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Zambia: Building Resilience to Climate Shocks

Linda Spahia

SIP/2025/127

IMF Selected Issues Papers are prepared by IMF staff as background documentation for periodic consultations with member countries. It is based on the information available at the time it was completed on June 30, 2025. This paper is also published separately as IMF Country Report No 25/242.

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Zambia: Building Resilience to Climate Shocks

Prepared by Linda Spahia

Authorized for distribution by Mercedes Vera Martn and Steven Qi
September 2025

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ABSTRACT: Zambia faces growing challenges from climate-related natural disasters, particularly floods and droughts, which have become more frequent and severe in recent years. These events disproportionately affect the country's large agricultural sector—especially vulnerable subsistence farmers—and the reliance on hydroelectric power makes it susceptible to drought-related disruptions in electricity supply, with cascading effects across the economy. In response, Zambia has identified its adaptation priorities and has developed a comprehensive legal and policy framework that aligns climate resilience with its long-term development agenda through national and sectoral strategies. However, implementation remains constrained by limited coordination across government levels and the absence of robust systems to track climate-related expenditures within the national budget. Effective implementation will depend on its ability to mobilize resources—both through domestic revenue and by attracting external financing.

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SELECTED ISSUES PAPERS

Zambia: Building Resilience to Climate Shocks

The Republic of Zambia

Prepared by Linda Spahia[1]

[1] The author would like to thank Balaz Stadler, Ignatius Masilokwa, and Steven Qi for their helpful comments and assistance. The views expressed in the paper are those of the author and do not necessarily represent the views of the IMF, its Executive Board, or IMF management.

ZAMBIA: BUILDING RESILIENCE TO CLIMATE SHOCKS

Zambia faces growing challenges from climate-related natural disasters, particularly floods and droughts, which have become more frequent and severe in recent years. These events disproportionately affect the country's large agricultural sector—especially vulnerable subsistence farmers—and the reliance on hydroelectric power makes it susceptible to drought-related disruptions in electricity supply, with cascading effects across the economy. In response, Zambia has identified its adaptation priorities and has developed a comprehensive legal and policy framework that aligns climate resilience with its long-term development agenda through national and sectoral strategies. However, implementation remains constrained by limited coordination across government levels and the absence of robust systems to track climate-related expenditures within the national budget. Effective implementation will depend on its ability to mobilize resources—both through domestic revenue and by attracting external financing.

A. Context

1. Zambia faces increasing risks from climate change, which pose serious threats to its economic and social development. A large proportion of the population depends on climate-sensitive sectors such as agriculture, water, forestry and energy, exposing the country to growing risks related to food security, health, and livelihoods. The 2023–2024 El Niño event underscored this vulnerability by triggering a prolonged drought, widespread crop failures, energy shortages, and economic disruptions. This shock further strained Zambia's fiscal position, highlighting the macro critical need for strengthened adaptation and resilience-building policies.

2. Zambia is rich in natural resources but remains highly vulnerable to shocks. The economy's heavy dependence on natural resources, particularly the dominant mining sector, exposes it to substantial external price volatility. Agriculture, which is predominantly rain-fed and largely subsistence-based, is increasingly affected by more frequent and severe weather events. In addition, Zambia's reliance on hydropower for electricity generation heightens its sensitivity to changing rainfall patterns. The government's Eighth National Development Plan (8NDP) prioritizes economic diversification, social inclusion, and environmental sustainability. However, building resilience and implementing effective adaptation policies remain challenging, particularly in the context of limited fiscal space.

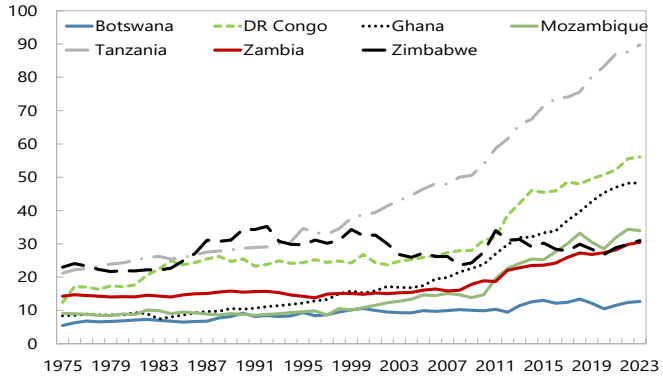
3. Climate change intersects with other critical challenges such as high debt levels, limited fiscal space, and widespread poverty and inequality. Climate-change related shocks intensify the country's socio-economic vulnerabilities, cause damage to its infrastructure and disrupt economic activity, constraining the government's institutional and fiscal capacity to respond effectively. Therefore, climate adaptation remains critical and offers an opportunity to pursue a more sustainable and resilient growth path aligned with Zambia's long-term development vision. Leveraging both domestic resources tax base and international financing remains key to achieve these goals.

B. Contribution to Global Emissions and Mitigation Commitments

4. Zambia contributes a modest 0.08 percent to global greenhouse gas (GHG) emissions, ranking 111th worldwide in 2023. Although overall emissions remain low, they have steadily increased at a compound average growth rate of 1.2 percent per year since 1991, a trend consistent with other countries at a similar development stage. Greenhouse gas emissions have doubled since the1970s level reaching 30 million tons of CO2 equivalent in 2023, at the mid-range of other regional peers in Sub-Saharan Africa (Figure 1).

Figure 1. Zambia: Greenhouse Gas Emissions in SSA Countries

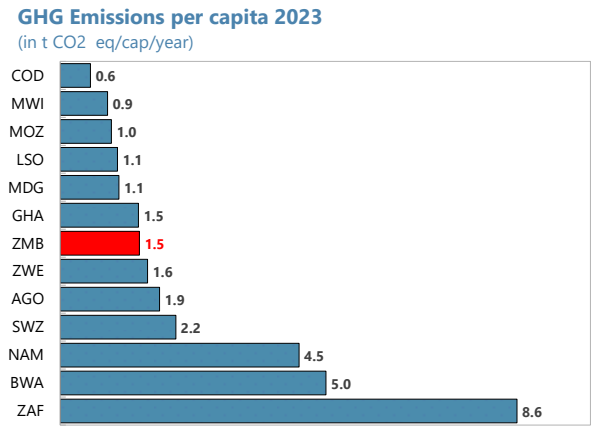
(Metric ton CO_2 equivalent per year)

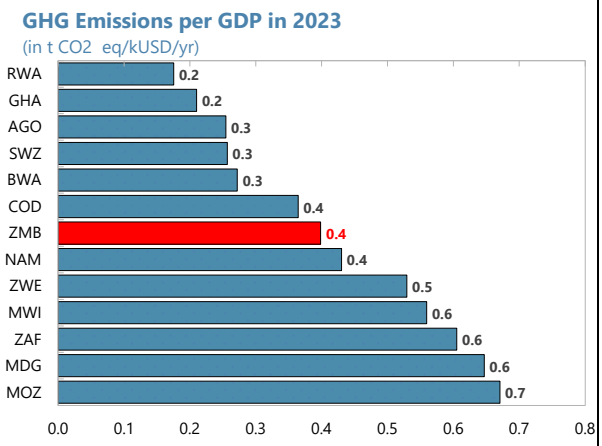


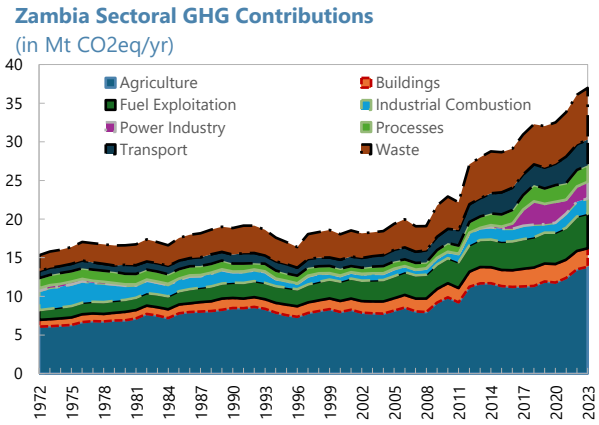
Source: Emissions Database for Global Atmospheric Research

5. Zambia's per capita emissions are significantly lower than regional peers, a reflection of low levels of industrialization, low population density and the relative size of its economy. Similarly, its emissions per GDP are low compared to its regional peers, thanks to its reliance on hydro-generated electricity (Figures 2). Agriculture, industry and waste management are the dominant sources of GHG emissions in Zambia, accounting for approximately 38, 20 and 17 percent, respectively. In contrast, the power sector historically contributed minimally to emissions, as electricity generation was almost entirely hydro-based prior to 2016. (Figure 2). That changed with the commissioning of Zambia's first MW300 thermal power plant in 2016, which added roughly 9 percent to the country's installed generation capacity. The severe electricity shortages of 2024 underscored the need to diversify energy sources, prompting the government to announce plans to double the capacity of thermal generation as part of its broader energy security strategy.

Figure 2. Zambia: GHG Emission





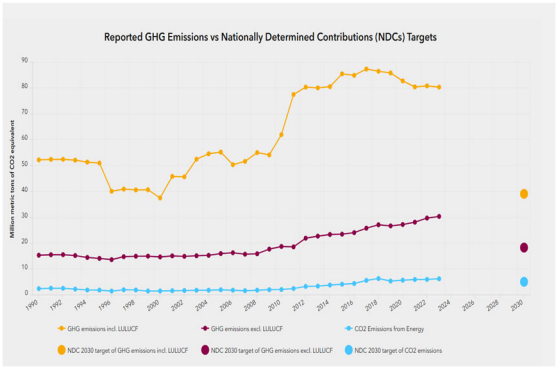


Source: EDGAR

6. Zambia's updated NDC, submitted in 2021 under the Paris Agreement, sets an ambitious climate agenda. The country commits to reducing GHG emissions by 25 percent unconditionally, and up to 47 percent with international support by 2030 compared to its 2010 level (Fig. 2). The mitigation efforts were broadened to include the transport sector, coal (production, transportation and consumption) and liquid waste alongside previous focus areas like sustainable forest management, agriculture, and renewable energy.

7. The NDC outlines both mitigation and adaptation priorities. Adaptation focuses on promoting climate-resilient agriculture, improved water management, strengthened health systems, and climate-resilient infrastructure. Implementing the NDC is estimated to cost approximately US$17.2 billion —about 65 percent of GDP— across 11 priority sectors. Zambia's National Adaptation Plan (NAP) provides a long-term roadmap for addressing climate vulnerabilities but requires additional resources and enhanced coordination across sectors and government levels to be operational. While these efforts align with Zambia's broader development goals, their full implementation is limited by financial constraints, insufficient technical capacity, and institutional fragmentation. International assistance in finance, technology, and capacity-building remains crucial to meeting these targets.

Figure 3. Zambia: NDC Targets



Source: EDGAR, UNFCCC, FAO, IMF

C. Changes in Temperature and Rainfall Patterns

8. Zambia is already experiencing the consequences of a changing climate. Over the past two decades, average temperatures have risen by 1.3°C, and rainfall patterns have become more erratic. The country receives between 700 mm and 1,400 mm of annual rainfall, but this distribution is increasingly unpredictable due to shifts in the Inter-Tropical Convergence Zone (ITCZ) and El Niño-Southern Oscillation (ENSO) phenomena. El Niño events bring severe drought to southern regions, where most of agriculture activity and hydro-power generation is concentrated, while La Niña episodes can cause excessive rainfall and flooding in northern and central areas.

9. Rainfall in Zambia follows a distinct seasonal pattern, with the wet season occurring between September and April. During this period, rainfall is driven by the movement of the tropical rain belt, also known as the ITCZ, which oscillates between the northern and southern tropics. The ITCZ typically brings 150–300 mm of rain per month from October to April. However, variations in its movement can cause significant changes in rainfall from one year to the next, amplifying the uncertainty faced by farmers and communities.

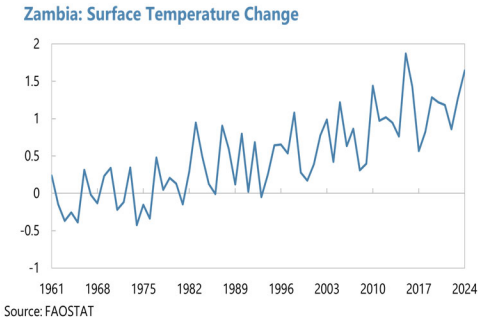
10. The cold season, spanning from May to August, is very dry, with almost no rainfall. This prolonged dry spell further exacerbates water scarcity and increases the risk of drought. The ENSO phenomenon adds to inter-annual variability, with El Niño conditions (warm phase) resulting in drier-than-average conditions in the southern parts of Zambia and wetter-than-average conditions in the north during the wet summer months (December–February). Conversely, La Niña (cold phase) episodes reverse this pattern, bringing wetter conditions to the south and drier conditions to the north.

11. The frequency and intensity of extreme weather events—such as prolonged dry spells, flash floods, and heatwaves—have increased. In the decades after 2000, the number of such events exceeded 10, while in the two prior decades there were fewer than 5. In parallel, the intensity of such events—i.e. people and infrastructure affected-has increased. The 2023–2024 El Niño drought was among the worst in recent memory, affecting over 1 million hectares of cropland, depleting water reservoirs, and triggering emergency food assistance for nearly 2.3 million households. Urban areas, including Lusaka, have also experienced growing flood risks due to poor drainage systems and unplanned settlements. These climatic shifts are undermining development progress and increasing the frequency of humanitarian crises.

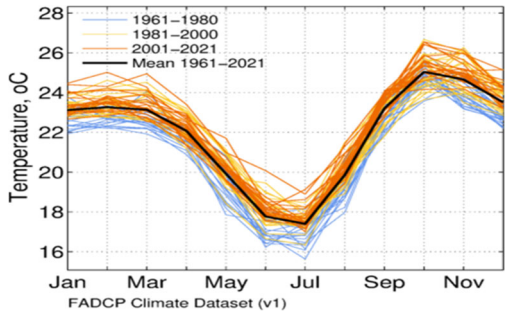
12. Depending on global emissions trajectories, projections indicate that Zambia will continue to experience warming of 1.5°C to 3°C by 2050 (see Figure 4). Rainfall variability is also expected to intensify, with shorter, more intense rainy seasons and longer dry spells (Fig 5). These changes necessitate adaptation measures to protect development gains and safeguard vulnerable populations, crops and livestock. Floods also exacerbate the spread of waterborne diseases like cholera, straining health response systems.

Figure 4. Zambia: Climate Change Impact on Surface Temperatures

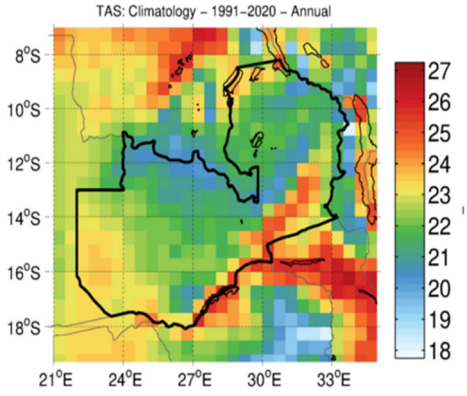
Average temperatures are rising….



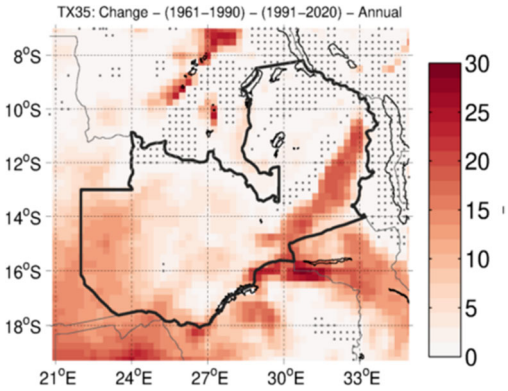
With higher temperatures recorded in all months ….



Mean temperatures have risen….



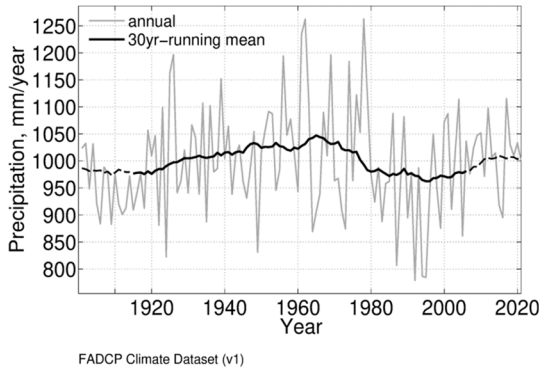
Days with temperatures above 35° C are more frequent….



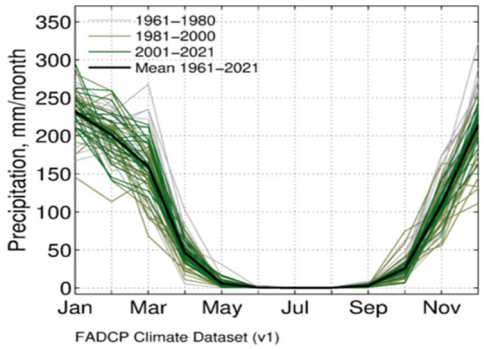
Source: FAD Climate Dataset (Massetti and Tagklis,2023), using Climate Research Unit data (Harris et al., 2020).

Figure 5. Zambia: Changes in Rainfall Patterns

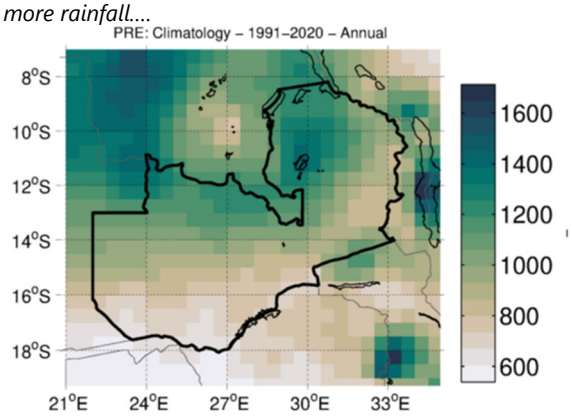
No big changes in average annual precipitation….



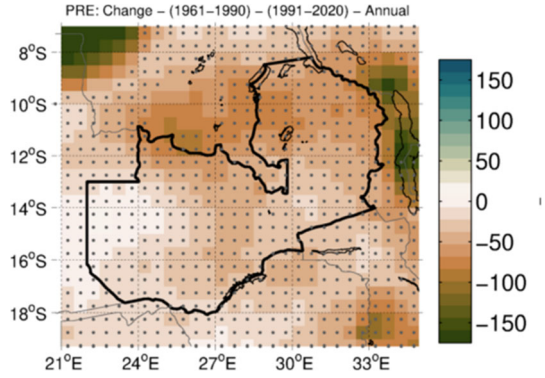
And monthly patterns….



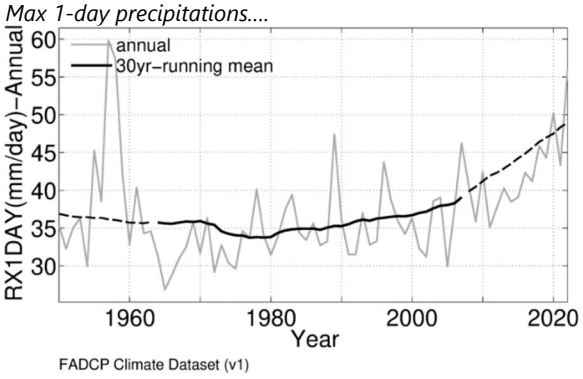
With regional variations where Northern provinces receive more rainfall….



With slightly lower precipitation in last two decades….



But intense rainfall events are rising as shown through the Max 1-day precipitations….



And Max 5-day precipitations….

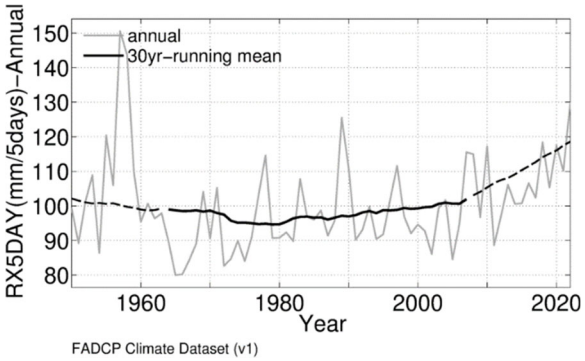
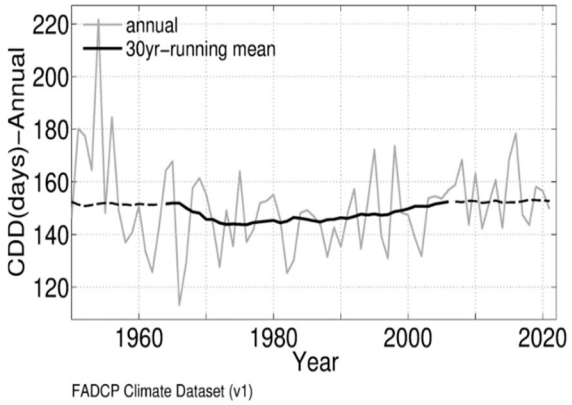


Figure 5. Zambia: Changes in Rainfall Patterns (concluded)

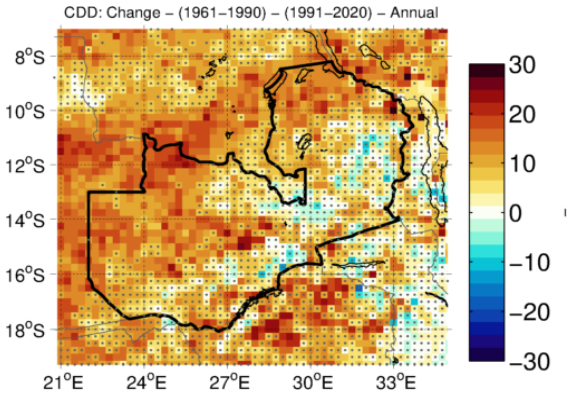
With dry spells becoming more frequent, as shown in consecutive dry days average….



FADCP Climate Dataset (v1)

Note: Consecutive dry days, or "dry spells" or "consecutive dry day (CDD) indices," are defined as a period of consecutive days with daily precipitation below a certain threshold (i.e. 1 mm)

And changes in CDD averages….

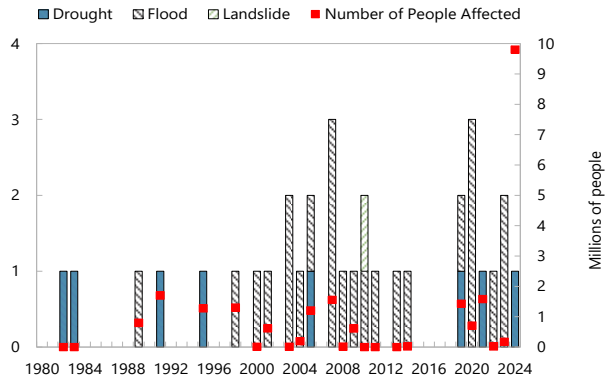


The CDD index is used in climate modeling, drought monitoring, and agricultural planning to assess the severity and duration of dry periods, which can impact biodiversity, water resources, and agriculture.

D. Impact of Natural Disasters

13. The number and frequency of climate-related disasters in Zambia have markedly increased over recent decades. Floods and droughts are the most common and impactful events, often localized but with serious consequences for affected regions. The increasing frequency of such events is a clear signal of the shifting climate regime (Fig. 6)[1]. For example, localized flooding has become a recurring challenge during the rainy season, affecting agriculture, infrastructure, and livelihoods in low-lying and poorly drained areas. However, rare large-scale disasters—such as the 2024 drought—have demonstrated the potential to disrupt national food security, and strain response systems. Unlike localized events, these large-scale crises have far-reaching socio-economic impacts, overwhelming national capacities and requiring coordinated international support. These severe events highlight the urgent need for improved disaster preparedness, early warning systems, and resilient infrastructure across both rural and urban settings.

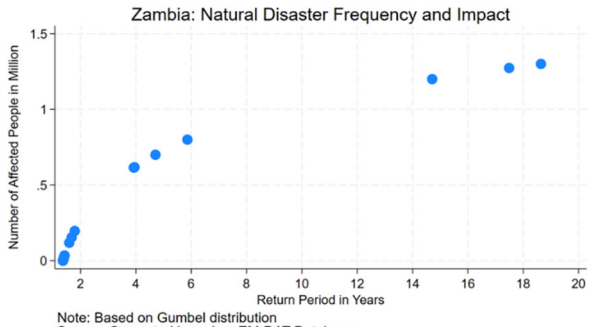
Figure 6. Zambia: Disasters and People Affected



Source: ED-DAT

14. As the risk of both localized and widespread disasters grows, it is crucial for Zambia to invest in climate-smart planning and proactive resilience-building strategies. Strengthening community-level preparedness, enhancing meteorological forecasting capacity, and mainstreaming climate risk into development planning will be essential to reduce vulnerability and improve adaptive capacity in the face of ongoing and future climate challenges. This becomes especially important to respond to rarer events, that have the potential to affect a wider share of a population, as a show by a probabilistic distribution of the frequency of disasters and their impact (Fig. 7).

Figure 7. Zambia: Probabilistic Distribution of Disasters

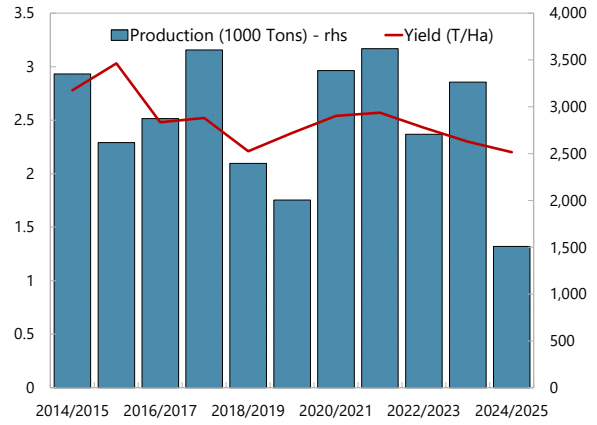


[1] While the EM-DAT remains a key resource with global coverage for understanding disaster events and their impacts, it has its limitations linked with the how disasters are reported and limited number of sources

15. Agriculture is seen as a pillar of Zambia's economy and the primary livelihood for a large share of its the population. While its share of GDP is small (on average 3 percent of GDP in the last decade), it employes ¼ of the work force. However, it remains predominantly rainfed and dominated by the production of the country's staple crop—maize. Most maize is produced by smallholder farmers using traditional techniques and minimal inputs, leaving them vulnerable to shifts in rainfall and temperature. El Niño events significantly impact agricultural productivity, often causing a 30–40% drop in crop yields, particularly for staple crops like maize. These losses directly threaten food security and rural incomes. For instance, the 2023–2024 El Niño-induced drought led to widespread crop failure and a substantial rise in food insecurity, especially in southern provinces.

16. Although Zambia saw earlier gains in maize productivity, yield growth has stalled over the past decade. Between 2002 and 2020, yields increased from 1.3 metric tons per hectare to 2.1 metric tons per hectare, and the area under maize cultivation expanded from 750,000 hectares to 1.7 million hectares (Figure 8). However, average yields remain low by international standards—currently around 2 metric tons per hectare, well below the global average of 5.5 metric tons. While government policies have prioritized food security, a combination of trade restrictions, export bans, high input costs, and infrastructure deficits has hindered the transformation of Zambia's agriculture sector from subsistence-based to export-oriented.

Figure 8. Zambia: Maize Production and Yield



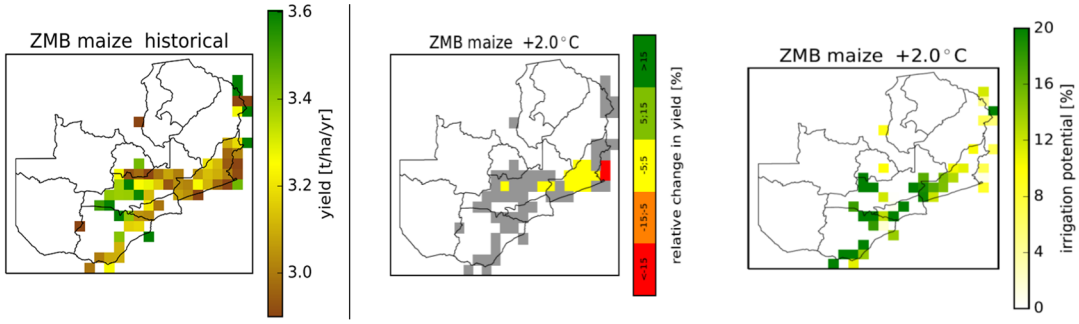
Sources: US Department of Agriculture

17. Irrigation infrastructure covers less than 6 percent of cultivated land, limiting the ability to buffer against droughts[2]. Access to drought and flood resistant seeds, fertilizers, and climate information remains limited, particularly among poor and remote farming communities. Livestock systems are also vulnerable to heat stress and water shortages. Crop failures and livestock losses have cascading effects, including reduced incomes, food insecurity, school dropout rates, and migration from rural to urban areas.

[2] Zambia Country Commercial Guide, International Trade Administration, U.S. Department of Commerce

18. The combination of increasing climate risks and low productivity underscores the need for climate-smart solutions in agriculture to build resilience and safeguard food security. Key interventions include investment in adaptive farming techniques, improved irrigation systems, drought- and flood-resistant seed varieties, and enhanced agricultural extension services. Climate-smart agriculture (CSA) practices—such as conservation agriculture, agroforestry, crop rotation and diversification, and integrated soil fertility management—can significantly improve productivity and resilience. Scaling up CSA will require coordinated public investment, targeted subsidies, strong extension support, and improved access to markets and financial services for smallholders (Fig. 9).

Figure 9. Zambia: Impact in Maize Yields vs Historic with and Without Irrigation



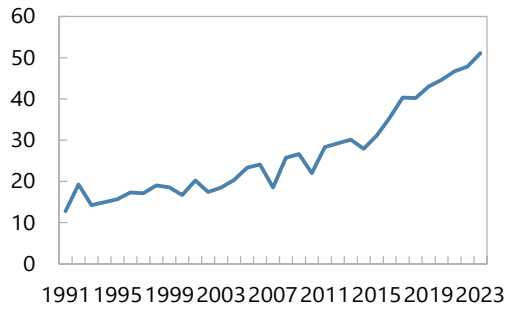
Source: Regiocrop

Notes:
1- Simulated crop yield (t/ha/yr) circa year 2000 (+0.61 ± C above preindustrial). Data are shown for combined present-day irrigated and rainfed harvested areas.
2- Projected change in yield relative to 2000 (a multi-model ensemble median). Yellow areas show small impact level of below 5.5%. When models have different signs, the areas are grey
3- Relative increase in yield (%) if irrigation is applied on present day rainfed harvested areas, assuming no water limitation (note this does not account for actual irrigated water availability).

E. Impact on Energy Generation

19. Zambia generates approximately 80% of its electricity from hydropower, with major plants at Lake Kariba and Kafue Gorge. Declining water levels—most recently during the 2023–2024 drought—severely curtailed generation. At its lowest point, Lake Kariba's output dropped by 80 percent, leading to load-shedding of up to 20 hours per day in urban centers like Lusaka (Fig. 10). This not only disrupted daily life but also constrained industrial production and economic output. The situation was exacerbated by similar droughts in neighboring countries, limiting electricity imports and increasing financial pressure on ZESCO, the state-owned utility.

Figure 10. Zambia: Access to electricity



Source: World Bank

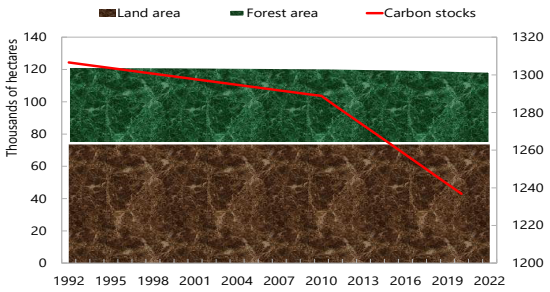
20. Power shortages and load-shedding undermine business operations and deter investment. During the 2015 drought, the Energy Regulatory Board reported that small businesses experienced a 7.3% drop in turnover due to electricity shortages. Operational costs also rose, as many firms turned to diesel generators to sustain production. In the 2024 crisis, ZESCO prioritized power to the mining sector and large manufacturers to cushion the economy, but small and medium enterprises were left more exposed.

21. Hydropower's climate vulnerability has highlighted structural weaknesses in Zambia's energy system. Currently Zambia has over 3,650 MW of installed capacity, but it must expand significantly to meet the government's copper production target of 3 million metric tons annually by 2030—triple current levels. At the same time, rural electrification remains incomplete. Despite progress since the 1990s, only about half of the population has access to electricity (Fig 10).

22. To build energy resilience and meet its development goals, Zambia must diversify its energy mix. Already, independent power producers contribute almost half of the generation capacity and solar, wind, and biomass have significant potential. Expanding off-grid solutions (like solar panels) in rural and semi-urban areas can also reduce vulnerability and increase electricity access. Institutional reforms to strengthen energy governance, returning ZESCO to financial viability by ensuring cost-recovery tariffs, and attracting private investment are essential for sustainable energy development.

23. Zambia has lost approximately 6 percent of its forest area due to the widespread use of wood for fuel and the expansion of cultivated land (Fig 11). Wood fuel—comprising both charcoal and firewood—is the primary source of energy for over 90 percent of Zambian households, particularly for cooking. In rural areas, firewood is the dominant energy source, while urban populations depend more heavily on charcoal. This heavy reliance on wood fuel has contributed significantly to deforestation, posing serious environmental challenges and threatening the long-term sustainability of Zambia's natural resources.

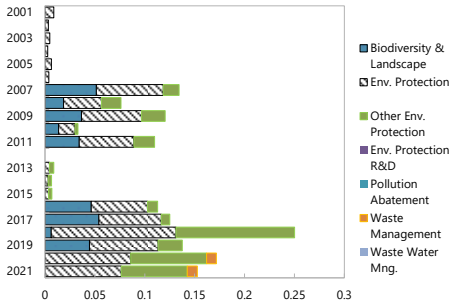
Figure 11. Zambia: Forest and Land Area
(Surf. in '000 of hectares, Carbon Stocks m of tones. RHS)



F. Strengthening Climate Adaptation for Long-Term Resilience

24. Zambia has embarked on a wide-ranging climate adaptation agenda to safeguard its development trajectory and protect vulnerable communities (see Box 1). The government's flagship policy, the National Adaptation Plan (NAP), aligns with Vision 2030 and the Eighth National Development Plan (8NDP), providing a framework for integrating climate resilience across national planning processes. The implementation of these policies is projected to cost approximately $17.2 billion between 2023 and 2030, according to the (NDC) Implementation Framework. These estimated funding needs (of above 8 percent of 2024 GDP) dwarf the current budgetary environmental spending of less 0.2 percent of GDP (Fig. 12). They reflect the scale of Zambia's adaptation needs and spans priority sectors such as agriculture, energy, forestry, water, and disaster risk management.

Figure 12. Zambia: Environmental Expenditure
(In percent of GDP)



Source: IMF staff calculations

Box 1. Zambia's Climate Framework

Zambia continues to embed climate change priorities into its national development agenda, reflecting a strong commitment to climate resilience and low-carbon growth. Since submitting its first Nationally Determined Contribution (NDC), the country has mainstreamed climate objectives into strategies such as Vision 2030 and the Eighth National Development Plan (8NDP), which emphasizes climate-resilient infrastructure to protect livelihoods and economic development. Institutional milestones include the creation of the Ministry of Green Economy and Environment (MoGEE) in 2021 and the passage of the Green Economy and Climate Change Act in 2024. These efforts are supported by frameworks like the National Policy on Climate Change (2016) and the National Green Growth Strategy (2024–2030), which promote adaptation, disaster risk reduction, renewable energy, and energy efficiency. Central to Zambia's adaptation agenda is the National Adaptation Plan (2023), which outlines medium- to long-term priorities for building resilience.

The Green Economy and Climate Change Act (No. 18 of 2024) represents a landmark legal reform. It establishes a framework for domesticating international climate agreements, regulating carbon markets, and creating a national Climate Change Fund. However, full implementation of the Act depends on the issuance of a Statutory Instrument.

Zambia has also developed sector-specific policies and strategies to address climate impacts. These include the National Policy on Environment (2007), National Climate Change Response Strategy (2010), National Forestry Policy (2014), National Energy Policy (2019), National Agriculture Policy (2014), the REDD+ Strategy (2025), Transport Policy (2002), Technology Needs Assessment (2013), and Strategic Plans for Agriculture and Energy (2022–2026).

Zambia is among the few African countries with a robust carbon credit framework, positioning it as a regional leader in carbon market readiness. The Green Economy and Climate Change Act provides the legal foundation for carbon credit generation, trading, and authorization, while promoting transparency, regulatory oversight, and incentives for low-carbon initiatives.

Building on this legal foundation, Zambia has advanced its Carbon Market Framework. This includes guidelines for project development, trading rules, institutional roles, fee structures, and a national carbon registry. Zambia's carbon market holds strong potential for both climate action and investment. With 49 million hectares of forest, Zambia already contributes 6 percent of Africa's and 0.7 percent of global carbon credits. In 2024, the country signed bilateral agreements with Sweden and Norway: Sweden is supporting carbon market infrastructure, while Norway's Global Emission Reduction Initiative is mobilizing private investment in renewable energy, reforestation, and climate-smart agriculture. To realize the full potential of this market, the country must deepen regulatory frameworks, attract private investment, and strengthen institutional capacity.

Despite these gains, Zambia's climate agenda faces implementation challenges. These include limited technical capacity, overlapping institutional mandates, weak rural outreach, and heavy reliance on donor financing. The NDC Implementation Framework (2023–2030) estimates a financing need of $17.2 billion across 11 priority sectors—including energy, agriculture, land use, infrastructure, water, and health—and targets a 25 percent reduction in greenhouse gas emissions by 2030, conditional on external support.

Zambia can benefit from regional experiences to advance its climate adaptation agenda. Rwanda's integration of climate adaptation into national budgeting via its Green Fund (FONERWA) offers a model for operationalizing Zambia's Climate Change Fund. The Gambia's "Aid for Trade" program demonstrates how trade policy can mobilize climate finance. Kenya has combined climate-smart agriculture with crop insurance, drought-resistant seeds, and resilient water infrastructure. Ethiopia's Productive Safety Net links social protection to natural resource management, enhancing rural resilience. Morocco's National Climate Commission provides a strong example of centralized planning and coordination. Together, these approaches offer valuable insights for strengthening Zambia's climate resilience.

25. Adaptation efforts are grounded in a detailed assessment of Zambia's climate risks. Based on the Climate-driven INFORM Risk Index, adapted by IMF staff from the global INFORM Risk framework, ranks Zambia in the second-highest global quintile for climate-driven disaster risk. This index distills climate vulnerability into three dimensions: hazard and exposure, vulnerability, and lack of coping capacity (Fig. 13). Zambia's high-risk score reflects frequent and severe climate hazards—particularly droughts and floods—combined with structural vulnerabilities and limited adaptive capacity.

Figure 13. Zambia: Climate-Driven Inform Risk in 2022

Source: IMF Inform Risk

26. The agricultural sector is a cornerstone of Zambia's adaptation strategy, given its central role in livelihoods and food security. The NAP promotes the adoption of drought-tolerant seeds, climate-smart farming practices, and soil conservation techniques. Expanding irrigation infrastructure and empowering community-based water management are also prioritized to stabilize productivity amid increasing climate variability.

27. Disaster preparedness is another critical pillar. Zambia is strengthening early warning systems, emergency response mechanisms to reduce the impacts of extreme weather events. By aligning adaptation with disaster risk reduction (DRR) frameworks, the country aims to lower long-term exposure to climate shocks and build institutional resilience.

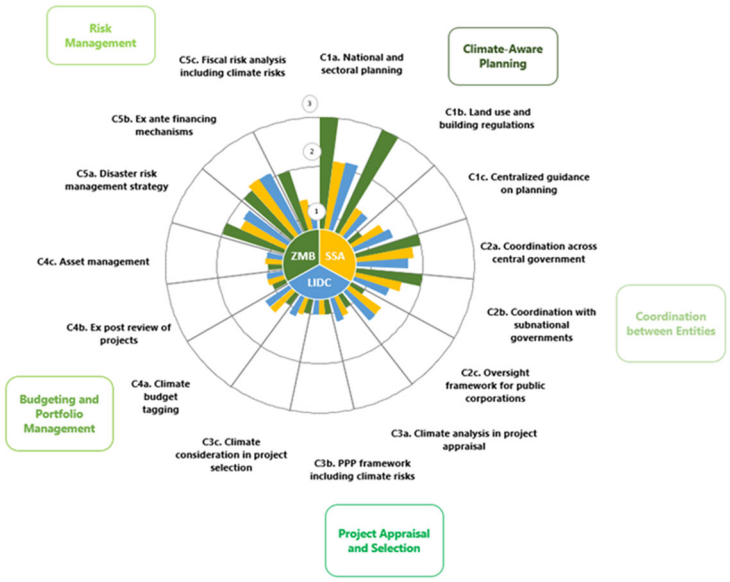
28. In the energy sector, Zambia is seeking to reduce its dependence on hydropower, which is increasingly vulnerable to drought. The adaptation agenda calls for accelerated investment in solar, wind, and other renewable energy sources, with an emphasis on decentralized, off-grid solutions to support rural communities. Diversifying the energy mix is essential for building a more climate-resilient power system and reducing disruptions linked to water scarcity.

29. Zambia's forests, while providing environmental and economic value, are under threat from unsustainable charcoal production. The NAP promotes the use of alternative cooking fuels, such as liquefied petroleum gas (LPG) and electric stoves, to reduce deforestation. Reforestation efforts and sustainable forest management practices are also being scaled up. A key policy priority is the formalization and regulation of the charcoal value chain, which would help reduce illegal logging while improving rural livelihoods. Some small-scale pilot projects in Eastern Province where farmers are provided solar panels, boreholes and irrigation equipment to engage in sustainable agriculture instead of tree cutting have shown promise and could be scaled up.

30. Financing remains a major constraint to implementation. Beyond seeking concessional funding and donor support, Zambia is exploring carbon finance opportunities, including establishing a carbon market framework (see Box 1), to trade carbon credits in exchange for resources for adaptation investments and it has already reached bilateral agreements (Sweden, Norway). It is also documenting the adverse impact of climate change to access financing through the Loss and Damage Fund established at COP28 in 2023.

31. The IMF's Climate Public Investment Management Assessment (C-PIMA) highlights that achieving Zambia's climate goals will require stronger institutional capacity, better coordination, and securing funding. In its first C-PIMA conducted in 2024, Zambia performed relatively well compared to peers in integrating climate considerations into public investment management. It showed strengths in national and sectoral planning, inter-governmental coordination, and disaster risk management. However, weaknesses remain in project appraisal, selection, and in tracking and reporting climate-related investments in the budget (Fig. 14). Of the five C-PIMA pillars, three—climate-aware planning, coordination, and risk management—were assessed as medium, while project appraisal and budgeting were rated low. While regulatory frameworks address climate in urban planning, Zambia lacks centralized guidance on preparing and costing climate-aware investment strategies (see Box 2).

Figure 14. Zambia: Design of Climate Public Investment Management Institutions



Source: IMF C-PIMA

Box 2. Climate Public Investment Management Assessment in Zambia

Zambia's public investment system is showing early progress in integrating climate considerations in its national and sectoral strategies. It compares well with peer countries in areas such as national and sectoral planning, and the integration of climate elements into spatial and urban development frameworks. The IMF's Climate Public Investment Management Assessment (C-PIMA), conducted in 2024, assessed Zambia against five pillars: (i) climate-aware planning, (ii) coordination across the public sector, (iii) project appraisal and selection, (iv) budgeting and portfolio management, and (v) risk management. It found strengths in planning and coordination across central government, as well as in disaster risk and climate-related fiscal risk management. However, it identified important institutional gaps in project appraisal, climate expenditure tracking, and budgeting frameworks.

Three of the five pillars—climate-aware planning, coordination between entities, and risk management—were assessed as medium in both strength and reform priority, suggesting Zambia has a foundation to build upon. In contrast, project appraisal and selection, and budgeting and portfolio management, were both rated low in strength and high in reform priority. This reflects the absence of structured climate analysis in investment decisions and the lack of a climate budget tagging system, making it difficult to identify and monitor climate-related public spending.

Recommendations from the C-PIMA include: integrating climate analysis into project appraisals to improve infrastructure resilience; implementing climate budget tagging to enable tracking and prioritization of climate-related investments; expanding climate risk analysis within fiscal risk statements to better anticipate vulnerabilities; and strengthening institutional coordination to align all public sector entities, including SOEs, with national climate goals.

By addressing these institutional and capacity constraints, Zambia can make meaningful progress toward building climate-resilient infrastructure and ensuring sustainable public investment. While Zambia's Nationally Determined Contributions (NDCs) and National Adaptation Plan provide a strategic direction, their effective implementation requires greater institutional capacity and more targeted climate-related investments.

32. Central and local government coordination frameworks are in place, but climate integration across public enterprises remains limited. Both the NAP and the NDC provide guidance for coordinating climate spending at sub-national levels, but these do not apply to state-owned enterprises (SOEs), which are not required to report GHG emissions or integrate climate objectives in their investment plans. Given their prominence in key sectors like energy, mining, transport, and infrastructure, ensuring SOE alignment with national climate goals is essential for effective resilience-building.

33. Climate risks embedded in long-term infrastructure investments are not systematically addressed. Zambia's adaptation strategy will need to evolve alongside increasing climate uncertainty, particularly as the country seeks to attract PPPs in climate-exposed sectors such as hydropower and roads. The C-PIMA underscores the need for structured frameworks to incorporate climate risks into PPP contracts and recommends establishing clear systems to monitor and report climate-related public spending to improve transparency and accountability.

34. Building buffers and quantifying risks are key to strengthening fiscal resilience. Although Zambia's annual budget includes contingency provisions for climate-related shocks, allocations have been insufficient to meet the costs of natural disasters. Expanding coverage of climate risks in the Fiscal Risk Statement and promoting insurance schemes in vulnerable sectors could help manage and share risks more effectively.

G. Conclusion

35. The intensification of climate risks demands action to protect lives, build resilience, and sustain economic development. However, with the right mix of policies, investments, and support from international partners, Zambia can turn the climate challenge into an opportunity.

36. Strengthening climate adaptation—through resilient agriculture, diversified energy, sustainable forestry, and institutional reforms—are key to enable Zambia to build resilience. International support, especially through climate finance and technology transfer, will be essential to bridge resource gaps. By embedding adaptation into its national vision and planning systems, Zambia can build a more resilient and inclusive development path while contributing to global climate goals.

37. Ensuring consistency between national development objectives and sectoral strategies across all levels of government and the wider public sector is key. As the C-PIMA assessments recommends Zambia should integrate climate considerations into public investment management processes and include mechanisms to track budgetary spending on climate adaptation. Enhancing risk awareness is also essential; this involves including and costing climate risks in the Fiscal Risk Assessment (FRA) to inform sound fiscal planning and decision-making.

38. In the agriculture sector, Zambia should promote drought and flood resistant seeds, crop diversification, and expanding irrigation to reduce vulnerability to erratic rainfall and prolonged dry spells. In the energy sector, efforts should be made to diversify electricity generation

toward renewable sources and to promote alternative fuels for household heating, reducing dependence on charcoal and firewood and helping to combat deforestation.

39. Zambia should also work to improve disaster risk management and early warning systems, enhancing the capacity of institutions and communities to respond effectively to climate-related hazards and increasing public awareness to strengthen preparedness. On the fiscal front, Zambia needs to create fiscal buffers to better absorb the economic shocks caused by climate change. This should be complemented by efforts to enhance general revenue mobilization, including through the use of environmental taxes that can both generate resources and incentivize greener behavior. Finally, Zambia must aim to attract a balanced mix of private and public funding to finance its climate adaptation priorities and advance its green development agenda.

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