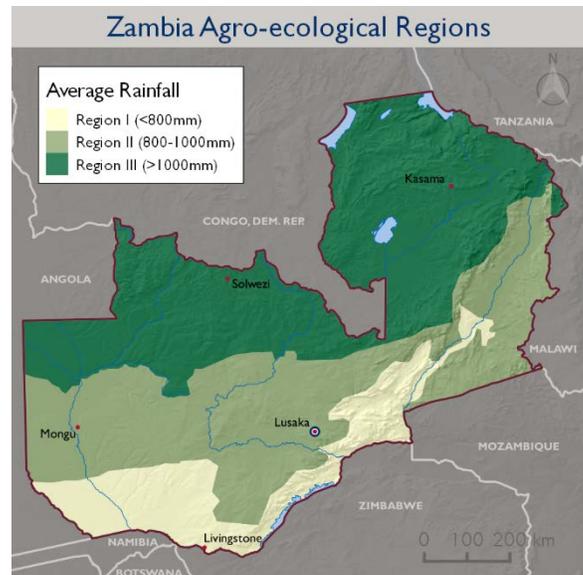




CLIMATE CHANGE RISK PROFILE ZAMBIA

COUNTRY OVERVIEW

Changes in climate pose challenges to Zambia's ongoing efforts to combat poverty, reduce food insecurity and sustainably manage natural resources. Zambia recently graduated to low middle-income status, primarily due to economic growth fueled by the mining sector. Standards of living remain low, however: almost 60 percent of Zambia's population of 13 million live under the poverty line. Droughts and floods have increased in frequency and intensity over the last two decades and adversely impacted food and water security, energy generation and livelihoods. Agriculture, which constitutes 9 percent of GDP, predominantly consists of rainfed, subsistence farming and is thus highly sensitive to changes in climate, as demonstrated by the failure of millet, maize and sorghum crops linked to the 2004–2005 droughts. Productivity and economic growth are slowed by power shortages, namely derived from hydropower, especially in summer months, due to reduced river flows. Extreme climate events also pose a risk to other sectors such as health and infrastructure and to biodiversity conservation. For example, recent floods displaced thousands of families, destroyed houses, washed away roads and contaminated water supplies. (2, 9, 12, 13)



CLIMATE PROJECTIONS



Increase in temperatures of 1.2 to 3.4°C by 2060



More extreme weather, with intense precipitation, floods and droughts



Rainfall variable but total annual averages decreasing

KEY CLIMATE IMPACTS

Agriculture

Waterlogging
Increased crop losses/failure
More pests, weeds, pathogens



Water Resources

Reduced water quality
Reduced water availability during dry season



Human Health

Increased food insecurity
Increased transmission of climate-sensitive diseases such as malaria



Ecosystems

Loss of habitat and species
Reduced ecosystem services
More forest fires



Energy & Infrastructure

Reduced hydropower potential
Disaster-related infrastructure damage



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CLIMATE SUMMARY

Zambia has a predominantly humid subtropical climate with small patches of semi-arid steppe in the southwest of the country. Three climate regions are recognized based on rainfall dynamics and vegetation:

- **Region 1:** Tropical savannas covering the country’s major valleys, including the driest areas of Zambia, with annual rainfall below 600 mm. This is Zambia’s most drought-prone region.
- **Region 2:** Warm semi-arid climates of the Sandveld plateau, the southern provinces of the Kalahari sand plateau and the Zambezi flood plains of the western province; annual rainfall is 800–1000 mm.
- **Region 3:** Humid subtropical climates characterized by annual rainfall above 1200 mm and by highly leached soils.

Despite these differences, all regions experience:

- **Three distinct seasons:** a hot and dry season from August to November, a wet season from November to April and a cool and dry season from May to August.
- **High rainfall variability:** Rainfalls are volatile and subject to the position of the Inter-Tropical Convergence Zone (ITCZ) and the El Niño Southern Oscillation (ENSO), resulting in average precipitation of 150 to 300 mm per month during the wet season. No rain falls between June and August. (4, 9)

HISTORICAL CLIMATE

Key climate changes since the 1960s include:

- Increased temperatures (1.3°C+), especially during the winter (June–Aug).
- Increase in average number of hot days and nights; decrease in average number of cold days and nights.
- Decrease in rainfall averages throughout the year but more marked during the wet season.
- Increased frequency and intensity of extreme weather events such as droughts and floods. (9)

FUTURE CLIMATE

Projected changes include:

- Mean annual temperatures increasing 1.2–3.4°C by 2060, with warming occurring more rapidly in the south and west.
- Substantial increase in frequency of hot days and nights; decrease in cold days and nights.
- Decrease in Sept–Oct rainfall; increase in Dec–Feb rainfall, particularly in the northeast.
- Proportion of rain falling in heavy events expected to increase annually. (9, 12, 14)

SECTOR IMPACTS AND VULNERABILITIES

AGRICULTURE PRODUCTION

Agriculture is the mainstay of rural employment in Zambia and most livelihoods depend on staple crops like cassava and maize, whose yields rely on a timely rainy season and stable temperatures. Increasing temperatures and erratic rainfall patterns have altered crop water requirements, significantly impacting yields. Higher temperatures have also increased the spread and incidence of pests and diseases. Within Zambia, challenges vary between the climate zones. Region 3, typically planted with cassava using slash-and-burn techniques, faces problems related to humidity and waterlogging. In contrast, Region 1 is dominated by maize and livestock, whose productivity is hampered by recurring droughts. Region 2 also faces water availability issues. In addition to negatively impacting production, reduced water availability could adversely impact hydropower-dependent agricultural processing and manufacturing. (12, 15, 16)

Climate Risks and Potential Impacts AGRICULTURE PRODUCTION	
Climate Risk	Potential Impacts
Increased temperatures	Less predictable growing seasons
	Increased pests, weeds and pathogens affecting crops and livestock
Increased rainfall variability	Increased soil erosion
	Limited field operations due to waterlogging
Increased intensity of rainfall	Decreased productivity and crop failure
	Reduced water and feed resources for livestock
Drought	Increased incidence of mortality and heat stress in livestock

WATER RESOURCES

Climate change may exacerbate existing problems related to the uneven distribution of water resources. Located within the Zambezi River basin and Congo River basin, Zambia has abundant surface water and groundwater. Nevertheless, water infrastructure is limited: 35 percent of the population lack access to clean water and 55 percent lack access to sanitation facilities. Water storage potential is negatively impacted by recurrent droughts in summer months, while floods in the north have led to contamination and the spread of waterborne illnesses that affect both humans and livestock. (6, 15)

Climate Risks and Potential Impacts WATER RESOURCES	
Climate Risk	Potential Impacts
Increased temperatures	Reduced recharge rates and lowered water tables, leading to drying of boreholes
Increased intensity of rainfall	Flooding, causing siltation and sedimentation of rivers
Increased drought	Contaminated water sources and reduced access to clean drinking water

HUMAN HEALTH

Zambians already suffer from climate-sensitive diseases such as malaria and diarrhea, the impacts of which climate change will likely compound. Of particular concern is the potential range expansion of disease-carrying vectors such as those that spread malaria, which already affects over 4 million Zambians annually. Cholera is a recurrent problem in peri-urban areas and linked to weather: a 2010 outbreak in Lusaka following heavy rains and flooding reached almost 4,500 cases. Between Jan–May 2016, Zambia recorded 1,179 cases. Furthermore, potential changes in agricultural productivity may exacerbate already high rates of malnutrition and food insecurity. Inadequate health coverage, high poverty rates and fragmented water supply and sanitation all contribute to the health sector’s vulnerability. (7, 11, 15, 17)

Climate Risks and Potential Impacts HUMAN HEALTH	
Climate Risk	Potential Impacts
Increased minimum temperatures	Reduced water quality, exacerbating health and sanitation problems
Increased drought	Spread of waterborne diseases such as cholera (urban areas), diarrhea (urban and southern provinces), and dysentery (southern provinces)
Increased intensity of rainfall events	Changing distribution of vector-borne diseases (e.g. malaria)
	Decreased crop and livestock productivity, leading to increased malnutrition and undernutrition

ECOSYSTEMS

Zambia’s ecosystems and the services they support are stressed by current climate variability. For example, Victoria Falls, a UNESCO World Heritage site, made international headlines in 2015 for its historically low water levels. Although approximately 38 percent of Zambia’s land has protected status, drought and reduced water availability drive wildlife from protected areas into human settlements, inevitably leading to conflicts. Zambia’s forests are already vulnerable in the face of deforestation, a function of agricultural expansion, mining and logging. Droughts and higher temperatures, projected to increase, have negatively impacted the miombo woodlands, which are critical sources for fuel, medicine and fodder. Fire risk in grasslands and the southern baikiaea woodlands (a source of export teak) increases with droughts and higher temperatures. (4, 5, 12, 13)

Climate Risks and Potential Impacts ECOSYSTEMS	
Climate Risk	Potential Impacts
Increased temperatures	Reduced fodder and water availability, leading to loss of wildlife or wildlife migration, causing increased potential for human/wildlife conflict
Increased intensity of rainfall events	Higher incidence of forest fires
Increased drought	Reduced capacity for growth and regeneration of forests
Reduced average rainfall	Changes to wildlife and vegetation diversity and composition
	Lower nutrient levels in rivers, reducing fish stocks and impacting aquatic ecosystems
	Increased number and diversity of pests and pathogens

ENERGY AND INFRASTRUCTURE

Decreased rainfall has exposed Zambia's over-dependence on climate-sensitive energy resources. Hydropower generates the majority of the country's electricity through dams distributed across the Zambezi and Kafue Rivers. Reduced river flows, especially in summer months, negatively impact energy production potential, which trickles down to reduced productivity in the industrial sector. Forest biomass is an important energy source for the rural population. Flash floods and heavy precipitation, especially in the north, damage roads, bridges and culverts already compromised by poor construction and lack of maintenance. (1, 6, 10, 12)

POLICY CONTEXT

INSTITUTIONAL FRAMEWORK

According to the newly approved National Policy on Climate Change, the Council of Ministers is the supreme decision-making body for overseeing climate change interventions, advised by the Steering Committee of Permanent Secretaries. The Ministry of Lands, Natural Resources and Environmental Protection (MLNREP) is the UNFCCC focal point and lead institution in overseeing implementation of the policy. A department of climate change will be established in the MLNREP to fulfil this function as well as take over the relevant functions of the Interim Inter-Ministerial Secretariat for Climate Change (IIMSCC), a semi-autonomous governing body that coordinates national efforts and strategic planning related to climate change.

Climate Risks and Potential Impacts ENERGY AND INFRASTRUCTURE	
Climate Risk	Potential Impacts
Drought and reduced rainfall	Reduced hydropower generation capacity
	Increased vulnerability of energy and physical infrastructure to extreme rainfall events (i.e., damage to bridges, railways and roads)
	Available forest biomass for energy generation at risk of reduction from increased incidence of wildfires and drought
Increased frequency of strong rainfall events	

The new Ministry of National Development Planning shall be responsible for overall coordination of climate change in the national development planning processes. The Ministry of Finance manages finances for climate change activities and currently houses IIMSCC. (1, 5)

NATIONAL STRATEGIES AND PLANS

- [Initial National Communication](#) (2002) and [Second National Communication](#) (2013)
- [National Adaptation Programme of Action](#) (2007)
- [National Policy on Climate Change](#) (2016)
- [National Climate Change Response Strategy](#) (2010)
- Other related sectoral policies include the [National Policy on Environment](#), the [National Forestry Policy](#), the [National Energy Policy](#), the [National Agriculture Policy](#), and the [Second National Biodiversity Strategy and Action Plan](#).

KEY RESOURCES

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 15. World Bank. n.d. [Data: Zambia](#).
 16. World Food Programme. n.d. [Zambia Overview](#).
 17. World Health Organization. 2011. [Cholera Country Profile: Zambia](#).
- Map modified from: Ministry of Lands, Natural Resources, and Environmental Protection. 2013. [Second National Communication to the UNFCCC](#).

SELECTED ONGOING EXPERIENCES

Selected Program	Amount	Donor	Year	Implementer
United Nations Joint Programme on Climate Change and Disaster Risk Reduction	\$20 million	UNDP	2012–2015	Zambia Ministry of Finance
Strengthening Climate Resilience (PPCR Phase II) Project	\$36 million	Climate Investment Fund/World Bank	2013–2019	Zambia Ministry of Finance
Strengthening Climate Resilience in the Kafue River Basin	\$39 million	Climate Investment Fund/African Development Bank	2013–2019	Zambia Ministry of Finance/National Climate Change Secretariat
Food Security Research Project (FRSP), Phase III	\$12.5 million	USAID	2010–2015	Michigan State University
Commercial Agribusiness for Sustainable Horticulture (CASH)	\$4.8 million	USAID	2012–2016	Agribusiness in Sustainable Natural African Plant Products (ASNAPP)
Production, Finance & Technology (PROFIT+)	\$24 million	USAID	2012–2016	ACDI/VOCA
Mawa: Zambia Economic Resilience for Improved Food Security (ZERS)	\$10 million	USAID	2012–2017	Catholic Relief Services
Community-Based Forest Management Program	\$14 million	USAID	2014–2018	Tetra Tech
Famine Early Warning Systems Network Zambia Program		USAID	Ongoing	Chemonics
Integrating Climate Change in Water Resources Monitoring and Planning	\$3.3 million	GIZ	2012–2017	Zambia Ministry of Mines, Energy and Water Development
Adaptation to climate change and variability in agro-ecological region I and II	\$13.5 million	UNDP	2009–2014	Ministry of Agriculture