

Zambia: Financing a Green Future

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Table of Contents

Abbreviations.....	5
I. Introduction.....	6
II. Economic and Financial Sector Context.....	7
Financial Sector.....	8
Current Government Initiatives for Climate Mitigation and Adaptation.....	10
Climate Vulnerabilities in Zambia.....	11
Gender Intersectionality of Climate.....	15
III. Climate Risks for The Financial System.....	16
Rapid Assessment of Financial Institutions’ Response to Climate Risks and Green Finance in Zambia.....	21
Risks.....	21
Existing Products.....	21
Market Opportunities.....	21
Areas For Further Actions.....	22
IV. Climate-related Risks: Supervisory and Central Bank Response.....	22
Governance, Strategy and Capacity Building.....	22
Supervision.....	23
Risk Identification, Assessment, and Monitoring.....	23
Supervisory Guidance and Framework.....	23
Data Availability and Analysis.....	24
V. Greening Value Chains: Demand-Side.....	24
Energy.....	25
Agriculture.....	28
Mining.....	29
Manufacturing.....	30
VI. Policy Recommendations.....	31
1. Develop Principle-based Approach to Greening Financial Sector in Zambia.....	31
2. Take A Value Chain Approach to Green Finance Market Development and To Identify Green Investment Entry Points.....	33
3. Integrate Green Finance Regulations and Supervisory Approach with Overall Business Environment and Investment Climate.....	34
VII. Conclusion.....	35
VIII. Bibliography.....	36

Abbreviations

Bank of Zambia	BoZ
Climate Change Gender Action Plan	ccGAP:ZM
Country Climate Development Report	CCDR
Development Bank of Zambia	DBZ
El Nino Southern Oscillation	ENSO
Environmental, Social, and Governance	ESG
Farmer Input Support Programme	FISP
Financial Institutions	Fis
Food and Agriculture Organization	FAO
Foreign Direct Investment	FDI
Government of the Republic of Zambia	GRZ
Greenhouse gasses	GHG
Index for Risk Management	INFORM
International Finance Corporation	IFC
International Monetary Fund	IMF
International Sustainability Standards Board	ISSB
Inter-Tropical Convergence Zone	ITCZ
Lusaka Stock Exchange	LuSE
Ministry of Green Economy and Environment	MGEE
National Pension Scheme Authority	NAPSA
National Policy on Climate Change	NPCC
Nationally Determined Contribution	NDC
Non-bank financial institutions	NBFIs
Pensions and Insurance Authority	PIA
Securities and Exchange Commission	SEC
Task Force on Climate Disclosures	TCFD
World Bank	WB

I. Introduction

Zambia is one of the lowest greenhouse gasses (GHG) emitters on the planet; however, the country is already facing the brunt of extreme weather events and consequent loss of physical assets and economic opportunities. Extreme climate events may in turn lead to risks to financial stability, roll back financial inclusion and constrain resilience of the private sector. A devastating drought in 2019 caused crop failures in half of the country's districts, leading to food insecurity for 10 percent of the population as recently as in 2022.¹ While no assessment has yet been undertaken, this may also have compromised the financial inclusion gains sought under the 1st National Financial Inclusion Strategy and may indeed have had spillover impact on the ability of users to gain access to insurance and other risk mitigation financial products and services.

In this context, climate change mitigation and adaptation strategies, driven by green investments, are critical needs for Zambia's economy and financial system to weather potential headwinds from accelerating climate change. As the frequency of extreme weather events increases, investments to reduce emissions across value chains and decreasing reliance on non-renewable energy sources would be essential. An enabling regulatory environment, in the financial and private sectors, is needed to bring these investments to fruition, through stimulating the development of financial products and services tailored to the particular needs and demands of key industries, where commercially viable opportunities for greening processes and products exist.

This note aims to provide a high-level analysis of the preconditions for stimulating green investments with a focus on financial sector supervisory framework needed to address climate risks (physical and transition), current landscape of green finance in Zambia, and the demand-side opportunities for green investments in key sectors.² As an introductory note, the scope is limited to the banking sector which dominates the financial sector in Zambia (recognizing that other aspects like long term finance and carbon markets, are also important, though currently beyond the scope of this note).³ Recommendations to develop the supply and demand-side of green investments in Zambia are intended to provide a starting point for the development and scaling up of green investments in the country. The audience for this note includes policymakers, financial sector regulators, financial institutions and industry stakeholders. Consultations were undertaken over a course of nine months from September 2022-June 2023 across these stakeholders and the focus on greening the financial sector is grounded in national priorities. It is important to note that addressing the climate crisis in Zambia is a larger agenda than is covered in this note. However, greening financial supervision is a necessary (though not fully sufficient) condition to ensure the readiness of the financial sector. Related priorities like financial stability and financial inclusion are important though beyond the current scope.

¹ <https://www.ipcinfo.org/ipc-country-analysis/details-map/en/c/1155845/>

² The sectors discussed in this note were selected based on engagement with government counterparts and the financial and private sectors. The discussion is intended to be a starting point.

³ The forthcoming Zambia Country Climate Development Report (CCDR) will include a background note on the financial sector which will expand on this note and provide a more comprehensive overview of the financial sector.

Some key terms used here include:⁴

- Climate finance: local, national, or international financing that is drawn from public, private and alternative sources to support mitigation and adaptation actions that will address climate change.
- Green finance: all lending and investment that contributes to climate mitigation, climate adaptation and resilience, and other environmental objectives – including biodiversity management.
- Greening the financial sector = managing climate risks (at the national, household and enterprise levels) + stimulating green finance (market development).

The focus of this report is on greening the financial sector and key economic sectors in Zambia. However, it should be noted that detailed finance-related data was not accessible, indicating the need for a more comprehensive analysis in the future.

II. Economic and Financial Sector Context

Zambia's GDP growth is recovering from the impact of COVID-19 even as the dominance of commodity exports of copper and gold continues. In 2021 and 2022, Zambia's real GDP grew by 4.6 percent and 3.0 percent respectively, after contracting by nearly 3 percent in 2020. Wholesale and retail trade, agriculture, and mining sectors were behind this recovery. Inflation also fell from 22.1 percent in 2021 to 10.1 percent in 2022, mainly due to reduced food prices (though it remains above the 6-8 percent target set by the central bank). The fiscal deficit fell from 8.1 percent of GDP in 2021 to 8.9 percent in 2022 after a high of 13.8 percent in 2020. Higher global copper prices are expected to contribute to estimated 4.0 percent GDP growth rate in 2023 and 4.2 percent in 2024. The largest markets for Zambian goods are in Switzerland (42 percent), China (18.9 percent), Singapore (13.5 percent), DRC (9.7 percent), and South Africa (2.6 percent).⁵

After intensifying debt distress in recent years, some positive signs continue to emerge. The 2019 drought and the COVID-19 pandemic worsened fiscal and external imbalances stemming from high levels of public investments that did not lead to growth or increased fiscal revenues. Zambia, as a result, fell into debt distress, defaulting on its Eurobonds in November 2020 and accumulating arrears with other creditors. Increases in fuel and fertilizer prices due to the conflict in Ukraine further exacerbated the pressure on the Zambian economy. The IMF's ECF arrangement, approved in 2022 offered some stability even as uncertainty stemming from absence of any restructuring arrangements with other creditors continued. In June 2023, a \$6.3 billion debt restructuring agreement with Zambia's creditors marked a positive move towards macroeconomic stability. With this deal, Zambia's debt to foreign governments will be rescheduled over more than 20 years. Beyond the immediate debt relief, the deal also unlocks much-needed financial resources to revive the country's economy. In addition, the IMF is now able to provide \$188 million as part of a three-year, \$1.3 billion bailout.⁶ In early November 2023,

⁴ <https://documents1.worldbank.org/curated/en/374051622653965991/pdf/Toolkits-for-Policymakers-to-Green-the-Financial-System.pdf>

⁵ World Integrated Trade Solution (WITS) data for 2021

⁶ <https://www.imf.org/en/News/Articles/2023/06/22/pr23235-imf-welcomes-debt-treatment-agreement-reached-by-zambia>

the government and representatives of the country's Eurobond holders reached an agreement towards restructuring that bodes well for Zambia's macroeconomic stability.

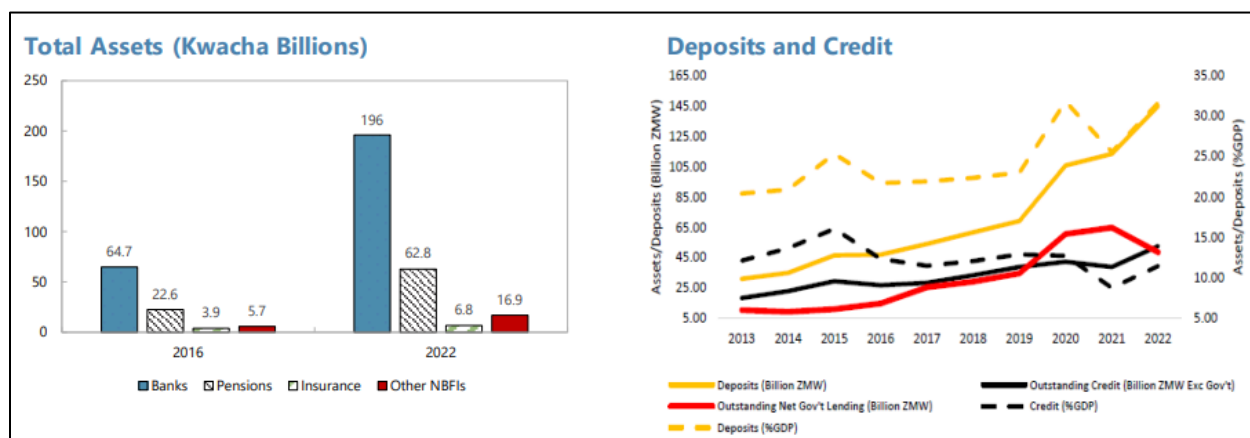
Financial Sector

The financial sector in Zambia is resilient but faces limitations which in turn constrains its ability to finance green investments. Though the banking sector is stable and relatively advanced, pensions, insurance, non-banking financial institutions, and capital markets are less developed. Similarly, the current framework for financial regulation and supervision requires modernization, especially in relation to climate-related policies.

Zambia has a relatively underdeveloped financial system dominated by banks. In 2022, the banking sector included seventeen commercial banks including subsidiaries of foreign banks, private banks, and entities partially owned by the government. Five banks, primarily foreign owned, hold 65 percent of the sector's assets and deposits. Four banks with 29 percent of the sector's assets are partially owned by the Zambian government. By the end of 2022, the entire banking sector had an asset base of K196 billion, mainly financed by deposit liabilities amounting to K147 billion.

The financial sector tripled assets between 2016 and 2022. This growth has been primarily driven by lending to the government and increase in deposits. Banking sector assets constitute approximately 41 percent of GDP, while the remaining 18 percent is contributed by other segments within the financial sector (Figure 1).

Figure 1: Financial Sector Structure 2013 - 2022



The Development Bank of Zambia (DBZ) has a mandate to deliver financial and non-financial services to support economic growth. These services include financial assistance, technical assistance and advisory services. DBZ is regulated by the Bank of Zambia and its activities are supervised by the Ministry of Finance. In June 2023, however, the Bank of Zambia took control of DBZ as a result of its failure to comply with the Banking and Financial Services Regulations and undercapitalization.⁷

The pensions and insurance segment, NBFIs segment, and Zambian capital markets are less mature. There are 122 non-bank financial institutions (NBFIs), the majority of which are bureaux de change and microfinance institutions. Overall assets are low, and low access to digital assets and electricity amongst

⁷ Bank of Zambia Public Notice: https://www.boz.zm/Public_Notice_DBZ.pdf

potential customers limit uptake of NBFIs' mobile banking services.⁸ Zambia has thirty-eight insurance providers and more than 240 national and occupational pension schemes.⁹ The pensions segment is marked by limited coverage and weak financial performance due to low payments, limited availability of profitable investments and limited activity in capital markets. The pension sector in Zambia covers less than 10 percent of the labor force with pension fund assets amounting to less than 3 percent of the GDP;¹⁰ it is dominated by the National Pension Scheme Authority (NAPSA). NAPSA covers private sector employees and public sector workers who joined the labor force after 2000. Among NBFIs, NAPSA is a major long-term investor in government local currency debt markets and holds the largest share of government bonds among non-bank entities. Zambia's principal stock exchange is the Lusaka Securities Exchange Plc (LuSE). The Zambian capital market comprises of 24 listed companies, 6 licensed brokers, and 2 custodian banks. Post-2009, the LuSE transitioned to being entirely reliant on its listed companies for operational revenues. Since then, it has diversified the financial instruments available on the market, including equities, unit trusts, government bonds, and corporate bonds. The LuSE debt market is more developed than its equity market, but both are shallow markets with low issuances and turnover, and generally low levels of participation of investors and issuers. The shallow capital market development in Zambia constrains long term green investments in Zambia.

The insurance industry in Zambia, which could potentially offer products to mitigate against damage due to extreme climate events, is growing though some smaller firms face solvency challenges. The entry of international and regional firms into the market led to an increase in the number of licensed insurance companies. Among these companies, 22 focus on general insurance, while 11 specialize in long-term insurance, primarily in the areas of group and individual life insurance, including the fast-growing funeral and credit insurance segments. However, the growth of long-term insurance has slowed down due to rising interest rates. It is worth noting that the 1997 Insurance Act was amended in 2005 to separate life and non-life insurance. Despite the growth, the assets of the insurance sector remain relatively low, accounting for only around 1 percent of the country's GDP and non-life insurance penetration is less than 1 percent.¹¹ Market concentration is high, with four main companies holding a combined market share of 70 percent. The largest life insurer controls over one-third of the market. Additionally, the adoption of alternative distribution channels such as bancassurance and mobile phone access has been limited thus far, lacking significant development.¹² The government offers farmers disaster risk insurance through its Farmer Input Support Programme (FISP)¹³ and there are some private sector options also available though used by a very small number of people.

The Securities and Exchange Commission (SEC) in Zambia issued green bond guidelines in 2020 though market development remains elusive. The market for green bonds in Zambia remains nascent, with no actual issuance recorded as of now. The underdevelopment of the bond market in Zambia poses a challenge to the take-up of green bonds, which are financial instruments specifically designed to fund environmentally sustainable projects. However, the establishment of guidelines by the SEC signals a forward-looking approach, providing a regulatory framework that can encourage the future development and issuance of green bonds in Zambia.

⁸ Zambia Financial Sector Assessment Program, Financial System Stability Assessment, IMF

⁹ [National-Financial-Sector-Development-Policy-2017.pdf \(boz.zm\)](#)

¹⁰ Global Financial Development data, 2020

¹¹ IMF data (<https://climatedata.imf.org/datasets/78763cc810af4779a73aa3123ef5e3ad/explore>)

¹² IMF: Zambia: Financial Sector Assessment Program

¹³ <https://reliefweb.int/report/zambia/climate-and-disaster-risk-financing-zambia-protection-gap-analysis>

Zambia requires an estimated \$50 billion in climate finance until 2030,¹⁴ and this funding is anticipated to come primarily from new climate finance mechanisms such as the Global Climate Fund, as well as climate-related bilateral, multilateral, and domestic financing.¹⁵ The private sector also plays a role in providing climate finance, including through corporate social responsibility initiatives and investments with expected returns. A notable example of private financing is the recent establishment of the \$53 million Green Outcomes Fund, a collaboration between Zambia National Commercial Bank, Kukula Capital, and the World Wide Fund for Nature–Zambia. The Development Bank of Zambia has also received accreditation from the Green Climate Fund, allowing them to receive and submit proposals for green projects. While there is untapped potential in carbon-market financing mechanisms, some climate finance initiatives are already underway, such as weather-indexed insurance instruments and early-stage green bond programs. Zambia possesses abundant natural resources, including land, water, forests, and wildlife. The mining sector contributes 12 percent to the country's GDP, and the forest sector accounts for 5 –7 percent.¹⁶ Additionally, over 300,000 individuals directly or indirectly rely on fishing for their livelihoods.

The listing rules of the Lusaka Securities Exchange include the only reporting and disclosure in relation to Environmental, Social, and Governance (ESG) matters. These rules require listed public companies to disclose annually the extent to which they have adhered to the Corporate Governance Guidelines which include a section on integrated sustainability reporting. Listed and quoted companies are therefore incentivized to undertake specific sustainability activities and report on their implementation. However, these guidelines only apply to public companies listed on the exchange.¹⁷

Current Government Initiatives for Climate Mitigation and Adaptation

Over the past decade, Zambia has made significant progress in formulating climate change policies, including the establishment of the Nationally Determined Contribution (NDC) and the National Policy on Climate Change (NPCC 2016). Zambia's extensive NPCC has the capacity to leverage eco-friendly initiatives from its domestic financial sector. The country's development trajectory is strongly focused on the green economy, evident through its NDC, National Climate Change Policy, establishment of the Ministry of Green Economy and Environment in 2021, and the upcoming Climate Change Act in 2023. Although financial regulators and supervisors have primarily concentrated on fostering a green bond market, additional policy adjustments are currently in progress to expand their involvement in green and climate-related activities. The Green Bond guidelines were issued in 2019.¹⁸

In 2023, Zambia introduced the NDC Implementation Framework to propel its mitigation and adaptation efforts aligned with national development goals. This framework encompasses 135 measures and 158 key performance indicators, estimated to require a total investment of USD 17.2 billion until 2030.¹⁹ The NDC emphasizes the importance of establishing an insurance market to mitigate

¹⁴ https://unfccc.int/sites/default/files/NDC/2022-06/FINAL%2BZAMBIA%27S%2BINDC_1.pdf

¹⁵ Estimation of climate finance needs are quite complicated and difficult and should be refined over time.

¹⁶ <https://www.afdb.org/en/countries-southern-africa-zambia/zambia-economic-outlook>

¹⁷ Lusaka Security Exchange: <https://luse.co.zm/wp-content/uploads/2023/06/LuSE-Main-Market-Listing-Rules.pdf>

¹⁸ <https://www.seczambia.org.zm/wp-content/uploads/2020/01/The-Securities-Green-Bonds-Guidelines-2019.pdf>

¹⁹ <https://ndcpartnership.org/news/zambia-launches-integrated-path-climate-action-through-its-ndc-implementation-framework>

the impacts of climate change, while the National Policy on Climate Change acknowledges the vital role of the Ministry of Finance in mobilizing resources for climate-related initiatives.

In addition, there has been a growing recognition of climate change as a developmental concern, attracting foreign aid. Despite the development of a comprehensive climate policy framework and ambitious goals, the incorporation of climate change into sector-specific policies and the effective implementation of these policies face challenges. These obstacles primarily arise from limited understanding, inadequate resources, and the substantial funding required to translate policies into tangible actions.

There are several key policies under development. The Ministry of Green Economy and Environment (MGEE) is leading the development of the Green Finance Roadmap. MGEE has also issued the Guidelines for the Submission and Evaluation of Proposed Mitigation Activities under Article 6 of the Paris Agreement as an initial framework for the development of carbon markets in the country.²⁰ Bank of Zambia (BoZ), Securities and Exchange Commission (SEC), and Pensions and Insurance Authority (PIA) are in a tripartite arrangement to work towards greening the financial sector. SEC issued Green Bonds Guidelines in 2019 and BoZ issued Green Loans Guidelines in 2023. These partners are working on developing a green taxonomy for Zambia. However, none of these regulators have yet signed up to the Network for Greening the Financial System (NGFS).

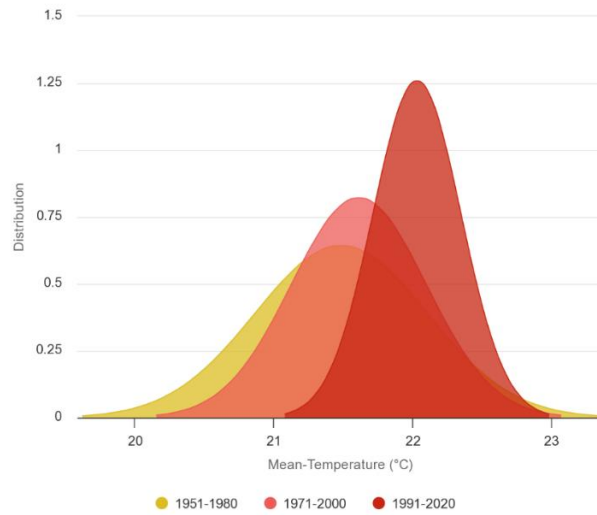
Climate Vulnerabilities in Zambia²¹

Climate risks stemming from changes in Zambia's climatology are already materializing. Zambia is located within the sub-tropical climate zone, and experiences seasons ranging from a hot and dry season (mid-August to mid-November), a wet rainy season (mid-November to April) and a cool dry season (May to mid-August). Rainfall in Zambia is strongly influenced by the Inter-Tropical Convergence Zone (ITCZ) and the El Niño Southern Oscillation (ENSO). The frequency of extreme weather events including droughts, floods and variabilities in temperatures has increased in recent years. As Figure 1 shows, mean temperatures have risen since the 1950s with accelerated change taking place since 1991. The distribution of mean temperatures shifted towards higher temperatures and the variability (distribution) of temperatures has registered an increase as well. This trend is projected to continue and indeed intensify.

²⁰ <https://www.mgee.gov.zm/wp-content/uploads/2023/10/Part-1-of-the-carbon-market-framework-for-zambia.pdf>

²¹ Data in this section is sourced from the World Bank Climate Change Knowledge Portal (<https://climateknowledgeportal.worldbank.org/overview>) unless specified otherwise.

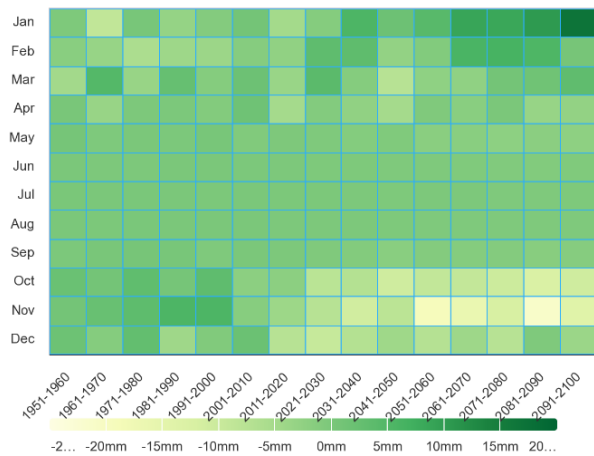
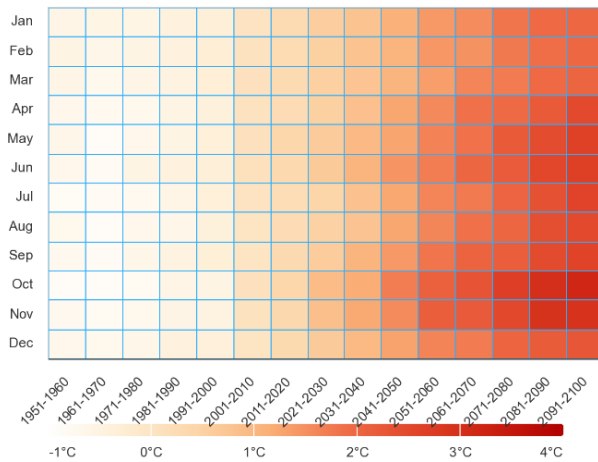
Figure 2: Change in Distribution of Mean Temperature



The impact of climate change is projected to further intensify with changes in mean temperatures and in rainfall patterns. Climate projections show that the number of hot days (with maximum temperatures exceeding 30°C) are also likely to increase under a range of scenarios.²² As figure 2 shows, mean temperatures in Zambia are consistently rising. This will have a direct impact on agricultural systems, biodiversity and Zambia’s economy including on the financial system. Similarly, variations in rainfall are also predicted to grow as shown in Figure 3. Rising temperatures and changes in rainfall patterns have a direct impact on farm yield, land use, water usage, and thereby on agricultural value chains where yields may be unpredictable, destabilizing household and farm incomes, for example.

Figure 3: Projected Mean Temperature Anomaly (SSP2-4.5) Multi-model Ensemble

Figure 4: Projected Precipitation Anomaly (SSP 2-4.5) Multi-Model Ensemble

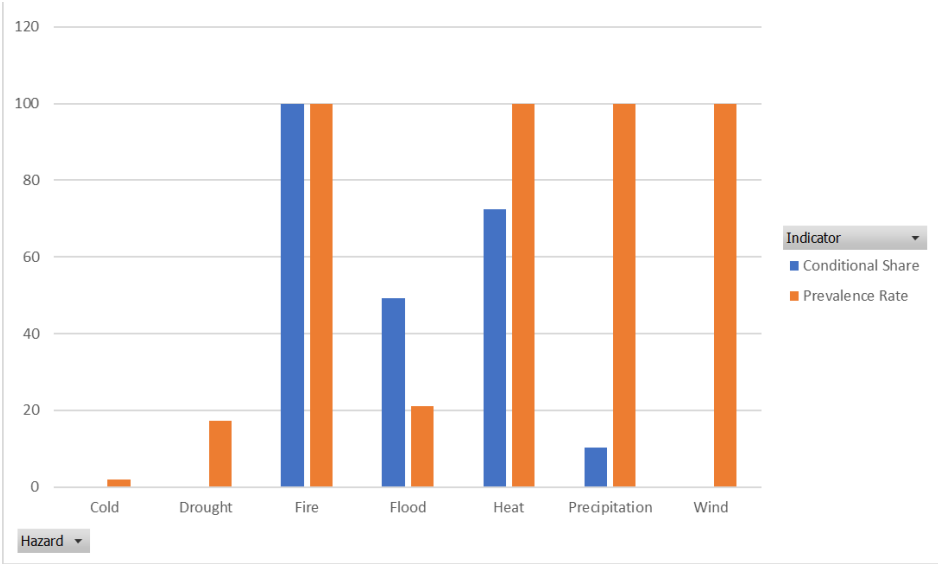


²² SSP = Shared Socioeconomic Pathways. These are projections which model a combination of social and economic outcomes for a variety of climate change scenarios.

(https://unfccc.int/sites/default/files/part1_iiasa_rogelj_ssp_poster.pdf)

As Figure 5 shows, Zambia is likely to face increased prevalence of hazards. The prevalence share indicates the share of total locations in a given country that are considered that are at risk at all.²³ In the case of Zambia, the entire country (100 percent locations) is at risk of wildfires, extreme heat, high winds and extreme participation while nearly 20 percent of the country is at risk of drought, and more than 20 percent of the country is exposed to flood risks. The conditional share is the percentage of non-zero score locations with scores greater than 50, i.e., only for those locations which are at risk.

Figure 5: Prevalence Share and Conditional Share of Hazards



The unpredictability of extreme weather events, changing climatology, and economic spillovers increase the vulnerability of households and value chains. Leveraging the Index for Risk Management (INFORM) model, the IMF models climate-driven hazard and exposure to calculate “the probability of physical exposure associated with specific climate-driven hazards”. For Zambia, this index registers at 5.2 with 10 being the highest level of risk (Figure 6) and climate-driven hazard and exposure which “reflects the probability of physical exposure associated with specific climate-driven hazards” stands at 3.8. Vulnerability index ranks higher at 6 indicating the extent to which destabilization can result from hazards. In this context, climate risk mitigation and adaption measures, at the household and firm level, are imperative particularly for a landlocked country like Zambia where disruption in transport and logistics as a result of hazard events may lead to significant shortages of essential items and industry inputs. With coping capacity scored at 5.9, it is clear that there is a significant gap in the existing infrastructure and ability at the country-level to undertake organized activities to recue disaster risk.

²³ https://climatedata.imf.org/datasets/8bc7f5db5a6042e2987c9421371473e3_0/about

Figure 6: Climate-driven INFORM Risk²⁴

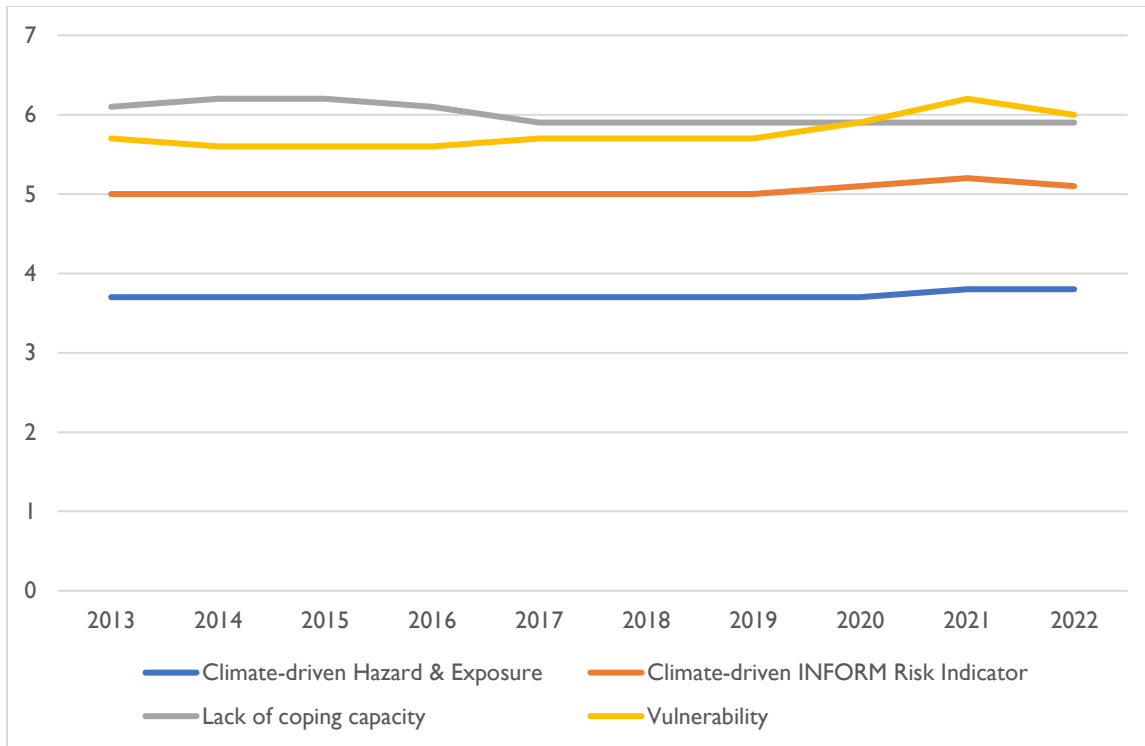
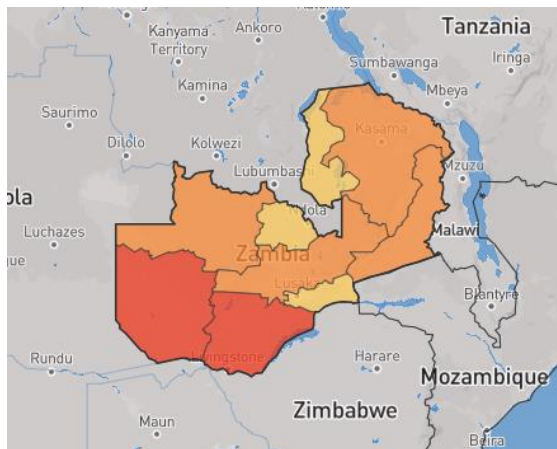


Figure 7: Water scarcity



Zambia is classified as a medium water stressed country with water scarcity projected to rise in the future.²⁵ The Southern and Western provinces are particularly vulnerable as shown in Figure 7.²⁶ These areas also overlap with agricultural production, posing a risk to crop yields and agricultural systems.

An analysis of the potential national income loss from chronic climate damages²⁷ highlights some worrying trends with projected loss of national incomes ranging from 4.6 to nearly 8 percent by 2050 if current policies are maintained.²⁸ Even with the scenario where Nationally Determined Contributions are met, losses in national income are estimated to range from 4.2 to 7.4 percent. While an inequality assessment has not yet been undertaken, it is likely that it would be the most vulnerable households

²⁴ https://climatedata.imf.org/datasets/7cae02f84ed547fbbd6210d90da19879_0/about

²⁵ <https://thinkhazard.org/en/report/270-zambia/DG>

²⁶ Ibid

²⁷ https://climatedata.imf.org/datasets/b0fe73a0430b47a6bb2723e5ac3231ff_0/about

²⁸ This range is based on the scenario of current policies with median and high levels of damage.

and population segments that would bear the brunt of lost incomes. Moreover, there is no sector-level assessment yet of the industries where these losses would be most acute. Overall, there is a gap in granular analysis of climate change risks and economic impact, which constrains effective policymaking and ability of real sector to adapt to a rapidly changing climate.

Gender Intersectionality of Climate

Climate change disproportionately affects women and girls due to existing gender inequalities and exacerbates existing inequalities. Women often face greater risks and vulnerabilities in the face of climate-related disasters and environmental degradation. Women bear the brunt of climate change impacts as they are responsible for caregiving, food production, and water collection. Climate change increases their workloads, limits their access to resources, and reduces their ability to cope.

Furthermore, gender inequalities in access to resources, finance, and employment opportunities hinder women's ability to adapt and recover from climate change impacts. Lack of land ownership, limited access to credit, and gender wage gaps exacerbate economic vulnerabilities. In Zambia, 64 percent of women in the labor force are in the agriculture sector with 33 percent in services and 3 percent in industry.²⁹

Ensuring that climate finance mechanisms are gender-responsive is crucial. Women in Zambia face barriers to accessing formal financial services, including limited access to bank accounts, loans, and insurance. This lack of financial inclusion hinders their ability to build resilience to climate change impacts and participate in climate-related activities. Financial inclusion plays a critical role in empowering women economically, enabling them to invest in climate-smart technologies, adopt sustainable practices, and diversify their livelihoods. When women have access to financial services, they can better adapt to climate change, mitigate risks, and build resilient communities. Furthermore, gender-responsive finance mechanisms can help channel climate funds to women-led initiatives, supporting their active involvement in climate change mitigation and adaptation projects.

²⁹ World Bank data

In 2018, the Government of the Republic of Zambia developed its first Climate Change Gender Action Plan (ccGAP:ZM). In Zambia, the Ministry of Lands and Natural Resources and Ministry of Gender worked together in conducting a gender analysis through the ccGAP:ZM. The ccGAP:ZM outlines specific strategies and activities to promote gender equality and empower women in climate change adaptation and mitigation efforts. It emphasizes the need to strengthen women's participation and leadership in decision-making processes, enhance their access to climate finance and technology, and promote women's entrepreneurship and income-generating opportunities in climate-resilient sectors. The plan also emphasizes the importance of gender-disaggregated data and monitoring to ensure the effectiveness of gender-responsive climate actions. It calls for capacity building and awareness raising to enhance gender mainstreaming in climate policies, planning, and implementation. The ccGAP:ZM in Zambia is closely aligned with the National Policy on Climate Change (NPCC), acknowledging that climate change impacts individuals differently based on their gender and age. A key objective of the NPCC is to incorporate gender considerations into climate change programs and initiatives, aiming to promote gender equality and equity in their implementation. By recognizing that climate change affects men, women, youth, and children in distinct ways, the ccGAP:ZM aims to address these diverse impacts. It seeks to ensure that climate change policies and activities are gender-responsive, considering the specific needs, vulnerabilities, and capacities of different groups. This approach not only supports gender equality but also enhances the effectiveness and sustainability of climate change initiatives. In line with the NPCC, the ccGAP:ZM strives to engender climate change programs and activities. It recognizes that gender equality and equity are essential for the successful implementation of climate change measures. By mainstreaming gender considerations, the ccGAP:ZM aims to create opportunities for women's meaningful participation and leadership in decision-making processes, enhance women's access to resources and technologies, and promote gender-responsive climate change adaptation and mitigation strategies. Through these efforts, the ccGAP:ZM seeks to foster an inclusive and equitable approach to climate change, ultimately contributing to Zambia's sustainable development and resilience in the face of climate challenges.

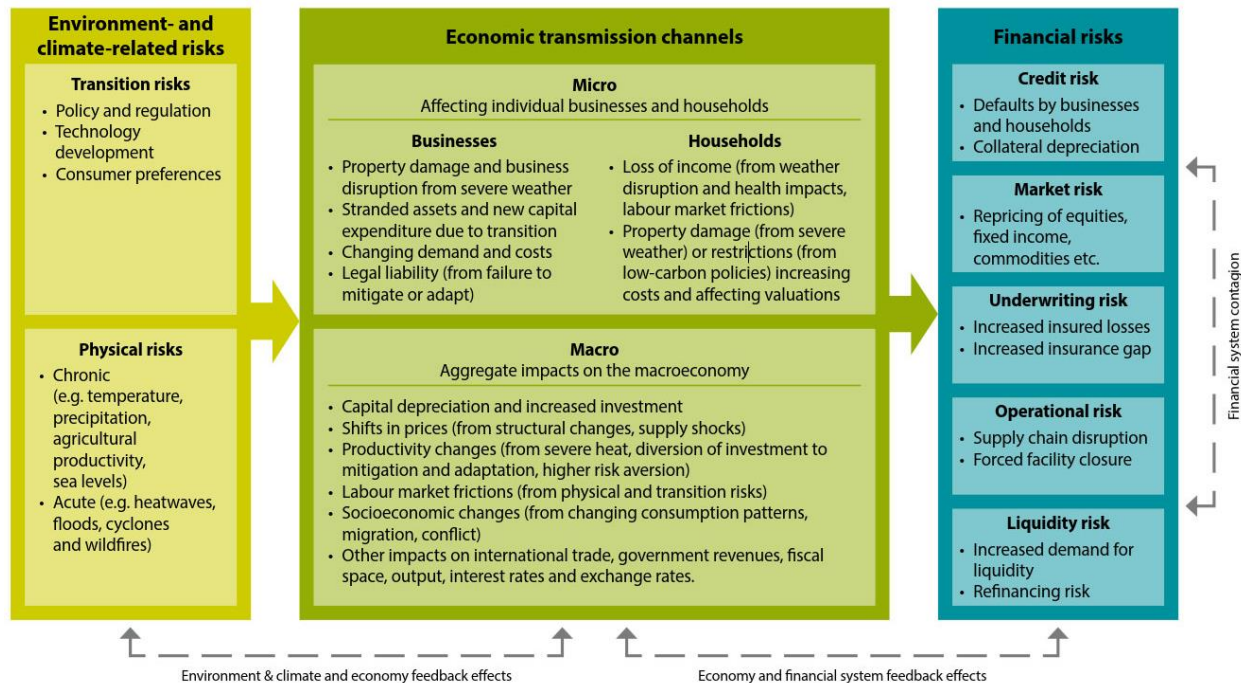
III. Climate Risks for The Financial System

The financial sector in Zambia is vulnerable to both physical and transition risks – particularly due to increased droughts and flooding. Climate-related risks include both the risks linked to climate-related hazards and the gradual changes from climate change (physical risk), and risks policy, technology, and consumption-related risks linked to the transition towards a lower-carbon economy (transition risk). The impacts of climate risk drivers on financial institutions can be observed through traditional risk categories, such as credit risk, market risk, liquidity risk, underwriting risk or operational risk (see Figure 8). The following analysis provides a general high-level overview of climate-related physical and transition risks based on the information available at the time of writing this note.

³⁰ <https://unfccc.int/sites/default/files/resource/Yunike%20Zulu%20Mutale-%20Zambia.pdf>

³¹ <https://www.ndcs.undp.org/content/dam/LECB/events/2019/20190423-global-gender-workshop/undp-ndcsp-global-gender-workshop-presentations/undp-ndcsp-global-gender-workshop-Zambia-postersession.pdf>

Figure 8: Climate risks and transmission channels for financial sector risks



Source: NGFS

In Zambia, climate-related risks pose significant challenges, both in terms of physical impacts and transition risks. As highlighted above, on the physical front, the country is vulnerable to extreme weather events such as droughts, floods, and heatwaves. These events have adverse effects on agriculture, the backbone of Zambia's economy, leading to reduced crop yields, livestock losses, and food insecurity. Additionally, water scarcity becomes a pressing issue, affecting both households and industries that rely on adequate water supply. Rising temperatures and changing rainfall patterns also impact ecosystems, biodiversity, and natural resources. These risks manifest in destruction of physical assets which in turn may disrupt banking operations, increase credit risk as affected borrowers may be unable to repay loans, damage collateral, or decline in household wealth. Agriculture sector which is particularly vulnerable to climate risks accounted for 7.2 percent of the total credit disbursements in 2022 and for nearly 11 percent of the losses in 2022.³² Agriculture in Zambia primarily centers on food security and a limited range of staple crops, rendering it particularly susceptible to climate-related disturbances, such as droughts and floods. Despite the government's substantial investments in subsidy programs aimed at facilitating access to seeds and fertilizers, the sector continues to be predominantly oriented toward subsistence-level farming practices. Land productivity remains low, and the efficient utilization of water resources is also a challenge. Moreover, the majority of agricultural production relies on rain-fed methods, despite Zambia's inherent advantage of possessing some of the most fertile lands in Africa.

³² This is the average of the four quarters in 2022. Authors' calculations from Bank of Zambia Credit Market Monitoring Report 2022 (<https://boz.zm/credit-market-monitoring-reports2.htm>)

The agriculture sector in Zambia is predominantly comprised of small-scale farmers who heavily rely on rainfed farming methods. Over the past decade, significant declines in agricultural production and productivity have been closely tied to adverse weather conditions like sudden floods and prolonged droughts, as highlighted in a report by IAPRI in 2021. These conditions have led to diminished agricultural output and productivity, prompting farmers to resort to deforestation as a means to clear more land in an attempt to maintain or increase their production levels and income. In 2021 alone, Zambia witnessed an annual deforestation rate estimated at 300,000 hectares, ranking among the highest globally. This deforestation, primarily linked to agricultural activities, stands as a notable source of GHG emissions, second only to charcoal production. The escalation of GHG emissions further compounds the challenges faced by the agriculture sector by contributing to long-term fluctuations in weather patterns, thereby intensifying the unpredictability of rainfall. It's important to note that the effects of climate change on rainfall patterns are projected to vary across different regions within Zambia (as reported by the World Bank in 2019). Consequently, climate change is expected to persist as a significant impediment to the development of the agriculture sector.

If not effectively addressed, the agriculture sector's vulnerability to climate-related risks will have detrimental effects on people's livelihoods. Climate change is already posing significant challenges to poverty alleviation, particularly among small-scale farmers. Projections from the Food and Agriculture Organization (FAO) indicate that by 2050, an increased amount of arable land in Zambia will be necessary for maize production each year. This is due to a decrease in the number of maize harvests that can be obtained from the same area of arable land, and there are inadequate improvements in maize yields. Recent research suggests that adopting climate-smart agriculture practices in Zambia, such as reducing post-harvest losses, implementing conservation agriculture, promoting agroforestry, minimizing soil disturbance, and retaining crop residues (as recommended by the World Bank in 2019), has the potential to enhance maize productivity and mitigate some of these challenges.

Transition Risks

Zambia encounters a range of notable risks from both external and domestic sources, and when combined with existing vulnerabilities, these risks have the potential to affect financial stability significantly. Some of the most significant external risk factors include a sudden decline in copper prices and fluctuations in the exchange rate. On the domestic front, key risks involve the possibility of private credit markets being squeezed due to the government's funding requirements, which could result in substantial direct and indirect exposure to public sector credit and liquidity. Additionally, challenges include the accumulation of significant government payment arrears and recent restrictions on domestic funding conditions in the local currency bond market.

In terms of transition risks, Zambia faces the need to shift towards a low-carbon and climate-resilient economy. The country heavily depends on fossil fuels, particularly coal, for energy generation, which contributes to greenhouse gas emissions and climate change. Transitioning to renewable energy sources and adopting energy-efficient practices is crucial to mitigate climate change and reduce reliance on fossil fuels. However, this transition poses challenges such as investment requirements, job transitions, and the need for policy and regulatory frameworks to support the shift. Transition risks for financial institutions may be reflected in the higher cost to borrow once climate risks are accounted for in the cost of financing, making credit more expensive for potential borrowers or existing borrowers who might find it difficult to repay existing debt. It would be important to price the impact on corporates'

profitability of any potential climate policies by the government. For financial institutions exposed to borrowers relying on carbon-intensive technologies, they may find their portfolios facing credit-related losses.

Understanding the transmission channels for physical and transition risks to manifest as risks for financial institutions and markets is key to addressing these across financial supervision and market development dimensions. Addressing these climate-related risks requires concerted efforts from various stakeholders, including the government, private sector, civil society, and international partners. It involves implementing climate adaptation measures to enhance resilience to extreme weather events and investing in sustainable infrastructure. Simultaneously, the country needs to promote renewable energy deployment, energy efficiency, and green technologies to facilitate a smooth transition towards a low-carbon economy.

South Africa

South Africa's high carbon dioxide (CO₂) intensity and significant emissions per capita expose the financial sector to transition risks from efforts to align with the commitments under the Paris Agreement. Transition risks include the local carbon tax, global trends reducing demand for fossil fuels, and the rise of renewable energy, particularly impacting the energy value chain, mining industry, and power production. Banks have approximately 16 percent of their credit portfolio in CO₂-intensive sectors, while insurers have about 15 percent exposure to bonds and equities in these industries. An abrupt energy transition could also affect government exposures, including guaranteed loans and investments in state-owned enterprises (SOEs), real estate, and indirect exposures to carbon-intensive sectors through financial sector investments. Although financial institutions have limited exposure to the agriculture sector, climate change is expected to amplify the impact of droughts and other physical hazards, which could affect the value of real and financial assets. While drought impacts on banks and insurers have been manageable due to relatively small and geographically diversified agricultural exposures, climate change is anticipated to significantly increase the impacts of weather-related stress and natural disasters.

In 2022, the first South African Green Finance Taxonomy for environmentally sustainable economic activities was published and is under implementation now, followed by 2023 statement by the Financial Sector Conduct Authority (FSCA) on Sustainable Finance. A Climate Change Bill was passed by the National Assembly in October 2023. A draft roadmap on Financing a Sustainable Economy (FSE) has been published to align the financial sector with climate targets.

The National Climate Change Response Policy and the National Development Plan 2030 outline plans for renewable energy, energy efficiency, waste management, carbon capture and sequestration, and water conservation. The 2019 Carbon Tax Act is a step towards incentivizing a clean energy transition. However, there is a need for stronger understanding and management of climate risks by prudential supervisors, such as the South African Reserve Bank (SARB) and the Prudential Authority (PA). This can be achieved through a comprehensive Climate Risk Assessment (CRA), improved data collection, and monitoring of sectoral and regional exposures to climate and disaster risks. Guidelines for the financial sector on climate risk management, stress testing, governance, and disclosure should be introduced, and climate and environmental risks should be integrated into supervisory dialogue, onsite inspections, and ratings.

³³ World Bank CCDRs

Rapid Assessment of Financial Institutions' Response to Climate Risks and Green Finance in Zambia

In May 2023, a rapid assessment of the financial institutions in Zambia in collaboration with the Bankers' Association of Zambia was undertaken.³⁴ Survey findings show that banks in Zambia are not currently able to accurately assess and quantify climate risks or identify potential opportunities to expand green finance in the country. Inconsistency in reporting data and a lack of standardization across sectors, has contributed to this challenge of obtaining and using good quality, reliable data on climate risks. This has been compounded by the lack of specialized personnel with the knowledge and skillset to undertake climate-related risk identification and assessment. An enabling legal and regulatory environment with formal policy guidance and documentation, supply chain disclosures, and internal guidance on ESG compliance is essential to facilitate identification, assessment, and mitigation of climate risks. Additionally, physical and transition risks have to be understood and assessed separately and in congruence with each other. The interconnectedness of systems and sectors has added to the overall complexity in gauging the impact of climate change, and understanding the operational, financial, legal, and reputational risks that financial institutions need to account for.

Risks

Among the main climate related risks identified by the surveyed financial institutions were extreme weather events like droughts and floods, unexpected and drastic fluctuations in temperatures, and an increase in carbon emissions, deforestation, and soil erosion. In light of this, the concerns listed by the financial institutions were largely around a loss in value of investments as a result of environmental damage as well as the negative publicity for the company and/or its products; liabilities stemming from becoming involved in a project or business relationship that has negative environmental or social implications (for e.g., for example financing a mine that causes water pollution in a protected area, financing a dam that will force many people to be resettled); community backlash from inaction and non-engagement; and reduced returns if environmental factors affect receipt of loan repayments or project profitability.

Existing Products

Some of the existing green products and services available in the market include special terms given on loan products for sustainable agriculture, green energy, green/eco-friendly business ventures and climate sensitive activities, and green loans and deposit products. But there has been an overarching perception of green/ renewable alternatives being very expensive and unable to produce similar energy outputs. This has been augmented by lack of expertise, inadequate infrastructure, and resource constraints in the sector, as well as lack of reliable and consistent data.

Market Opportunities

But there has also been an increasing proclivity towards pursuing green economic opportunities in the country. Some of the opportunities identified by the surveyed financial institutions were – investments in climate smart infrastructure and techniques across the agriculture, manufacturing and mining sectors including use of renewable energy sources (especially solar with access to large amounts of sunlight and to reduce the dependency on hydropower) like solar energy markets and solar financing; energy saving

³⁴ The rapid assessment was rolled out to all 17 banks in Zambia; of these, 10 banks responded. It is intended to be an indicative analysis and not an exhaustive or comprehensive evaluation of the universe of FIs in Zambia. The assessment does not cover NBFIs.

ventures, low-carbon businesses, and efficient construction projects. The use of carbon credits for hedging and security, the use of green bonds, and financing mitigation and adaptation projects, supplemented with improved carbon literacy, sensitization, and education about the importance of complying with ESG guidelines among staff and customers, were some additional opportunities identified.

Areas For Further Actions

As a starting point, the key questions financial institutions have to grapple with include:

- What proportion of the portfolio is exposed to climate risks, distinguishing between physical and transition risks? What sectors and segments of borrowers are most exposed?
- How are these risks to the balance sheet being reported to the supervisor?
- What risk mitigation actions is the financial institution taking?
- What financial products and services is the financial institution offering to support climate risks mitigation, adaptation and stimulate green investments?
- What skills and human resource capacity would be needed at all levels of staffing (including management) to adequately assess climate risks, mitigate portfolio-level risks, and develop and roll-out new finance products and services?
- What disclosures would be appropriate e.g. ISSB, TCFD? (This is more likely to be guided by the regulator's guidance).

IV. Climate-related Risks: Supervisory and Central Bank Response

Governance, Strategy and Capacity Building

BoZ is at the early stages of incorporating climate considerations into its supervisory and central banking activities, and awareness throughout the organization is increasing. While BoZ has taken important first steps by starting engagement on the topic of climate-related financial risk, the work still needs to be operationalized and embedded throughout the organization. Important foundations include the basis which has been laid for the establishment of a “Climate Team”, which is expected to lead and coordinate the efforts on climate risk. However, this team still needs to be formalized and its effectiveness and capacity will depend on support across different levels of the organization, including at senior management and board level. The consideration of climate risks is not yet integrated into existing governance structures or an internal strategy. While the board is aware, there is no formal endorsement or engagement mechanism at board level at this stage.

Early-stage capacity building activities are being undertaken, but this is not yet widely disseminated. Several individuals at BoZ have started to develop their expertise on the topic of climate-related risks and supervisory practices, and climate risk in the context of other relevant central banking activities. This is largely through the offering of online self-study courses. Initiatives for a broader capacity building program for BoZ staff across different departments are still to be developed. As awareness of climate risk throughout the organization is currently low, capacity building will be one of the main focus areas for BoZ going forward. Similarly, more in-depth capacity building will be needed for relevant staff to ensure they are prepared for engagement on this topic with financial institutions.

Supervision

Risk Identification, Assessment, and Monitoring

While BoZ recognizes the potential impacts of climate-related risks to its financial sector, it has not yet conducted a risk assessment to identify the sector’s potential vulnerabilities. As the risks from climate change are becoming increasingly apparent in Zambia, the urgency of the issue for the financial sector and the supervisory response increases. BoZ recognizes the potential implications of the financial risks from climate change and sees them already being amplified through changing climatic conditions. Conducting a climate-related risk assessment is an important first step to help identify the main climate-related financial risks that Zambia could face and their potential impact on the financial sector. Over time, and as data quality and availability improve, more detailed risk analysis can provide further insights into the specific financial stability implications of climate-related risk drivers over different time horizons. In particular, it would be relevant to assess the resilience of banks’ collateral against the increase in climate risks.

The availability and quality of data may be a key issue in conducting a more in-depth climate risk assessment, including scenario analysis. As in many other countries, the geographical and sectoral breakdowns of financial sector data in Zambia is of limited granularity. Given the localized occurrence of physical climate risk events, detailed geographical data on exposures, location of physical assets and collateral will be needed to provide an adequate picture of the risk profile of banks’ lending portfolios.

Supervisory Guidance and Framework

Supervisory guidance on climate-related financial risk has not yet been issued to the Zambian financial sector. In future engagement, and given BoZ’s mandate, it will be important to consider the banking, insurance as well as the microfinance sector. Although all sectors will be exposed to the impacts from climate change, the supervisory response and applicable regulatory (prudential) framework will be different. While the consideration of climate-related financial risk for banks and insurers is relatively well established from the regulatory perspective, this is less so for microfinance (partly due to data issues, which are generally even more pressing for the MFI sector than for banking and insurance). In particular, the relevant global standard setters for banking (Basel Committee on Banking Supervision, BCBS) and insurance (International Association of Insurance Supervisors, IAIS) are actively engaged on the topic, including the issuance of supervisory principles on climate-related financial risk.³⁵ These will be particularly important in guiding the BoZ in its efforts to integrate the consideration of climate risk into its supervisory practices.

Issuing supervisory guidance on climate-related (and environmental) financial risks is a key component of the supervisory response. Over time, BoZ will need to clarify its expectations in relation to its supervised institutions’ response to climate risks. Aligning it with the BCBS Principles for the Effective Management and Supervision of Climate-related Financial Risks³⁶ will be important. The supervisory guidance needs to be tailored to the local context allowing for flexibility depending on the scale, nature, and complexity of BoZ’s institutions in scope of the guidance. Training and capacity building initiatives to ensure supervisors are equipped to engage with regulated institutions and can embed the consideration

³⁵ Key documents include BCBS (2022). [Principles for the effective management and supervision of climate-related financial risks](#), and IAIS

³⁶ BCBS (2022). [Principles for the effective management and supervision of climate-related financial risks](#).

of climate risks into the supervisory review process is an important complement to the issuance of supervisory guidance.

Data Availability and Analysis

Undergirding all these considerations is the availability of robust data which is currently not available in Zambia. Regular, transparent and robust data collection and analysis on climate risks, physical and transition, would be needed for effective supervision and market development. Data collection would need to be conducted by the regulators in collaboration with ministries including the MGEE, Ministries of Land and Natural Resources, Energy, and Agriculture, and Zambia Statistics Agency, among others. Continued institutional collaboration would be essential to maintaining a flow of reliable data for regulators, policymakers, financial institutions, and investors.

V. Greening Value Chains: Demand-Side

While the supply of green financial products and services is an enabling aspect of greening the financial sector, the demand-side i.e. industry take-up of green finance is equally important in determining where and to what extent green finance is leveraged in the economy. The analysis below presents a starting point for sector-level understanding of green finance opportunities which would need to be validated by detailed market analyses. Overall and for complex value chains in particular, there is a need to garner further insight into the direct and indirect climate impact of economic activities and identify opportunities for more carbon efficient processes and products. Even as sector-level opportunities are being identified, one crucial element of stimulating demand is an overall business environment conducive to adoption of green technologies and processes by firms and sectors.

The overall business environment in Zambia is weak. More than a quarter of firms report business licensing and permits to be a major constraint.³⁷ Moreover, unreliable power supply, limited access to water supply and low worker productivity compound macroeconomic challenges and contribute to low levels of innovation in the private sector. In this context, firms are not incentivized (or facilitated) to adopt green technologies and processes, thereby keeping demand for green finance low in the country.

The key sectors identified in an initial opportunity analysis based on stakeholder engagement include: agriculture, manufacturing, and mining. Energy investments are a foundational element of the green economy where renewable energy offers one of the key sources of reducing carbon emissions and reducing reliance on fossil fuels. In Zambia, agriculture employs 23.6 percent of the employed population according to the 2021 Labor Force Survey³⁸ though it contributes less than 4 percent to GDP. Agriculture is also particularly vulnerable to climate change as it faces frontline impact of extreme weather events (like the 2019 droughts which led to crop failures and food insecurity). The services sector constitutes nearly 50 percent of the Zambian economy with tourism, financial services and telecommunications as key industries; tourism in particular is ripe for greening as it is heavily reliant on biodiversity resources which are vulnerable to climate risks.

This section provides a high-level overview of key sectors and the potential opportunities in these sectors to stimulate demand for green finance. Not all of the demand identified here may be

³⁷ Enterprise Survey 2019

³⁸ <https://www.zamstats.gov.zm/wp-content/uploads/2023/05/2021-Labour-Force-Survey-NHPP.pdf>

appropriate for financing through short-term bank deposits. However, as the financial sector currently is dominated by banks, these financial institutions are the focus of this note.

Energy

Renewable energy is one of the key channels to reduce carbon emissions and pursue energy efficiency. Solar, thermal and wind energy offer viable opportunities for diversifying industrial and household usage and are especially relevant in Zambia where gaps in energy access lead to uneven sub-national economic development. The installed generation capacity in Zambia is 3356.6 MW. According to the Energy Regulation Board (ERB) of Zambia, in 2022, hydro comprised 84 percent of the national installed capacity followed by 9 percent coal, 3 percent heavy fuel oil, and 2 percent each for solar and diesel.³⁹ The mining sector remains the largest consumer of power at 51 percent of total generated electricity, followed by the domestic sector (households) at 33 percent.⁴⁰

Energy access is a major challenge for Zambian enterprises and a more diversified energy mix offers commercially viable climate benefits. According to the 2019 WB Enterprise Survey of Zambian firms, more than 87 percent firms report experiencing electrical outages causing losses amounting to nearly 19 percent of annual sales; for manufacturing this proportion reaches nearly 25 percent. For the broader population, an estimated 32.4 percent have access to electricity with 67 percent of the urban population

and only 4 percent of the rural population having access. There are alarming statistics and highlight the urgency of diversifying the energy mix for households and the private sector, especially for the manufacturing sector, in Zambia.

As figure 9 shows, there is tremendous untapped potential for solar energy in the country particularly in the southwest provinces.⁴¹ Most potential appears to be concentrated in the southwest regions with some viable pockets in the northwest as well. For on-grid energy at scale, considerable project finance resources would be needed.

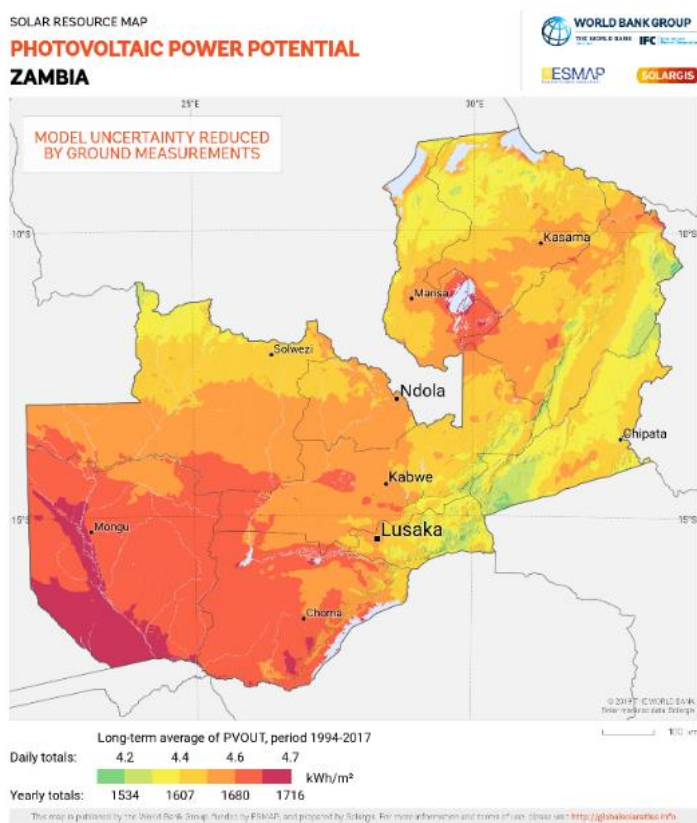


Figure 9: Photovoltaic Power Potential, national distribution⁴²

³⁹ <https://www.erb.org.zm/wp-content/uploads/statBulet2022.pdf>

⁴⁰ https://www.moe.gov.zm/?page_id=2198

⁴¹ <https://documents1.worldbank.org/curated/en/139281556198757322/pdf/Solar-Resource-and-PV-Potential-of-Zambia-Solar-Resource-Atlas.pdf>

⁴² <https://documents1.worldbank.org/curated/en/139281556198757322/pdf/Solar-Resource-and-PV-Potential-of-Zambia-Solar-Resource-Atlas.pdf>

Renewable energy in Zambia is seeing an upswing with USD 2 billion investments in solar energy announced as recently as January 2023.⁴³ Though public investments in renewable energy have been uneven between 2016 and 2019 (Figure 10), there is renewed interest in the aftermath of COVID. The regulatory framework for mini-grids in Zambia was approved by the Energy Regulation Board (ERB) in October 2018. Off-grid electricity generation for own use, with an installed capacity of up to 100kW, is exempt from the requirement to obtain a license from the Energy Regulation Board; however, there are six steps to obtain other permits and licenses.⁴⁴ In 2022, the ERB issued 45 licenses for the manufacture, supply, installation and maintenance of renewable energy generating equipment.⁴⁵ Nevertheless per capita renewable capacity has actually been falling in Zambia as Figure 14 shows.

Figure 10: Public flows to renewables⁴⁶

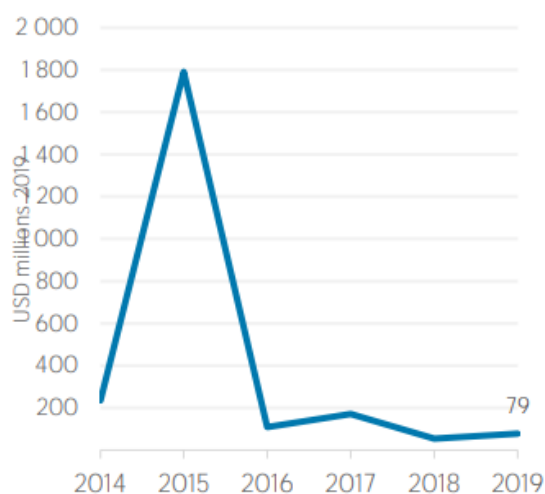
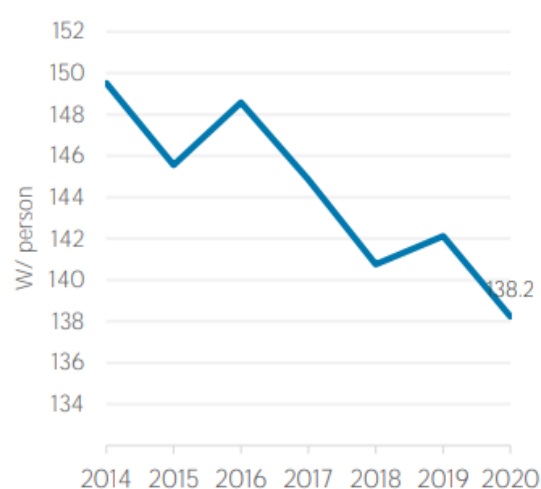


Figure 11: Per capita renewable capacity⁴⁷



Zambia is also the first country to participate in IFC's Scaling Solar program which was aimed at developing viable solar power markets in the country.⁴⁸ The program has led to the generation of 75.7 MW of solar power at 6.02 cents per KW-hour.⁴⁹ The success of the Scaling Solar program has created a market demonstration effect in modeling how commercially viable transactions in the solar energy space can be structured. There are opportunities for Zambian financial institutions to partner with other supply-side actors to undertake similar projects.

Any new energy investments in Zambia should be evaluated through the lens of fully costing their climate impact and taking into account the impact of any potential volatility in energy markets. It is important to note that while other forms of energy, like natural gas, may appear cheaper in the short-term, when factoring in climate risks and associated costs, renewable energy may actually be more cost-effective in the long-term. Any new energy investments would need to price it fully, taking into account

⁴³ <https://www.reuters.com/business/energy/zambia-uae-develop-2-billion-solar-projects-2023-01-17/>

⁴⁴ <https://www.offgrid.gov.zm/en/Licensing>

⁴⁵ <https://www.erb.org.zm/wp-content/uploads/statBulet2022.pdf>

⁴⁶ https://www.irena.org/-/media/Files/IRENA/Agency/Statistics/Statistical_Profiles/Africa/Zambia_Africa_RE_SP.pdf

⁴⁷ Ibid

⁴⁸ <https://www.worldbank.org/en/news/feature/2019/05/14/unlocking-low-cost-large-scale-solar-power-in-zambia>

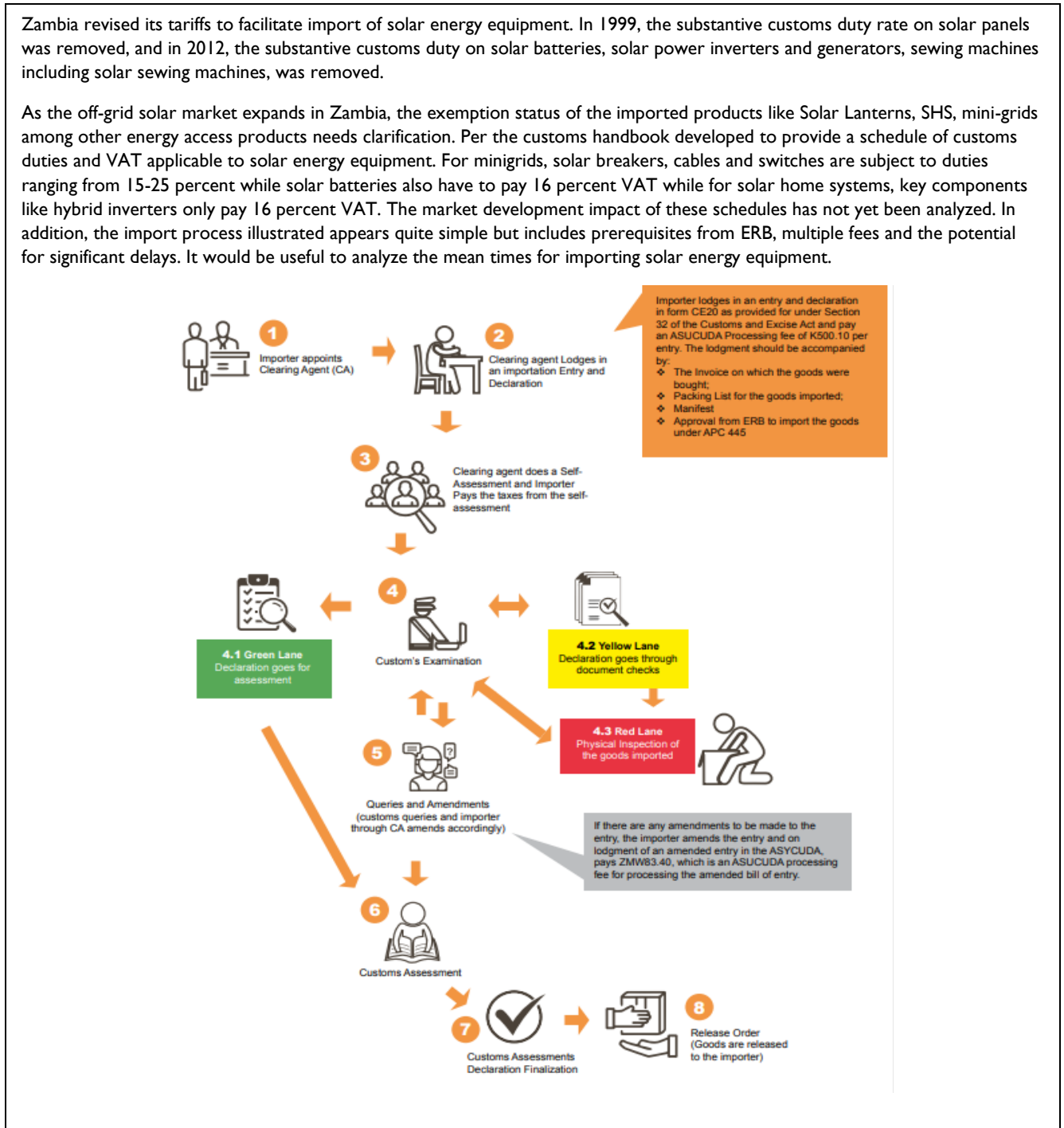
⁴⁹ <https://www.scalingsolar.org/active-engagements/zambia/>

the climate impact, risks, and costs to green economic activities for transparent feasibility in addition to the cost impact of any potential energy market volatility.

Box 3: Zambia import framework for solar energy generation⁵⁰

Zambia revised its tariffs to facilitate import of solar energy equipment. In 1999, the substantive customs duty rate on solar panels was removed, and in 2012, the substantive customs duty on solar batteries, solar power inverters and generators, sewing machines including solar sewing machines, was removed.

As the off-grid solar market expands in Zambia, the exemption status of the imported products like Solar Lanterns, SHS, mini-grids among other energy access products needs clarification. Per the customs handbook developed to provide a schedule of customs duties and VAT applicable to solar energy equipment. For minigrids, solar breakers, cables and switches are subject to duties ranging from 15-25 percent while solar batteries also have to pay 16 percent VAT while for solar home systems, key components like hybrid inverters only pay 16 percent VAT. The market development impact of these schedules has not yet been analyzed. In addition, the import process illustrated appears quite simple but includes prerequisites from ERB, multiple fees and the potential for significant delays. It would be useful to analyze the mean times for importing solar energy equipment.



⁵⁰ <https://www.moe.gov.zm/wp-content/uploads/2022/05/ACE-TAF-Customs-Handbook-for-Solar-PV-Products-in-Zambia-April-final.pdf>

The Scaling Solar program combines World Bank Group services and instruments under a single engagement aimed at creating viable markets for grid-connected solar energy. Scaling Solar is an open and competitive approach that facilitates the rapid development of privately-owned, utility-scale solar PV projects in Sub-Saharan Africa.

In March 2019, the first solar plant under this arrangement was inaugurated in Bangweulu with the (then) lowest tariff in Sub-Saharan Africa at 6.02 US¢/kWh (locked in for 25 years). more than 27,000 households were served. The second plant is also operational offering electricity at 7.8 US¢/kWh. The two plants have added nearly 76 MW to the grid.

Based on initial assumptions, Zambia's savings over the first 25 years would be about \$163 million per 50 MW power plant. The first two plants are projected to increase the country's generating capacity by 5 percent.

For SMEs, investing in off-grid renewable energy may be a viable path to advance energy diversification and also grapple with the costs of irregular electricity supply. This would however require upfront capital investment which may be challenging for a significant proportion of SMEs without borrowing from financial institutions. Moreover, there is a challenge for buyers in identifying the most appropriate renewable energy solution and quality products. It would be relevant to have concurrently a quality and standardization framework to ensure that borrowers/SMEs invest in quality products (in some cases, financial institutions only finance certified renewable energy equipment rather than anything available in the market).

Agriculture

Zambia's economy remains heavily dependent on agriculture and as such opportunities for green investments in agricultural value chains abound. The primary crops grown in Zambia include maize, sorghum, millet and cassava for domestic consumption and sugar, soybeans, coffee, groundnuts, rice, and cotton for exports.

The agriculture sector grapples with several critical challenges, including climate change, policy instability, and deficient policy execution. Numerous studies and national policies and plans have identified various issues within the sector, such as inadequate electricity supply, high production costs, limited access to credit, challenges in reaching markets, substantial pre- and post-harvest losses, low adoption of modern technology, restricted land rights, a lack of crop diversification, a high prevalence of pests and diseases, limited extension services, heavy reliance on rainfed farming, and other structural obstacles. These factors collectively hinder the sector's development and growth. In addition to the sector's vulnerability to the impacts of climate change, the primary constraint arises from country-specific policy challenges. Successive national development plans (NDPs) have often fallen short of achieving desired development outcomes due to inadequate implementation. Consequently, many of the longstanding challenges in agriculture remain unresolved, leading to the underutilization of the sector's potential.

⁵¹ <https://www.moe.gov.zm/wp-content/uploads/2022/05/ACE-TAF-Customs-Handbook-for-Solar-PV-Products-in-Zambia-April-final.pdf>

For smallholder farmers in particular, it is challenging to access finance for capital investments in productivity enhancing technologies. There is a strong trend of outgrower schemes in the sector which may offer a viable pathway to support transition to usage of more water efficient technologies by cultivators. The overreliance on rain-fed agriculture among smallholders, estimated to be at 1.5 million farmers, exposes them to significant climate risks.⁵² In addition, they are not always well-informed about risk mitigation strategies or able to access mitigation tools like insurance.

A focus on improving agricultural productivity and green financing for productivity-focused investments are key drivers of demand in the sector. The World Bank's Climate Smart Agriculture (CSA) Project finds considerable scope for private investments in adopting and scaling up CSA practices, especially in the areas of "technology development and dissemination, credit, and weather insurance for smallholders."⁵³ For financial institutions that may be exposed to increased risk due to larger share of agricultural borrowers (or clients) in their portfolios, facilitating finance for CSA practices offers an important opportunity in green finance. Key investment opportunities to consider across agricultural value chains include:

- **Increased agricultural productivity:** investments in drought-resistant seed varieties, low emissions fertilizers, investments in post-harvest management to reduce losses, these are all opportunities for green finance to enhance productivity which in turn reduces the stress on natural resources.
- **Water management:** agriculture accounts for 73 percent of annual freshwater withdrawals in Zambia⁵⁴ and more efficient water usage including cleaning and recycling wastewater is key to reducing costs for cultivators.
- **Integrating digital technologies into agricultural value chains:** digital technologies like soil sensors, drones, and irrigation scheduling software, allow for more efficient management of natural resources in agriculture. In addition, investing in traceability which drives further efficiency in agriculture also helps outputs command a premium as consumers, particularly in export markets, increasingly seek to engage in responsible consumption.

Mining

Mining in Zambia is a key export sector as copper (raw and refined) constitutes more than 60 percent of exports followed by gold, precious stones and nickel; it is also the largest consumer of energy, accounting for 51 percent of energy usage in the country. Transition risks are particularly urgent for the mining industry as the cost of capital is likely to increase with investors and lenders increasingly factoring in the cost of climate impact of mining. Relatedly, ESG requirements for investments are growing more robust. There is a recognition within the mining industry in Zambia of the urgency of diversifying the energy mix though the emphasis seems to be more on new mining concerns than retrofitting existing active mines. However, there is evidence from other markets showing that diversification of energy in mining may bring down costs by 15-50 percent. In Zambia, more detailed studies need to be undertaken to ascertain the relative gains from retrofitting and greening new mines.

Key investment opportunities to consider across the mining industry include:

⁵² https://www.iwmi.cgiar.org/Publications/Other/PDF/zambia_agricultural_policy_profile.pdf

⁵³ https://climateknowledgeportal.worldbank.org/sites/default/files/2019-06/CSA%20_Profile_Zambia.pdf

⁵⁴ World Bank data

- **Climate-smart mining (CSM):** based on four principles of climate change mitigation, climate change adaptation, reducing material impacts and creating market opportunities,⁵⁵ CSM is a holistic approach towards introducing decarbonization in the mining process, improving efficiency of extraction, and improved land use to prevent land and soil degradation. Green finance would be needed to implement activities across the spectrum, retool processes, and increase efficiency of resource usage. For example, one of the largest components of energy costs for copper mining in Zambia is for pumping groundwater.⁵⁶ Improving efficiency of water usage would reduce stress on groundwater resources and also bring down operational costs.

Manufacturing

Manufacturing in Zambia employs nearly 11 percent of the labor force and contributes 9 percent to the GDP. According to the ZDA, the primary manufacturing industries in Zambia include: food and beverages, textile and leather, wood and wood products, paper and paper products, chemicals, rubber and plastic products, non-metallic mineral products, basic metal products, and fabricated metal products. Green finance to decarbonize these value chains would likely be a significant commercial opportunity.

Key green finance and investment opportunities to consider across manufacturing value chains include:

- **Green building codes for manufacturing/production plants:** diversified energy sources, more efficient heating and cooling systems, using low-emissions building materials and increasing usage of local materials (to reduce emissions from transporting/importing materials), these are all potential opportunities for green finance for investments in setting up and/or refurbishing manufacturing plants. This would require a combination of changes in the regulatory environment which can offer green production plant guidelines (and potentially certifications)
- **Water and waste management:** understanding the water usage along the manufacturing value chain and identifying leakages and inefficient use is the basic requirement for more efficient usage. This analysis would need to be undertaken at the value chain and enterprise levels to ascertain the changes in processes and technologies that would be needed for improved water management. Zambia is already a water stressed country with industry accounting for 8 percent of freshwater withdrawals.
- **Circular economy:** recycling and reusing waste products is a viable pathway for manufacturing firms to reduce input costs, increase operational efficiency and grow profit margins (as green products command a premium in the market). This would be particularly relevant for manufacturing activities which rely heavily on imported inputs. The key principle here is to reduce waste along the value chain, reuse materials and thereby reduce costs for manufacturers as well. Leveraging digital technologies to track waste and reuse would be an important aspect of stimulating circular manufacturing. Green finance investments would be needed for technology adoption, setting up new logistics chains to collect and manage waste materials and putting into place new core processes. Any value chains with packaging would be particularly good candidates for this.

⁵⁵ <https://thedocs.worldbank.org/en/doc/761501550004005661-0110022019/render/CSMMiningforClimateActionInfographic2.8ilovepdfcompressed.pdf>

⁵⁶ <https://miningforzambia.com/energy-and-the-mining-industry/>

The Scientific and Technological Research Council of Türkiye (TUBITAK) is an agency for management, funding and conduct of research in Turkey. It is responsible for coordinating research and development in line with national targets and priorities, and to support the industry by transferring the knowledge and skills to support the use of green technologies, a dedicated Directorate namely “Climate Change and Sustainability” has been established within the TUBITAK, building upon existing research infrastructures and human resources.

With support from the World Bank, TUBITAK is undertaking a holistic program to support green innovation. The Green Deal Action Plan of Türkiye was released in July 2021 by the Ministry of Trade and provides a strategy for achieving a green transition in all sectors of the economy. The action plan foresees Enhancement of the Technological Infrastructure for Green Transition. A “Technological Transformation Working Group” was within Ministry of Information Technology and TÜBİTAK to support this, and to identify critical sectors and technological needs towards the Green Deal Action Plan targets.

Some of the prioritized sectors identified by the Green Growth Technology Roadmap include: Iron and Steel Sector; Aluminum Sector; Cement Sector; Fertilizer Sector; Chemicals Sector; and the Plastics Sector.

Furthermore, in order to increase the number and effectiveness of innovation hubs in Türkiye, the “TÜBİTAK Industrial Innovation Networks Mechanism (SAYEM)” was launched to trigger the joint production of knowledge and innovation by industry, research, government, end users and also civil society actors of the R&D ecosystem. The program aims to pave the way for furthering specialization and strengthening the innovation ecosystem for the development of green technologies in Türkiye.

VI. Policy Recommendations

Ensuring the right pre-conditions are in place will be vital for Zambia’s institutions to effectively address the risks and opportunities from climate change; the macroeconomic conditions and broader issues around financial sector stability and resilience also need to be addressed though the policy recommendations are not specifically climate related. Given the current levels of Zambia’s capacity and institutional framework, priority should be given to building the foundations which will be needed for the financial sector to increase its understanding and its involvement in this space. Authorities are encouraged to focus on creating a conducive enabling environment, enhancing the credibility of their institutions, and defining the pre-requisites for the development of climate finance markets. This includes the development of relevant frameworks, standards, and definitions to support the identification of risks and opportunities. Financial sector policies supporting adaptation, mitigation need to be prioritized and coordinated to benefit private sector-led economic growth and financial sector involvement. Given the significant financing needs for Zambia to meet its mitigation and adaptation objectives, the pace of progress will depend on progress in domestic revenue mobilization, international finance, and development partner support. Based on the preliminary analysis in this note, the following policy recommendations have been identified. Further analysis is needed to explore the feasibility and prioritization of these policy recommendations for Zambia. Implementation efforts of recommendations provided below, may need to be adapted to the relevant local supervisory and institutional context.

1. Develop Principle-based Approach to Greening Financial Sector in Zambia

Before greening the financial sector can materialize, the enabling environment influenced by the regulatory and supervisory structures would have to be put into place. The World Bank’s toolkit

⁵⁷ <https://www.zda.org.zm/manufacturing/>

"Toolkits for Policymakers to Green the Financial System" provides a comprehensive guide on how financial institutions can transition towards greening their systems. The following is a suggested sequencing of main principles to follow, with a primary focus on proportionality:

Theme	Recommendation	Responsibility	Timing*
Strategy, coordination, and capacity building	Develop a green finance roadmap and national strategy on climate risks and opportunities, integrating global best practice (in progress)	BoZ, SEC, PIA, MoFNP	ST
	Establish a national taskforce on climate risks and opportunities (working group established)	BoZ, SEC, PIA, MoFNP	I
Prudential supervision and central bank response	Develop a supervisory/regulatory climate risk strategy	BoZ	ST
	Issue supervisory guidance on climate risk	BoZ	ST
	Explore further integration of climate risk into monetary policy where relevant	BoZ	MT
Climate risk assessment and data environment	Build up data capabilities and enhance (regulatory) data environment	BoZ, SEC, PIA, MoFNP	ST
	Conduct assessment of banking sector's collateral quality/exposure to climate risk	BoZ	ST
Green financial instruments and institutions	Focus on implementation of debt management strategy, incl. issuance of sovereign bonds with longer maturities to strengthen the domestic capital market	BoZ, MoFNP	I-ST
	Develop guidelines and regulations to introduce green finance instruments and promote future sustainable bond and loan issuance, incl. the development of a green taxonomy/classification system	BoZ, SEC, PIA, MoFNP	ST
	Explore further concessional and semi-concessional finance sources	BoZ, MoFNP	ST
DRF/Climate risk insurance	Promote opportunities to expand micro- and parametric insurance for climate risks	PIA	ST
	Conduct a DRF diagnostic to increase financial response capacity of government and identify financial tools for an optimal risk layering approach.	PIA, MoFNP	
Green financial inclusion and PCGS	Develop comprehensive green financial inclusion policies and regulations	BoZ, Ministry, PIA	ST-MT
	Develop a plan for a national PCGs to support access to climate finance for SMEs	BoZ, MoFNP	ST

* "I: Immediate" is within one year; "ST: short-term" is 1–2 years; "MT: medium-term" is 2–5 years.

Implementation of these principles would require a high level of coordination across the financial sector regulators and other stakeholders in Zambia. In Zambia, there is already a Green Finance Working Group comprising of MoFNP, BoZ, SEC and PIA on developing green finance framework. This is a positive approach and would go a long way towards ensuring alignment among key supervisors. At the same time, it is essential to also factor in some significant players which are not regulated by these authorities, including institutional investors like the National Pension Scheme Authority (NAPSA). As mentioned above, green bond guidelines have already been developed by the SEC though no green bonds have yet been issued and the bond market in Zambia is rather underdeveloped. As the market matures and stakeholders become more familiar with sustainable finance instruments, there is potential for the growth of green investments, contributing to both environmental sustainability and the overall diversification of the country's financial markets. In prioritizing and sequencing the activities to support greening of the financial sector, it would be important to take stock of the stage of market development, the market's openness and capacity to implement new guidelines, and demand from the real sector.

Some of the interventions and incentives that can stimulate financing towards green alternatives and renewables include: lower pricing for green initiatives and elevated pricing for non-green initiatives; an enabling legal and regulatory environment including supportive policy measures to drive green investments like tax incentives, low-cost financing and attractive lending rates; increased awareness and capacity building activities; guarantee schemes to de-risk investments in renewable energy; and facilitating enhanced first loss capital to finance renewable energy projects such as geothermal projects that are innovative and have huge potential to generate power.

Facilitating ongoing dialogue between financial institutions and the real sector would be key to successful greening of the Zambian financial sector. Based on the success of the consultations which brought together the supply and demand side of green finance i.e. financial institutions and the real sector, it would be highly relevant for Zambia to develop a market-led platform to bring together FIs and firms.

2. Take A Value Chain Approach to Green Finance Market Development and To Identify Green Investment Entry Points

New product development by financial institutions for green finance is likely to occur only in response to strong demand from the real sector and mapping this demand to quantify the potential market is the first step. Financial institutions would be more likely to respond to market signals from larger market segments they consider profitable. Demonstrating market demand through market research and business case development would be needed to stimulate supply of green finance in Zambia. Value chains with critical mass of potential consumers are more likely to drive market development in conjunction with a strong enabling environment.

For key sectors including agriculture, mining and manufacturing, it is important to undertake a value-chain analysis to identify and quantify investment and green finance opportunities. This would entail mapping emissions across value chains, developing mitigation and adaptation plans, identifying the financing needs for these plans to be implemented and diversified sources of financing. Feasibility studies would be needed at the industry, value chain and enterprise levels. For well-established value chains, it may be useful to use the value chain financing model to mobilize a broader range of enterprises.

Leading business associations also offer a robust platform to undertake industry-level initiatives, which if anchored in large enough membership-based organizations, have the potential to scale. On circular economy in manufacturing for example, the Zambia Association of Manufacturers (ZAM) may be a relevant platform to launch an industry-wide assessment of which specific value chains would lend themselves to circularity. For sectors like agribusiness, which have strong backward and forward linkages across the economy, working with anchor firms to map high-emissions segments and opportunities for adaptation and mitigation would provide cross-sectoral scale. In addition to financing new green investments, it would be important to bundle risk mitigation products like crop insurance with financing products to provide full-spectrum solutions.

Theme	Recommendation	Responsibility	Timing*
Strategy, coordination, and capacity building	Develop a green growth strategy (ongoing)	MoGEE	ST
	Establish cross-sectoral green economy working group in the Public-Private Dialogue Forum (PPDF)	GoZ	ST

	Develop sector-level green roadmaps for key sectors	MGEE, respective sector ministries	MT
Value chain analysis of key sectors	Document	Respective sector ministries, private sector	MT
Firm level capacity building	Establish green fund for firms to seek technical assistance to identify	MoFNP, respective sector ministries	LT

3. Integrate Green Finance Regulations and Supervisory Approach with Overall Business Environment and Investment Climate

Green finance and investments operate within the broader business environment and succeed when the overall environment is business friendly. Green finance and investments in industry can thrive only when the overall business environment is similarly conducive to greening the economy which in turn would stimulate demand for green financial products and services. No diagnostics have yet been undertaken to ascertain whether and to what extent business environment reforms would be needed to stimulate demand for green technologies.

An essential recommendation centers on regulatory initiatives and reforms within the financial sector to address climate-related risks comprehensively. One pivotal suggestion is the implementation of an exposure assessment conducted by regulatory bodies to evaluate the physical risk exposure of financial institutions. This assessment would provide critical insights into the vulnerability of banks to climate-induced events, enabling a more informed risk management approach. Additionally, the regulator could offer proportional guidance to banks on climate risk management, governance, and strategic planning. Such guidance would help financial institutions align themselves more effectively with Environmental, Social, and Governance (ESG) principles, thus facilitating increased participation in impact investing and sustainable finance. Moreover, the regulator can play a pivotal role in raising awareness and building capacity among stakeholders within the financial sector, fostering a collective understanding of climate risks and their management. Crafting an institutional strategy for BOZ can also be a valuable step, potentially forming part of the broader roadmap for enhancing climate resilience in the financial industry.

Theme	Recommendation	Responsibility	Timing*
Strategy, coordination, and capacity building	Conduct diagnostic of business environment to identify: <ul style="list-style-type: none"> i. reforms needed to facilitate uptake of green technologies and processes ii. reforms/regulations needed in the financial sector 	GRZ	ST
Reforms	Undertake targeted reforms of the business environment to facilitate greening of key sectors	GRZ	MT

Some further potential initiatives that can be considered include:

- Create green business registration window to reduce the regulatory burden for businesses that provide green products and services (to stimulate domestic supply of green technologies). This would require defining ‘green’ at the industry and/or value chain level.
- Facilitate comprehensive sustainability regulations for businesses with standards segmented by enterprise size, sector/industry and scope of emissions. Some areas where it would be

important to provide a framework that includes: energy use and carbon emissions, waste management, energy taxes and incentives, among other areas.

- For enterprises seeking new power connections, subsidize/prioritize connections for those which have a diversified energy mix.
- Develop and implement green building codes for new production facilities, workplaces, and construction projects.
- Streamline process for FDI inflows for green activities with dedicated 'Green Investments' window in Zambia Development Agency.
- Develop standards and disclosures frameworks for firms. While intensive standards and disclosures requirements may pose an increased cost for firms in Zambia, there are opportunities to streamline disclosures for more manageable regulatory burden.

VII. Conclusion

Climate change and its related impacts create risks and opportunities for Zambia's financial sector. The financial sector in Zambia is vulnerable to both, physical and transition climate-related risks, which are particularly expected to materialize due to increased flooding and droughts. The vulnerabilities in Zambia's financial system and banking sector will be exacerbated by its lack of economic diversification and low levels of insurance coverage. At the same time, there are opportunities for Zambia's financial sector to contribute to the financing of Zambia's NDC and to support efforts for the diversification of the economy. Playing a more active role in the climate agenda may provide an opportunity for the banking sector to contribute to a green growth trajectory while benefitting from the opportunities presented by the low-carbon transition. While the financial system is small now, but FIs could still play a role in the future and there is a need to make sure that as the financial sector develops, they develop in a way that is "green".

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