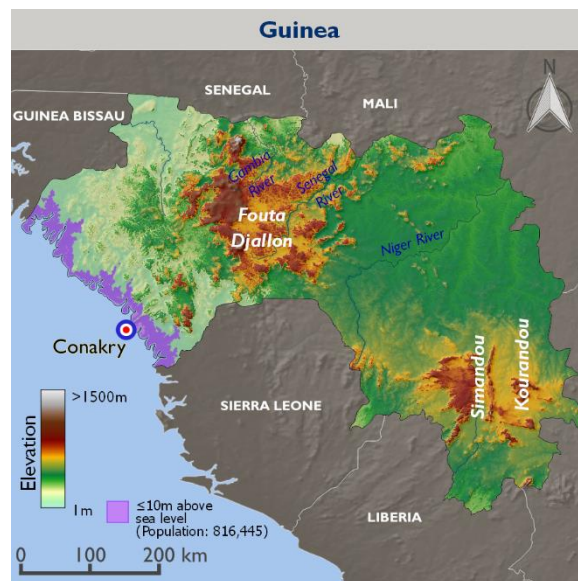




CLIMATE RISK PROFILE GUINEA

COUNTRY OVERVIEW

Guinea is an emerging democracy whose economy was hard hit by the 2014–2015 Ebola outbreaks and recent commodity price shocks resulting from weak global economic growth, appreciation of the dollar, and rising borrowing costs. A slow recovery is taking place, but challenges of a high poverty rate (55 percent of the population in 2012) and unemployment rate persist. Although agriculture makes up only 22 percent of the national GDP, 70 percent of Guineans earn their living in this climate-sensitive sector, growing crops such as rice and cocoa. Guinea is known as Africa’s “water tower,” the country’s highlands being home to the headwaters of three major river systems, the Gambia, the Niger, and the Senegal. Forested areas cover about 63,600 km² (roughly 26 percent of the country). Guinea already suffers recurring floods during the rainy season and climate change is likely to alter rainfall patterns in a manner that exacerbates this challenge. About 6 percent of Guinea’s population lives in low-lying areas subject to sea level rise; sea level rise is already evident along the coast. Increased salinization of water sources and coastal flooding from rising sea levels harm agriculture, water availability, coastal infrastructure, and mangrove ecosystems. Coastal flooding may also increase spread of diseases by creating more vector habitat and, particularly in urban areas, dispersing pathogens from wastewater and sewage. Rising temperatures and changes in regional rainfall may continue to lead to flooding and have the potential to bring drought and extended dry spells in some regions. (13, 18, 27, 31, 32)



CLIMATE PROJECTIONS



1.1°C–3.0°C increase in temperatures by 2060



Increase in rainfall during rainy season; increase in heavy rainfall events



0.4 m–0.7m rise in sea levels by 2100

KEY CLIMATE IMPACTS

Agriculture

Reduced yields (maize)
Salinization of coastal production
Shift in the agricultural calendar
Increased food insecurity



Water Resources

Reduced water supplies
Decline in water quality (i.e., salinization of coastal aquifers)



Human Health

Increased risk of diarrheal disease
Expanded range of malaria to highlands



Coastal Resources

Reduced fish yields/productivity
Loss of income and protein source
Damage to mangroves



Forests & Biodiversity

Decline in forest productivity and associated ecological services
Increased risk of forest fires



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This document was prepared under the 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

Most of Guinea has a tropical climate with a long rainy season of eight months (April–November), a relatively uniform annual temperature (23°C to 29°C), and high humidity. Annual rainfall, which peaks in July–August, varies between 1,500 mm and 4,500 mm. Annual rainfall is highest in the north and along the coast, decreasing towards the south and inland of the country. Coastal and southern Guinea have a monsoon climate with rainfall exceeding 100 mm per month, a shorter dry season, and smaller temperature range than the interior. Northern or Upper Guinea has higher temperatures (closer to a Sahelian climate), greater temperature ranges, a shorter rainy season, and a longer dry season (December–May). The arrival of the migratory Intertropical Convergence Zone (ITCZ) brings the heaviest rainfall of the wet season. As the ITCZ shifts southward in November, the hot, dry wind known as the Harmattan blows from the northeast off the Sahara during the dry season, when rainfall is limited. (7, 13, 15, 22, 30)

HISTORICAL CLIMATE

Observations since 1960 indicate:

- Increased average annual temperatures of 0.8°C.
- Decrease in average annual precipitation by 5.3 mm per month per decade.
- A 100 mm decrease overall in the March–May precipitation (measured by the Kankan Station, 1981–2013).
- Increase in the number of hot nights and decrease in the number of cold nights.

FUTURE CLIMATE

Projected changes include:

- Increase in annual average temperatures of 1.1°C –3.0°C by 2060, with more marked increases in the interior and north.
- Increase in number of “hot” days by 21–52 percent by the 2060s.
- Increased variability of rainfall (changes in frequency and distribution); increased rainfall during rainy season in most regions; decrease in rainfall in the north.
- Increase in frequency of heavy rainfall events.
- Increased drought risk due to rising temperatures and more variable rainfall.
- Rise in sea levels of 0.4 m to 0.7 m by 2100.

SECTOR IMPACTS AND VULNERABILITIES

WATER RESOURCES

Guinea’s highlands are home to the headwaters of 22 regional rivers, including the Gambia, Niger, and Senegal. Abundant renewable water resources are estimated at 226 km³, yet warming temperatures, decreased overall rainfall, and increased heavy rainfall events threaten water quantity and quality for domestic, agricultural, and commercial uses. The Fouta Djallon Highlands of central Guinea, for example, are expected to see rainfall reduced up to 26 percent by the end of this century. Reduced rainfall combined with warming is projected to reduce flows in the Konkouré River in western Guinea by 30–50 percent by 2100. This is a major concern, given that several dams along the river provide much of the country’s hydropower. Flows of northern rivers, such as the Milo, are expected to decrease up to 70 percent by 2100. Increased frequency and intensity of heavy rainfall events raise the risk of pollutants, including agricultural fertilizers, human waste, and mining waste, washing into water bodies and reducing water quality. This is

particularly dangerous for the more than 30 percent of the population that lacks access to safe drinking water. Diminishing river flow combined with sea level rise increases salinization risk of surface and groundwater sources. (13, 19, 24, 29, 33)

Climate Stressors and Climate Risks WATER RESOURCES	
Stressors	Risks
Rising temperatures	Reduced availability of surface water from evaporation and declining river flows
Variable rainfall and heavy rainfall events	Reduced hydropower potential
	Reduced surface water quality
Increased drought/dry spells	Increased strain on limited groundwater sources
Sea level rise	Increased demand for irrigation
	Salinization of coastal water sources

AGRICULTURE

As a significant contributor to national GDP (22 percent) and source of livelihoods, the agriculture sector is key to economic growth in Guinea. However, as 97 percent of cultivation is rainfed, crops are highly vulnerable to changes in climate. Yield levels for most crops in Guinea are already low compared with other countries in the region, and many Guineans rely on crops, livestock, and fish traded informally across porous borders to meet their food needs. In a country where 26 percent of the population currently experiences chronic malnutrition, increasing climate variability will have important implications for food security and nutrition. Crop models for rice (Guinea’s primary staple crop) are variable, with some areas showing decreases and others increases in yield. Projections indicate a decrease of 5–25 percent in maize, the second most important cereal after rice, by 2050 due to higher temperatures and variable rainfall. These losses are projected to be particularly severe (>25 percent) in the southern border areas of N’Zérékoré and Kankan. Damage to crops from pests such as the desert locust is likely to increase as higher temperatures speed maturation and prolong breeding periods. More erratic rainfall and rising temperatures could also contribute to the spread of new agricultural pests, posing unprecedented threats to rice and maize crops. Fall armyworm has emerged as a new challenge for Guinea, its

HUMAN HEALTH

Malaria is a leading cause of mortality in Guinea, responsible for almost 30 percent of the deaths of children under five. Mosquitoes carrying yellow fever, chikungunya, and Zika virus are also prevalent. In areas along the coast and in the northeast, higher temperatures will limit mosquito survival and thus could reduce malaria transmission risk, even as soon as 2030. In other areas, such as the Fouta Djallon and Guinea highlands, transmission may shift to higher elevations. Climate change may also indirectly impact a range of infectious diseases such as Ebola, Lassa fever, Rift Valley fever, avian flu, anthrax, and zoonotic tuberculosis. As climate and other factors drive people to clear more land for agriculture, increased contact between humans and animals (both livestock and wildlife) becomes more likely. Food insecurity can push households to hunt for bushmeat as a source of animal protein, increasing risk of contracting Ebola or other zoonotic diseases

neighbors in West Africa, and much of sub-Saharan Africa. While no direct link between fall armyworm and climate has been established, more than 50 years of data on the closely related African armyworm indicate that their population explodes after droughts. Rising sea surface temperatures will impact marine fisheries and sea level rise could cause a major loss (17–30 percent by 2050) of rice fields along the coast through salinization, erosion, and flooding. In addition, reduced rainfall contributes to saltwater intrusion in river deltas where recession crops are grown. (4, 6, 10, 11, 13, 15, 30, 21)

Climate Stressors and Climate Risks AGRICULTURE	
Stressors	Risks
Rising temperatures	Reduced yields of rainfed crops, particularly maize
Variable rainfall and heavy rainfall events	Increased risk of crop pests and livestock diseases
	Shift in the timing of planting and growing seasons; disturbance of traditional agriculture calendar
Increased drought/dry spells	Salinization of rice paddies along the coast
Sea level rise	Food shortages, leading to increases in grain prices and imports

through contact with reservoir species (e.g., bats). Changes in rainfall distribution and frequency, and rising temperatures may also impact the population density, migration, habitat use, reproduction, and feeding behaviors of species suspected to be disease carriers.

Climate Stressors and Climate Risks HUMAN HEALTH	
Stressors	Risks
Rising temperatures	Expanded ranges of disease-carrying mosquitoes to higher elevations, increasing transmission of malaria and other diseases
Variable rainfall and heavy rainfall events	Increased incidence of diarrheal diseases
Increased drought/dry spells	Increased risk for spread of infectious diseases due to increased human–wildlife contact

Heavy rainfall events and resulting floods and landslides are likely to amplify Guinea’s water, sanitation and hygiene challenges. Only 34 percent of the urban population has access to improved sanitation and cities have poorly maintained or non-existent drainage systems, which creates conditions for waterborne diseases to spread. This was the case in Conakry in 2012 when heavy rains spurred a

COASTAL RESOURCES

Guinea’s extensive coastline is home to a thriving fisheries industry that provides livelihoods for 450,000 Guineans and is an important source of protein for the coastal population: 40 percent of animal protein is provided by fish consumption. Fisheries are under threat from nonclimate stressors such as illegal fishing, pollution from petroleum activities, and waste from coastal cities. Climate trends such as rising ocean surface temperatures are likely to add to these threats as warmer waters affect fish biology, reproduction, and food supply and distribution. Guinea’s 1,900 km² of mangroves provide habitat for fish and other marine life, protect the coastline from erosion and flooding, and supply local populations with wood for construction and

FORESTS AND BIODIVERSITY

The montane and lowland forests of Guinea, along with mangroves and wetlands, are located within a recognized West Africa Biodiversity Hotspot and characterized by high species richness and endemism. These forests are home to important primate species and key to regulating the country’s water supply and providing timber and nontimber forest products, including shade-grown coffee and cocoa, rubber, and palm oil. Rising temperatures and more variable rainfall threaten to increase heat and water stress among plant and animal species and leave forests at risk from longer fire seasons. The most climate-vulnerable species include wild relatives of the chickpea and Bambara groundnut, reptiles and amphibians, and range-restricted forest bird species such as the Nimba flycatcher. Growing climate stress on the region’s agriculture and water

POLICY CONTEXT

INSTITUTIONAL FRAMEWORK

Guinea has charged its National Environment Department of the Ministry of Environment, Water and Forestry (MEEF) with implementing government

policy on combating climate change. The MEEF set up a National Consultation Platform on COP21 to organize state and nonstate actors around COP

cholera outbreak totaling 7,350 cases and 133 deaths. Heavy rainfall also triggers floods and landslides in rural areas, bringing about injury and death. Intense rainfall and floods swept through the country during the summer of 2015, claiming at least nine lives and injuring dozens more. (3, 9, 12, 17, 20, 23, 26, 27, 33)

fuel. Mangroves are sensitive to changes in salinity and flooding, the dynamics of which are in part determined by changes in precipitation, temperatures, and sea levels. (1, 14, 25, 28)

Climate Stressors and Climate Risks COASTAL RESOURCES	
Stressors	Risks
Rising temperatures	Reduced fish yields/productivity; loss of income and protein source
Rise in sea levels and surface water temperatures	Damage to mangroves, reducing protection of coastline from erosion and storm surges, habitat for fish, and wood source for communities

supply could also increase people’s dependence on forest resources, leading to further forest degradation. Agricultural expansion and increasing demand for fuel, timber, bushmeat, and mineral resources have already led to a loss of 3,637 km² of forest from 2000 to 2012. (5, 8, 2)

Climate Stressors and Climate Risks FORESTS AND BIODIVERSITY	
Stressors	Risks
Rising temperatures	Decline in forest productivity and associated ecological services (regulating runoff and soil erosion, habitat provision, etc.)
Increased drought conditions	Loss or shift in distribution of species
	Increased incidence of forest fires
	Loss of livelihoods dependent on forests

negotiations but has not yet produced a national policy or Second National Communication to the UNFCCC. The recent Ebola crisis may have taken the government's attention off the matter. The Ministry of Spatial Planning and Decentralization has required the inclusion of climate issues into local development plans and urban development plans, but implementation levels are not yet known. Guinea ratified the Climate Change Convention in 1993 and the Kyoto Protocol in 2000. The country also signed

and ratified the Paris Climate Agreement in 2016. (16, 34)

NATIONAL STRATEGIES AND PLANS

- [Initial National Communication to the UN Convention on Climate Change \(2002\)](#)
- [National Adaptation Plan of Action \(NAPA\) \(2007\)](#)
- [Intended Nationally Determined Contribution \(INDC\) \(2015\)](#)

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SELECTED ONGOING EXPERIENCES

A large proportion of aid to Guinea aims to strengthen participatory governance to improve health outcomes and food security through a “One Health” approach. Below are selected programs in Guinea focused on aspects of climate change resilience, such as improved capacity for natural resource management, conservation, and climate-smart approaches to health and agriculture.

Selected Program	Amount	Donor	Year	Implementer
Stop Palu+	\$28 million	USAID PMI	2017–2022	RTI
West Africa Biodiversity and Climate Change Project (WA-BiCC) (regional)	\$48.9 million	USAID	2015–2020	TetraTech (lead)
Ecosystem-Based Adaptation Targeting Vulnerable Communities of the Upper Guinea Region	\$8 million	GEF	2016–TBD	United Nations Development Programme
Strengthening Resilience of Farming Communities' Livelihoods against Climate Changes in the Guinean Prefectures of Gaoual, Koundara and Mali	\$3.7 million	GEF	2013–TBD	United Nations Development Programme
Improving IWRM, Knowledge-based Management and Governance of the Niger Basin and the Iullemeden-Taoudeni/Tanezrouft Aquifer System (NB-ITTAS)	\$13.4 million	GEF	2018–TBD	United Nations Development Programme
West Africa Regional Fisheries Program	\$10 million	GEF	2016–TBD	The World Bank