CLIMATE RISK COUNTRY PROFILE

TOGO

WORLD BANK GROUP

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This profile is part of a series of Climate Risk Country Profiles developed by the World Bank Group (WBG). The country profile synthesizes most relevant data and information on climate change, disaster risk reduction, and adaptation actions and policies at the country level. The country profile series are designed as a quick reference source for development practitioners to better integrate climate resilience in development planning and policy making. This effort is managed and led by Veronique Morin (Senior Climate Change Specialist, WBG) and Ana E. Bucher (Senior Climate Change Specialist, WBG).

This profile was written by MacKenzie Dove (Senior Climate Change Consultant, WBG). Additional support was provided by Jason Johnston (Operations Analyst, WBG) and Yunziyi Lang (Climate Change Analyst, WBG).

Climate and climate-related information is largely drawn from the Climate Change Knowledge Portal (CCKP), a WBG online platform with available global climate data and analysis based on the latest Intergovernmental Panel on Climate Change (IPCC) reports and datasets. The team is grateful for all comments and suggestions received from the sector, regional, and country development specialists, as well as climate research scientists and institutions for their advice and guidance on use of climate related datasets.

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FOREWORD

Climate change is a major risk to good development outcomes, and the World Bank Group is committed to playing an important role in helping countries integrate climate action into their core development agendas. The World Bank Group is committed to supporting client countries to invest in and build a low-carbon, climate-resilient future, helping them to be better prepared to adapt to current and future climate impacts.

The World Bank Group is investing in incorporating and systematically managing climate risks in development operations through its individual corporate commitments.

A key aspect of the World Bank Group's Action Plan on Adaptation and Resilience (2019) is to help countries shift from addressing adaptation as an incremental cost and isolated investment to systematically incorporating climate risks and opportunities at every phase of policy planning, investment design, implementation and evaluation of development outcomes. For all IDA and IBRD operations, climate and disaster risk screening is one of the mandatory corporate climate commitments. This is supported by the Bank Group's Climate and Disaster Risk Screening Tool which enables all Bank staff to assess short- and long-term climate and disaster risks in operations and national or sectoral planning processes. This screening tool draws up-to-date and relevant information from the World Bank's Climate Change Knowledge Portal, a comprehensive online 'one-stop shop' for global, regional, and country data related to climate change and development.

Recognizing the value of consistent, easy-to-use technical resources for client countries as well as to support respective internal climate risk assessment and adaptation planning processes, the World Bank Group's Climate Change Group has developed this content. Standardizing and pooling expertise facilitates the World Bank Group in conducting initial assessments of climate risks and opportunities across sectors within a country, within institutional portfolios across regions, and acts as a global resource for development practitioners.

For developing countries, the climate risk profiles are intended to serve as public goods to facilitate upstream country diagnostics, policy dialogue, and strategic planning by providing comprehensive overviews of trends and projected changes in key climate parameters, sector-specific implications, relevant policies and programs, adaptation priorities and opportunities for further actions.

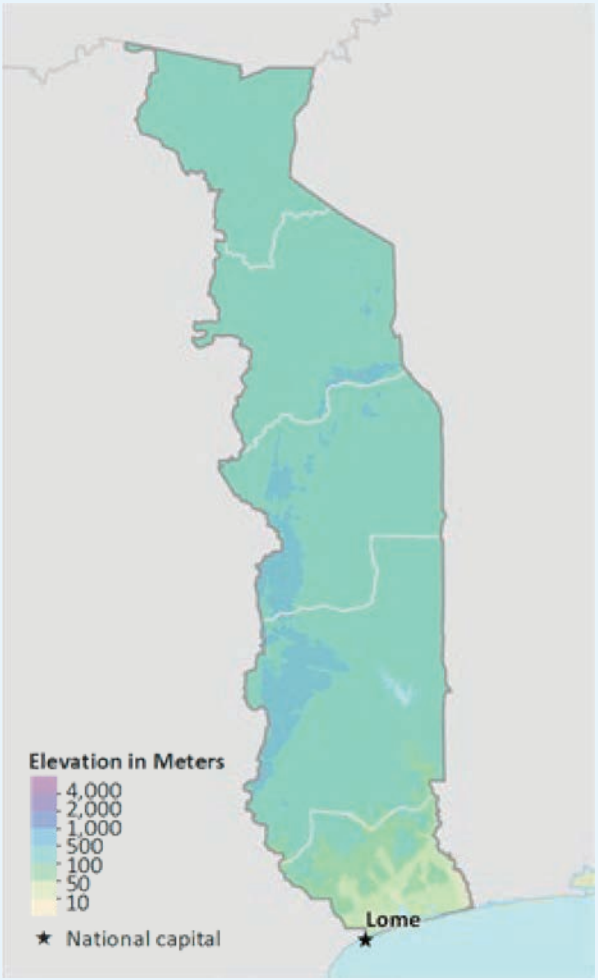
It is my hope that these efforts will spur deepening of long-term risk management in developing countries and our engagement in supporting climate change adaptation planning at operational levels.

Bernice Van Bronkhorst
Global Director
Climate Change Group (CCG)
The World Bank Group (WBG)

COUNTRY OVERVIEW

The Republic of Togo is located in West Africa, along the Gulf of Guinea, between latitudes 6° to 11°N. The country shares borders with Ghana to the west, Benin to the east, Burkina Faso to the north, and its southern coastline of 56 kilometers (km), lies on the Gulf of Guinea. The country spans an area of 54,600 km^2 encompassing rolling hills in the north, a southern plateau, and a low coastal plain with extensive lagoons and marshes (**Figure 1**). Togo's rainfall seasons are controlled by the movement of the tropical rain belt, which oscillates between the northern and southern tropics over the course of the year. This results in the country's dry northern areas with prevailing south-westerly winds and the wet and humid areas of the southern areas of the country. The seasonal rainfall in this region varies considerably on inter-annual and inter-decadal timescales, due in part to variations in the movements and intensity of the Inter-Tropical Convergence Zone (ITCZ), and variations in timing and intensity of the West African Monsoon.[1]

FIGURE 1. Topography Map of Togo[2]



Togo is a low-income country and poverty rates remain high, with an estimated 69% of rural households currently living below the poverty line.[3] As of 2020, Togo has a population of 8.1 million people, with an annual growth rate of 2.4% (2019), this is expected to reach 10.4 million and 15.4 million people in 2030 and 2050, respectively.[4] Currently, 42.2% of the population lives in urban areas and this is expected to increase to 48.6% and 60.6% by 2030 and 2050, respectively.[5] The country has a Gross Domestic Product (GDP) of $5.49 billion (2019) and a current annual growth rate of 5.3% (2019) (**Table 1**).[6]

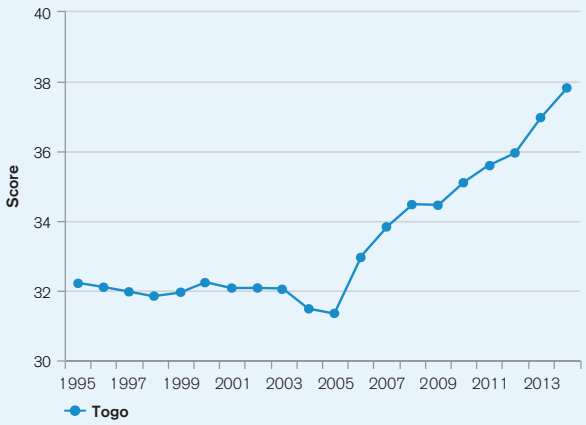
[1] UNDP (2019). Togo Climate Change Adaptation Overview. URL: https://www.adaptation-undp.org/explore/western-africa/togo
[2] World Bank (2019). Internal Climate Migration Profile — Togo.
[3] World Bank (2021). Togo — Overview. URL: https://www.worldbank.org/en/country/togo/overview#1
[4] World Bank Data Bank (2021). World Development Indicators, Togo. URL: https://databank.worldbank.org/source/world-development-indicators
[5] World Bank Data Bank (2021). Population estimates and projections, Togo. URL: https://databank.worldbank.org/source/population-estimates-and-projections
[6] World Bank Data Bank (2021). World Development Indicators, Togo. URL: https://databank.worldbank.org/source/world-development-indicators

TABLE 1. Data snapshot: Key development indicators

Indicator	
Life Expectancy at Birth, Total (Years) (2019)	61.0
Population Density (People per sq. km Land Area) (2018)	145.0
% of Population with Access to Electricity (2018)	51.3%
GDP per Capita (Current US$) (2019)	$679.30

The ND-GAIN Index[7] ranks 181 countries using a score which calculates a country's vulnerability to climate change and other global challenges as well as their readiness to improve resilience. This Index aims to help businesses and the public sector better identify vulnerability and readiness in order to better prioritize investment for more efficient responses to global challenges. Due to a combination of political, geographic, and social factors, Togo is recognized as highly vulnerable to climate change impacts, ranked 135 out of 181 countries in the 2020 ND-GAIN Index. The more vulnerable a country is the lower their score, while the more ready a country is to improve its resilience the higher it will be. Norway has the highest score and is ranked 1st. **Figure 2** is a time-series plot of the ND-GAIN Index showing Togo's progress.

FIGURE 2. ND-GAIN Index for Togo



Togo's recent economic growth has grown steadily, largely due to the rebound of the country's extractive industry and continued expansion of its agricultural sector. However, significant parts of Togo's population remain in poverty, without adequate access to basic services, and would benefit from more inclusive development policies. The lack of job opportunities is at the core of the country's high poverty levels, inequality, and of social and economic disparity. The country's poverty and reliance on rain-fed agricultural and livestock increases its vulnerability to climate change and limits the capacity of poor households and communities to manage climate risk, increasing their vulnerability to climate-related shocks. Weather related hazards for which Togo is vulnerable are likely to increase with climate change. Average temperatures across the country are projected to increase into the future, while rainfall may decrease or increase in parts of the country. Agriculture, energy, health, housing, water resources, and coastal areas will be particularly vulnerable to these climatic changes. Future droughts will likely impact crop production and water availability. Floods will impact food security and infrastructure, and encourage communicable and water borne an diseases, such as cholera and malaria, while sea level rise will threaten coastal settlements, for instance through salinization of fresh water sources at the coast and may also force migrations. Future climate change may worsen coastal erosion and lead to loss of goods and services, this is especially concerning as over 90% of the country's industrial units are located in coastal areas.[8]

[7] University of Notre Dame (2020). Notre Dame Global Adaptation Initiative. URL: https://gain.nd.edu/our-work/country-index/
[8] World Bank (2021). Togo — Overview. URL: https://www.worldbank.org/en/country/togo/overview#1

Togo submitted its Nationally-Determined Contribution (NDC) to the UNFCCC in 2016, which outlines the country's efforts to promote sustainable economic development goals and strengthen the resilience of its production systems and to reduce population vulnerability to climate change. At the time of writing, Togo also published its Third National Communication (NC3) to the UNFCCC in 2015.[9] Togo has prioritized key adaptation efforts to focus on priority sectors of energy, water resources, agriculture, forestry and land use, human settlements and coastal zones.[10] Togo was currently undergoing a review of its NDC, with an updated anticipated for release, June 2021 and Togo has also begun the process of producing its Fourth National Communication.

Green, Inclusive and Resilient Recovery

The coronavirus disease (COVID-19) pandemic has led to unprecedented adverse social and economic impacts. Further, the pandemic has demonstrated the compounding impacts of adding yet another shock on top of the multiple challenges that vulnerable populations already face in day-to-day life, with the potential to create devastating health, social, economic and environmental crises that can leave a deep, long-lasting mark. However, as governments take urgent action and lay the foundations for their financial, economic, and social recovery, they have a unique opportunity to create economies that are more sustainable, inclusive and resilient. Short and long-term recovery efforts should prioritize investments that boost jobs and economic activity; have positive impacts on human, social and natural capital; protect biodiversity and ecosystems services; boost resilience; and advance the decarbonization of economies.

CLIMATOLOGY

Climate Baseline

Overview

Togo's climate is characterized as a part of the hot and humid inter-tropics marked by two main wind currents: (i) the monsoon which blows from the southwest and is associated with the rainy season, and (ii) the airstream harmattan from the northeast, which brings with it cool dry weather between November and March; periodic droughts occur in the north of the country. The country is made up of five regions, the savannah and the kara region in the north, the central region, and the plateau and maritime regions in the south. The highest average temperatures are found in the savannah region while the lowest average rainfall is experienced in the coastal region. The north-south configuration

[9] Togo (2015). Third National Communication to the UNFCCC. URL: https://unfccc.int/sites/default/files/resource/tgonc3.pdf
[10] Republic of Togo (2016): Nationally Determined Contributions to the UNFCCC. URL: https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Togo%20First/INDC%20Togo_english%20version.pdf

of the country comes with a diversity of climates, making up three main climate zones in the country. The *Sub-Equatorial Region* extends from the coast to the 8° north latitude. The rainfall ranges from 800–1,400 millimeters (mm), divided into two seasons: from mid-March to late July and from early September to early mid-November. Average annual temperature in Togo is 27°C. Relative humidity is high and fluctuates around 90%. The *Guinea-Sudan Region* lies between 8° and 10° north in latitude. It is a climatic transition zone where annual rainfall ranges from 1,400 mm to1,500 mm. Annual temperatures average is 26.5°C (ranging 15°C–37°C) and humidity ranges between 60% and 80%. *The Sudan Region* lies between the 10° and 11° north in latitude. It is semi-arid and has the lowest rainfall, ranging 900–1,100 mm, and falling in a single rainy season between May and October. Temperatures vary from 17°C–41° C in the dry season.[11]

Analysis of data from the World Bank Group's Climate Change Knowledge Portal (CCKP) (**Table 2**) shows historical information for 1901–2019. Over this period, mean annual temperatures in Togo averaged 27°C, ranging between 25°C (August) and 29.5°C (March). Mean annual precipitation is 1,169.9 mm per year with monthly rainfall ranging from 7 mm (January) to 196 mm (September), for the latest climatology, 1991–2020 (**Figure 3**). In general, the relative humidity decreases from southern regions to the north.[12] **Figure 4** shows the spatial variation of observed average annual precipitation and temperature across Togo.

TABLE 2. Data snapshot: Summary statistics

Climate Variables	1901–2020
Mean Annual Temperature (°C)	**27.0°C**
Mean Annual Precipitation (mm)	**1,169.9 mm**
Mean Maximum Annual Temperature (°C)	**32.7°C**
Mean Minimum Annual Temperature (°C)	**21.5°C**

[11] ODI (2017). Delivering disaster risk reduction by 2030. Country Case Studies. URL: https://www.odi.org/sites/odi.org.uk/files/resource-documents/11531.pdf

[12] WBG Climate Change Knowledge Portal (CCKP, 20121). Togo. URL: https://climateknowledgeportal.worldbank.org/country/togo/climate-data-historical

FIGURE 3. Average monthly temperature and rainfall for Togo, 1991–2020[13]

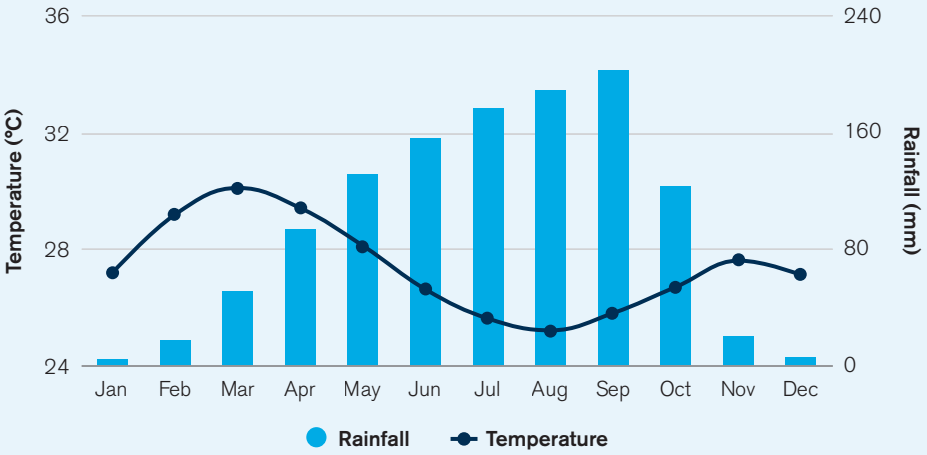
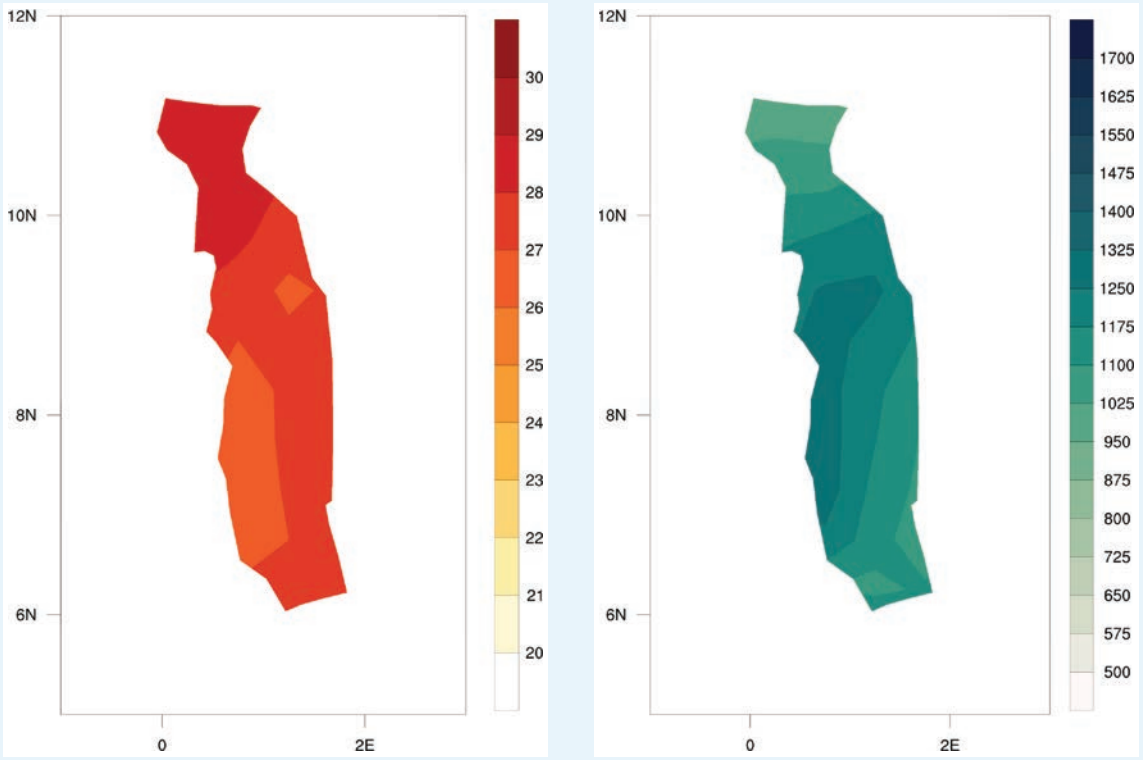


FIGURE 4. Map of average annual temperature (°C) (left); annual precipitation (mm) (right) of Togo, 1991–2020[14]



[13] WBG Climate Change Knowledge Portal (CCKP, 2021). Togo. URL: https://climateknowledgeportal.worldbank.org/country/togo/climate-data-historical

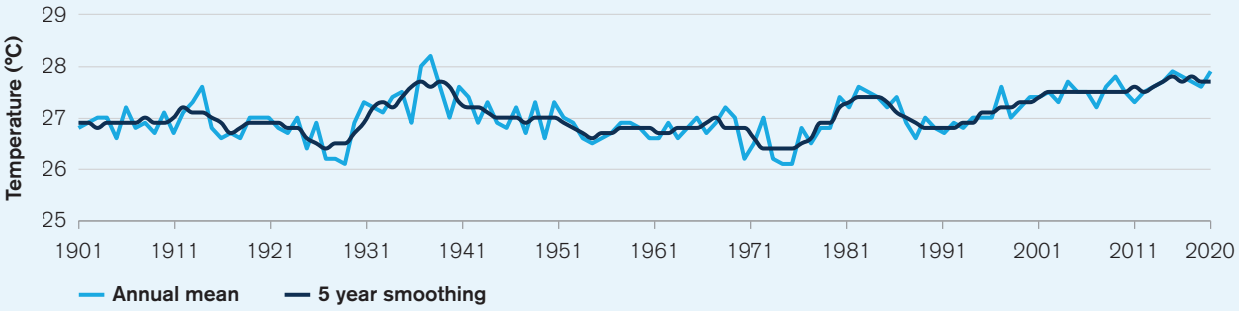
[14] WBG Climate Change Knowledge Portal (CCKP, 2021). Togo, Historical Climate. URL: https://climateknowledgeportal.worldbank.org/country/togo/climate-data-historical

Key Trends

Temperature

Togo is characterized by high temperatures and mean annual temperature has increased by 1.1°C since 1960, at an average rate of 0.24°C per decade (**Figure 5**). Rates of increase have been most pronounced from April to June, with the northern regions of the country experiencing faster rates of temperature increase then the south. From 1960 to 2003, the number of hot days increased by 15.5%, with increases observed to occur most strongly from September to November. The number of cold nights has also decreased since 1960. Additionally, heat waves have become common across all regions of the country, with significant impacts seen for livelihoods, human an animal health and natural resources.[15]

FIGURE 5. Observed temperature for Togo, 1901–2020[16]



[15] McSweeney, C., New, M. and Lizcano, G. (2012). UNDP Climate Country Profiles — Togo. URL: https://www.geog.ox.ac.uk/research/climate/projects/undp-cp/UNDP_reports/Togo/Togo.hires.report.pdf

[16] WB Climate Change Knowledge Portal (CCKP, 2020). Togo URL: https://climateknowledgeportal.worldbank.org/country/togo/climate-data-historical

Precipitation

Annual rainfall in Togo is highly variable across inter-annual and inter-decadal timescales and long-term trends for the country have been difficult to identify. Rainfall over Togo was particularly high in the 1960s, and decreased to particularly low levels in the late 1970s and early 1980s, which causes an overall decreasing trend in the period 1960 to 2006, of an average 2.3mm per month (2.4%) per decade. An increase in heavy rainfall events was not observed during this period.[17]

Climate Future

Overview

The main data source for the World Bank Group's Climate Change Knowledge Portal (CCKP) is the CMIP5 (Coupled Inter-comparison Project No.5) data ensemble, which builds the database for the global climate change projections presented in the Fifth Assessment Report (AR5) of the Intergovernmental Panel on Climate Change (IPCC). Four Representative Concentration Pathways (i.e. RCP2.6, RCP4.5, RCP6.0, and RCP8.5) were selected and defined by their total radiative forcing (cumulative measure of GHG emissions from all sources) pathway and level by 2100. The RCP2.6 for example represents a very strong mitigation scenario, whereas the RCP8.5 assumes business-as-usual scenario. For more information, please refer to RCP Database. For simplification, these scenarios are referred to as a low (RCP2.6); a medium (RCP4.5) and a high (RCP8.5) emission scenario in this profile. **Table 3** provides CMIP5 projections for essential climate variables under high emission scenario (RCP 8.5) over 4 different time horizons. **Figure 6** presents the multi-model (CMIP5) ensemble of 32 Global Circulation Models (GCMs) showing the projected changes in annual precipitation and temperature for the periods 2040–2059 and 2080–2099.

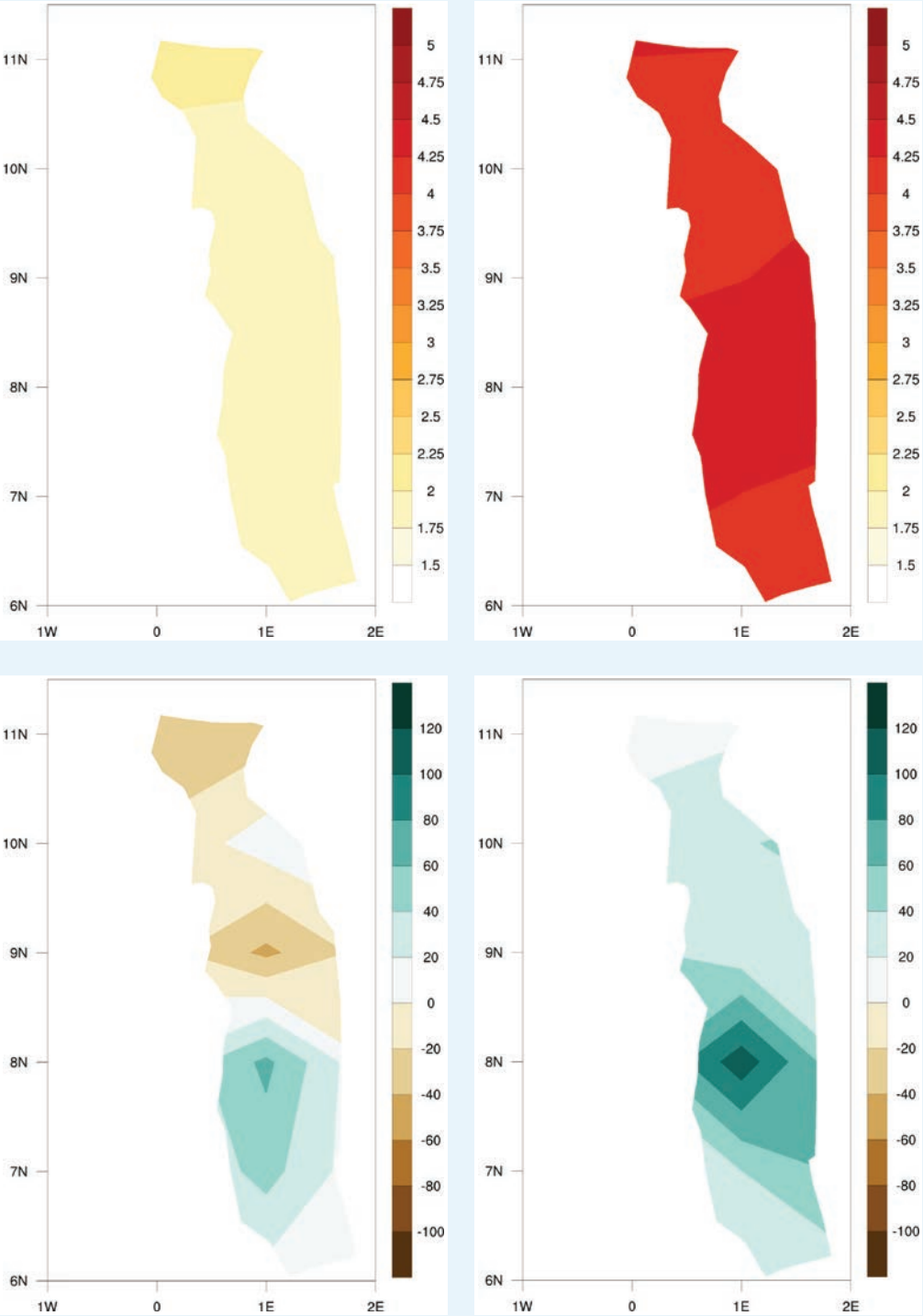
TABLE 3. Data snapshot: CMIP5 ensemble projection

Cmip5 Ensemble Projection	2020–2039	2040–2059	2060–2079	2080–2099
Annual Temperature Anomaly (°C)	**+0.6°C to +1.5°C** (+1.5°C)	**+1.2°C to +2.7°C** (+1.7°C)	**+1.8°C to +4.1°C** (+2.6°C)	**+2.5°C to +5.6°C** (+3.5°C)
Annual Precipitation Anomaly (mm)	**–16.8 to +21.3** (1.3 mm)	**–24.1 to +29.2** (–0.5 mm)	**–24.8 to +36.1** (2.8 mm)	**–32.5 to +41.6** (0.6 mm)

Note: The table shows CMIP5 ensemble projection under RCP8.5. Bold value is the range (10th–90th Percentile) and values in parentheses show the median (or 50th Percentile).

[17] McSweeney, C., New, M. and Lizcano, G. (2012). UNDP Climate Country Profiles — Togo. URL: https://www.geog.ox.ac.uk/research/climate/projects/undp-cp/UNDP_reports/Togo/Togo.hires.report.pdf

FIGURE 6. CMIP5 ensemble projected change (32 GCMs) in annual temperature (left) and precipitation (right) by 2040–2059, relative to 1986–2005 baseline under RCP 8.5[18]



[18] WBG Climate Change Knowledge Portal (CCKP, 2021). Togo Projected Future Climate. URL: https://climateknowledgeportal.worldbank.org/country/togo/climate-data-projections

Key Trends

Temperature

Temperature is projected to increase progressively in Togo throughout the end of the century. Temperatures will increase across the whole country, with the greatest increases projected for inland regions, while increase in coastal temperatures will be moderated by the ocean. Climate projections for Togo show a consistent warming through the century. While the average change in the near term (2020s), a robust increase in temperature is seen through end of the century. Temperatures are projected to increase by as throughout the country under a high-emission scenario.[19] The greatest increase in temperatures will be over the period July to September. Across all emission scenarios, temperature increase for Togo are projected throughout the end of the century and as seen in the graph below, under a high-emission scenario, average temperatures are expected to increase rapidly by mid-century. Across the seasonal cycle, temperature is supposed to increase throughout the year.[20] Increased heat and extreme heat conditions will result in significant implications for human and animal health, agriculture, and ecosystems.

Across all emissions scenarios, temperatures are projected to continue to rise in Togo, through the end of the century. As seen in **Figure 7**, under a high-emissions scenario (RCP 8.5), average temperatures are projected to rise rapidly after the 2040s. Extreme temperatures, analyzed in terms of the number of days above 35 degrees, are expected to rise significantly across the seasonal cycle, with the most pronounced changes occurring during September-October and March to May (**Figure 8**). Rising temperatures and extreme heat conditions will result in significant implications for human and animal health, agriculture, water resources, and ecosystems.

FIGURE 7. Historical and projected average temperature for Togo from 1986 to 2099 (Reference Period, 1986–2005)[21]

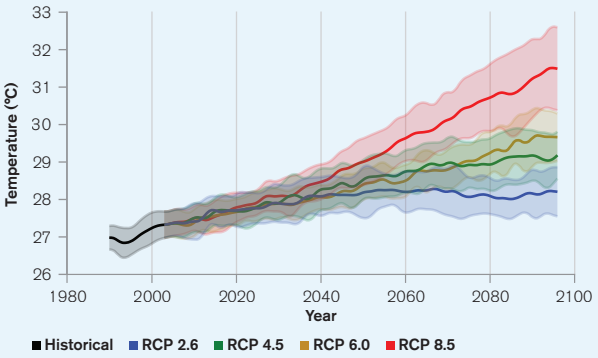
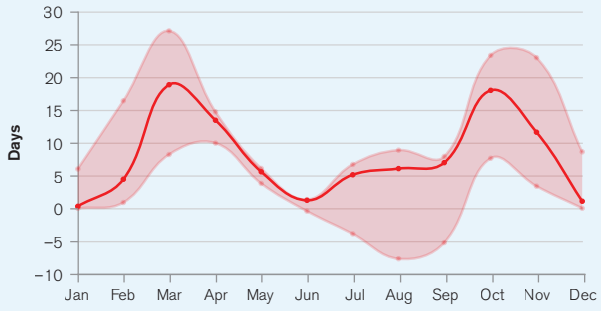


FIGURE 8. Projected change in very hot days (Tmax >35°C) (RCP8.5, Reference Period, 1986–2005)[22]



[19] Togo (2017). National Climate Change Adaptation Plan. URL: https://www.preventionweb.net/files/58281_togonap.pdf

[20] McSweeney, C., New, M. and Lizcano, G. (2012). UNDP Climate Country Profiles — Togo. URL: https://www.geog.ox.ac.uk/research/climate/projects/undp-cp/UNDP_reports/Togo/Togo.hires.report.pdf

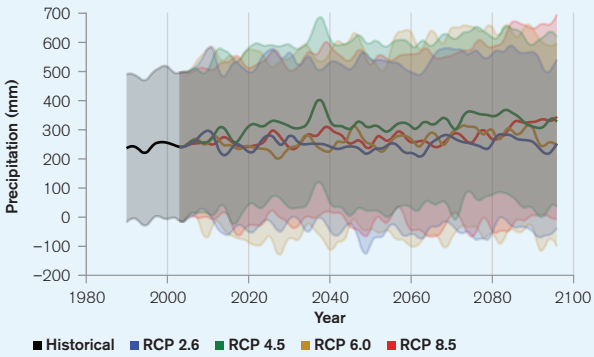
[21] WBG Climate Change Knowledge Portal (CCKP, 2021). Interactive Climate Indicator Dashboard — Agriculture. Togo. URL https://climatedata.worldbank.org/CRMePortal/web/agriculture/crops-and-land-management?country=TGO&period=2080-2099

[22] WBG Climate Change Knowledge Portal (CCKP, 2021). Interactive Climate Indicator Dashboard — Agriculture. Togo. URL https://climatedata.worldbank.org/CRMePortal/web/agriculture/crops-and-land-management?country=TGO&period=2080-2099

Precipitation

Rainfall projections for Togo are highly variable and most indications project likely seasonal changes to rainfall patterns. Decreases are expected during January to March and April to June rainfall periods and increases during the October to December rainfall period.[23] The proportion of total annual rainfall that falls in 'heavy' events is expected to increase. The figure below shows the change in the number of days with at least 20 mm of rainfall. Understanding the changes in the number of days with at least 20 mm of daily rainfall helps to estimate how likely the impacts are of heavy rainfall. Water routing and storage and other management options, are often very different if the precipitation input comes as many weak or a series of heavy rainfall events.[24] As shown in **Figure 9**, there is significant uncertainty on the future of rainfall patterns for Togo[25] with most scenarios pointing to an average projected increase in annual precipitation by the of the century under a high emissions scenario for Togo (RCP8.5).

FIGURE 9. Annual average precipitation in Togo for 1986 to 2099 (Reference Period, 1986–2005)[26]



CLIMATE RELATED NATURAL HAZARDS

Overview

Togo is highly vulnerable to natural disasters in the form of flooding, drought, high winds and storms, wildfires, coastal erosion, and disease epidemics. The country experiences recurring flooding and drought with often negative socio-economic effects on the population, the environment, and the economy.[27] Recent floods have been particularly devastating, destroying infrastructure and devastating cultivated land. Flooding in 2010 affected 83,000 people and resulted in over $38 million in damages and losses.[28] Areas along the coast, like the capital Lomé, are subject to coastal flooding due to high levels of coastal erosion. Deforestation from individuals, communities and companies cutting down trees to clear farmland or sell wood intensify flooding and increase its effects on infrastructure and land resources. Floods were previously prevalent in the Maritime (Gulf, Lakes, Zio Prefectures) and Savannah

[23] McSweeney, C., New, M. and Lizcano, G. (2012): UNDP Climate Country Profiles — Togo. URL: https://www.geog.ox.ac.uk/research/climate/projects/undp-cp/UNDP_reports/Togo/Togo.hires.report.pdf
[24] Togo (2017). National Climate Change Adaptation Plan. URL: https://www.preventionweb.net/files/58281_togonap.pdf
[25] WBG Climate Change Knowledge Portal (CCKP, 2021). Togo Water Dashboard. Data Description. URL: https://climateknowledgeportal.worldbank.org/country/togo/climate-sector-water
[26] WBG Climate Change Knowledge Portal (CCKP, 2021). Climate Data-Projections. Togo. URL: https://climatedata.worldbank.org/CRMePortal/web/agriculture/crops-and-land-management?country=TGO&period=2080-2099
[27] UNECA (2015). Assessment Report on Mainstreaming and Implementing Disaster Risk Reduction in Togo. URL: https://www.uneca.org/sites/default/files/uploaded-documents/Natural_Resource_Management/drr/drr_west-africa_english_fin.pdf
[28] GFDRR (2019). Togo. URL: https://www.gfdrr.org/en/togo

regions (Kpendjal Prefecture) in Togo but have become widespread in recent years across the country.[29] Between 1925 and 1992, Togo reported 60 rural and urban floods. From 2007 through 2010 were particularly marked by floods. Two of the three most severe droughts ever in the country were experienced during 1976/77 and 1982/83, mainly localized in the Savannah, Kara, Maritime and eastern part of the Plateau regions. Diseases also prominently affect the Togolese population and have had more recorded total deaths relative to other hazards. However, droughts and river floods tend to affect more people, with a combined total of recorded people affected surpassing 1 million.[30]

Data from the Emergency Event Database: EM-Dat database,[31] presented in **Table 4**, shows the country has endured various natural hazards, including droughts, floods, landslides, epidemics, and storms.

TABLE 4. Natural disasters in Togo, 1900–2020

Natural Hazard 1900–2020	Subtype	Events Count	Total Deaths	Total Affected	Total Damage ('000 USD)
Drought	Drought	3	0	550,0000	500
Epidemic	Bacterial Disease	10	1,032	11,610	0
	Viral Disease	2	84	560	0
Flood	Riverine Flood	8	72	547,695	0
Storm	Convective Storm	1	0	15	200

Key Trends

Climate change trends in Togo are expected to increase the risk and vulnerability of local communities to the intensity of extreme events, coastal storms, and natural hazards such as heat waves, droughts, floods, and wildfires.[32] Projections indicate that flood hazards such as river flooding may remain similar to current conditions under future change. However, changes in the environment such as land use changes will affect local flood hazards in the future. While model projections are largely uncertain about the change in drought hazard, the present hazard level in Togo may increase in the future due to the effects of climate change, particularly rising temperatures. This could lead to water scarcity in the long-term. Rising temperatures will also likely contribute to rising sea levels and increased high winds. Rising sea levels, regardless of height, will cause coastal erosion and the advance of the sea on the territory, which will affect the infrastructure and physical resources.[33]

[29] ODI (2017). Delivering disaster risk reduction by 2030. Country Case Studies. URL: https://www.odi.org/sites/odi.org.uk/files/resource-documents/11531.pdf7

[30] UNECA (2015). Assessment Report on Mainstreaming and Implementing Disaster Risk Reduction in Togo. URL: https://www.uneca.org/sites/default/files/uploaded-documents/Natural_Resource_Management/drr/drr_west-africa_english_fin.pdf

[31] EM-DAT: The Emergency Events Database — Universite catholique de Louvain (UCL) — CRED, D. Guha-Sapir, Brussels, Belgium. http://emdat.be/emdat_db/

[32] UNECA (2015). Assessment Report on Mainstreaming and Implementing Disaster Risk Reduction in Togo. URL: https://www.uneca.org/sites/default/files/uploaded-documents/Natural_Resource_Management/drr/drr_west-africa_english_fin.pdf

[33] Togo (2015). Third National Communication to the UNFCCC. URL: https://unfccc.int/sites/default/files/resource/tgonc3.pdf

Recurring flooding and drought in Togo are anticipated to continue to have negative socio-economic effects on the population, the environment, and the economy. Though Togo experiences some flooding almost every year, there were ten major floods in Togo between 1983 and 2010 and during the last four years, there have been particularly widespread and devastating floods that have destroyed infrastructure and devastated cultivated land. Soil erosion, coastal erosion, and deforestation are also major concerns that exacerbate the effects of flooding. Furthermore, the country's vulnerability to weather-related hazards is likely to increase as a result of climate change.[34]

Flooding is the most common natural hazard in Togo. The northern region, which shares the upper Volta basin with Ghana and Burkina Faso, is highly vulnerable to river flooding and areas along the coast like the capital city, Lomé, are subject to coastal flooding. In 2007, over 127,000 people were affected by flooding with 23 recorded casualties.[35] The magnitude of impacts of floods are exacerbated by local vulnerabilities. In the Mono basin in south eastern Togo, the lack of vegetation along river banks, the closeness of farmlands to river bodies, the poor construction and the position of settlements, the lack of diversification of livelihood strategies, and the lack of adequate flood warning systems and emergency response contribute significantly to the magnitude of impacts in the region.[36] In the country's coastal regions, coastal erosion exacerbates the effects of flooding.[37] Floods commonly damage infrastructure and crops, and hamper patients' access to health care and children's access to schools.

In Togo, drought occurs less frequently than floods, however is still of considerable concern for the country's livelihood and agriculture sector. Additionally, the total affected people and total cost of damage from droughts tends to be higher per drought event. Togo's three severe droughts which caused severe famine in 1942/43, 1976/77 and 198/83 had their strongest effect through the loss of agricultural yields and livestock deaths, and drying of important water bodies, all with severe implications for livelihoods and economic growth.[38]

Coastal erosion in Togo contributes to coastal regression and is particularly concerning where the coastal area represents an important economic zone for the country with more than 90% of the country's economic activities, and more than 42% of the country's population.[39] In the eastern section of Lomé harbor, the coast has receded at an annual rate of 20 m. Along the coast (Gbodjome and Kpogan), erosion is also significant, occurring at an annual regression rate of 10 m. The natural coastal erosion phenomenon has been amplified by the cumulative effects of construction of the Akosombo Dam on Volta river in Ghana and Nagbento dam on the Mono river as well as construction of port of Lome. Coastal erosion has caused disruption all along the coast of Togo through: (i) complete destruction of fishing villages; (ii) loss of agricultural land and coconut plantations; (iii) threat of seaside and economic structures (hotels, industries, habitats, etc.); and (iv) destruction of road infrastructure.[40]

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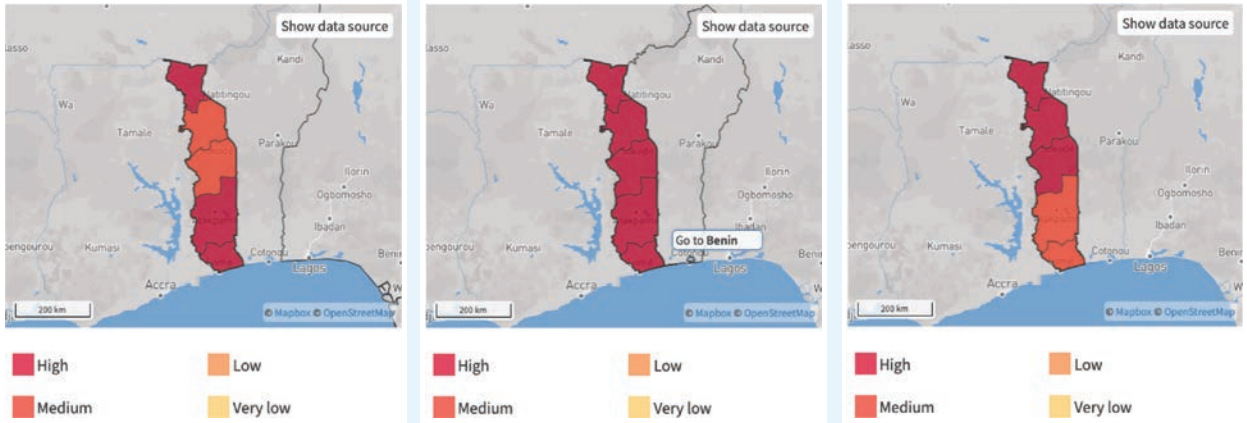
[34] GFDRR (2019). Togo. URL: https://www.gfdrr.org/en/togo
[35] GFDRR (2019). Togo. URL: https://www.gfdrr.org/en/togo
[36] Kissi et al. (2015). Quantitative Assessment of Vulnerability to Flood Hazards in Downstream Area of Mono Basin, South-Eastern Togo: Yoto District. Journal of Geographic Information System, 7, 607–619.
[37] GFDRR (2019). Togo. URL: https://www.gfdrr.org/en/togo
[38] UNECA (2015). Assessment Report on Mainstreaming and Implementing Disaster Risk Reduction in Togo. URL: https://www.uneca.org/sites/default/files/uploaded-documents/Natural_Resource_Management/drr/drr_west-africa_english_fin.pdf
[39] UNECA (2015). Assessment Report on Mainstreaming and Implementing Disaster Risk Reduction in Togo. URL: https://www.uneca.org/sites/default/files/uploaded-documents/Natural_Resource_Management/drr/drr_west-africa_english_fin.pdf
[40] World Bank (2019). The Cost of Coastal Zone Degradation in West Africa: Benin, Côte D'Ivoire, Senegal and Togo. West Africa Coastal Areas Management Program. URL: http://documents.worldbank.org/curated/en/822421552504665834/pdf/The-Cost-of-Coastal-Zone-Degradation-in-West-Africa-Benin-Cote-dIvoire-Senegal-and-Togo.pdf

Water scarcity is projected to be particularly acute for northern areas of the country. The wildfires come with significant environmental and economic impacts, through the destruction of biodiversity, forests and pasture lands.[41] Increased aridity and temperatures are expected to significantly increase these risks. **Figure 10** show risks from river flooding, wild fires and extreme heat.

FIGURE 10. Risk of river flood (left);[42] risk of wildfires (center); risk of extreme heat (right)[43]



Implications for DRM

Togo's Disaster Risk Management (DRM) strategy highlights the country's strong political commitment to implement DRM and reduce the risk of disaster in the country. Togo has advanced its DRM platform by developing a National Action Program for Adaptation to Climate Change (2009) and a National Investment Program for Environment and Natural Resources (2010). Togo has also integrated DRM activities in its climate change adaptation considerations through the country's Accelerated Growth and Employment Promotion Strategy (2013) and in its National Development Plan (2018–2022). Additional activities should include the development of analytical tools to enhance the country's risk identification capabilities to build capacity and integrate DRM considerations within the country's agriculture sector to increase resilience of agricultural production systems.[44] Togo created the National Agency of Aivil Protection (ANPC) in January 2017 in order to establish the meteorological information bulletin, annual actualization of national multi-risk contingency plan and implement its climate risks early warning system (CREWS). Other important DRM actions include, i) the Elaboration of National Strategy for Disaster Risk Reduction (SNRRC) updated in 2013; ii) the operationalization of the flood early warning system; iii) the establishment of a database

[41] UNECA (2015). Assessment Report on Mainstreaming and Implementing Disaster Risk Reduction in Togo. URL: https://www.uneca.org/sites/default/files/uploaded-documents/Natural_Resource_Management/drr/drr_west-africa_english_fin.pdf
[42] ThinkHazard! (2020). Togo River Flood. URL: http://thinkhazard.org/en/report/243-togo/RF
[43] ThinkHazard! (2020). Togo Extreme Heat. URL: http://thinkhazard.org/en/report/243-togo/EH
[44] GFDRR (2019). Togo. URL: https://www.gfdrr.org/en/togo

on disasters that have occurred in Togo the last thirty (30) years (DesInventar); iv) the establishment of a Sendai Framework Monitor (SFM) database on the monitoring of the implementation of the seven objectives of the Sendai framework. Togo also participates in the implementation of the WASCAL project (West African Sciences Service Center on Climate change and Adapted Land use) by granting research grants in the field of climate change and human security.

CLIMATE CHANGE IMPACTS TO KEY SECTORS

Togo is highly vulnerable to seasonal variability and long-term climate change. Increasing vulnerability is expected to result in cumulative impacts across the country's social, economic, and environmental structures. Changing rainfall patterns and floods in particular are likely to have significant consequences on the environment, society, food security situation, and economy. Significant impacts are also expected for the country's water resources, agriculture, coastal areas, and health sectors. Increased temperatures, flooding, increased aridity in the north, and soil erosion puts both urban and rural communities at risk, particularly for poor and vulnerable groups.[45] Environmental degradation, impacted water resources, and loss of biodiversity and ecosystem services constitute serious obstacles to the country's continued development and responsible management of its natural resources, and may also impact the country's tourism sector. Projected trends of climate variability and longer-term change are likely to exacerbate concerns, as the agricultural and livestock sector relies on rainfed production, and provides livelihoods for the majority of the population. More extreme weather events such as intense rainfall after prolonged dry spells can lead to erosion and flash flooding, damaging roads and infrastructure, crops destruction and put additional lives at risk.[46]

Gender

An increasing body of research has shown that climate-related disasters have impacted human populations in many areas including agricultural production, food security, water management and public health. The level of impacts and coping strategies of populations depends heavily on their socio-economic status, socio-cultural norms, access to resources, poverty as well as gender. Research has also provided more evidence that the effects are not gender neutral, as women and children are among the highest risk groups. Key factors that account for the differences between women's and men's vulnerability to climate change risks include: gender-based differences in time use; access to assets and credit, treatment by formal institutions, which can constrain women's opportunities, limited access to policy discussions and decision making, and a lack of sex-disaggregated data for policy change.[47]

[45] Togo (2017). National Climate Change Adaptation Plan. URL: https://www.preventionweb.net/files/58281_togonap.pdf
[46] Togo (2015). Third National Communication to the UNFCCC. URL: https://unfccc.int/sites/default/files/resource/tgonc3.pdf
[47] World Bank Group (2016). Gender Equality, Poverty Reduction, and Inclusive Growth. URL: http://documents1.worldbank.org/curated/en/820851467992505410/pdf/102114-REVISED-PUBLIC-WBG-Gender-Strategy.pdf

Agriculture

Overview

Agriculture dominates the Togolese economy, contributing approximately 40% to the country's GDP[48] (26% from food crops, 4% from cash crops, 5% from livestock products, 2% from fishery products and aquaculture, and 2% from forestry production).[49] Agriculture is also the main source employment for more than 70% of the population, especially for rural populations as well as contributes up to 20% of export revenue. However, Togolese agriculture is dominated by subsistence, traditional farming practices, small scale mixed crop and livestock production, with very low productivity.[50] Agriculture is heavily reliant on natural rainfall with only 2% of the total cultivated land in the country being irrigated. The amount and distribution of rainfall can be a large contributor to food shortages, famine and economic challenges.[51]

Climate Change Impacts

Projected climate variability and climate change trends for Togo such as rising temperatures, changing seasonal rainfall patterns, increased duration of dry spells, and increased aridity and drought threaten the country's agricultural sector. In Togo, agriculture (crop production, livestock and fisheries) is highly sensitive to climate conditions. While temperatures are projected to increase across the country, decreased rainfall during January to March and April to June is expected, with a likely increase during the October to December period and the impact these climatic changes on agriculture in Togo will vary considerably with the temperature and precipitation in different seasons and across regions. Significant potential exists for the increased prevalence of pests and diseases given the projected increase in temperatures and rainfall, thereby affecting crop yields. Increasing temperatures could affect the productivity of key cash crops like coffee and cocoa and maize yields could decline by more than 25% in the central and southern regions of the country by mid-century. Sorghum and cassava yields could double by end of the century, in the regions where rainfall may increase, owing to the crops' resilience under hot and harsher climates.[52] Tuber crops such as yams in regions like northern Bassar, Dankpen and Keran may also benefit from high temperatures and increasing rainfall. However, projected extreme temperatures in regions such as Tone, Tandjoare, Kpendjal and Cinkasse will be harmful to vegetable crop production.

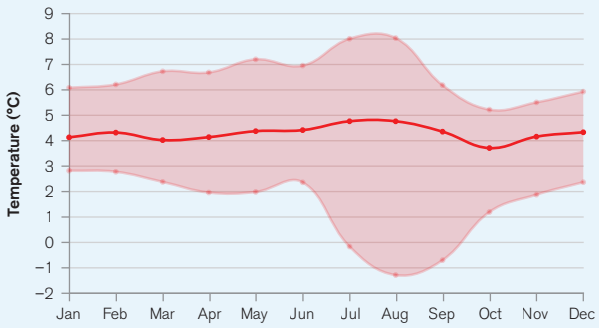
More persistent and intense rainfall could be experienced in the drier northern parts of the country resulting in flash flooding and may introduce diseases and pests that livestock in that area not adapted to.[53] For instance including trypanosomiasis in cattle, may lead to considerable livestock losses. Drying of watering points for livestock, pasture degradation, and death of livestock will lead to falling incomes for pastoralists and agro-pastoralists and could lead to an exodus from rural areas in drier parts of the country. The country's fishing industry will likely experience

[48] UNDP (2018). Country study — Togo. Strengthening of National Capacities for National Development Strategies and Their Management: An Evaluation of UNDP's Contribution.
[49] Tchinguilou et al. (2013). West African Agriculture and Climate Change: a comprehensive analysis — Togo
[50] Tossou (2015). Understanding farmers' perceptions of and adaptations to climate change and variability: the case of the maritime, plateau and savannah regions of Togo. *Agricultural Sciences*, 6, 1441–1454.
[51] Mekimina (2013). Climate change impact on Togo's agriculture performance: a Ricardian analysis based on time series data. *Ethiopian Journal of Environmental Studies and Management*, 6 (4), 390–397.
[52] Tchinguilou et al. (2013). West African Agriculture and Climate Change: a comprehensive analysis — Togo
[53] Togo (2015). Third National Communication to the UNFCCC. URL: https://unfccc.int/sites/default/files/resource/tgonc3.pdf

a decrease in fish production due to heavy disturbances in fish productivity cycles, and salinization of freshwater bodies. Rising sea surface temperatures will lead to warming and increased evapotranspiration in surface water, while rising sea levels will also increase temperatures forcing certain fish species to lower depths and decreasing the volumes of pelagic fish catches. Rising sea levels will also result in reduced productivity of fish species such as shrimp and crabs. Raising temperatures, and evapotranspiration will increase the risk of wild fires, thereby affecting forests. Salt water intrusions from rising sea levels will affect the productivity of mangroves, while increasing rainfall intensities in the mountainous regions will lead to an intensification of hillside erosion and expose the mountain regions to loss of vegetation. This is already occurring in the Atakora mountain chain.[54]

Temperature thresholds for agriculture and livestock are important as temperature changes, and in particular extreme heat, it can cause damage to plants and affect the health of livestock as well as farm workers. Crops are known to have specific temperature windows for optimal growth and yield. Cold temperatures and frost can affect the early growth, but high temperatures above crop-specific thresholds rapidly reduce the yield. **Figure 11** shows the projected change in average daily maximum temperatures for Togo across the seasonal cycle. What is clear is that higher temperatures are expected throughout the year.

FIGURE 11. Average daily max temperature for Togo (RCP8.5, Reference Period, 1986–2005)[55]



Adaptation Options

Both the sensitivity of the agricultural sector to the climate and the high reliance of this sector on rainfall and water resources have important implications for Togo's farmers and wider economy. While the agriculture sector continues to be hindered by weak dynamism, low investments, low-levels of growth, market challenges and faces the additional threat of climate change, it remains the sector with the greatest possibilities for accelerating national growth, ensuring food security, creating jobs, increasing the income of the poor, contributing to trade balance and developing agro-industry in Togo.[56] Therefore, various actions are planned or are currently underway in the country to improve resilience and adapt the sector to a changing climate.

Togo's adaptation action for the Agriculture Forestry and Other Land Use (AFOLU) sector includes; (i) capacity building in AFOLU sector — through for instance building technical capacity of key research institutions on modeling; (ii) strengthening the resilience of crops, livestock and forests — through for instance breeding of crops and livestock for resistance to pests and diseases and promoting small scale irrigation; (iii) promoting sustainable forest management — through promoting fast growing tree species for wood energy); and (iv) sustainable land management (e.g developing a national monitoring program for land use). The sector would also benefit from the

[54] Togo (2015). Third National Communication to the UNFCCC. URL: https://unfccc.int/sites/default/files/resource/tgonc3.pdf
[55] WBG Climate Change Knowledge Portal (CCKP, 2021). Togo Agriculture. Dashboard URL: https://climatedata.worldbank.org/CRMePortal/web/agriculture/crops-and-land-management?country=TGO&period=2080-2099
[56] IMF (2014). Poverty reduction strategy paper — Togo. URL: https://www.imf.org/external/pubs/ft/scr/2014/cr14224.pdf

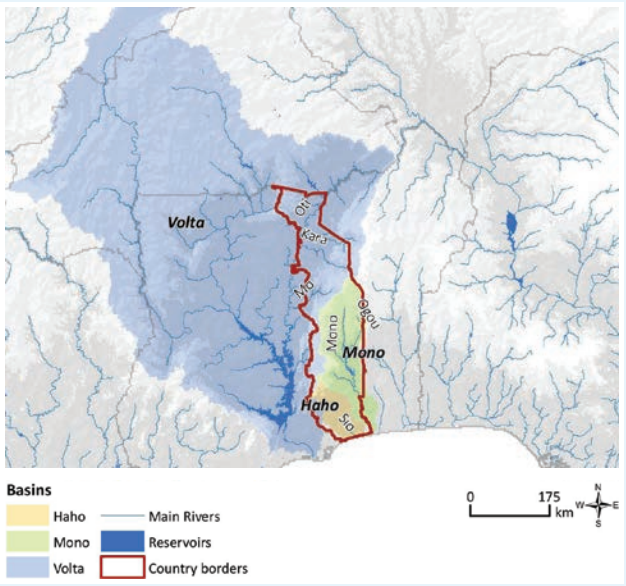
strengthening of Integrated Soil Fertility Management (ISFM), the construction and/or improvement of reservoirs for micro-irrigation and livestock watering in rural areas throughout all regions, support for the mapping of areas vulnerable to climate change, and the promotion of rice production systems with very low water consumption and low GHG emissions.[57] The country has committed to the Climate-Smart Agriculture process outlaid in the framework of the implementation of the agricultural policy laid out by ECOWAS and in the National Policy for the Agricultural Development of Togo 2013–2022.[58]

Water

Overview

Togo is relatively well endowed with water resources, estimated at 11.5 km^3/yr, of which 10.8 km^3/year are surface water and 5.7 km^3/yr are groundwater, with 5.0 km^3/year being considered as common between surface and groundwater. The Mono River is the largest river and approximately 37% of the country is located in its basin. Rivers in the northern part of the country (Oti, Kara and Mo) are part of the Volta basin, where 48% of the country is located. The southern part of the country includes the Lake Togo Basin, which includes the Haho basin and the Sio River. Annual discharge of rivers in the country vary annually. There is no apparent trend in river flows over the past few decades. However, there is strong seasonality in discharge of the rivers, with high flows from August to October. Rivers in the northern part of the country may dry between February and April.[59] **Figure 12** shows the river basins in Togo.

FIGURE 12. River basins in Togo[60]



[57] Togo (2015). Third National Communication to the UNFCCC. URL: https://unfccc.int/sites/default/files/resource/tgonc3.pdf
[58] Republic of Togo (2016). Nationally Determined Contributions to the UNFCCC. URL: https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Togo%20First/INDC%20Togo_english%20version.pdf
[59] Togo (2015). Third National Communication to the UNFCCC. URL: https://unfccc.int/sites/default/files/resource/tgonc3.pdf
[60] ECREE (2017). GIS Hydropower Resource Mapping and Climate Change Scenarios for the ECOWAS Region. P. 7. URL: http://www.ecowrex.org/sites/default/files/country_report_14_togo.pdf

In Togo, the agriculture sector uses 45% of the total water drawn in the country, households use 52% and industry and mines use up to 3%. Despite the nation's water endowments, access to portable drinking water in Togo stands at around 50%, with strong regional disparities. Drinking water access is much lower in the southern parts of the country, particularly in the Plateau and Maritime regions where drinking water access rates are 39% and 30% respectively.[61]

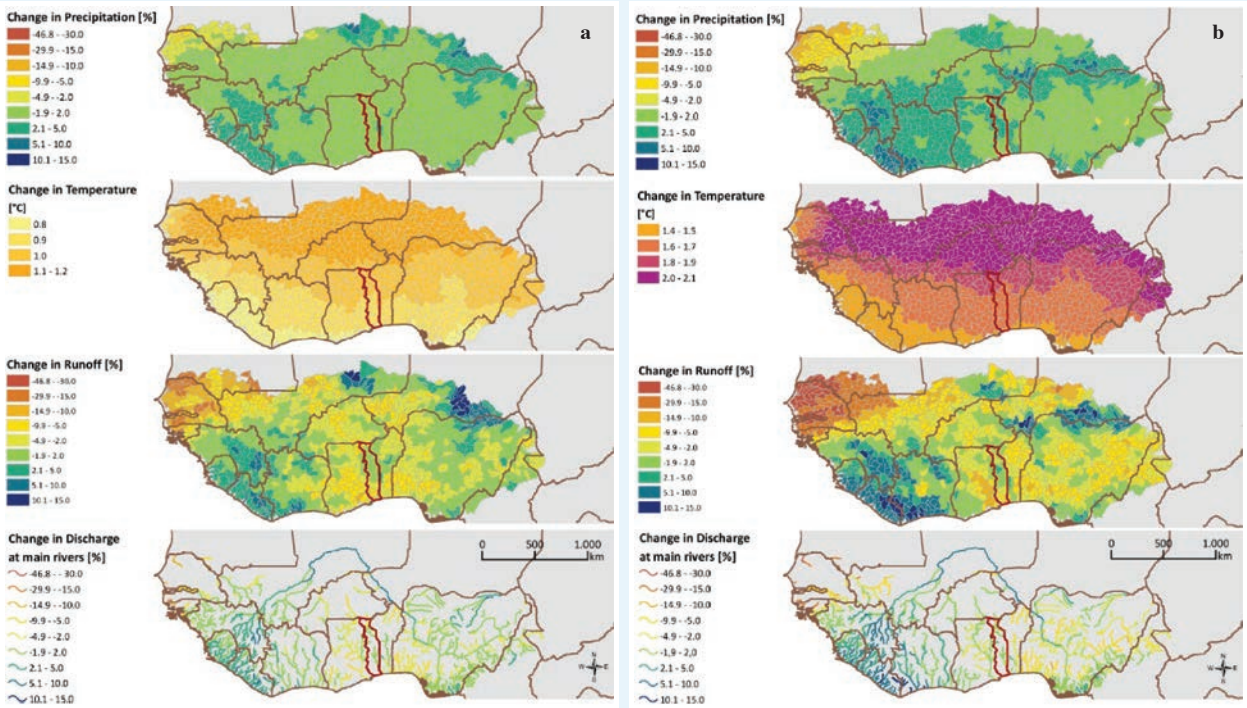
Climate Change Impacts

It is expected that future runoff and river discharge will decrease slightly in the southern parts and may not change in the central and northern parts of the country.[62] Reduced river flows in the southern parts of the country will encourage the rise in toxic water plants like hyacinth. Coupled with rising temperatures, these conditions will exacerbate the deterioration of water quality, and the proliferation of vectors for water borne diseases such as malaria. Low river flows will also meaningfully affect hydro-power generation capacity in the country. Rising sea levels will result in permanent saltwater intrusion in rivers with implications for migration and also negative effects on biodiversity, such as affecting the productivity of mangroves.[63] Lakes and coastal lagoons are likely to become completely brackish due to sea-level rise and increased storm surges, further deteriorating these critical ecosystems. In the southern parts of the country about 90% of rainfall is lost via evapotranspiration and only about 10% of rainfall generates runoff. In the central parts of Togo, where rainfall is higher, about 80% of rainfall is lost via evapotranspiration and 20% generates runoff.[64]

Approximately 85% of the total public national water supply in Togo comes from groundwater.[65] Model projection suggest that these ground water resources in Togo will be severely affected by climate change. In the Maritime region, ground water reserves could be depleted by the late 2030s under extreme scenarios. Depletion could occur by the 2050s in the Savannah region under the same scenario. The moderate climate projection scenarios show that the central region of the country could see a drop of up to 61% in ground water reserves by the end of the century.[66] Under these conditions, severe water shortages may result and the national will struggle to meet its drinking water needs. In addition, hygiene related diseases may become more widespread. **Figure 13** shows multi-model ensemble of projections of climate and associated changes in runoff and river discharge for West Africa and Togo for 2025–2045 (a) and 2046–2065(b).

[61] Togo (2015). Third National Communication to the UNFCCC. URL: https://unfccc.int/sites/default/files/resource/tgonc3.pdf
[62] ECREE (2017). GIS Hydropower Resource Mapping and Climate Change Scenarios for the ECOWAS Region. P. 7. URL: http://www.ecowrex.org/sites/default/files/country_report_14_togo.pdf
[63] Togo (2015). Third National Communication to the UNFCCC. URL: https://unfccc.int/sites/default/files/resource/tgonc3.pdf
[64] ECREE (2017). GIS Hydropower Resource Mapping and Climate Change Scenarios for the ECOWAS Region. P. 7. URL: http://www.ecowrex.org/sites/default/files/country_report_14_togo.pdf
[65] Gnazou MD-T., Sabi EB, Tairou SM, Akakpo W, Agouda K, Upton K, Ó Dochartaigh BÉ and Bellwood-Howard, I. (2018). Africa Groundwater Atlas: Hydrogeology of Togo. British Geological Survey
[66] Togo (2015). Third National Communication to the UNFCCC. URL: https://unfccc.int/sites/default/files/resource/tgonc3.pdf

FIGURE 13. Projections of climate and associated changes in runoff and river discharge for West Africa and Togo for 2025–2045 (a) and 2046–2065 (b).[67]

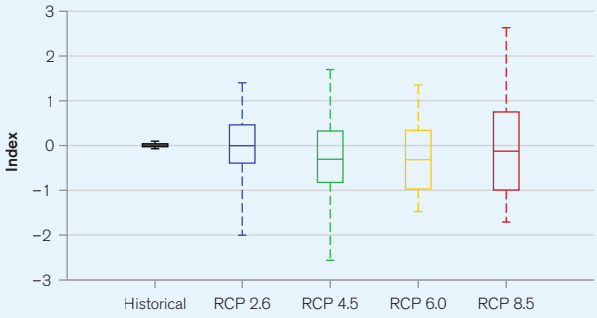


The effects of climate change on water resources will have significant effects on the economy and livelihoods in Togo. As such, adaptation of water resources to climate change is high on the agenda of national policy and planning. A key priority for adaptation is the promotion of integrated, sustainable water resources management approach. There is need to prioritize the protection of the quality of Togo's water resources, through improved management and reduced pollution of ground and surface water.[68] Specific actions include capacitating grass roots communities in efficient water resource management, rehabilitating and strengthening the nation's hydrometeorological network and accelerating the implementation of the country's integrated water resource management program which was adopted by the government.[69] There is need to prioritize the protection of the quality of Togo's water resources, through improved management and reduced pollution of ground and surface water.

[67] ECREE (2017). GIS Hydropower Resource Mapping and Climate Change Scenarios for the ECOWAS Region. P. 15–16. URL: http://www.ecowrex.org/sites/default/files/country_report_14_togo.pdf
[68] World Bank (2020). Diagnostic Stratégique de l'Eau et de l'Assainissement — Togo. [Avril 2020].
[69] IMF (2014). Poverty reduction strategy paper — Togo. URL: https://www.imf.org/external/pubs/ft/scr/2014/cr14224.pdf

Changes in precipitation patterns will impact river flow, irrigation, water management and flooding. This can be seen through both the supply as well as demand. Greater periods of enhanced drought will be exacerbated by higher temperatures, and thus stronger evapotranspiration. Projected climate change trends for Togo are therefore expected to enhance the contrast between wet and dry and thus might change the dynamics around the balance between availability and use of water. **Figure 14** shows the projected annual Standardized Precipitation Evapotranspiration Index (SPEI), an index which represents the measure of the given water deficit in a specific location, accounting for contributions of temperature-dependent evapotranspiration and providing insight into increasing or decreasing pressure on water resources. Negative values for SPEI represent dry conditions, with values below –2 indicating severe drought conditions, likewise, positive values indicate increased wet conditions. This is an important understanding for the water sector in regard to quantity and quality of supply for human consumption and agriculture use as well as for the energy sector as reductions in water availability impacts river flow and the hydropower generating capabilities. At national scale, Togo is expected to experience slightly decreased SPEI through the end of the century, representing slightly drier conditions.

FIGURE 14. Annual SPEI Drought Index in Togo for the period, 1986 to 2099 (Reference Period, 1986–2005)[70]



Adaptation Options

Togo should enhance and scale up its integrated water resource management which includes the increased conservation and management of watersheds and catchment areas, promotion of integrated development and water resource management, conservation and sustainable utilization of water resources, improved trans-boundary cooperation regarding water resources and access, and improved institutional and human capacity in water resource management and more efficient use.[71] The country has committed to adaptation in the water sector in various policies and plans. Improvements are targeting improved water supply and access to safe drinking water, improved sanitation in rural and peri-urban areas, and the development and implementation of water regulations and protections. Improved integrated water resource management should increase water availability in both quality and quantity.[72] Togo can also further strengthen its system for water monitoring for both surface and ground water, which would be strengthened through the development and introduction of a monitoring mechanism to monitor withdraws.[73]

[70] WBG Climate Change Knowledge Portal (CCKP, 2020). Togo. Water Sector Dashboard. URL: https://climatedata.worldbank.org/CRMePortal/web/agriculture/crops-and-land-management?country=TGO&period=2080-2099
[71] Togo (2015). Third National Communication to the UNFCCC. URL: https://unfccc.int/sites/default/files/resource/tgonc3.pdf
[72] Republic of Togo (2016). Nationally Determined Contributions to the UNFCCC. URL: https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Togo%20First/INDC%20Togo_english%20version.pdf
[73] World Bank (2020). Diagnostic Stratégique de l'Eau et de l'Assainissement — Togo. [Avril 2020].

Energy

Overview

The rate of access to electricity in Togo has improved from 17% in 2000 to 35% in 2016. However, large disparities exist between urban areas (access rate: 87%) and rural (access rate: 7%). Renewable energies (solar, wind, hydropower) are present in the electricity generation capacity of the country. Over 90% of Togolese urban households do not have access to clean cooking. The supply of butane gas channels are not sufficiently decentralized and the gas price and the purchase cost of user equipment significantly limit the access of the majority of the population to modern cooking fuel.[74] Togo's installed energy generating capacity is about 230 MW (2015). The majority of Togo's energy comes from thermal energy (70%) and is complemented by hydro-power (29%). There are two existing hydropower plants in Togo (Kpimé and Nangbéto) with two others planned (Adjarala and Kara).[75]

Total energy access in Togo has been improving steadily and stood at 47% in 2016. However, there are strong disparities in access between urban and rural areas. Electricity access in urban areas is about 87% while in rural areas it is 7%. Unserved rural populations rely strongly on wood/biomass for energy. The estimated total of people who rely heavily on traditional biomass for energy for cooking is around 91% of the population: firewood accounting for 49% and charcoal for 42%.[76] Energy use in Togo is largely for residential purposes. In 2008, households used 67% of the total energy, transport 22%, commercial activities 9%, and industry 2%.[77] Electricity demand is growing at an annual rate of 8% per year and is expected to double by 2025. The country will require an additional 200MW to meet this demand.[78] These energy needs will need to be met under increasingly difficult conditions as the climate changes.

Climate Change Impacts

It is anticipated that by 2025, natural forests and plantations will experience a significant drop in productivity in Togo.[79] Rising temperatures and evapotranspiration will likely lead to water balance deficit and reduced productivity in forest resources. Moreover, future increase in flooding of agricultural fields, natural vegetation and forest plantations could jeopardize biomass production. With the implementation of current forestry and energy policy in Togo, the potential deficit for wood energy would be 1.2 million m^3 in the 2050s and up to 8 million m^3 by late century. These impacts will likely affect the rural poor for who biomass is the main source of energy. The savannah region, which is already facing the highest poverty rate and increasingly scarce wood resources, will likely suffer greatly from the impacts of climate change on forest resources. At the same time, the supply of fuel wood from Lomé and the maritime region would become virtually impossible under changing climatic conditions.

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[74] SEA (2018). Togo — Rapid Assessment Gap. URL: https://www.se4all-africa.org/fileadmin/uploads/se4all/Documents/Country_RAGAs/TOGO_RAGA_FR_Released.pdf

[75] ECREE (2017). GIS Hydropower Resource Mapping and Climate Change Scenarios for the ECOWAS Region. URL: http://www.ecowrex.org/sites/default/files/country_report_14_togo.pdf

[76] Practical action (2017). Poor people's energy outlook. URL: https://www.developmentbookshelf.com/doi/pdf/10.3362/9781780446813

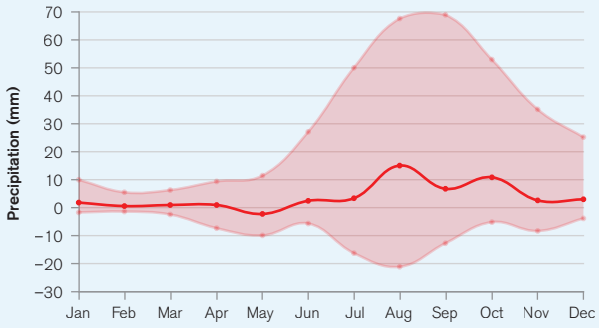
[77] World Bank (2013). Togo Energy Sector Policy Review. Review of the Electricity Sub-Sector. URL: http://documents.worldbank.org/curated/en/127631468119670200/pdf/ACS4990WP0ENGL0ox0379826B000PUBLIC0.pdf

[78] UNEP (2016). Togo energy profile. URL: https://wedocs.unep.org/bitstream/handle/20.500.11822/20593/Energy_profile_Togo.pdf?sequence=1&isAllowed=y

[79] World Bank (2013). Togo Energy Sector Policy Review. Review of the Electricity Sub-Sector. URL: http://documents.worldbank.org/curated/en/127631468119670200/pdf/ACS4990WP0ENGL0ox0379826B000PUBLIC0.pdf

While there is high potential for hydropower in Togo, it remains highly dependent on rainfall, evaporation and temperature changes in the country. Increased evaporation could affect hydropower potential leading to a deficit of 27%–36% in hydroelectric power by the 2050s. Runoff and river discharge is expected to only decline slightly in the south or remain unchanged under climate change. Conservative projections (RCP 2.6) suggest that climate change may lead to slight increases in peak flows in the Nangbeto dam and the planned Adjarala dam of 1.36 m3/s and 0.62 m3/s. These projections indicate that there is potential to maximize hydro-power production in Togo and address energy related challenges through building strategic dams. There is also potential for developing irrigation downstream of existing dams and boosting agricultural productivity in the country. Future projections also suggest that increases in temperature could be a result of increasing solar radiation. Therefore, in addition to hydropower as a source of renewable energy, there is potential for solar energy installation in Togo.[80] Togo's national energy policy focuses on increasing the nation's energy security and access, partly through the development of renewable energy sources. The country already has impressive renewable energy potential. Solar potential is at 4.6–5.7 kWh/m2/day, but has not yet been harnessed.[81] Hydropower capacity is estimated at 596 MW, yet current capacity is way below that (reference period 1998–2014).[82] In light of climate change and the potential renewable energy offers, the country is prioritizing investment in new and renewable energy. This is being done through training to enhance local capacities for research in renewable energy and actively seeking out technical and financial partners for the production of new and renewable energies. Already there are at least two planned investment in hydro power plants at Adjarala and Kara. Given the heavy reliance of the country's population on energy wood supply and its vulnerability to climate change, Togo also seeks to improve biomass energy potential through sustainable management of forest resources via reforestation and participatory forest management. **Figure 15** shows the largest 5-day cumulative rainfall, which will influence water flows with the potential to impact hydropower.

FIGURE 15. Average largest 5-day cumulative rainfall (RCP8.5, Reference Period, 1986–2005)[83]



[80] IMF (2014). Poverty reduction strategy paper — Togo. URL: https://www.imf.org/external/pubs/ft/scr/2014/cr14224.pdf
[81] Practical Action (2017). Poor people's energy outlook. URL: https://www.developmentbookshelf.com/doi/pdf/10.3362/9781780446813
[82] ECREE (2017). GIS Hydropower Resource Mapping and Climate Change Scenarios for the ECOWAS Region. URL: http://www.ecowrex.org/sites/default/files/country_report_14_togo.pdf
[83] WBG Climate Change Knowledge Portal (CCKP, 2021). Togo Energy Sector. URL: https://climateknowledgeportal.worldbank.org/country/togo/climate-sector-energy

Adaptation Options

The Togolese government is working to increase access to energy; however, a significant share of current energy demand remains unmet. The country has committed to improving its energy situation by increasing the share of renewable energy (hydro, solar, wind and biomass) in electricity production and to develop its renewable energy sector to meet 4% of total energy mix by 2030. Efforts are being made to attract training and financial partners in the countries production of new and renewable energies. Togo has adopted its strategic plan for the electricity sub-sector, has drafted its national energy policy and has begun to implement its national renewable energy action plan 2015–2020–2030.[84] To improve management of its forests, Togo is committed to increasing the sustainable supply and use of biomass for energy production, continue to develop and promote renewable energies and continue to promote the use of alternative energy. According to Togo's National Strategy for the Reduction of Emissions from Deforestation and Forest Degradation (REDD+) 2020–2029, the country has committed to reducing the pressure on wood energy through the sustainable supply and improved efficiency of conventional energy conversion and combustion, increase the development and promotion of modern renewable energies, and also through the promotion of alternative and renewable energy.[85]

Health

Overview

Togo has a decentralized health system, and the health situation in Togo is characterized by persistently high morbidity and mortality rates, despite progress in recent years in interventions such as integrated management of childhood illnesses, the use of treated mosquito nets and immunization coverage. An epidemiological transition is under way, in that noncommunicable diseases are increasingly becoming an issue. Little progress has been made on most health indicators, particularly those related to the Sustainable Development Goals. Leading causes of deaths (all age groups) are HIV/AIDS, diarrhea, tuberculosis, pneumonia and malaria and maternal and child health continue to be leading health needs. In 2013, malaria was the leading cause of morbidity in all age groups (46%), and of mortality (12.26%) in health facilities. The epidemic of Ebola virus disease in West Africa and the meningitis and Lassa fever epidemics in the central and northern regions of the country in 2016 have revealed further shortcomings in the health system and in the enforcement of the International Health Regulations. Noncommunicable diseases have emerged due to higher exposure to risk factors such as tobacco use, alcohol abuse, the use of drugs and other psychoactive substances, and obesity. Thus, in the population aged 15 to 64, the prevalence of high blood pressure is 19% and that of diabetes 2.6%. Cardiovascular diseases are responsible for 6% of all deaths recorded at health-care facilities nationwide.[86]

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[84] Republic of Togo (2016). Nationally Determined Contributions to the UNFCCC. URL: https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Togo%20First/INDC%20Togo_english%20version.pdf

[85] Republique Togolaise (2019). Stratégie nationale de Réduction des Émissions dues à la Déforestation et à la Dégradation des forêts (REDD+) 2020–2029. Ministere de l'Environnement, du Developpement Durable et de la Protection de la Nature. URL: https://www.reddtogo.tg/index.php/ressources/strategie-nationale-redd/strategie/send/15-strategie/141-strategie-nationale-redd-2020-2029-version-finale

[86] WHO (2016): Country Cooperation Strategy — At a glance, Togo. URL: https://apps.who.int/iris/bitstream/handle/10665/136894/ccsbrief_tgo_en.pdf?sequence=1

Climate Change Impacts

Togo is highly vulnerable to the adverse health implications from projected future climates for the country, including increased temperatures, more intense and frequent extreme weather events and increased duration and severity of aridity and drought. These trends are likely to result in increased water and food insecurity, higher exposure to heat stress and ultraviolet radiation, changes in infectious and vector borne disease transmission patterns. Increased risk of food insecurity, flood and drought-related mortality and displacement, heat stress, and infectious disease are the most pressing climate-related challenges to human health in the West African region.

Heat stress and associated risks of cardiovascular and respiratory disease are likely to increase due to longer and hotter heat waves in addition to overall warmer temperatures, particularly in the already hot and arid northern areas and among children and the elderly. Heat-related mortality is projected to increase across the region through this century. Evidence also exists of increasing dust during the harmattan, which may be linked to warming temperatures and increased evaporation over the Sahara. Diminished air quality from dust or increasing wildfires exacerbates cardiovascular and respiratory diseases with cross-border health implications. The incidence and distribution of vector- and waterborne diseases are also likely to be affected by warming temperatures in combination with more frequent and intense heavy rains. Cholera outbreaks, recurrent in the region, are linked to heavy rains and flooding, which bring contaminated water and sewage into sources used for drinking, bathing, and washing. Diarrheal disease also increases under flood conditions and is already a leading cause of undernutrition mortality in children. Additionally, temperature and rainfall trends will also lead to shifts in the distribution, timing, and severity of climate-sensitive diseases like meningitis and malaria. Warming trends appear to be expanding meningitis occurrence southward from the Sahel. Areas of endemic and seasonal malaria risk, however, are projected to shrink across the region where temperatures will exceed mosquitoes' thermal tolerance, especially in Sahelian countries, where warming is expected to occur at faster rates.[87]

In Togo, the annual distribution of days with a high-heat index provides insight into the health hazard of heat. Increased night temperatures can result in decreased opportunity for natural cooling. **Figure 16** shows the expected Number of Days with a Heat Index >35°C through the 2090s; appointing to a sharp increase in the number of very hot days, which will accelerate by mid-century and continue to sharply increase under a high-emission scenario (RCP 8.5) through the end of the century. Heat discomfort and heat stress increases mortality and morbidity for the most vulnerable, especially the elderly, children and pregnant women. Additionally, children's learning ability significantly decreases with increased heat exposure. **Figure 17** shows that tropical nights, minimum temperatures (>20°C), will follow a similar warming as days with a high heat index, rising rapidly under a high-emission scenario (RCP8.5).

[87] USAID (2018): Climate Risk Profile — West Africa. URL: https://www.climatelinks.org/sites/default/files/asset/document/West_Africa_CRP_Final.pdf

FIGURE 16. Days with a Heat Index >35°C (Reference Period, 1986–2005)[88]

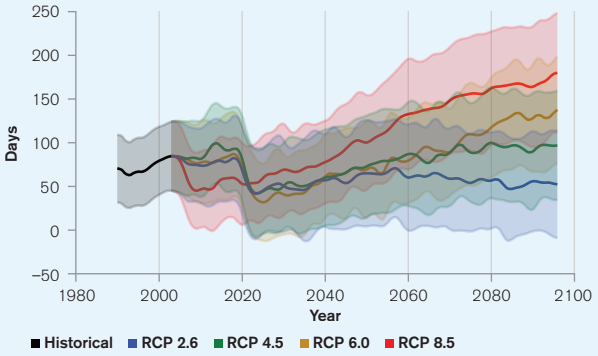
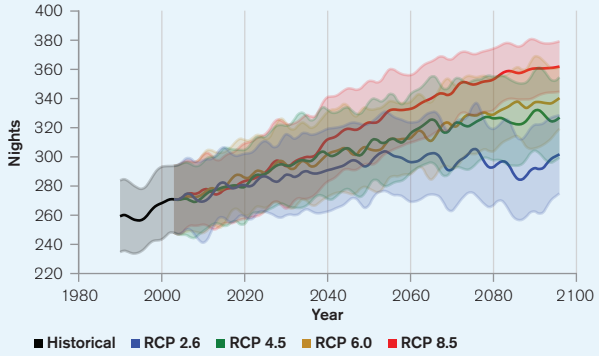


FIGURE 17. Number of Tropical Nights (Tmin >20°C) (Reference Period, 1986–2005)[89]



Adaptation Options

Togo remains committed to improving its healthcare system, service delivery and resilience to climate change. The country is committed to improving its sanitation and drainage, improving road networks, especially in urban areas, increasing sustainable waste management and strengthening its institutional and regulatory framework concerning health and the environment. Togo has developed a national health policy and is preparing its draft of a national hygiene and sanitation policy, which is expected to be accompanied by a strategic plan. In order to increase the prevalence of climate change adaptation strategies, revisions are being made to urban planning and housing policies, including increasing energy efficiency measures and disaster risks. The country is committed to focusing on disaster risk management and preparedness, proactive management of forced migrations, improved cholera outbreak and malaria control and improvement in nutrition. These are to be achieved party through increasing nutrition surveillance and improved staff trainings for malnutrition prevention and treatment. Additional training is needed for community health workers to provide emergency support as well as to strengthen transport and communication systems between health facilities. Improvements to water and sanitation systems is imperative as is improved data collection and management for preparing for climate induced events and changes.[90]

[88] WBG Climate Change Knowledge Portal (CCKP, 2021). Togo Health Sector Dashboard. URL: https://climatedata.worldbank.org/CRMePortal/web/health/systems-and-service?country=TGO&period=2080-2099

[89] WBG Climate Change Knowledge Portal (CCKP, 2021). Togo Health Sector. URL: https://climateknowledgeportal.worldbank.org/country/togo/climate-sector-health

[90] Republic of Togo (2016). Nationally Determined Contributions to the UNFCCC. URL: https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Togo%20First/INDC%20Togo_english%20version.pdf

Coastal Zones

Overview

Togo has a 56 km coastline and the coastal region includes 70% of the country's economic activities. These include fishing, trade, industry (90% of the country's industry is located in the coastal region)[91] and tourism. However, the complex physical and socio-economic activity in the coastal area is fragile and bears the weight of population growth and economic development. Currently, more than 500 000 people live in precarious housing along the coast and key economic activities such as the phosphate mining located near the coast, increase vulnerability, risk and exposure to disasters.[92] Furthermore, coastal erosion, for which the coast is highly susceptible has contributed to coastline recession by nearly 250 m across areas east of the port of Lome since 1967, twice removing a national highway and leading to losses of property and infrastructure. Climate change is likely to exacerbate the physical and socio-economic vulnerabilities along the Togolese coast through sea level rise, and coastal flooding.[93]

Climate Change Impacts

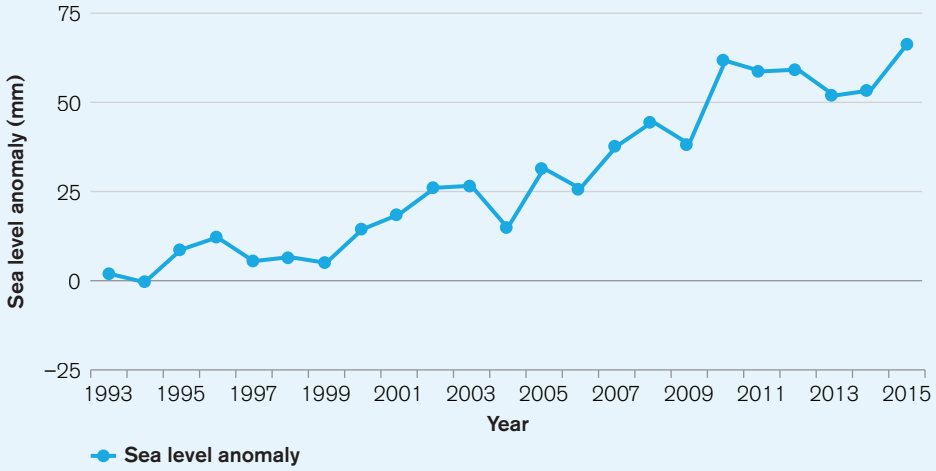
Significant increases in sea levels are anticipated for Togo's coastline in the coming decades. Projections show sea level rise over 1986–2005 levels by up to 0.16 m in 2025, 0.34 m for 2050, 0.55 m around 2075 and between 0.74 m by end of century, based on the conservative RCP 2.6 Scenario. This is likely to require the displacement of more than 90% of industrial units in the country, which are currently concentrated in the coastal zone, which will affect the country's economy significantly. Furthermore, salt water intrusion from rising sea levels will increase salination drinking water and affect local populations who derive incomes from lagoons and exacerbate poverty or necessitate the shifting of livelihoods activities. Those carrying out farming activities such as market gardening along the coast may also lose their farms.[94]

Rising sea levels will exacerbate coastal erosion, creating significant threats to infrastructure along the coast and in the coastal region. Already, coastal erosion measurements put the average loss of coastline to 5 m/ year, likely to reach recession of 10 m/year. Along the eastern section of Lomé harbor, an annual erosion rate of 20 m has been recorded and will likely increase in the future. Sea level rise induced erosion will likely lead to the proliferation of informal settlements and displaced populations. Furthermore, the occupation of land belonging to other communities by displaced population may lead to land disputes.[95] Flooding in coastal areas is likely to increase, with potential to cover 20%–35% of the coastal areas, which largely do not experience flooding presently.[96] Increased flooding in

[91] Republic of Togo (2016). Nationally Determined Contributions to the UNFCCC. URL: https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Togo%20First/INDC%20Togo_english%20version.pdf
[92] Togo (2015). Third National Communication to the UNFCCC. URL: https://unfccc.int/sites/default/files/resource/tgonc3.pdf
[93] World Bank (2019). The cost of coastal zone degradation in West Africa: Benin, Côte D'Ivoire, Senegal and Togo. URL: http://documents.worldbank.org/curated/en/822421552504665834/pdf/The-Cost-of-Coastal-Zone-Degradation-in-West-Africa-Benin-Cote-dIvoire-Senegal-and-Togo.pdf
[94] Togo (2015). Third National Communication to the UNFCCC. URL: https://unfccc.int/sites/default/files/resource/tgonc3.pdf
[95] Togo (2015). Third National Communication to the UNFCCC. URL: https://unfccc.int/sites/default/files/resource/tgonc3.pdf
[96] USAID (2018). Climate Risk Profile — West Africa. URL: https://www.climatelinks.org/sites/default/files/asset/document/West_Africa_CRP_Final.pdf

the lower region of the city of Lomé, where 40%–50% of the population lives and 80% of infrastructure, industries and hotels are located, will likely cause a considerable economic damage.[97] Rising sea surface temperatures may lead to losses of coastal habitats such as mangroves as well as key food sources such as plankton. Continued ocean acidification will result in reduced protein intake and nutrition deficits for human population. The West African coastal region is expected to be largely impacted by sea level rise (**Figure 18**) and depleted fish stock, which will hurt local and regional economies and negatively impact food security for the region.[98]

FIGURE 18. Sea level rise anomaly for Togo (1993–2015)[99]



Adaptation Options

Adapting its coastal zones to climate change impacts and sea level rise is one of Togo's primary adaptation priorities. Current effort include investment in coastal protection and preventative management actions as well as increased monitoring and management of coastal erosion.[100] Priority actions espoused in key strategic planning and policy documents include: (i) intensifying national action under the West African regional program against coastal erosion (West African Economic and Monetary Union) and West Africa Coastal Areas management program(WACA) with its resilience investment projects in Togo and Benin(WACA ResIP); (ii) awareness raising on coastal vulnerabilities and sustainability; (iii) consolidation of data observation and databases to inform actions; (iv) construction of barriers against salt water intrusion; and (v) resettlement of those in risk zones along the coast and rehabilitation of lagoons. However, proposed infrastructure development has the potential to displace local communities and should be undertaken with care.

[97] Togo (2015). Third National Communication to the UNFCCC. URL: https://unfccc.int/sites/default/files/resource/tgonc3.pdf
[98] USAID (2018). Climate Risk Profile — West Africa. URL: https://www.climatelinks.org/sites/default/files/asset/document/West_Africa_CRP_Final.pdf
[99] WBG Climate Change Knowledge Portal (CCKP, 2021). Togo. Impacts-Sea Level Rise. URL: https://climateknowledgeportal.worldbank.org/country/togo/impacts-sea-level-rise
[100] Togo (2015). Third National Communication to the UNFCCC. URL: https://unfccc.int/sites/default/files/resource/tgonc3.pdf

Togo has committed to improving its regulatory framework and knowledge management regarding coastal erosion and to increase structural investment in coastal protection.[101] In December, 2020, the Togolese Government the draft law on planning, protection and enhancement of the coastline. The text points the way to the imminent adoption of a Coastal Development Master Plan (SADL). Other Plans include, the Plan D'investissment Nultisectoriel (PIMS) or Multisectoral Investment Plan(MSIP), the Strategie Nationale pour la Mer et le Littoral (SNML), and the Cadre Strategique pour le Developpement de l'Economie Maritime et Cotiere au Togo.

ADAPTATION

Institutional Framework for Adaptation

Togo is committed to improving its adaptation and mitigation to climate change. The Environmental Directorate within the Ministry of the Environment and Forest resources is responsible for implementing national policy regarding environmental management and climate change issues and is the designated authority to the UNFCCC. The country has also established a number of national committees: the National Climate Change Committee, the National NAPA Committee, the National NAMA Committee and the Designated National CDM Authority. Furthermore, all the national programs, strategies and plans have prepared planning, monitoring and various evaluation mechanisms. These different documents include the National Environmental Action Plan (NEAP) process, the National Environmental Policy, the final NEAP document, the National Environmental Management Program, the National Sustainable Development Strategy (NSDS), the National Strategy for Reducing the Risk of Catastrophes in Togo, the National Program for Reducing Greenhouse Gas Emissions from Deforestation and Forest Degradation (REDD+) (2010–2050), the National Medium Term Priority Framework (NMTPF) for Togo (2010–2015), and Adapting Agriculture in Togo to Climate Change (ADAPT).[102]

Policy Framework for Adaptation

Togo submitted its Third National Communication to the UNFCCC in 2015, is First Biennial Update Report in 2017, and its Nationally-Determined Contributions in 2016. Togo is in the process of developing its Nationally Appropriate Mitigation Action (NAMA) and National Adaptation Plan of Action (NAPA) in order to better guide the country on its way to mitigate and adapt to climate change. The country is working to develop and enhance both adaptation and mitigation efforts to support the country's development goals and improve its economy. Adaptation efforts are focused on the country's most vulnerable sectors: agriculture, forestry, water resources, health, and coastal zones.[103]

[101] Republic of Togo (2016). Nationally Determined Contributions to the UNFCCC. URL: https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Togo%20First/INDC%20Togo_english%20version.pdf
[102] Republic of Togo (2016). Nationally Determined Contributions to the UNFCCC. URL: https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Togo%20First/INDC%20Togo_english%20version.pdf
[103] Republic of Togo (2016). Nationally Determined Contributions to the UNFCCC. URL: https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Togo%20First/INDC%20Togo_english%20version.pdf

National Frameworks and Plans

- National Multi-Risks Contingency Plan, March 2020-February 2021 (2021) French
- National Strategy for Reducing Emissions due to Deforestation and Degradation (REDD+) 2020–2029 (2019) French
- National Development Plan 2018–2022 (2018)
- First Biennial Update Report (2017) French
- BUR 1 National Inventory Report (2017) French
- National Climate Change Adaptation Plan (2017) French
- Third National Communication (2015) French
- Second National Communication (2010) French
- First National Communication (2001) French
- National Adaptation Plan (2018) French
- Nationally Determined Contributions (2016)
- Forest Action Plan (2009) French
- Poverty Reduction Strategy Paper: 2009–2011 (2009)

Recommendations

Research Gaps

- Improve the understanding of occurrence of important indicators of climate change in the future, as well as the key vulnerabilities, developmental impacts, and possible adaptation responses
- Improve, support and reinforce the teaching of meteorology, climatology and general hydrology in the higher education and university channels of natural sciences and build capacity of hydro-met service staff
- Enhance capabilities for handling climate change data at the national, regional and local levels
- Improve local capability for research into renewable energy capability
- Improve cooperation between research institutions and universities on climate change issues[104]
- Develop effective early warning system for monitoring, preventing and effectively responding to the human diseases associated with climate change
- Undertake research to quantify the potential impacts of climate change at the local, national and regional levels to enable informed decision-making and action.
- Improve coordination of climate research to optimize meeting the needs of policy makers
- Undertake research on sea level rise
- Develop and project climate change scenarios at higher resolutions for the different regions of the country

[104] Togo (2015). Third National Communication to the UNFCCC. URL: https://unfccc.int/sites/default/files/resource/tgonc3.pdf

Data and Information Gaps

- Improve technical capacity to analyze hydro-met data and project impacts across sectors; specifically, regarding health and natural disaster events
- Create national observatories to monitor GHGs, hydrology and forestry and strengthen national capability to document, archive and store observational data[105]
- Establish institutional capacity for providing timely early warning systems to farmers for improved decision making and understanding seasonal variability for key agricultural zones
- Increase understanding of water resource threats and groundwater risks to improve long term management and improve water use efficiency in agriculture and urban management
- Improve regulation and enforcement to protect forests, rainforests and protected areas
- Strengthen information exchange by enhancing technologies transfer and capacities necessary from national to local levels to promote environment and climate change mitigation and adaptation through education and public awareness development

Institutional Gaps

- Increase staff, reduce existing schedules and stem staff turn overs in key collaborating institutions on climate change
- Institutionalize and strengthen disaster risk management and create mechanism and capacities at all levels of government and communities
- Mainstream climate change in national, local and sector policies and reinforce institutional frameworks for implementation of UNFCCC commitments[106]
- Strengthen and enhance international collaboration, linkages and networking among stakeholders involved in environment and climate change related issues
- Strengthen institutional and regulatory framework for action on health and environment
- Review and update existing legislation to reflect climate change issues and develop new sector or national policies that address emerging climate change issues
- Provide support to build capacity of national experts in various state departments for implementation, follow-up, quality control and reporting
- Integrate climate change concerns into relevant policies and planning processes at the state and national levels

[105] Republic of Togo (2016). Nationally Determined Contributions to the UNFCCC. URL: https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Togo%20First/INDC%20Togo_english%20version.pdf

[106] Togo (2015). Third National Communication to the UNFCCC. URL: https://unfccc.int/sites/default/files/resource/tgonc3.pdf

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