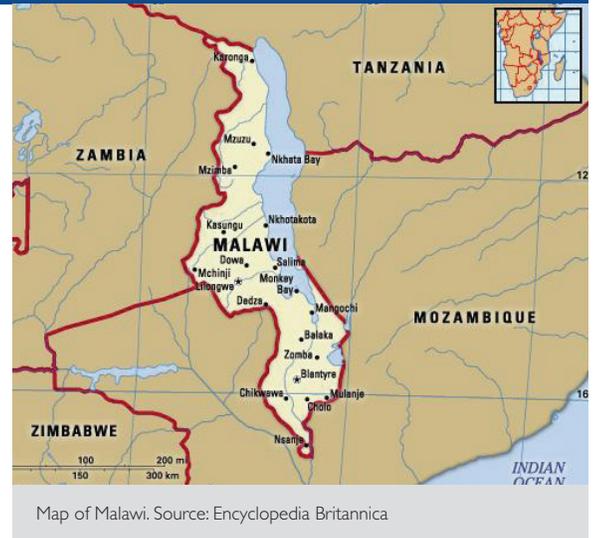




Climate Change Adaptation in MALAWI

Climate variability and change are already affecting Malawi, which has experienced a greater incidence of dry spells and intense rainfall events over the last two decades. These changes have led to an increase in the frequency of floods, droughts, and pest and disease outbreaks, with severe economic and social consequences. With projected increases in temperatures, more erratic precipitation patterns, and increasing frequency and intensity of extreme weather events, already-distressed economic and social systems in Malawi are likely to become more strained. In recognition of the increasing climate-related challenges, the Government of Malawi and the donor community have initiated activities to determine vulnerability and adaptation priorities, and to integrate this knowledge into development and sectoral planning. A number of challenges remain, however; including mainstreaming adaptation concerns into ministerial-level planning and activities, increased data collection and monitoring of climate-related changes, and addressing capacity and financial constraints to carry out adaptation at the local level.



CLIMATE IMPACTS AND VULNERABILITY

Historic Weather and Climate

- Observations indicate that average annual temperatures have risen 0.9°C since 1960, an average rate of 0.21°C per decade.
- Changes in patterns of El Niño, associated with low rainfall and droughts, and La Niña, associated with intense rainfall and floods, have increased climate variability and unpredictability.
- Long-term precipitation trends have been difficult to establish for Malawi given the high degree of intra- and inter-year variability in rainfall.
- There has been a noted increase in the frequency of flooding and drought events.

Projected Weather and Climate

While projections for Malawi vary across models depending on assumptions, the majority of climate models suggest:

- An increase in average annual temperatures from the 1970-99 average of 1.1-3.0°C by the 2060s, and of 1.5-5.0°C by the 2090s.
- Projected changes in annual precipitation for the 2030s range from a decrease of 13 percent to an increase of 32 percent from the 1970-99 average.
- Even with an estimated increase in total annual rainfall, the number of rainfall events is likely to decrease, with significant increases in the intensity of each episode.
- There will be an increase in the frequency of droughts and floods.

KEY SECTOR VULNERABILITIES

Agriculture and Food Security

Malawi's agriculture sector and food security are vulnerable to the impacts of climate change, primarily due to increased uncertainty in precipitation patterns and in the frequency of extreme weather events, such as droughts and floods. An increased frequency of both drought and flooding will reduce the production of staple crops, directly impacting food security, health, and nutrition. Maize, a staple crop for Malawi, is particularly vulnerable to drought and changes in seasonality of the rains. Drought will also have a significant effect on Malawi's export earnings and will negatively influence other sectors of the economy by affecting downstream food processing. In total, droughts and floods are estimated to reduce Malawi's economy by 1.7 percent of GDP each year, or US\$22 million in 2005 dollars.

Water Resources

The projected increases in both droughts and floods are likely to cause stress on the country's water resources. Flooding can increase siltation and debris collection behind large dams, which can have a significant impact on power generation. Siltation is exacerbated by

Malawi's high level of deforestation. Severe droughts can cause a reduction in power production by reducing available water resources. Droughts can also lead to localized depletion of groundwater, making local boreholes insufficient to reach dropping water tables, which recede during droughts. This may mean that more dams and ponds are needed to adequately recharge aquifers and serve as a source of water during droughts. National strategies need to consider the implications of current and potential climate change vulnerabilities and fully integrate these implications into broader development and sector-specific planning.

Health

Increased temperatures, droughts, and floods will result in a range of direct and indirect impacts to health, as highlighted in the table below. Malaria is of particular concern as warmer temperatures will create a climate more suitable for the transmission to populations at higher altitudes, which historically have not been exposed to the disease.

Impact Mode	Impacts	Consequences
Direct	<ul style="list-style-type: none"> Altered frequency and/or intensity of other extreme weather conditions (droughts, floods, storms, etc.). 	<ul style="list-style-type: none"> Deaths, injuries, and damage to public health infrastructure.
Indirect (due to disturbances of ecological systems)	<ul style="list-style-type: none"> Effects on ranges and activity of vectors and infective parasites. Altered local ecology of water- and food-borne infective agents. Altered food (especially crop) productivity due to changes in climate, weather, and associated pests and diseases. Impacts of the quantity, quality, and distribution of freshwater, including localized lowering of the water table. Social, economic, and demographic dislocations due to adverse climate change impacts on the economy, infrastructure, and resource supply. 	<ul style="list-style-type: none"> Change in the transmission zones of mosquito-borne diseases and the numbers of people infected. Changed incidences of diarrhea and infectious diseases such as cholera. Regional malnutrition and hunger with consequent impairment of child growth and development, especially in vulnerable communities. Injuries, increased risk of various infectious diseases (due to migration, overcrowding, contamination of drinking water). Asthma and allergic disorders, other acute and chronic respiratory disorders and deaths. Wide range of consequences affecting public health (e.g.

Additionally, Malawi has one of the highest rates of HIV/AIDS in sub-Saharan Africa. The disease has an effect on households' ability to cope with climate change by reducing available labor and income, reducing local knowledge and skill base, and increasing healthcare expenditures. HIV/AIDS also increases the nutritional requirements of infected populations, increasing demand for food even as climate change enhances the pressures on food production.

KEY ECOSYSTEM VULNERABILITIES

Forests

Forest ecosystems in Malawi provide resources and services that are critical for the health and livelihoods of communities and for the greater economy. Forests have been negatively affected by decades of deforestation, which has been driven by clearing for agriculture, particularly for tobacco plantation, fire wood, and charcoal production. The reduction in tree cover has localized impacts on the land's ability to absorb and slow water during floods. The reduction of forests in Malawi also reduces the safety net of last resort for many rural inhabitants, as many poor farmers in southern Malawi use forests to cope with climate variability by using them as an important source of food and cash during food shortages and crop failures.

Aquatic Ecosystems

Aquatic freshwater ecosystems are of fundamental importance to the health and livelihoods of many citizens of Malawi, and they host exceptionally high biodiversity. Freshwater lakes also serve as a significant source of potable water and support the fishing industry. These critical resources are under pressure from a number of non-climate stressors, such as overexploitation of fisheries. Other non-climate stressors, such as poor land management and deforestation, have also had consequences for Malawi's aquatic ecosystems. New threats, such as nutrient loading from cage aquaculture and coal and uranium mines, may pose a risk in the future.

Climate change can aggravate these impacts and have negative consequences on fish stocks and the biodiversity of Malawi's fisheries. The increased frequency of floods and droughts has accelerated the loss of habitat, which in turn has caused the disappearance of some species. Increasing water temperatures may also be affecting the declining fish populations through disruptions in nutrient cycling. Malawi lacks the needed monitoring of fish stocks to provide a means of early warning to inform the formulation of local and national strategies to deal with the threats. Information on Malawi's fish stocks is essential for effective adaptation planning and better sustainable management of Malawi's aquatic resources.

NATIONAL STRATEGIES, PLANS AND INSTITUTIONS RELEVANT TO CLIMATE CHANGE

National strategies and plans

- Initial National Communication (2002): Provides an inventory of greenhouse gas emissions, a vulnerability and adaptation assessment, a mitigation and abatement analysis, plans for education and public awareness, and potential adaptation and mitigation projects.
- National Adaptation Programme of Action (NAPA) (2006): Evaluates various adaptation projects based on criteria such as costs in terms of human impact, likelihood of irreversible change, imminence of threat on development and livelihoods, removal of triggers for socioeconomic and environmental deterioration, and enhancement of system properties such as improving the threshold of adverse effects.

Institutional Framework

The Environmental Affairs Department (EAD) is the mandated government body responsible for coordinating Malawi's environmental policies and programs. The EAD is responsible for coordinating NAPA projects, with line ministries implementing specific projects. The EAD also acts as the lead climate change planning organization for the Government of Malawi. Another relevant government agency influencing environmental policy and implementation is the Cabinet Committee on Health and Environment, which is the highest level executive decision-making entity for environmental affairs. The National Council for the Environment is a government watchdog that ensures coordination with various stakeholders, promotes compliance with environmental regulation, and monitors development projects to ensure the incorporation of environmental concerns.

GOVERNMENT ADAPTATION PRIORITIES

The NAPA identified and rank-ordered clusters of projects and interventions that are most urgent for Malawi's adaptation to climate change. Due to the vulnerability of Malawi's population to famine and general risks related to food insecurity, the NAPA favors food and water security-related interventions. Very little progress has been made related to implementation of these projects, primarily due to the lack of funding. NAPA-related projects with particular relevance to USAID initiatives include:

- Developing improved crop varieties, improving farmer choice, and increasing access to those varieties
- Strengthening extension services to improve information flow to farmers
- Enhancing community storage systems for seed and food reserves
- Promoting low-cost nutritional supplements
- Diversifying crops and livestock to improve nutrition and food security
- Improving access to water, including water treatment works
- Enhancing water management to withstand erratic rains through water harvesting, water conservation, and small-scale irrigation

KEY PLAYERS AND INITIATIVES

The few donor-supported, adaptation-specific activities that have been implemented to date in Malawi have primarily focused on strategies, plans, or assessments; integrating adaptation into general development and sector initiatives; and raising awareness of climate change issues. Listed below are organizations and national institutions that are vital to climate change adaptation in Malawi.

NAPA Project Clusters Based on Urgency

1. Improving community resilience through the development of sustainable rural livelihoods.
2. Restoring forests in the Upper, Middle, and Lower Shire valleys.
3. Improving agricultural production under erratic rains and changing climatic conditions.
4. Improving Malawi's preparedness to cope with droughts and floods.
5. Improving climate monitoring to enhance Malawi's early warning capability and decision-making.
6. Improving sustainable utilization of Lake Malawi and its lakeshore.

Organization	Mission	Role in climate adaptation
Department of Climate Change and Meteorological Services	Provide climate and weather information and services	Produces climate change scenarios; improves forecasting and early warning
Department of Poverty and Disaster Management Affairs	Direct disaster management activities	Improves preparedness and response to changing disaster risks
Ministry of Agriculture and Food Security	Promote agricultural and rural development	Educates and promotes adaptation practices
Ministry of Irrigation and Water Development	Ensure the provision and equitable access to water	Ensures water supply as climate threats increase
Malawi Red Cross Society	Reduce human suffering	Reduces vulnerability of those at risk; increases preparedness for more frequent disasters
National Smallholder Farmers' Association of Malawi	Empower and represent farmer interests	Promotes adaptation practices; increases access to risk pooling schemes
Environmental Affairs Department of the Ministry of Natural Resources and Environment	Serve as the focal point for the United Nations Framework Convention on Climate Change (UNFCCC)	Coordinates climate change adaptation planning for the government of Malawi

PRIORITY CHALLENGES AND CONSTRAINTS FOR ADDRESSING VULNERABILITY AND INCREASING RESILIENCE

Climate change data collection and monitoring continue to be a challenge in Malawi. There are notable vacancies in weather monitoring stations and a need for greater monitoring of fish stocks and water quality in Lake Malawi and in other parts of the country, which are necessary to assess the potential impact of climate change on aquatic resources. The government is aware of the needs for increased monitoring, and the opportunity exists to aid it as it attempts to increase its capacity to monitor the impacts of climate change. Additional needs include the mainstreaming of climate change adaptation in national development planning and increasing the resources and skills at the local level to improve planning for climate change and environmental management.

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