



Climate Change Adaptation in ZAMBIA

Climate variability is already affecting Zambia, and projected climate change impacts include rises in temperature, shifts in precipitation, and possible increases in the frequency and intensity of weather events. Changes in climate may exacerbate preexisting socio-economic development challenges, with implications for Zambia's most vulnerable sectors, including food security, human health, water resources, and forestry. The Government of the Republic of Zambia (GRZ) and the donor community have initiated activities to help determine priority climate impacts and vulnerabilities, adaptation strategies, and means to integrate this knowledge into development and sectoral planning. Despite these efforts, a number of challenges and needs remain. These include collecting additional climate-related data, monitoring climate change impacts, moving from the development of adaptation plans to their implementation by the line ministries, and addressing capacity and financial constraints to adaptation.



CLIMATE IMPACTS AND VULNERABILITY

Historic Weather and Climate

Observations indicate:

- Temperatures have warmed by 1.3°C since 1960, at an average rate of 0.29°C per decade.
- Since 1960, there has been an average decrease in annual rainfall of 1.9 mm per decade.
- There has been an increase in the frequency and intensity of drought and flooding events.

Projected Weather and Climate

Projections for Zambia vary across models depending on assumptions; however, the majority of climate models suggest:

- Annual temperature increases, above the 1970-1999 average, of 1.2-3.4°C by the 2060s and 1.6-5.5°C by the 2090s.
- An overall decrease in annual rainfall, and an increase in the frequency and intensity of heavy rainfall events during the rainy season.

KEY SECTOR VULNERABILITIES

Food Security

Agriculture in Zambia accounts for 18-20 percent of the country's gross domestic product, employs approximately two-thirds of the country's labor force, and is a key source of livelihoods for 50 percent of the country. Approximately 12 percent of total land area is suitable for arable use and over 80 percent of the country's farmers are subsistence farmers. Most of the country's farms, located in central, south, and southwestern Zambia, have become increasingly prone to drought and have received low, unpredictable, and unevenly distributed rainfall over the last 20 years. As agricultural and livestock production are largely dependent on rainfall, the country's high rainfall variability and limited irrigation capacity make them vulnerable to climate change. The rising frequency of drought and shorter rainy seasons has led to increasing crop loss and food insecurity. Higher temperatures and greater frequency of drought may also degrade grazing land and lead to loss of livestock, with negative consequences for food security. Floods from heavy rainfall events are also threatening food production, particularly in northern Zambia. Recorded effects of past floods on agriculture include inundation of farmland, destruction of crops, increased malnutrition and hunger; soil erosion, reduced cultivatable land, and loss of livestock.

Water Resources

Zambia has a relatively abundant supply of surface water and groundwater. However, surface water is unevenly distributed throughout the country, and the southern region often experiences water shortages. During drought periods and following declines in precipitation, there have been reductions in the flow and volume of rivers, streams, and lakes, which have affected the accessibility and availability

of surface water and groundwater for drinking, agriculture, livestock rearing, other human activities, and fisheries. Reduced access and availability of water resources also impact hydroelectric power in Zambia. With rising temperatures, the rate of evapotranspiration—the transfer of water from the earth's surface into the atmosphere—can increase. In addition, Zambia has experienced increases in heavy rainfall and flooding events in recent years, which can increase siltation of water sources, and carry pollutants such as fertilizer and chemicals, contaminating water sources and exacerbating health and sanitation problems. Non-climate stresses affecting water resources include pollution from mining, industries, and households; inadequate sanitation facilities, particularly in cities; and increased demand for water sources for household, agricultural, and industrial use.

Health

Climate variability has already begun to affect health in Zambia, and climate change, particularly warmer temperatures, droughts, and floods, is likely to directly and indirectly exacerbate current impacts. Climate-sensitive diseases that have persistently increased mortality and morbidity rates in urban and rural Zambia include malaria, diarrhea, cholera, and respiratory infections, with malaria having the highest rate of incidence. In light of increases in heavy rainfall events and rising temperatures, both of which facilitate mosquito breeding, the spread of malaria is of particular concern. Increases and changes in geographic coverage and survival of mosquito populations may expose more of the Zambian population, including some that previously may not have been exposed to the disease. A recent study on cholera in Lusaka, Zambia found that outbreaks were strongly associated with the quantity of precipitation, with increased precipitation linked to greater occurrence of cholera. Poor drainage systems, contaminated water, and lack of access to potable water also contribute to cholera and diarrhea outbreaks. Non-climate stresses, such as inadequate health care facilities and providers, high poverty levels, poor water supply and sanitation, food insecurity, and poor nutrition, exacerbate the impacts of climate change on public health. Zambia's high rate of HIV/AIDS places further strain on individual health and livelihoods, the provision of public health services, and food demand, as the disease raises the nutritional requirements of those affected, increasing the need for food, even as climate change impacts increase pressure on crop yields and livestock.

KEY ECOSYSTEM VULNERABILITIES

Forests and Grasslands

Zambia's grasslands and forests are of ecological, economic, and social importance, especially for rural populations. They provide food, fodder, fuel, and medicinal products to communities dependent on them for their health and livelihoods. Shrublands, savannas, and grasslands comprise about 49 percent of total land area, while forests account for approximately 16 percent of the country's land area. Forest ecosystems also provide habitats for the nation's extensive wildlife, which are an important attraction for foreign tourists. Warmer temperatures, drought, and declines in precipitation may lead to a loss of vegetation and soil degradation, higher incidence of forest fires, and introduction of a range of pests and pathogens which can impact tree growth and survival. More intense rainfall and flooding events can cause land and soil erosion. Non-climate stresses that further exacerbate the effects of climate change on forests and grasslands include increasing demand for fuelwood and charcoal for heating and cooking, clearing of forest land for agricultural expansion, greater demand for timber, and unsustainable land use practices.

Wildlife

Over 30 percent of Zambia's land is managed in protected areas, including 19 game parks covering 8 percent of the country's land area and 34 game reserves covering 22 percent. The park system and the wildlife it supports is a major draw for foreign tourism, which is an important source of livelihoods and economic growth in the country. Droughts and decreases in rainfall may cause losses in soil moisture and fertility, increase water scarcity, and reduce the quality of fodder that wildlife populations depend upon for survival. Changes in precipitation, temperature, and forest fires may reduce wildlife diversity and abundance, and alter the ecosystems and habitats they depend on for survival. Droughts and reduced rainfall may increase uncontrolled wildlife migration into areas with human settlements, while flooding events enable animals such as crocodiles to swim and move onto fields and areas where they may threaten the lives of villagers. Non-climate change factors, such as increased agricultural activity near rivers and unprotected wildlife habitats, affect animal populations and also increase the likelihood of potential human/wildlife conflict.

NATIONAL STRATEGIES, PLANS AND INSTITUTIONS RELEVANT TO CLIMATE CHANGE

National Strategies and Plans

- Initial National Communication (2004): Provides resources for the inventory of greenhouse gases and initial vulnerability and adaptation assessments. The Second National Communication is currently being prepared.
- National Adaptation Programme of Action (NAPA) (2007): Identifies the sectors most vulnerable to climate change and recommends relevant stakeholders, policies, programs, and projects that can help address the impacts of climate variability and change in the country.
- National Climate Change Response Strategy (NCCRS) (2010): Provides a comprehensive national institutional and implementation framework through which climate change adaptation, mitigation, technology, financing, public education, and awareness-related activities in Zambia can be coordinated and harmonized. It also emphasizes the importance of focusing on the most vulnerable sectors of the economy and mainstreaming climate change into development plans.

Institutional Framework

- The Department of Environment and Natural Resources, under the Ministry of Tourism, Environment and Natural Resources (MTENR), is the climate change focal point under the United Nations Framework Convention on Climate Change.
- The Climate Change Facilitation Unit, established by the MTENR, serves to strengthen national coordination of all efforts related to climate change, including integrating climate change into national strategic planning.
- The Disaster Mitigation and Management Unit, housed by the Office of the Vice President, focuses on strengthening national capacity for effective disaster preparation, response, mitigation, and rehabilitation.
- The Zambia Meteorological Department (ZMD) is the country's primary provider of meteorological services. The department is charged with monitoring, predicting, analyzing, and providing weather and climate change-related data and information, as well as providing advice and assessments for related policy formulation.

GOVERNMENT ADAPTATION PRIORITIES

Zambia's NCCRS identifies agriculture, food security, fisheries, water, forestry, wildlife, health, mining, tourism, human settlements, and physical infrastructure as priority sectors for adaptation based on their economic vulnerability and national development priorities. Priority projects presented in the NCCRS and NAPA include:

- Improving the ZMD's Early Warning System to facilitate timely dissemination of weather information so as to enhance preparedness.
- Promoting better land and critical habitat management.
- Diversifying crops and livestock to improve nutrition and food security.
- Promoting alternative sources of livelihood to reduce vulnerability to climate change and vulnerability.
- Enhancing water management to withstand erratic rains through water harvesting, water conservation, and small-scale irrigation.
- Renovating and rehabilitating existing health infrastructure.
- Climate-proofing sanitation in urban areas.

The NCCRS and NAPA highlight the following as priorities for Zambia's adaptation planning efforts: increasing technical capacity at all levels of the government to conduct adaptation planning; promoting adoption of adaptation efforts among line ministries; improving national data collection and monitoring, with greater investment in meteorological services; increasing knowledge management in technical areas; and increasing stakeholder participation and the dissemination of climate change information. These investments will allow for greater understanding of country-specific vulnerabilities. They will also provide increased capacity to assess sector-specific as well as sub-regional vulnerabilities necessary to support better prioritization of adaptation resources.

KEY PLAYERS AND INITIATIVES

The few donor-supported, adaptation-specific activities that have been implemented to date in Zambia have primarily focused on: developing strategies and plans, carrying out assessments, integrating adaptation into general development and sector initiatives, and raising awareness on climate change issues.

Title	Lead Organization	Funding Source
Initiatives		
Adaptation to the effects of drought and climate change in Agro-ecological Zones 1 and 2 in Zambia (2009-13)	United Nations Development Programme (UNDP)/Ministry of Agriculture and Cooperatives	GRZ/UNDP/Global Environment Facility (GEF): Least Developed Country Fund
Community Markets for Conservation Phase II Scaling up across the Luangwa Valley (increasing farmers resilience to climate change) (2008-10)	Wildlife Conservation Society of Zambia	Government of Norway
UN Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation (UN-REDD) (2010-13)	UNDP/Food and Agriculture Organization/United Nations Environment Programme (UNEP)	UN-REDD Multi-donor Trust Fund
Capacity Development for Sustainable Utilization of Environmental	MTENR/Zambia Wildlife Authority/ Environmental Council of Zambia/ZMD	UNDP
Pilot Program for Climate Resilience	Ministry of Finance and National Planning of GRZ/World Bank/African Development Bank/ International Finance Corporation/ UNDP/United Kingdom Department for	Climate Investment Fund

PRIORITY CHALLENGES AND CONSTRAINTS FOR ADDRESSING VULNERABILITY AND INCREASING RESILIENCE

Data, research, and capacity needs include:

- Carrying out climate change data collection and monitoring.
- Improving training for policymakers and other relevant stakeholders on tools for developing climate scenarios and analyzing vulnerability.
- Improving inter-ministerial and inter-institutional coordination to facilitate implementation and mainstreaming of cross-cutting environmental and climate change programs, plans, and policies.
- Increasing public awareness on climate change and its potential impacts on social and economic development, livelihoods, and ecosystems.
- Developing clear and specific legal and policy frameworks for climate change to help direct adaptation planning.

In order to better address hurdles the GRZ faces in mainstreaming climate change adaptation, implementing adaptation plans and strategies in government activities, and through line ministries is critical. In relation to financial resources, lack of funding for climate change adaptation limits the implementation of adaptation measures that will facilitate the integration of climate considerations into social and economic development, national poverty reduction, and growth objectives threatened by climate change and climate variability. Increased funding will not only support necessary climate change adaptation efforts and initiatives, it will contribute to strengthening the capacities of decision makers and stakeholders to work towards and achieve climate resilience and sustainable development goals in Zambia.

KEY SOURCES

Government of the Republic of Zambia. National Climate Change Response Strategy [Internet]. Gov. of Zambia, Lusaka; 2010 [cited 2011 Jun 25]. Available from: http://www.tzdp.gov.zm/uploads/media/Zambia_CC_strategy_2010.pdf.

Government of the Republic of Zambia—Ministry of Tourism, Environment and Natural Resources. Formulation of the National Adaptation Programme of Action on Climate Change (Final Report) [Internet]. Gov. of Zambia; 2007 [cited 2011 Jul 27]. Available from: <http://www.adaptationlearning.net/sites/default/files/zmb01.pdf>.

Kasali G. Capacity Strengthening in the Least Developed Countries (LDCs) for Adaptation to Climate Change (CLACC): Climate Change and Health in Zambia [Internet]. CLACC; 2008 [cited 2011 Nov 20]. Available from: <http://www.clacc.net/HumanHealth/Health%20report08-final/HealthStudy-WorkingPaper2Zambia.pdf>.

McSweeney C, New M, Lizcano G. UNDP Climate Change Country Profiles: Zambia [Internet]. School of Geography and Environment—University of Oxford and Tyndall Centre for Climate Change Research ; 2008 [cited 2011 Jun 25]. Available from: <http://country-profiles.geog.ox.ac.uk>.

Republic of Zambia—Ministry of Energy and Water Development. National Water Resources Report. Republic of Zambia, Lusaka; 2008 [cited 2011 Jul 27]. Available from: <http://country-profiles.geog.ox.ac.uk>.