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FACT SHEET

CLIMATE CHANGE RISK PROFILE
GHANA

COUNTRY OVERVIEW

Ghana is one of Africa's fastest growing economies and has made significant strides in poverty reduction. Economic growth since 2010 has been fueled by high commodity prices and new-found wealth in offshore oil. But Ghana's high GDP growth rate of 14 percent in 2011 could not be sustained: it fell to 4 percent in 2014 and 3.9 percent in 2015. Climate variability and change are partly responsible, posing a threat to future growth and development. Rising sea levels, drought, higher temperatures and erratic rainfall negatively impact infrastructure, hydropower production, food security and coastal and agricultural livelihoods. One-quarter of the population lives along the coast in rapidly expanding urban areas like Accra, and are especially vulnerable to flooding and waterborne disease. Drought and reduced rainfall threaten access to reliable power sources, already erratic and insufficient. Despite the country's recent transition to an industry and services-oriented economy, 45 percent of the workforce still depends on rainfed agriculture. The fisheries sector contributes 4.5 percent to GDP and is another important source of income and nutrition, providing livelihoods for as many as 2.2 million people. Ghana's Northern Savannah Ecological Zone, where significant agricultural production is centered and poverty is most severe, is likely to see increased impacts from climate change. (1, 11)

CLIMATE PROJECTIONS

1.4–5.8°C increase in temperatures by 2080

4 percent decrease in rainfall by 2040

75–190 mm rise in sea levels by 2100

KEY CLIMATE IMPACTS

Agriculture
Increased crop loss/failure
Shorter growing season
Loss of arable land

Fisheries
Reduced productivity
Loss of income and key protein source

Water Resources
Decline in water quality and availability
Potential for increased political tensions around transboundary water use

Energy
Reduced hydropower production
Interrupted services; increased costs

Human Health
Increased risk of vector- and waterborne diseases
Exacerbation of respiratory diseases

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This document was prepared under the Climate Change Adaptation, Thought Leadership and Assessments (ATLAS) Task Order No. AID-OAA-I-14-00013 and is meant to provide a brief overview of climate risk issues. The key resources at the end of the document provide more in-depth country and sectoral analysis. The contents of this report do not necessarily reflect the views of USAID.

CLIMATE SUMMARY

Ghana has a tropical climate that follows the country's varied topography. Annual rainfall ranges from 1100 mm in the north to about 2100 mm in the southwest. The northern part of the country has one rainy season that extends from May to September; the south has two rainy seasons – the first lasts from April to July and the second from September to November. Like several other countries in West Africa, the dry season (December to March) brings the arid and dusty *harmattan* winds that blow from the Sahara Desert, and is marked by low humidity, hot days and cool nights. Average annual temperatures are around 26°C, with higher temperatures in the north and during the dry season. The area between the forest in the southwest and the savanna in the north is vital for domestic food production, due to more reliable rains and an extended growing season. (7)

HISTORICAL CLIMATE

Climate trends since the 1960s include:

- Increase in average annual temperatures of approximately 1°C (an average increase of 0.21°C per decade).
- Increase in the average number of "hot" nights per year (73), with the rate of increase most pronounced from September to November.
- Although interannual and interdecadal rainfall levels were highly variable, overall rainfall saw a well-defined cumulative reduction of 2.4 percent per decade.
- Increase in sea surface temperatures (precise data are not available).
- Rise in sea level of 63 mm over the past 30 years.
- Average coastal erosion of 1.13 m per year.

FUTURE CLIMATE

Projected climate changes include:

- Increase in average annual temperatures between 1.4–5.8°C by 2080, with the greatest increases in the north.
- Increase in the frequency of hot days and nights of 18–59 percent by 2060.
- Decrease in overall rainfall of 4.4 percent by 2040. More erratic and intense rainfall during the wet season and lower precipitation levels during the dry season; larger decreases in the south.
- Rise in sea surface temperatures by approximately 2–4°C.
- Sea level rise of 75–190 mm by 2100.
- Average coastal erosion and shoreline loss of 0.38 m per year. (5, 12, 13, 14, 15, 17)

SECTOR IMPACTS AND VULNERABILITIES

AGRICULTURE

Most agricultural production in Ghana relies on small, rainfed plots that are highly vulnerable to the impacts of climate change. Erratic precipitation patterns have severe consequences on production, as only 2 percent of the country's irrigation potential has been tapped. Rising temperatures are projected to lower yields in major staple crops (cassava, yams, plantains, maize and rice). Cassava yields, for example, are projected to fall by 29.6 percent by 2080 and maize yields by 7 percent by 2050. Total crop failure is expected to occur approximately once every five years in Ghana's northern region due to delayed or diminished rains. Cocoa, a major cash crop and Ghana's second leading foreign exchange earner, is sensitive to rising temperatures and drought. Areas suitable for cocoa production, which lie primarily along the coast, are contracting as temperatures rise, floods increase, and soil salinization and coastal erosion continue.

Climate Stressors and Climate Risks AGRICULTURE

Stressors	Risks
Rising temperatures **Reduced rainfall** **Drought-like conditions** **Rising sea level**	Increased crop loss/failure and reduced yields, particularly for cassava
	Increased incidence of pests and crop diseases
	Shorter growing seasons
	Desertification and loss of arable land for agricultural production
	Soil salinization and saltwater intrusion into coastal aquifers

Projections suggest yield losses may become more severe as interannual rainfall variability increases and the length of the growing season shortens. (5, 16)

FISHERIES

Seafood is an important part of the Ghanaian diet and economy, making up 40–60 percent of protein intake and contributing 4.5 percent to national GDP. The sector primarily comprises marine fisheries with some inland, freshwater fisheries in Lake Volta, Lake Botsumtwi and other reservoirs. Rising sea surface temperatures alter migratory patterns and reproductive cycles of key species such as anchovies, sardines, tilapia and catfish. The decline in fisheries sector productivity from climate variability and overfishing forces Ghana to spend over $200 million per year on seafood imports to satisfy domestic demand. (8, 17)

Climate Stressors and Climate Risks FISHERIES

Stressors	Risks
Increased sea surface temperatures **Diminished rainfall** **Rising sea level**	Decline in the number and diversity of fish and shrimp species
	Reduced freshwater fish stocks due to reduced river flows
	Loss of income and livelihoods
	Reduced protein intake and nutrition deficits for human population

WATER RESOURCES

Almost half of the water used in Ghana originates from three international rivers (Volta, Bia and Tano), which flow in from outside its borders, putting the country at risk of water insecurity if political tensions increase over declining water availability. Tension exists between Ghana and Burkina Faso as a result of Burkina Faso's decision to withdraw water from the Volta Basin, reducing water levels required for hydropower generation in Ghana. A recent study projected flows in the Volta Basin could fall by 24 percent by 2050 and 45 percent by 2100 due to reduced rainfall and increased evaporation. About 25 percent of the population does not have access to clean water, and declining rainfall levels, drought and rising temperatures are straining available water resources amidst increased demand from high rates of urbanization and industrialization. (3, 10)

Climate Stressors and Climate Risks WATER RESOURCES

Stressors	Risks
Rising temperatures **Increased intensity and variability of rainfall** **Rising sea level**	Increased conflict and political tensions with surrounding countries over transboundary rivers
	Reduced river flows, particularly in the Volta Basin
	Reduced quantity and quality of water for human consumption, agriculture, industry and hydropower
	Contaminated water sources due to salinization and runoff
	Damaged water infrastructure due to storm surges

ENERGY

Hydropower (Akosombo, Kpong and Bui dams) provides approximately 54 percent of national generation capacity. The Volta River Authority, responsible for Ghana's state-owned hydro and thermal generation, tries to balance water levels in Lake Volta in response to increased evaporation and unpredictable rainfall in this transboundary catchment. Accommodating these risks along with reduced supplies of natural gas results in erratic power production. Frequent outages, the most severe of which occurred in early 2015 when power was interrupted for up to 36 hours at a time, have real economic consequences. GDP growth fell from 8.8 percent in 2012 to 3.9 percent in 2015, in part due to insufficient power from the grid. A recent study on projected water losses in the Volta Basin found that there will only be enough water for hydroelectric facilities to perform at 50 percent of current capacity by 2050. (2, 4, 9, 11)

Climate Stressors and Climate Risks ENERGY

Stressors	Risks
Rising temperatures **Reduced rainfall and drought-like conditions**	Insufficient water to operate dams and generate electricity
	Decline in productivity and investment due to unreliable access to electricity
	Heightened tensions with neighboring countries over transboundary water sources and dams
	Increased cost of doing business

HUMAN HEALTH

Climate change is expected to increase the risks and impacts associated with vector- and waterborne diseases, which are already prevalent in Ghana. This will be particularly true in densely populated urban areas where temporary settlements lack access to clean water and sanitation. Access to improved sanitation is low overall (20 percent of the urban population and 9 percent of the rural population), and severe flooding has led to several recent cholera outbreaks – the worst of which occurred in 2014, with nearly 15,000 cases reported across 8 of the country's 10 regions. Malaria, which affects 50 percent of children in Ghana, is likely to increase in the short term due to increasing temperatures and flooding (particularly in coastal urban areas). (10, 18)

Climate Stressors and Climate Risks HUMAN HEALTH

Stressors	Risks
Rising temperatures **Increased intensity and variability of rainfall**	Increase in waterborne diseases, particularly cholera in urban areas
	Increase in prevalence of malaria in the short term, particularly in coastal urban areas
	Increase in the incidence and severity of respiratory diseases such as asthma and meningitis due to increased exposure to dust and other particles from the *harmattan* winds

POLICY CONTEXT

Implementation of climate change activities has been slow, but the government has made a concerted effort to integrate climate change objectives and priorities into sector-specific development plans in agriculture, transportation and energy to mainstream climate change strategies.

INSTITUTIONAL FRAMEWORK

The Environmental Protection Agency (EPA) is responsible for coordinating Ghana's national climate change strategy. Line ministries and other public sector institutions (National Development Planning Commission, Forestry Commission, Energy Commission, Ministry of Food and Agriculture, Ministry of Lands and Natural Resources, Ministry of Power, and the Ministry of Environment, Science, Technology and Innovation direct mitigation, adaptation and clean energy policies and activities).

NATIONAL STRATEGIES AND PLANS

- Economic and Social Development Policy (CPESDP) (2014–2020)
- UNFCCC Initial National Communication (2001), Second National Communication (2011), Third National Communication (2015)
- Ghana National Climate Change Policy (2013)
- National Climate Change Adaptation Strategy (2012)
- Ghana's Intended Nationally Determined Contribution (INDC) (2015)
- National REDD+ Strategy (2015)
- National Action Program to Combat Drought and Desertification (2012)

KEY RESOURCES

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2. Bloomberg. 2015. Worst blackouts in decade spur Ghana opposition protests.
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7. FAO. 2016. Fishery and Aquaculture Country Profiles: The Republic of Ghana.
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9. IWMI. 2012. The Water Resource Implications of Changing Climate in the Volta River Basin.
10. Netherlands Commission for Environmental Assessment. 2015. Climate Change Profile: Ghana.
11. USAID. 2011. Ghana Climate Change Vulnerability and Adaptation Assessment.
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13. USAID. 2013. Climate Change and Conflict in West African Cities.
14. University of Ghana. 2015. Vulnerability of Ghana's Accra Coast to Sea Level Rise.
15. University of Ghana. 2014. Managing Shoreline Change Under Increasing Sea-Level Rise in Ghana.
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17. World Health Organization. 2014. WHO Provides Technical Support to Fight Cholera Outbreak in Ghana.

Map modified from: USAID. 2011. Ghana Climate Change Vulnerability and Adaptation Assessment.

SELECTED ONGOING EXPERIENCES

Ghana currently boasts the highest number of climate change adaptation projects in West Africa, focused on human health, freshwater resources, agriculture, urban sustainability, ecosystem conservation and institutional capacity building for addressing climate change.

Selected Program	Amount	Donor	Year	Implementer
Climate Change Adaptation of Agro-Ecosystems in Ghana	€3 million	BMZ	2012–2017	Ministry of Food and Agriculture
Ghana Climate Innovation Center	$17.2 million	World Bank	2016–2020	
Integrating Climate Change into the Management of Priority Health Risks	$10.2 million	GEF, UNDP, GoG, WHO	2010–2014	UNDP, Ghana Ministry of Health
Advocacy and Capacity for Disaster Risk Reduction and Preparedness	$0.5 million	World Bank	2014–2016	UNDP, National Disaster Management Organization (NADMO), WHO
Promoting Value Chain Approach to Adaptation in Agriculture	$8.5 million	IFAD	2012–2017	Ministry of Food and Agriculture
Water, Sanitation and Hygiene in Disaster-Prone Communities in Northern Ghana	$19.9 million	CIDA	2041–2017	UNDP
Participatory Forest Resource Management Project in the Transitional Zone (PAFORM)	¥460 million	JICA	2004–2009	Ministry of Lands, Forestry and Mines
Re-thinking Water Storage for Climate Change	€1.12 million	GIZ	2008–2011	International Water Management Institute (IWMI)
Promoting Participatory Action Research through Structured Learning on Climate Change Adaptation in Africa	unknown	CGIAR	2008–2010	Center for International Forestry Research (CIFOR)
Food and Nutrition Technical Assistance (FANTA II) Project	$6 million	USAID	2008–2013	Academy for Educational Development (AED)
Coastal Sustainable Landscapes Project	$8 million	USAID	2013 - 2019	U.S. Forest Service
Sustainable Fisheries Management Project (SFMP)	$24 million	USAID	2014 - 2019	University of Rhode Island
Fisheries and Coastal Management Capacity Building Support Project	$5.5 million	USAID	2014 - 2019	University of Cape Coast
Integrated Resource and Resilience Planning	$3.9 million	USAID	2016 - 2018	ICF Incorporated, L.L.C.