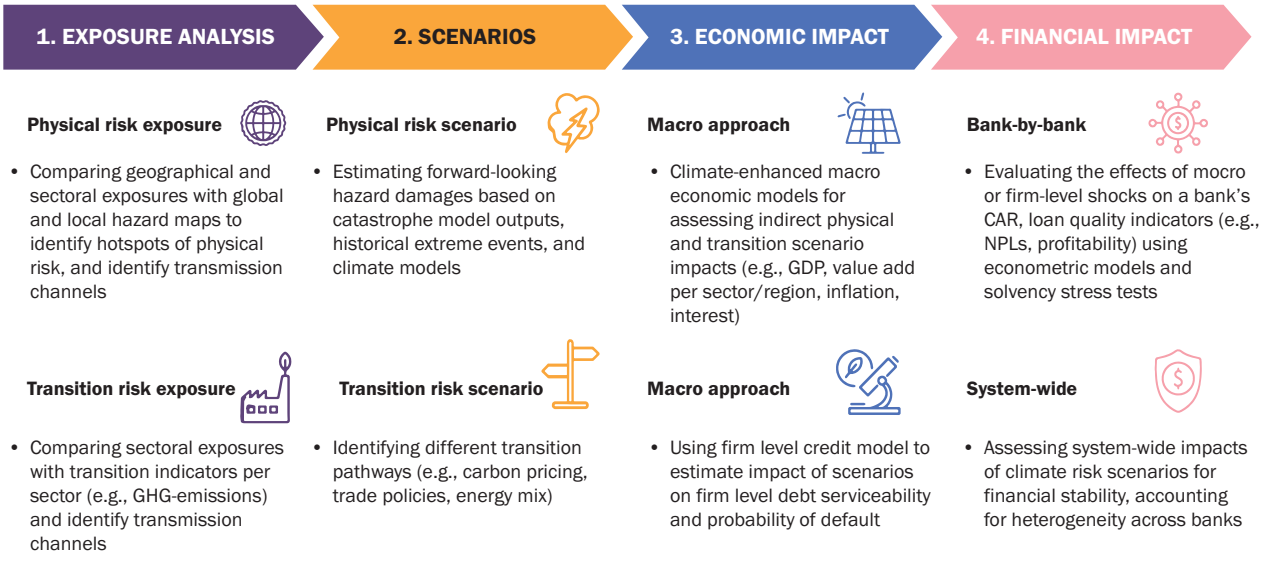
70 The Bank of England, European Central Bank, and Bank of Bangladesh are examples of institutions that have dedicated unit in place. Some of the key learnings from these examples include the importance of having a hub close to the board, better coordinating across units, and ensuring sufficient capacity, while having focal points in the various units.

and country examples (e.g., Central Bank of Jordan).[71] The strategy should also consider a phased approach, given potential limitations around resources and capacity. For example, BOT could prioritize assessing and managing sectors, regions, and banks that may have the highest level of climate-related financial risks (e.g., managing banks' climate-related risks in coastal regions such as Dar es Salaam or banks' exposure to climate risks related to the agriculture sector).

Climate risk analysis and monitoring

BOT could conduct a climate scenario analysis and develop modeling capacity to perform in-depth stress tests over time. A climate risk analysis is critical to informing the supervisory response to climate risks and supporting broader capacity building for banks. As a starting point, BOT could conduct an exposure analysis, building on the findings from section 2.1. This exposure analysis could target key risks identified in this note. For example, it could focus on a more granular analysis of banks' exposure to climate risks related to the agriculture sector, or climate risks in Dar es Salaam. Based on the exposure analysis, BOT could also engage with experts to develop climate scenarios to further analyze future climate impacts on banks. Informed by the CCDR, this may include scenarios that assess the impacts of climate change on flood and drought risks, which are the most prominent climate-related natural disasters in the country. Other scenarios could delve deeper into the interlinkages between climate risks and nature risks, given the economy's strong reliance on natural assets such as coral reefs, fisheries, and forests. Since the topic of nature-related financial risk is less established compared to climate risks, it will be important to draw from other countries' experience with such analysis and build on global guidance on the topic.[72] In the long run, BOT could develop and include climate physical risk metrics in macro-modeling capacity to generate relevant shock parameters that could be used in a climate risk stress test. Figure 20 provides an overview of the different approaches to analyzing climate-related financial risks, each with varying levels of complexity and data needs.

Figure 20: Overview of climate risk assessment approaches



Source: World Bank (2024)

71 World Bank, "Jordan: Empowering Climate Action in the Financial Sector,"2024.

72 For example, Network for Greening the Financial System has established a taskforce and conceptual framework for analyzing nature-related financial risks. Malaysia is also the first country in the world to conduct a nature-related financial risk analysis. World Bank, "An Exploration of Nature-related Financial Risks in Malaysia," 2022.

BOT should address critical data gaps for climate risk modeling. Data gaps have been identified as one of the key barriers to climate risk analyses for banks in the survey. In terms of financial data, the collection of geographical breakdowns (ideally also per sector) of loan exposures will be critical, and BOT is already in the process of creating a system that will permit the collection of data on credit distribution by region. A more granular sectoral breakdown is equally important. Banks could also request additional climate information from clients in vulnerable sectors to understand the extent to which the project is equipped to respond to climate physical risks and transition risks (e.g., by asking for information on the company's carbon footprint and climate adaptation and resilience measures). At the same time, sectoral and environmental authorities could help collect climate-related data that is critical for climate risk assessments. For example, authorities could collect additional information on the level of coastal protection in critical areas, such as Dar Es Salaam, where bank credit and operational activities are particularly high. Environmental agencies could also improve information from natural catastrophe models to inform the development of physical risk scenarios and estimations of historical and projected damages from key climate events. Over time, BOT could consider making relevant metrics for climate risk analysis publicly available so they can be used by banks in their risk assessment. Learnings can be drawn from the Malaysia climate data catalogue, which has recently launched an experimental set of climate risk and sustainable finance indicators.[73] In line with these recommendations, the International Monetary Fund (IMF) Resilience and Sustainability Facility has, with World Bank technical assistance, already kickstarted support to the BOT to create a repository of climate-related data for assessments of climate risks.[74]

Climate risk supervision

The BOT issued the Guidelines on Climate-Related Financial Risks Management in 2022. Since then, the BOT has been following up with banks and providing them with training to help them implement the guidelines. The guidelines form part of BOT's strategy to strengthen financial resilience which has also included joining the NGFS in September 2022. Beyond climate risk management, BOT is also helping banks transition to Basel III based on the BCBS Core Principles for Effective Banking Supervision. This has enabled BOT to prescribe an additional capital buffer and to define a framework for liquidity standards and leverage ratio.

BOT could assess banks' compliance with the climate risk supervisory guidelines laid out for them. BOT could conduct surveys and consultations with banks to understand the extent to which banks are implementing BOT's supervisory guidelines on climate risks. As highlighted in section 2.2, banks' understanding and management of climate risks are relatively nascent, so such analysis could be helpful in assessing key gaps in expertise and capacity building needs for banks. Notably, the survey results indicates that only 44 percent of banks were aware of the BCBS climate risk principles, even though BOT issued the climate risk guidelines in 2022. This discrepancy suggests potential implementation challenges and points to the need for more awareness raising and capacity building for banks. As part of this analysis, BOT could also analyze the potential unintended impacts of climate risk management on financial inclusion (Box 7).

In the long run, BOT could further integrate climate risk in the supervisory tools and methodologies for banks. As initial steps on climate risk analysis have not yet been enacted, integration of climate risk in supervisory monitoring and mitigation may be premature. Nonetheless, as practices and capacity develop, BOT should consider integrating these aspects in its on- and off-site supervision. This may initially include monitoring the actual implementation of climate risk supervisory guidelines. At a later stage, integration in the country's CAMELS[75] supervisory rating system may be appropriate.

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73 Joint Committee on Climate Change, "JC3 Climate Data Catalogue," last updated October 2023.

74 International Monetary Fund, "Country Report No. 2024/187."

75 Details of BOT's supervisory methodology and tools are provided here.

Table 2: Summary of policy recommendations for climate-related financial risk management

Policy action	Lead entity	Suggested timeline
Governance framework for climate risk management	BOT	NT
Climate risk institutional strategy	BOT	ST
Capacity building for banks and BOT on climate risk	BOT	NT
Climate and nature risk exposure analysis	BOT	ST
Climate and nature risk scenario analysis and modeling	BOT	MT
Climate risk supervisory tools and methodologies	BOT	MT

Note: NT (near term) = less than 1 year, ST (short term) = 1–3 years, MT (medium term) = 3 –5 years.

Box 7: Managing unintended consequences of climate risk management on financial exclusion

Marginalized segments of the economy, including low-income households, rural households, women, and MSMEs are typically more vulnerable to climate physical and transition risks. Many MSMEs work in sectors (e.g., agriculture) and geographical areas that are highly exposed to the effects of climate impacts and have less resources and capacity to respond to these climate shocks. MSMEs could also be vulnerable to transition risks because, compared to larger firms, MSMEs have less capacity to mobilize the required financing for investments in low-carbon and environmentally sustainable technologies and practices.

Enhancing banks' climate risk management, while well intentioned and important for managing banking sector stability, could have unintended consequences on financial exclusion. For example, in terms of managing operational risks, banks already have a limited number of branch locations in rural or remote areas in Tanzania (as shown in Box 5). Banks may be further disincentivized to establish branches in these locations due to elevated climate shocks. This would further compound the challenges faced by these communities, as they would need to travel long distances to access financial services. Furthermore, managing climate-related credit risks could further reduce MSMEs' access to financing, particularly in sectors that are considered highly vulnerable to climate change (e.g., smallholder farmers). A study found that only 3 percent of agricultural households in Tanzania have access to formal credit due to barriers such as low financial literacy, high collateral requirements, unfavorable interest rates, and complex application procedures.16 This creates a vicious cycle, whereby the lack of access to formal credit reduces farmers' ability to respond to climate shocks, and these farmers' increased vulnerability to climate shocks could further lessen banks' willingness to provide credit to them.

The impact of policy measures to improve climate financial risk management on financial exclusion therefore needs to be carefully assessed and managed. For example, climate risk disclosure and reporting requirements could be overly burdensome for MSMEs. Enhanced climate risk management by banks could also steer bank lending away from MSMEs in vulnerable sectors, who are typically more exposed to climate physical and transition risks. Several policy measures could be considered to respond to these potential challenges. For example, targeted training and support could be provided to MSMEs on climate risk disclosure requirements so these firms could build their capacity over time. Capacity building could also be offered to help MSMEs develop monitoring and due diligence capabilities for climate risk management. 17 If appropriate, authorities could enhance access to risk mitigation mechanisms for MSMEs that are vulnerable to climate risks (e.g., loan guarantees, digital financial services). Section 3.3 further discusses possible financial instruments that could be developed to improve MSMEs' access to climate finance.

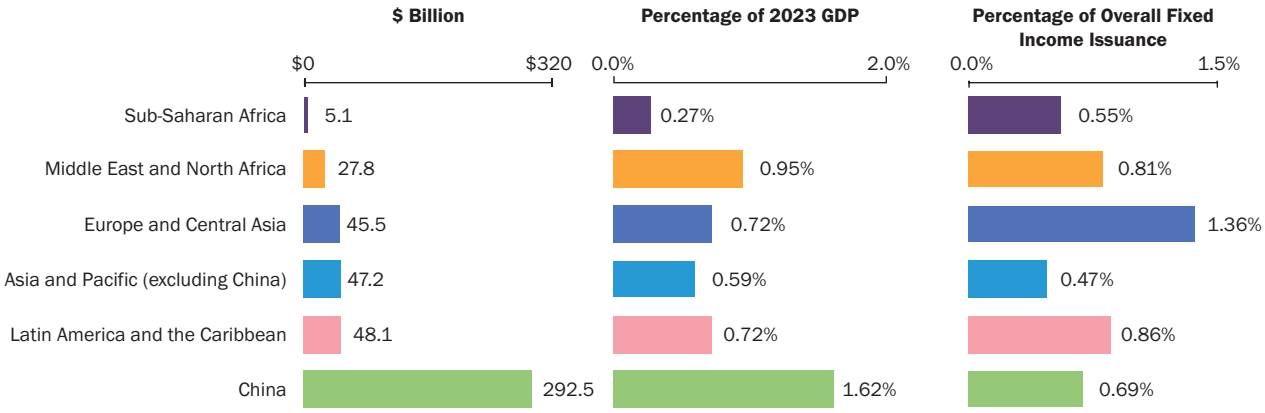
76 World Bank, "The Agribusiness Innovation Center of Tanzania," 2011; Isaga, "Access to Bank Credit by Smallholder Farmers in Tanzania: A Case Study," 2018.

77 World Bank, "Climate Risk and Financial Inclusion: A Regulatory Perspective on Risks and Opportunities," 2023.

3. Identifying Opportunities to Scale Green Finance

Green finance markets, which leverage an array of financial mechanisms (e.g., credit, bond, equity, insurance) to stimulate finance for green projects, are gaining popularity among financial institutions globally**.** For instance, according to the World Bank, the cumulative amount of green, social, sustainable and sustainability-linked bonds issued in the market reached US$4.9 trillion in 2024. Total issuance in 2023 breached US$1 trillion, marking a reversal from the lower volumes seen in 2022.[78] Despite the growing interest in these bonds globally, a recent IFC report notes Sub-Saharan Africa has the lowest levels of green bond issuance among all regions (Figure 21).[79]

Figure 21: Green bond issuances in emerging markets 2021–2023 (cumulative)



Source: IFC (2024), data source: Bloomberg, CBI, Environmental Finance, IFC.

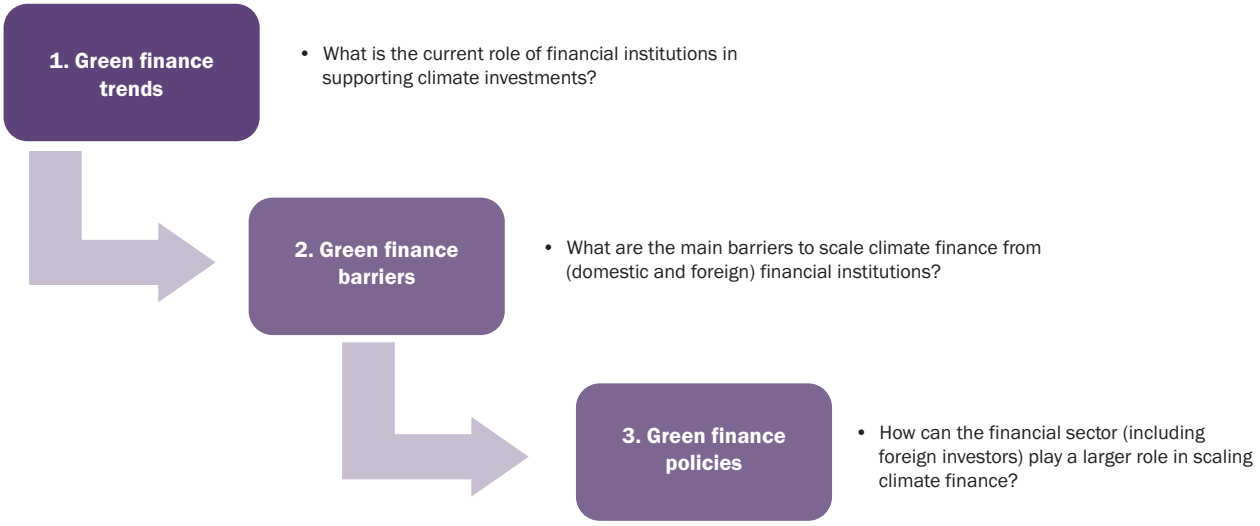
Financial institutions could step up to meet Tanzania's significant financing needs for climate action, given the limited amount of public and concessional finance available. The CCDR identifies various industries and sectors that are critical to the climate agenda in Tanzania. For example, the CCDR emphasizes the need to support conservation and management of natural forest habitats; promote ecotourism; invest in clean cooking infrastructure; improve farming methods to boost productivity and strengthen climate resilience; promote low-carbon transport modes; improve the climate resilience of planned infrastructure; expand renewable energy investments; and improve waste management in cities. According to the Government of Tanzania, the financing required to meet the country's climate needs is substantial—the estimated total budget for NDC implementation is approximately US$19.23 billion. Data constraints limit the ability to assign financing needs for specific sectors or estimate current spending on climate action. Nonetheless, even with an imperfect picture of the climate finance landscape, the CCDR estimates that the financing gap is likely more than US$12 billion, representing a significant share (89 percent) of the 2023 GDP. The CCDR also estimated that the private sector's contribution to climate finance is scarce. Over 93 percent of climate finance in 2022 was mapped to the public sector, although this may be partially because Tanzania does not have a green taxonomy, making it difficult to track green finance amounts provided by the private sector.

Against this backdrop, this section aims to analyze ways in which financial markets (both domestic and international) can be scaled to mobilize the capital required to achieve Tanzania's climate goals. The analysis is centered around three key research questions: (i) What is the current role of financial markets in supporting climate investments? (ii) What are the main barriers for financial institutions to scale climate finance? (iii) What policies and actions could address key barriers and stimulate climate finance? (Figure 22).

78 World Bank, "Green, Social, Sustainability and Sustainability-linked (GSSS) Bonds—Market Update—January 2024," 2024.
79 International Finance Corporation, "Emerging Market Green Bonds," 2024.

Since the financial sector in Tanzania is small, the policy actions considered are also aimed at mobilizing capital from international financial institutions towards climate action in Tanzania.

Figure 22: Scope of the climate finance analysis



Source: Authors.

3.1 Current role of the financial sector in supporting climate action

Tanzanian banks are increasingly a prominent source of domestic private finance for climate action. For instance, to support climate adaptation and resilience, NBC Bank made US$2.5 million available in 2022 for irrigation and livestock, and put in place insurance facilities for agriculture, fisheries, livestock, and food systems.[80] In 2023, CRDB, the largest commercial bank in the country by asset base, and the sole financial institution accredited to the GCF, received US$35mn to establish an adaptation credit facility to provide loans to farmers to acquire climate adaptation and resilience technologies.[81] Meanwhile, other banks, including the Agriculture Development Bank and NMB Bank are all seeking accreditation from GCF. In 2024, the Global Climate Partnership Fund partnered with CRDB Bank to provide a US$25 million facility to finance climate-positive businesses by enhancing energy efficiency and integrating climate-friendly technologies and practices.[82]

Most banks do not track the amount of climate finance they offer, which makes it difficult to analyze their overall contribution to climate finance. According to the survey response from the nine banks, a mere 22 percent of sampled banks reported employing a classification system to label green finance projects, and only 33 percent of surveyed banks actively monitor the volume of green finance across their operations. This ambiguity can lead to discrepancies in reporting, as evidenced by some banks' responses to the survey where they report their entire credit (for all sectors) as "green" credit, rather than tracking specific credit that is allocated for climate and environmentally friendly projects. This highlights the need for a standardized taxonomy that clearly delineates what constitutes green credit, ensuring that banks can track and report their contribution to green finance accurately and transparently.

In Tanzania, green finance markets (i.e., involving the use of financial instruments like bonds, equity, and insurance to support climate and environmental objectives) are still nascent, but there is growing

80 World Bank, "Tanzania Country Climate and Development Report," 2024.
81 CRDB, "Creating a Sustainable Future: Sustainability Report 2023."
82 Global Climate Partnership Fund, "GCPF and CRDB Bank Partner to Launch USD 25M Green Finance Initiative in Tanzania," 2024.

interest among banks and other entities to embrace these markets in the future. In 2023, CRDB Bank debuted its first green bond—the largest in Sub-Saharan Africa[83]—the "Kijani" Bond/Green Bond. Listed on the DSE and the London Stock Exchange, the bond offered a 10.25 percent interest rate and was met with enthusiasm, with the subscription rate reaching 429.55 percent, reflecting a significant pivot towards sustainability by this major financial institution. In March 2024, Tanga Urban Water Supply and Sanitation Authority issued a landmark 10-year green bond for TZS 53.12 billion (approximately US$21 million) to fund improvements in water infrastructure in Tanga City and surrounding areas. Financing garnered through the bond is projected to enhance access to safe and affordable clean water for roughly 6,000 new households or just over 26,000 people.[84] In the broader sustainable finance space, in 2022, NMB Bank also became the first financial institution in Sub-Saharan Africa to issue a gender bond "Jasiri" whose net proceeds of TZS 74.3 billion (approximately US$27.3mn) have gone on to bring financing to over 3,000 women-owned MSMEs in Tanzania.[85] While these developments are positive, the size of the GSSS bond market in Tanzania is still small. The green equity market is similarly underdeveloped, with no known ESG indexes or ESG funds in the country. In addition, insurance offerings to respond to climate-related shocks are limited. For example, Tanzania's agricultural insurance sales reached TZS 2.4 billion in 2022, only about 0.3 percent of the country's total insurance sales that year.[86] This is lower than its neighboring countries of Kenya and Uganda. The low penetration of insurance (mostly public sector) in agriculture may be attributed to the farmers' inability to afford insurance premiums and low financial literacy. Kagera and Kigoma, which are expected to face the highest crop production loss from droughts, are also some of the lesser-insured parts of the country.[87][88]

Box 8. Case study: CRDB's climate engagement[88]

CRDB, which is the largest commercial bank in Tanzania in terms of assets, has already made important strides to support the climate agenda. In 2021, CRDB Bank became the first commercial bank in Africa approved by GCF. Using GCF's concessional resources, the bank is launching three new financial products to improve the climate resilience of local agribusiness: (a) a dedicated credit line for climate adaptation technologies and practices; (b) a credit guarantee facility to expand access to new borrowers; and (c) a weather-indexed insurance product to help protect against losses from climate-related events. Several factors contributed to CRDB's successful engagement with GCF. For example, coordinating with the national designated authority and integrating environmental and social frameworks into the bank's operations were critical to compliance with the GCF's eligibility requirements. Having dedicated staff with strong climate expertise was also important.

In 2023, CRDB also issued a green bond in the amount of US$300 million, the first of its kind to be issued in Tanzania. The bond was cross listed at the London Stock Exchange and the Dar es Salaam Stock Exchange, and it was oversubscribed by more than 400 percent, with many domestic investors (including retail investors) participating in the transaction.

CRDB is also committed to expanding its green credit portfolio and has set targets to achieve a green asset ratio of 15 percent by 2030 and 30 percent by 2050, starting from their current baseline of 7 percent. In addition, CRDB has integrated environmental and social risk assessment into their credit process and appraisals, and it is conducting a climate-related financial risk assessment with the support of IFC.

83 CRDB, "CRDB Bank Hailed for Launching Kijani Bond with Unprecedented 10.25% Interest Rate: A Green Investment Opportunity for All," 2024.
84 UN Capital Development Fund, "Tanga UWASA Issues Historic Water Infrastructure Green Bond Valued at TZS 53.12 Billion," February 22, 2024.
85 NMB Bank, "NMB Jasiri Gender Bond Impact Report."
86 TIRA, "Annual Insurance Market Performance Report," 2023.
87 TIRA, "Annual Insurance Market Performance Report," 2023.
88 Based on consultations and CRDB, "Sustainability Report," 2023.

3.2 Barriers to climate finance from the financial sector

Financial markets can contribute toward Tanzania's climate objectives, but long-standing barriers must be removed for private capital to flow at the required scale. This section provides a high-level analysis of the key financial and nonfinancial barriers that limit the domestic financial sector's contribution to climate finance. Challenges that limit international investment flows to climate action are also considered.

Like many other developing countries, the business case for climate investments is not always clear due to perceived high levels of risk and the lack of data and track record for these investments. As an example, the benefits of adaptation could be difficult to monetize because they usually entail avoided impacts, and these climate risk impacts are insufficiently priced into investment models. In addition, climate projects that serve rural communities (e.g., solar home or micro-hydropower plants) and nature-based solutions (mangrove restoration) may not generate sufficient revenue to attract large-scale commercial investors. Renewable energy projects in the country could also face various infrastructural challenges (e.g., grid connection) that could impact their profitability. Currency risk is another key constraint when it comes to foreign green investments, since local borrowers are required to repay foreign debt finance on agreed terms in the foreign currency but revenues from green projects are often generated in the local currency. The lack of data and information further hampers investors' ability to make informed decisions around climate projects. For example, banks that were surveyed noted that the lack of a green taxonomy hinders their ability to identify "green" projects. There is also limited granular data and know-how on how to select and analyze green investment opportunities.

There is a lack of guidelines, technical assistance, and incentives for domestic banks to develop green or sustainability-linked loan products in the market. Some banks have shown strong interest in scaling GSSS loans. TBA has also taken steps to encourage banks to further engaging in green lending, including by developing the sustainable finance principles for Tanzania. Despite this interest, there are no known GSSS labeled loans issued in Tanzania, and surveyed banks have asked for additional guidance and technical assistance on how to stimulate these loan products. Survey responses also suggest that banks are concerned about greenwashing risks because issuing of these loan products is not transparent and the process is not standardized across commercial banks. Incentive mechanisms (e.g., credit guarantees) to reduce the risks of climate-related lending are also limited.

The corporate GSSS bond market has not been able to grow partly due to the small size of the domestic capital markets and the perceived cost and complexity of issuing such instruments. Tanzania's corporate bond market is very small, with only 11 corporate bonds issued to date in the DSE.[89] Since the local currency capital market is underdeveloped, it will likely only be able to play a marginal role in supporting Tanzania's climate agenda in the short and medium term. On the supply side, corporates may be reluctant to issue GSSS bonds because of perceived high structuring costs (e.g., in terms of reporting and verification) as well as limited technical assistance and guidelines, leading to confusion on the approval and authorization process with domestic financial regulators. The lack of a national green taxonomy could also reduce clarity on what projects can be tagged as green. In addition, a regional study conducted by Fitch suggests that use-of-proceeds bonds such as green bonds are challenged by issuers' inability to identify a pipeline of green projects. The research therefore suggests that African issuers generally prefer sustainability-linked debt instruments given their inherent flexibility in the use of proceeds.[90] On the demand side, the absorption capacity for GSSS bonds is also low because the domestic investor base is small and concentrated, with limited investments in the local capital market.[91] Furthermore, there is very low participation of foreign investors in the local capital market, due to the market's size, perceived investment risk, and limitations in the market infrastructure in terms of accessibility.

89 DSE, "Corporate Bond."

90 Sustainable Fitch, "Africa's Sustainable Finance Markets Face Scalability Challenges," March 2, 2023.

91 According to the Bank of Tanzania, 47.7 percent of insurance sector investments are in bank deposits, 30.7 percent in government securities, and 5 percent in real estate. More than half—53.5 percent—of social security investments are in government securities, 10.8 percent in real estate, and 8.2 percent as direct loans to the government. Bank of Tanzania, "Financial Stability Report," 2022.

3.3 Policy recommendations for stimulating green finance markets

Governance, strategy, and capacity building

Financial sector authorities, including MOF, BOT, NSSRA, TIRA, and CMSA, could develop a roadmap for greening the financial sector to identify policy priorities to stimulate green finance markets. Such a roadmap should closely align with strategic priorities for promoting financial inclusion. An inter-agency roadmap could be developed and published to set out actions and measures needed to ensure a coordinated approach to align Tanzania's financial sector with climate goals. The roadmap could also serve as guiding principles for authorities and industry associations to develop strategies, policies, and mechanisms within their mandates to contribute to the climate finance agenda. The roadmap could cover key pillars, such as managing climate risks, developing green finance markets, and ensuring market transparency. Since climate change will likely disproportionately affect marginalized segments of the economy such as women and MSMEs, the roadmap should place close consideration on how green finance could complement the country's financial inclusion agenda (e.g., as outlined in the National Financial Inclusion Framework, 2023–2028).[92] Box 7 further discusses the interlinkages between the green finance and financial inclusion agenda, building on the example of Jordan's green finance roadmap. Since the size of the financial sector is small, it would also be important for such a roadmap to cover actions that are needed to attract *foreign investors* towards green investments in Tanzania (e.g., this could include prioritizing actions to create the policy enabling environment, enhancing data and developing de-risking instruments targeted at foreign investors).

Box 9: Interlinkages between greening the financial sector and financial inclusion[93]

As noted, climate change and financial exclusion are closely interlinked because the most vulnerable groups of the population (e.g., low-income households and smallholder farmers), which are already at the margins of the financial system, are also those that are most vulnerable to climate risks such as coastal flooding and sea level rise. MSMEs need funding to increase their resilience to climate shocks and adopt low carbon technologies. However, they face much greater hurdles than larger firms in obtaining the needed financing for such investments through the formal financial system. A strategy that outlines the interlinkages between climate finance and financial inclusion is therefore valuable to identify synergies across the two agendas. The strategy should carefully consider policy priorities that could achieve both objectives of scaling climate finance and financial inclusion. For example, this could include ensuring climate reporting and disclosure requirements do not substantially raise the transaction costs for low-margin consumers such as MSMEs and rural households. MSME financing tools, such as credit guarantee schemes, could also be adjusted to serve climate purposes. BOT could also ensure that any new climate risk supervisory guidelines for banks are gradually phased in and consider making climate due diligence proportional to the loan size.

As an example, the Central Bank of Jordan issued its five-year Green Finance Strategy, which includes inclusive green finance as a key policy priority (Figure 23). The development of this strategy has revealed seven key lessons for other regulators: (1) the importance of embracing new areas, such as inclusive green finance; (2) the need to address the demand side through comprehensive national policies; (3) leveraging the green finance strategy as a robust policy signal; (4) recognizing the opportunity for regulators and supervisors to lead by example; (5) addressing data gaps for evidence-based greening of the financial sector; (6) emphasizing the importance of remaining flexible and adjusting along the way; and (7) identifying gradual implementation and proportionality as key principles for success.

92 National Council for Financial Inclusion, "National Financial Inclusion Framework (2023–2028)," 2023.

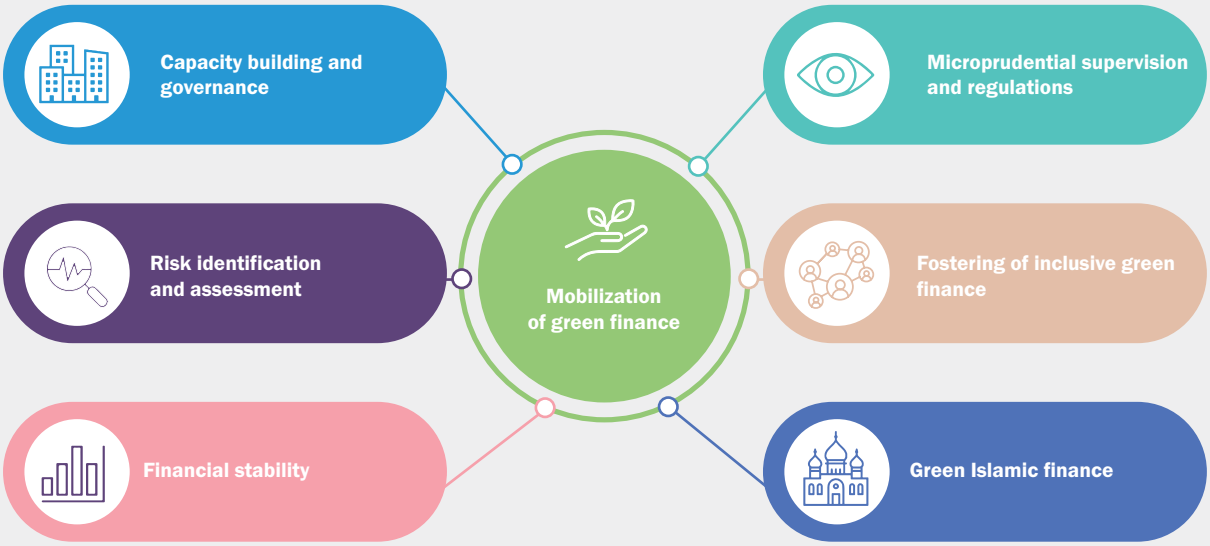
93 This box builds on World Bank, "Maldives Financial Sector Assessment Program Technical Note: Climate-related and Environmental Risks and Opportunities," 2024.

94 Central Bank of Jordan, "Green Finance Strategy (2023–2028)," 2023.

95 World Bank, "Jordan: Empowering Climate Action in the Financial Sector," 2024.

Box 9: Contd...

Figure 23: Main areas of the Central Bank of Jordan's green finance strategy (2023–2028)



Source: World Bank (2024).[96]

Authorities, development partners, and private sector counterparts (e.g., via TBA) could work together to further raise awareness and build the capacity of corporates and financial institutions to align their business, portfolios, and strategies with climate objectives. One of the key barriers to green finance is the lack of awareness of climate change, particularly among local investors and corporates. To address this challenge, authorities could convene a market-led forum that brings together financial institutions and corporates to scale climate finance and manage climate risks. The forum could be used to educate corporates and financial institutions on the latest climate science. It could also be used to raise awareness of investment priorities and seek feedback on how the private sector could feasibly support investments.[97] As an example, in Morocco, the Bank Al-Maghrib and the Moroccan Banking Association reported on green finance initiatives and discussed key risks and challenges from these experiences. Sustainable development is also part of the agenda for the twice-yearly meetings held between the Bank Al-Maghrib Governor and the presidents of Morocco's banks.[98]

Foster transparency by issuing a green taxonomy and enhancing climate disclosure requirements

Investors (including foreign investors) need adequate information to understand, price, and manage climate risk and opportunities in their portfolios. To ensure that investors and lenders can make informed decisions around climate investments, authorities should ensure that key data and information are easily accessible to help financial institutions consider climate risks and opportunities and align their capital accordingly.

96 World Bank, "Jordan: Empowering Climate Action in the Financial Sector," 2024.

97 Examples of similar forums include the Green Finance Task Force, the South Africa Sustainable Finance Initiative, and the Netherlands Platform for Sustainable Finance.

98 Alliance for Financial Inclusion, "Inclusive Green Finance: A Survey of the Policy Landscape," 2020.

Important steps have been initiated to scale climate-related disclosure and reporting in Tanzania. Moving forward, capacity building and awareness raising will be critical to ensure that these emerging disclosure requirements are effectively implemented. Dar es Salaam Stock Exchange launched Guidelines to Sustainability Reporting (approved by CMSA in 2021) to compel listed companies to include sustainability considerations in their strategic planning and reporting.[99] Furthermore, the NBAA has set ambitious targets to implement the IFRS Sustainability and Climate Reporting Standards (S1 and S2) issued by the International Sustainability Standards Board (ISSB). Through the amendment of the Tanzania Financial Reporting Standards, NBAA expects private sector entities to incorporate the requirements of sustainability reporting standards in their financial statements by the end of 2024, and it expects public sector entities to comply with these standards by the end of 2025. NBAA's roadmap also sets targets to enhance scope 1 and scope 2 GHG emission disclosures in 2025. A National Sustainability Reporting Steering Committee was established to monitor the sustainability reporting in both the public and private sector.[100] Aligning with global guidance such as ISSB could be essential for attracting foreign investors that need such data to make informed decisions around climate investments. Nonetheless, a phased approach is needed to ensure that that companies with less expertise and resources (e.g., MSMEs) are not overly penalized at the outset. Significant capacity building and training will also be needed to help entities implement ISSB S1 and S2 requirements.

Moving forward, it will be important to ensure that a sustainable finance taxonomy is developed in close coordination between the MOF, CMSA, line ministries, and other financial sector authorities, with the Prime Minister's Office for Climate Change taking the lead in coordination. With the support of the EU, CMSA has laid out an action plan for the development of a sustainable finance taxonomy. A sustainable taxonomy is needed to define what economic activities are aligned with climate-related goals. If designed well, a taxonomy could help financial actors make informed decisions on green investments, facilitate reliable and comparable disclosures, and provide a starting point for developing green finance products. There is no universally agreed approach for developing a taxonomy. In some cases (e.g., EU), the taxonomy is very detailed, with screening criteria such as activity metrics and thresholds to define the eligibility of activities. In other cases (e.g., the Association of Southeast Asian Nations [ASEAN]), the taxonomy describes high-level principles that provide an overarching guide for green investments. Moving forward, the taxonomy should be developed in close coordination with key line ministries, noting that certain adaptation and resilience activities may be especially difficult to define.[101] In terms of scope, the taxonomy should ideally consider the interlinkages between climate mitigation, adaptation, and broader environmental objectives (e.g., marine biodiversity). To ensure international interoperability and attract foreign investments, Tanzania should also ensure that the taxonomy is aligned with international good practices to the extent possible, while addressing proportionality and local circumstances and needs.

Policy actions are also needed to ensure that the taxonomy will be properly implemented over time. South Africa is the only African country that has developed a green taxonomy, although Kenya has also recently released its draft green taxonomy for public consultation.[102] South Africa's experience suggests that entities may not implement the taxonomy unless there are sufficient incentives to do so. Several policy actions could be taken to address this challenge once Tanzania has developed its taxonomy. For example, CMSA could integrate the taxonomy into financial guidelines (e.g., on climate disclosure). Incentive mechanisms could also be implemented (e.g., concessional loans or guarantees for "green" assets). In addition, pilots could be conducted to demonstrate how the taxonomy would work in practice.

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99 See attachment 4 of DSE, "Dar es Salaam Stock Exchange PLC Rules, 2022," 2022.

100 National Board of Accountants and Auditors, "Adoption and Implementation of Sustainability Reporting in Tanzania," 2024.

101 It is difficult to define and quantify current levels of private investment in adaptation because adaptation is often part of a larger investment (usually as part of maintenance costs). Unlike mitigation, there is no well-defined list of activities for climate adaptation and resilience. Adaptation and resilience cuts across sectors, ranging from mainstreaming adaptation into traditional infrastructure projects (e.g., roads, bridges) to standalone adaptation projects (e.g., protection against coastal erosion). Most taxonomies have climate adaptation as an objective, but how they are defined varies across countries. World Bank, "Maldives Financial Sector Assessment Program Technical Note: Climate-related and Environmental Risks and Opportunities," 2024.

102 National Treasury, "South African Green Finance Taxonomy," 2022; Central Bank of Kenya, "Draft Kenya Green Finance Taxonomy," 2024.

Catalyze market instruments and investors to mobilize finance for climate action

Since the financial sector is dominated by banks, a short-term priority should be to channel bank loans towards climate mitigation and adaptation. To this end, labeling frameworks and incentive mechanisms could be developed to stimulate green and/or sustainability-linked loans. Building on international guidelines, such as the LSTA and LMA Green Loan and Sustainability Linked Loan Principles, BOT (in conjunction with MOF) could develop national guidelines to help lenders track green lending activity, ensure harmonization across green loan products, and create transparency and clarity on the demand side.[103] It should, however, be noted that there are limited country examples of green loan guidelines, so additional consultations with banks may be needed to better understand whether and how such guidelines should be developed.[104] Tracking or underwriting can also be facilitated by the labeling of assets in the real economy (e.g., energy efficiency standards for real estate buildings) and a green taxonomy. Incentive mechanisms could be explored to stimulate the origination of green and sustainability-linked loans (e.g., partial credit guarantee mechanisms, government support funds, aggregation, data provision).[105]

CMSA has already started drafting guidelines for GSSS bonds, focusing on corporate and subnational issuances. These efforts will play an important role in raising the awareness of these instruments, but GSSS bonds are unlikely to play a large role in the short run given the small size of the overall corporate bond market. While CMSA's work to develop GSSS bond guidelines should be commended, experience in other African countries suggests that these supportive policies have mixed results. For example, in the case of Kenya, only one corporate green bond has been issued following the publication of the Kenya Green Bond Guidelines in 2019. This suggests that progress in this area is not guaranteed and is unlikely to be rapid without broader financial sector reforms to scale the capital market in general.[106] To scale GSSS bond markets, additional support may be needed to stimulate both supply and demand. On the supply side, this may involve offering capacity building and incentive mechanisms (e.g., fee waivers). One example is SEC Thailand, which waived the approval fee and filing fee for green, social, and sustainability bond issuance.[107] A survey conducted by the Asian Development Bank suggests that tax incentives and/or subsidies played a key role in stimulating the green bond market in Thailand. On the demand side, this may involve exploring opportunities to expand the domestic investor base for GSSS bonds, for example, by introducing guidelines to help institutional investors integrate climate and broader ESG factors into investment decisions. This should be followed by efforts supporting reforms to enable higher participation by pension funds in the corporate bond market (see section 1.1).

The Ministry of Finance should continue its efforts to explore the issuance of a sovereign GSSS bond. While the private sector plays a crucial role in climate finance, public financing is equally essential in bridging the climate funding gap, especially for interventions that are not commercially viable but provide significant public benefits, such as large-scale adaptation projects. To this end, MOF, in collaboration with the United Nations Development Programme (UNDP) is currently drafting a sovereign sustainable financing securities framework, which aims to enhance the sovereign's access to both domestic and international financial markets through the issuance of green, blue, social sukuk, and sustainability securities. MOF is encouraged to finalize the framework, including by reviewing and approving the framework, obtaining a second party opinion on the framework, and identifying a pipeline of projects. At the broader level, a benchmark yield curve for government securities will also be needed. Since GSSS bonds tend to (initially) have higher transaction/structuring costs than standard bonds, mainly due to the incremental cost associated with complying with international guidelines and taxonomy, concessional funds from development partners can be used to support capacity building and/or offset part of these fixed costs. Development partners may also

103 LSTA and Loan Market Association (LMA), "Green Loan Principles"; LSTA and LMA, "Sustainability Linked Loan Principles," 2023.
104 One example is the Bank of Zambia's "Banking and Financial Services (Green Loans) Guidelines," which were published in 2023.
105 World Bank, "Toolkits for Policymakers to Green the Financial System," 2021.
106 Sustainable Fitch, "Africa's Sustainable Finance Markets Face Scalability Challenges," March 2, 2023.
107 Association of Southeast Nations Working Committee on Capital Market Development, "Report on Promoting Sustainable Finance in ASEAN," 2020.

contribute to lowering the cost of funding by providing guarantees to the bond or offering grants to partially cover the bond's interest cost. Finally, it is also important to ensure that the sovereign GSSS bond issuance is integrated into a broader investor relations strategy (e.g., by gathering data, insights, and knowledge that would facilitate meaningful engagement with the investor community on climate issues).

Several policy efforts are underway to help manage disaster risk in Tanzania, which is needed to strengthen financial resilience to climate shocks. Tanzania's National Disaster Management (DRM) Strategy (2022–2027) identifies several priorities to scale public and private financing for disaster risk management. This includes, for example, establishing the national disaster risk reduction investment and financing framework and resources mobilization strategy; establishing an operational framework for disaster risk transfer, insurance, risk-sharing, and financial protection for public and private investment; and enhancing social safety nets, among other things. UNDP has also initiated a capacity building program for MOF, TIRA, and other policy counterparts to enhance awareness and capacity building on climate disaster risk financing.[108]

Climate risk insurance products could be further explored as part of a broader disaster risk finance strategy. Building on the DRM Strategy, the government should continue its efforts to develop a DRF strategy that leverages a diversified set of financial instruments based on a risk layering approach. DRF relies on four key principles: (i) no single risk financing instrument can address all the risks; (ii) different sources of financing should be cost-effectively combined in a risk layering strategy; (iii) targeting of money is as important as where it comes from; and (iv) data and analytics are key for sound decision-making in DRF. According to these principles, combining different risk financing instruments is more cost-effective than depending on a single source of funding (Box 10 provides an example of Malawi's DRF strategy was an example). In general, financing mechanisms could be grouped into two main categories: (i) retention, in which the government decides to assume and manage disaster losses through its budgetary resources—for example, through the creation of budgetary reserves or funds or through post-disaster budget reallocations or borrowing, and (ii) transfer, in which the government transfers potential future disaster losses to financial or insurance markets by paying a premium—for example, through traditional insurance, alternative risk transfer products, or contingent financing mechanisms. As part of this broader strategy, the government could further explore how the insurance market could be further leveraged to respond to natural disaster shocks (see examples in Box 11).

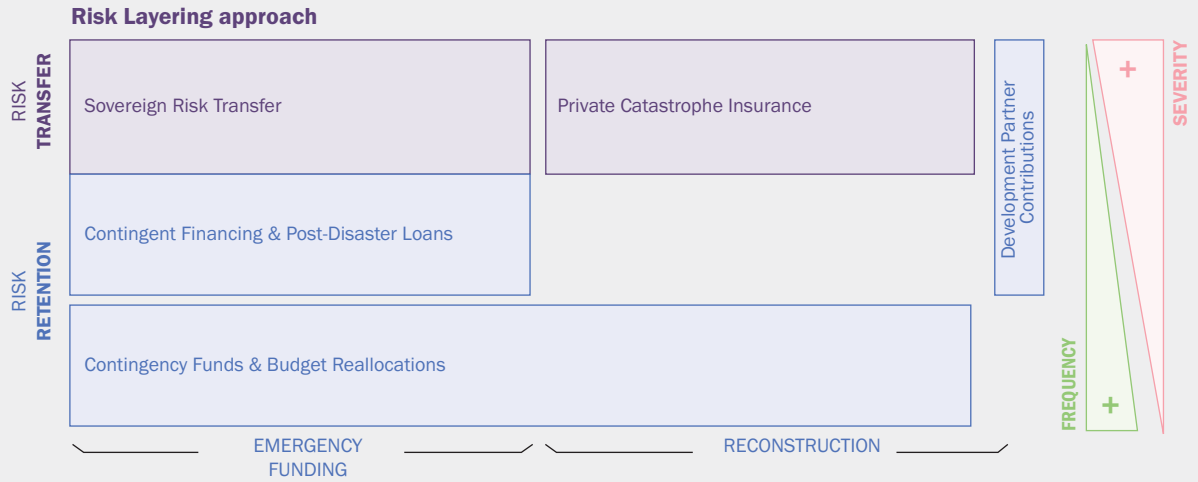
Box 10: Malawi DRF strategy

Risk layering entails combining different instruments to ensure that cost-efficient financing is available after disasters. In 2019, the Government of Malawi became the first country in Southern Africa, and second in Africa, to adopt a national DRF strategy and implementation plan, which identified the country's strategic DRF priorities (Figure 24). The bottom layer shows cheaper funds, which are designed to cover less severe, more frequent disasters. For each additional layer, the funds are more expensive and cover less frequent but more severe disasters. This enables the government to use cheaper funds for more frequent events and transfer risk for more expensive shocks (for example, to the insurance sector). Malawi is a country that will strongly benefit from its proactive risk financing efforts. In 2015 alone, floods affected over 1.1 million people, displaced 230,000 people, and killed 106 people. Public and private infrastructures were damaged in various parts of the country. Damages and losses due to floods amounted to about US$335 million or roughly 5 percent of GDP. Estimates suggest that floods with a 20-year return period led to a GDP decline amounting to 3.2 percent while increasing government expenditure by 1.3 percent.

108 UN Development Programme, "Growing Insurance and Risk Finance in United Republic of Tanzania," 2022.

Box 10: Contd...

Figure 24: Overview of Malawi's national disaster risk financing strategy



Source: World Bank (forthcoming).

Box 11: Examples of climate risk insurance programs

In Kenya, Acre Africa, a beneficiary of the World Bank's One Million Farmers Platform, offers farmers tailored crop insurance to help mitigate the risk associated with crop failure amidst climate shocks. At the start of the agricultural season, a farmer buys a Bima Pima scratch card with a bag of seeds or fertilizer, activates the card through his phone, pays an initial premium of KES 50 (US$0.50), and can top-up via SMS to increase the level of insurance coverage. ACRE Africa then geo-tags the farm using the mobile localization service. A combination of satellite and weather station data determines whether the farmer will receive a payout directly on his/her mobile account in case of drought or excess rain on his/her land. The mix of smart design and digital innovation offers the farmers the ease of buying the scratch cards at local agri-dealers, use of the system, the capability to top up, and the options to pay for the premium in small amounts and over time. The pricing model ensures that most farmers, 89 percent of whom had never accessed insurance services before, can afford insurance.

The World Bank's De-risking, Inclusion, and Value Enhancement of Pastoral Economies in the Horn of Africa (DRIVE) project, which commenced in July 2022, is designed to improve the financial resilience and productivity of pastoral communities in the Horn of Africa, focusing on Ethiopia, Kenya, Somalia, and Djibouti. With an allocation of US$360.5 million, the project includes a financial resilience component that offers an integrated package of financial services, comprising index-based livestock insurance, to enhance pastoralists' resilience against drought.[109] As of August 2024, DRIVE has covered 390,000 households (a total of 2.5 million people) with financial services and capacity-building programs. The project's implementation showcases the importance of clear and well-defined principles in designing climate risk insurance programs, such as asset protection, which assists pastoralists in keeping their core breeding stock alive instead of replacement of lost livestock; use of remote sensing/satellite technology for objective risk assessment and insurance product design; prompt and direct payments to beneficiaries through digital accounts; taking a people-centered approach, including offering Sharia-compliant products for Muslim consumers; and

109 World Bank, "In a Nutshell: The De-risking, Inclusion and Value Enhancement of Pastoral Economies in the Horn of Africa (DRIVE) Project," 2022.

Box 11: Contd...

comprehensive risk layering, including by incentivizing households to build savings for other shocks not covered by the insurance. The progress achieved by DRIVE also points to the importance of i) financial literacy programs that utilize creative and beneficiary-centric tools to enhance the understanding of complex financial products, ii) close collaboration with the private sector at all intervention stages to ensure efficiency, sustainability, and scale, and iii) strengthening the regulatory environment to ensure customer protection.[110] Additionally, regional collaboration has been key in mobilizing partnerships and creating shared insurance infrastructure, such as data, calculation agents, and reinsurance arrangements.

In Malawi, some banks have been bundling insurance with loans and providing incentives (such as better interest rates and lower collateral requirements) for farmers who take up agriculture insurance linked to agricultural loans. Similar actions are taken in Armenia where banks have incentivized uptake by reducing loan interest rates for farmers who purchase climate risk insurance.

Carbon markets could be further explored as a source of non-debt, results-based financing for climate action. As noted in the Tanzania CCDR, carbon markets could be a promising source of financing but will require reforms to reach their full potential. Carbon markets have grown rapidly over the past few years in Tanzania, and most credits issued and retired were for reducing emissions from deforestation and forest degradation in developing countries and additional forest-related activities (REDD+), which covers nature-based emissions avoidance and reduction projects (Figure 25 and 26). According to the CCDR, Tanzania could further explore applying carbon credits to clean cooking, organic fertilizers, and agroforestry. Tanzania has set an ambitious goal of receiving over US$20 billion investment in carbon offset credits from over 20 companies from across the globe.[111] However, reaching such targets will require several important reforms, including developing a national strategy that outlines Tanzania's vision for international carbon market participation, which the government has already embarked on, as well as reforms to tackle private sector challenges such as the fees and charges on carbon credit revenues (see CCDR for further details).

In the long run, authorities could explore ways to stimulate financial institutions' engagement in carbon markets. For example, banks could provide upfront capital (e.g., in the form of loans) to address the challenges that many project developers face in securing financing to kickstart a carbon credit project. In the long run, banks could even function as aggregators of carbon credits for smaller enterprises. While there is no specific size limit for enterprises to participate in the carbon markets, the costs and capacity needed to generate credits may hinder smaller enterprises from participating. In sectors with many small-scale players, such as agriculture and waste management, aggregation can help distribute project development costs and navigate the credit generation process. Beyond banks, impact investors could also play a role in stimulating carbon credits given their motivation to provide financing for enterprises that make a positive social or environmental impact while obtaining a financial return. One regional example is KawiSafi Ventures, a Kenya-based impact investor, which invested US$5 million in BioLite, a company bringing clean cooking and solar home energy products to customers in Kenya. BioLite has over 40 projects registered under Gold Standard across East Africa and India. Despite this potential, most banks and investors in Africa are still at a nascent stage of considering carbon credits as part of their business models, potentially because the size of carbon markets is still small and there are still significant uncertainties around price and volumes. An analysis could be conducted to better understand how these carbon-linked financial instruments could be developed in Tanzania in the future.

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110 Global Shield Financing Facility, "Horn of Africa: DRIVE Takaful—FAQ," 2024; Global Shield Financing Facility, "De-risking, Inclusion, and Value Enhancement Of Pastoral Economies In The Horn Of Africa (DRIVE): Integrating a Gender Equality Lens," 2024.

111 The countries include the United States, Canada, Switzerland, Russia, Italy, Singapore, Estonia, United Arab Emirates, and Kenya. CarbonCredits.com, "Tanzania Carbon Credit Projects Attract $20B from Companies," 2023.

Figure 25: Carbon credit issuance and retirement in Tanzania (1996–2024)

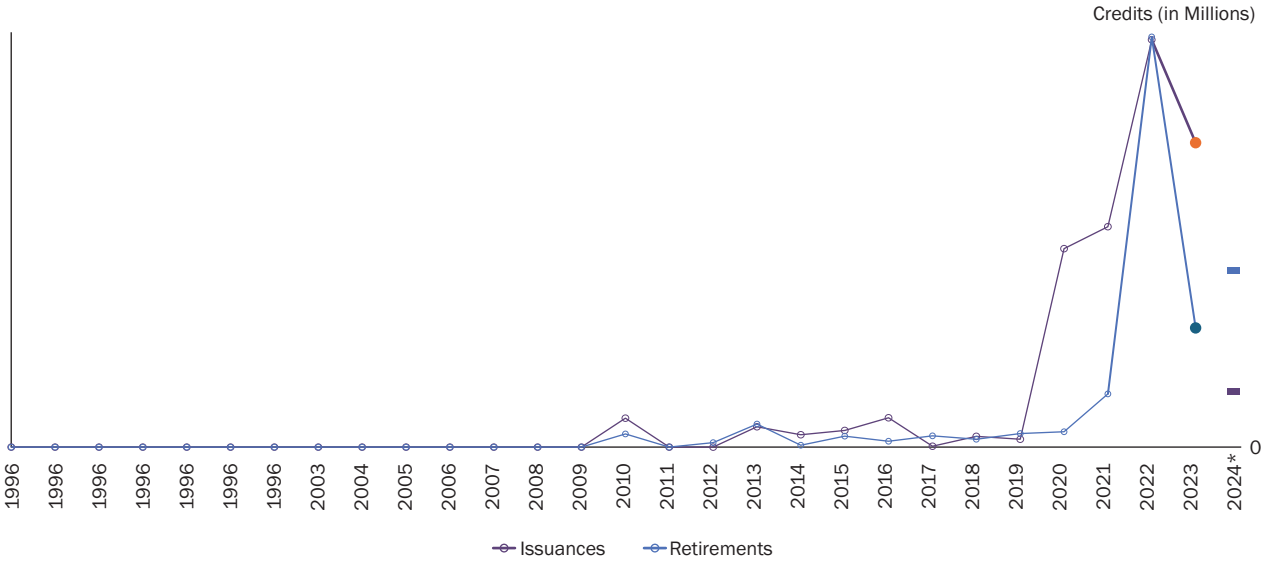
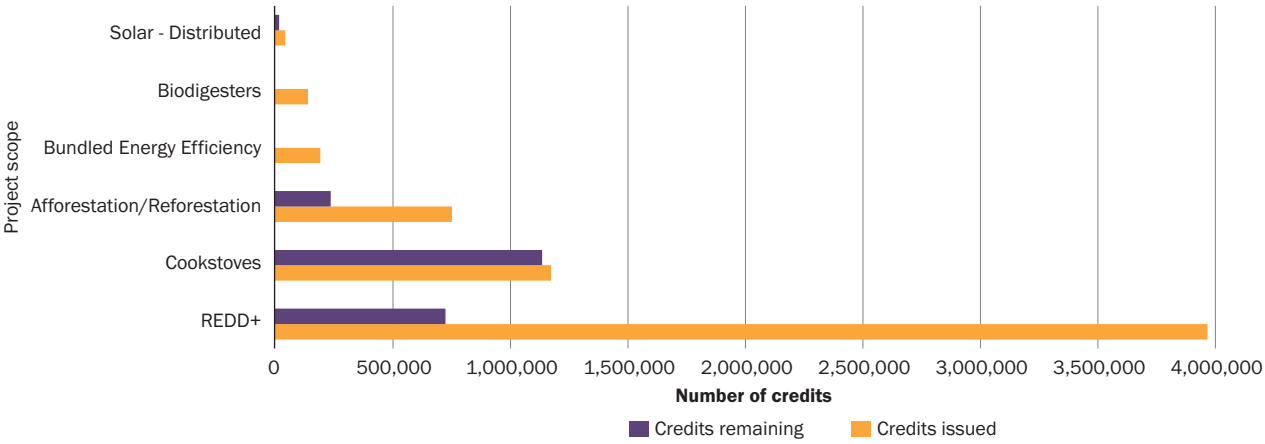


Figure 26: Breakdown of carbon credit project type



Source: Authors based on data from Berkely (2024).[112]

Greening National Development Financial Institutions

A recent World Bank report highlights the important role that NDFIs could play in scaling climate finance.[113] NDFIs are well positioned to overcome market barriers associated with green investments and catalyze private-sector financing. NDFIs, when adequately managed, can address market failures and create new markets. Compared to private investors, NDFIs have a stronger appetite for financing long-term, high-risk investments and can thus overcome market barriers associated with green investments, such as long payback periods and high perceived project risk. NDFIs have the tools to support private capital mobilization through de-risking instruments and blended financing. Moreover, NDFIs can enable private capital mobilization by supporting the generation of a green project pipeline and through demonstration transactions that stimulate market creation.

112 Berkeley Public Policy, "Voluntary Registry Offsets Database," 2024.
113 Word Bank, "Greening National Development Financial Institutions Trends, Lessons Learned, and Ways Forward," 2023.

The two NDFIs in Tanzania, TIB and TADB, have shown strong interest in further engaging in climate finance. Several efforts are underway to green TADB. For example, TADB is developing a climate risk scenario analysis, developing a system for tagging climate-smart agriculture projects, and designing a credit guarantee scheme for climate projects. Both TIB and TADB have requested further training to better understand how they can further green their operations.

For both NDFIs, a short-run priority should be to build capacity and develop a robust governance and strategy framework around climate action. TIB and TADB could play an important role in the climate agenda, but reforms and capacity building are needed to ensure that NDFIs can effectively scale climate finance. It is also important to ensure that TIB and TADB have a strong corporate governance framework to start with to enhance their efficiency and effectiveness in the climate agenda. To this end, MOF should consider developing targeted capacity building programs to TIB and TADB, with special attention on NDFIs' ability to mobilize international funding for climate action, including from international climate funds and bilateral development partners and philanthropic organizations, which could have different and complex accreditation and disbursement processes to follow. As TIB and TADB's climate expertise builds over time, they could develop a strategy to communicate a public commitment to measurable climate financing goals (e.g., share of climate credit in total credit portfolio, amount of investments in climate projects), in line with broader climate targets of the country. MOF could also encourage TIB and TADB to integrate climate considerations into their governance and investment processes (e.g., by introducing positive and negative lists to screen projects based on their climate attributes). TADB has already identified climate change as one of its priorities for 2023–2027 and indicated that an environmental, social, and governance framework is already underway to set out the policy and procedures for scaling sustainable finance.[114]

TIB and TADB could conduct a climate risk analysis to assess their vulnerabilities to climate-related financial risks. According to TADB, work is already underway to conduct a climate risk scenario analysis. It is critical for TADB to continue these efforts because TADB solely provides financial services and support to the agriculture sector, which, as noted in section 2.1, could be directly affected by climate change. TIB could similarly conduct a climate risk analysis, potentially starting with a simple exposure assessment, since a scenario analysis is more resource and data intensive. Not only are climate risk analyses useful for TIB and TADB's risk management, but these assessments could also provide lessons learned for other commercial banks that are looking to conduct similar exercises.

NDFIs and commercial banks with development funding could further develop instruments to stimulate inclusive green finance. Based on other countries' experience, there are many instruments that could be leveraged to promote financial inclusion and green finance simultaneously. These instruments could be developed by GCF-accredited entities (currently only CRDB), national development banks (Tanzania Agricultural Development Bank and the TIB Development Bank). An important consideration when designing these instruments is how to stimulate both domestic private capital and foreign investments to support climate action. Several examples are provided below:

- As part of the recently approved World Bank Kenya Jobs and Economic Transformation (KJET) project, the World Bank is helping Kenya establish a Climate Disaster Credit Facility, which is a US$3 million pilot facility which aims to enhance the climate resilience of MSMEs by providing a contingent credit option triggered when a climate disaster occurs. This financing will be offered to eligible beneficiary firms—in the form of concessional loans for specific purposes for a well specified period—and will be triggered by external climatic events, including droughts and floods. The facility is intended to, first, unlock capital for MSMEs that have productive potential but are constrained in their borrowing by exposure to climatic disasters primarily drought and floods and, second, increase the expected survivability of businesses that are already leveraged and would have otherwise been viable had the disaster not occurred. The product is intended to cushion

114 TADB, "Integrated Annual Report 2022," 2023.

MSMEs that demonstrate financial viability but are exposed to severe liquidity/bankruptcy risks due to adverse climate events.[115]

- The World Bank KJET project is also helping to establish a Green Investment Fund, with the government financing its share to the fund as a limited partner. The fund is meant to provide risk-adjusted, patient capital (including in the form of private equity and mezzanine financing) to green/greening MSMEs. A similar equity fund is also being established in Türkiye with the support of the World Bank.[116]
- Public credit guarantee (PCG) schemes have been widely used to support access to finance. Moving forward, these instruments could be scaled to mobilize private capital for green investments by reducing financial risks and lowering the cost of capital of these projects. Not many PCGs focus exclusively on climate projects, although some real-world examples exist (e.g., Trust Funds for Rural Development, FIRA [Mexico]; US Agency for International Development–US International Development Finance Corporation [USA]).[117] There are different ways in which climate factors could be integrated into PCG schemes. For example, the eligibility criteria could ensure that the loan is consistent with climate objectives (e.g., in line with a green taxonomy, if available). The PCG scheme could also target labeled products such as green and sustainability-linked loans. In addition, the guarantee coverage rates could be calibrated to further incentivize green projects. As an example, FIRA in Mexico offers a higher guarantee for climate projects (65 percent versus the standard 50 or 40 percent guarantee) at no additional costs.[118] Finally, the monitoring and reporting framework (including key performance indicators) could be used to track financial and climate performance. For example, PCGs could disclose the carbon footprint of their guarantee portfolio in annual reports, aligning with Task Force on Climate-Related Financial Disclosures recommendations and other national and international guidance.[119]

Table 3: Summary of policy recommendations for green finance markets

Policy action	Lead entity	Suggested timeline
Capacity building for financial institutions on green finance	BOT, MOF, TBA	NT
Capacity building on climate disclosures, including international guidance (e.g., ISSB)	CMSA, NBAA	NT
Roadmap for greening the financial sector	BOT, MOF, NSSRA, CMSA, TIRA	ST
Disaster risk finance strategy, including considerations on how climate risk insurance products could be expanded	MOF, TIRA	ST
Sustainable finance taxonomy	CMSA	ST
Labeling framework and incentives for green and sustainability-linked loans	MOF	ST
Sovereign Sustainable Financing Securities Framework	MOF	ST
GSSS bond and loan guidelines and incentives	CMSA, BOT, MOF	MT
Greening NDFIs (building capacity, setting the climate governance and strategy framework, conducting a climate risk analysis, and developing green finance instruments)	TIB, TADB	MT

Note: NT (near term) = less than 1 year, ST (short term) = 1–3 years, MT (medium term) = 3–5 years.

115 World Bank, "Kenya Jobs and Economic Transformation (KJET) Project."
116 World Bank, "$155 Million World Bank Loan to Expand Equity Finance for the Greening of Turkish Firms," 2023.
117 Climate Policy Initiative, "Landscape of Guarantees for Climate Finance in EMDEs," 2024.
118 World Bank, "Greening National Development Financial Institutions: Trends, Lessons Learned, and Ways Forward," 2023.
119 World Bank, Greening Public Credit Guarantee Schemes for Net Zero," 2021.

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