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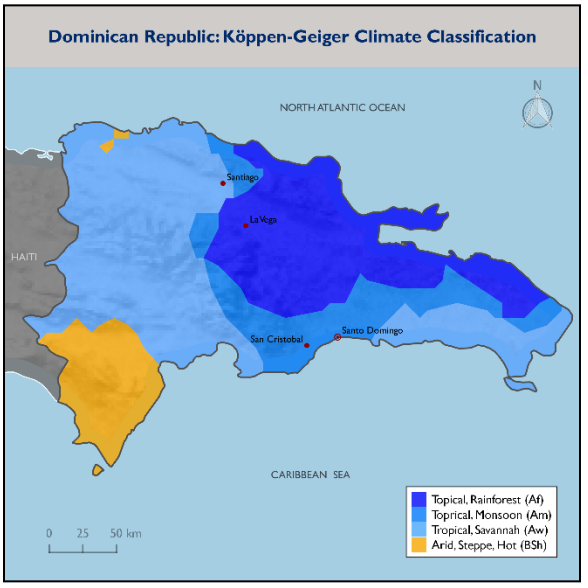
FACT SHEET

# CLIMATE RISK PROFILE
# DOMINICAN REPUBLIC

## COUNTRY OVERVIEW

The Dominican Republic (DR) shares the Caribbean island of Hispaniola with Haiti, occupying the eastern two thirds of the island. Manufacturing and services are dominant drivers of the country's $71 billion GDP. Unemployment remains high at 14 percent, and more than 30 percent of the population lives in poverty, with many of the poor located near the Haitian border. In 2017, the DR was ranked the 11th most vulnerable country in the world to climate change. Floods are the most frequent climate-related hazard in the DR. The northeastern region is vulnerable to floods and mudslides from severe storms, while arid parts of the northwest are experiencing increasing temperatures leading to more drought, which reduces crop yields and water supplies. Moreover, Hispaniola Island is in the center of a hurricane belt, where intense storms often damage hotels, coastal infrastructure and beaches, leading to significant loss of tourism revenues. They also damage fish nursery areas and coral reefs, threatening coastal fisheries. (Citations: 8, 9, 15, 18, 21, 22, 24)




## CLIMATE PROJECTIONS

1.1 - 1.5° C increase in temperatures by 2050

04.7 - 8.5% reductions in annual precipitation by 2050; inconsistent projected changes in intensity of extreme rainfall; events; increase in dry spell duration

0.4 - 0.7 m rise in sea level by 2090

## KEY CLIMATE IMPACTS

**Agriculture**
Increased pests and diseases
Soil erosion and water logging
Damage to crops and livestock

**Water Resources**
Reduced water supply
Decline in water quality

**Coastal Zones**
Damage to tourist areas
Salinization of aquifers; beach erosion
Loss of habitat and fish stocks

**Ecosystems**
Loss of forest habitats and biodiversity
Increased erosion of hillslopes

**Human Health**
Food insecurity
Increased waterborne and vector-borne diseases

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This document was prepared under the USAID Climate Change Integration Support (CCIS) Task Order No. AID-OAA-TO-15-00030 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

Average annual precipitation for the DR is about 1,400 mm (1960-2015), with two peaks during the year: May and October. The spatial distribution of rainfall is determined by trade wind direction and the orientation of the mountains from northwest to southeast. The heaviest precipitation occurs in the northeast, where it exceeds 2,500 mm per year, while the far western and southwestern valleys remain relatively dry with less than 760 mm of annual precipitation. Average annual temperature is 24°C (1960-2015), and varies with altitude. Average monthly temperatures are highest July to September, reaching 26-28°C close to sea level, and lowest December through February, when they average 23-25°C. Inter-annual variability in climate is influenced strongly by the El Niño Southern Oscillation (ENSO). Between June and August, El Niño episodes bring warmer and drier than average conditions, whereas La Niña episodes bring colder and wetter conditions. Cyclone and hurricane landfall frequencies average one every two years, but can occur as often as two per year or as little as every five to ten years. (10, 13, 14,15, 21, 22, 26)

## HISTORICAL CLIMATE

Climate trends since 1960 include:

- Average annual temperature from 1960-2015 exhibits a slightly increasing trend of 0.05°C per decade.
- A 17.4 percent increase in the number of "hot" days and a 13.2 percent increase in "hot" nights per year between 1960 and 2003; highest rates of increase occurred June to August[1].
- Average annual precipitation indicated a statistically insignificant increase of 4.5 percent from 1960-2015.
- There is insufficient data to determine trends in daily rainfall extremes.
- Sea level in the Caribbean region has risen by about 1.8 mm per year over 1950-2009.

## FUTURE CLIMATE

Projected changes by 2050 include[2]:

- An increase in average annual temperature of 1.1 to 1.5°C.
- A decrease in average annual precipitation of 4.7 to 8.5 percent.
- An increase in the number of consecutive "dry" days of 7.2 to 17.4 percent.[3]
- Uncertain changes in extreme rainfall.[4]
- An increase in sea level of 0.4 to 0.7 m by the 2090s, relative to 1986-2005.
- Uncertain changes in the frequency of hurricanes; an increase in the global average intensity of tropical storms of 2 to 11 percent by 2100.

# SECTOR IMPACTS AND VULNERABILITIES

## AGRICULTURE

While agriculture contributes only about 4 percent of GDP, it occupies 68 percent of land and remains important for income and food security. By value, the main agricultural products are poultry, cattle, banana, rice, papaya, avocados, milk, sugarcane, pigs and pineapples. Yields will decline and crop cycles may become shorter as the DR experiences less rainfall, higher temperatures and more intense droughts. These conditions will also promote pests, crop diseases and invasive plants. Extreme weather events that produce floods lead to soil erosion and waterlogging of fields. (2, 4, 7, 18, 21)

**Climate Stressors and Climate Risks AGRICULTURE**

| Stressors | Risks |
|---|---|
| **Rising temperatures** | Increased pests and disease |
| | Increased waterlogging of fields |
| **Changes in seasonality of precipitation** | Soil erosion and loss of soil fertility |
| **Increased drought** | Reduced crop yields |
| **Increased storms** | Storm damage to crops and livestock |

[1] "Hot" day or night is defined by the temperature exceeded on 10% of days or nights in current climate of that region or season.

[2] Relative to data from 1986-2015.

[3] Maximum number of consecutive days per year with less than 1 mm of precipitation.

[4] Annual total precipitation when daily precipitation exceeds the 99th percentile of wet days (calculated from days when it precipitated at least 1 mm).

## WATER RESOURCES

Three mountain ranges supply most of the water for domestic and industrial consumption, irrigation and hydroelectric energy production. Agriculture accounts for four-fifths of water demand. Rising temperatures, increased evaporation and decreasing precipitation are reducing surface waters and groundwater recharge. The Yaque del Norte River watershed is one of the most important watersheds in the country, supplying water to 17 municipalities, supporting six hydro-electric dams and providing water for a large percentage of agricultural production. Government projections indicate water supply from this watershed could decline by 22 percent between 2005 and 2025. In coastal communities, sea level rise leads to seawater intrusion of aquifers, reducing freshwater supply for drinking water and irrigation. (7, 21, 24)

**Climate Stressors and Climate Risks**
**WATER RESOURCES**

| Stressors | Risks |
|---|---|
| **Increased temperatures and reduced rainfall** | Increased water stress for households, agriculture and hydropower production |
| **Increased drought** | Decreased surface waters and groundwater recharge |
| | Reduced water quality |
| **Increased storms** | Increased flooding |
| **Sea level rise** | Salinization of coastal aquifers |

## COASTAL ZONES

With more than 1,200 km of coastline, most Dominicans depend on coastal livelihoods based on fisheries and tourism. Warmer sea surface temperatures could potentially alter breeding and migration patterns for fish, while coastal storms and sea level rise will alter beaches and coastal ecosystems. For example, mangroves located within a few feet of sea level, such as in Montecristi and Samaná Bay, are at risk. One of the country's most profitable tourist destinations, Bavaro Beach in Punta Cana, could lose 29 percent of its valuable beach by 2030 due to sea level rise. Storm surge and sea level rise contaminate groundwater with saltwater and flood coastal communities. (4, 9, 17, 21)

**Climate Stressors and Climate Risks**
**COASTAL ZONES**

| Stressors | Risks |
|---|---|
| **Rising sea surface temperature** | Loss of coral reefs |
| | Flooding of nearshore habitats |
| | Beach erosion |
| **Sea level rise** | Salinization of aquifers |
| | Flood and salinity damage to infrastructure |
| **Increased tropical storms** | Storm damage to settlements, tourist areas and ports |
| | Reduced mangroves and fish stocks |

## ECOSYSTEMS

The Dominican Republic includes numerous different climatic zones and a high level of endemism, particularly reptile species, vascular plants and bird species. Ecosystems will shift upwards as temperature increases, and montane habitats may decline in extent or disappear completely if upper temperature limits are exceeded and/or moisture levels drop at high elevations. Since 2003, Lake Enriquillo has experienced a 50 percent increase in surface area due in large part to increased mists and cloud cover. Warming sea temperatures and increased rainfall have triggered the development of upstream cloud forests that shed excess water to the lake. Heavy rainfall events that produce flooding damage arable land, pasture and terrestrial habitats. (3, 4, 6, 19)

**Climate Stressors and Climate Risks**
**ECOSYSTEMS**

| Stressors | Risks |
|---|---|
| **Rising temperatures** | Loss of forest habitats and biodiversity |
| **Change in seasonality of precipitation** | Increased erosion of hillslopes |
| **Increased storms** | |
| **Sea level rise** | |

### HUMAN HEALTH

The DR's tropical climate is conducive to the transmission of several diseases associated with moist conditions, including malaria, dengue, Zika and Chikungunya, which are transmitted by mosquitoes. Following extreme precipitation events, standing flood waters attract mosquitoes and stimulate growth and reproduction, increasing mosquito-borne disease. Such outbreaks can have significant impact on the DR's tourism industry. In 2010, 12,166 cases of dengue were reported in the DR, resulting in 49 deaths, with most cases in Santo Domingo, San Cristóbal, Distrito Nacional and Santiago. There is also a growing concern that freshwater scarcity and more intense droughts and storms could lead to a deterioration in standards of sanitation and hygiene. In 2007, Hurricane Noel caused damages and losses of approximately $24 million to the country's water supply and sanitation sector, while floods and landslides resulted in over 80 deaths and more than 65,000 people displaced. (12, 16, 19,21, 24)

**Climate Stressors and Climate Risks HUMAN HEALTH**

| Stressors | Risks |
|---|---|
| **Increased temperatures** | Increased incidence and spread of vector-borne diseases |
| | Increased incidence of heat stroke |
| **Reduced rainfall and increased drought** | Increased food insecurity |
| | Increased waterborne diseases |
| **Increased storms** | Damage to health facilities |

## POLICY CONTEXT

Adaptation to climate change is a priority for the DR as stated in Article 194 of the Constitution.

### INSTITUTIONAL FRAMEWORK

The Ministry of Environment and Natural Resources is the lead entity responsible for environmental issues and cooperates with regional and international actors to fund and implement related projects. The National Council for Climate Change is responsible for formulating, implementing and enforcing climate change policies and projects under the President; the Council also coordinates climate change efforts across different Ministries. The DR ratified the UNFCCC in 1998 and the Kyoto Protocol in 2002. It has submitted its initial and second national communications to the UNFCCC, and in 2015, the DR submitted its post-2020 action plan, or INDC. (9, 15, 20)

### NATIONAL STRATEGIES AND PLANS

- Intended Nationally Determined Contributions (2015)
- National Strategy for Adaptation to Climate Change in the Agricultural Sector, Dominican Republic 2014-2020 (2014)
- National Development Strategy of the Dominican Republic 2010-2030 (2010) (Spanish)
- Second National Communication to the UNFCCC (2009) (Spanish)
- First National Communication to the UNFCCC (2003) (Spanish)

### KEY RESOURCES


1. Adaptation Partnership. 2011. Review of Current and Planned Adaptation Action: The Caribbean -Dominican Republic.
2. Adaptation Partnership. 2012. Assessing Climate Change Vulnerability and Building Resilience in the Agricultural Sector to Promote Economic Development and Food Security in Central America.
3. Caribbean Community Climate Change Centre, et al. 2014. National Adaptation Strategy and Action Plan to Climate Change in the Agricultural Sector of the Dominican Republic 2014-2020.
4. CARIBSAVE, et al. 2012. Climate Change Risk Profile for the Dominican Republic.
5. Chemonics International Inc. 2016. Synthesizing Good Practices in Climate Adaptation Assessments: Summary Report and Annexes.
6. Critical Ecosystem Partnership Fund. 2010. The Caribbean Islands Ecosystem Profile.
7. FAO. 2016. Fact Sheet on Food and Agriculture Policy Trends in the Dominican Republic.
8. Germanwatch. 2016. Global Climate Risk Index 2017: Who Suffers Most from Extreme Events?
9. Government of the Dominican Republic. 2015. Intended Nationally Determined Contribution. (unofficial translation)
10. IPCC. 2013. Sea Level Change.
11. IPCC. 2014. Impacts, Adaptation and Vulnerability: Central and South America.
12. IPCC. 2014. Impacts, Adaptation and Vulnerability: Small Islands.
13. KNMI Climate Explorer

14. McSweeney, C. et al. 2010. UNDP Climate Change Country Profiles: Dominican Republic.
15. Nachmany, M. et al. 2015. Climate Change Legislation in the Dominican Republic.
16. PAHO. 2012. Health in the Americas: Dominican Republic.
17. Rosa, M. et al. Climate Change Adaptation in the Dominican Republic: Impact on Coastal Resources and Communities.
18. UNDP. 2013. Climate Risk Management for Water and Agriculture in the Dominican Republic.
19. UNEP. 2014. Emerging issues for Small Island Developing States.
20. USAID.2016 Analysis of Intended Nationally Determined Contributions (INDCs).
21. USAID. 2013. Dominican Republic Climate Change Vulnerability Assessment Report.
22. USAID. 2013. Dominican Republic CDCS FY2014-2018.
23. World Bank. 2014. Turn Down the Heat: Confronting the New Climate Normal.
24. World Bank. 2015. Central America and the Dominican Republic Regional Assessment: Status of Disaster Risk Management in the Water Supply and Sanitation Sector.
25. World Bank. 2016. Building a Better Future Together: Dominican Republic Policy Notes.
26. World Bank Climate Change Knowledge Portal.

Map source: Adapted from Koppen-Geiger Classification information (Due to source pixilation, there is a lack of coverage around the edges of the country and thus assumptions were made regarding data category).

## SELECTED ONGOING EXPERIENCES

| Selected Program | Amount | Donor | Year | Implementer |
|---|---|---|---|---|
| Mainstreaming Conservation of Biodiversity and Ecosystem Services in Productive Landscapes in Threatened Forested Mountainous Areas | $62 million | UNDP/ GEF | 2016-2022 | Ministry of Environment and Natural Resources |
| Planning for Climate Change Adaptation Program | $6.6 million | USAID | 2015-2019 | International City/County Management Association (ICMA) |
| Climate and Agriculture Program | $1.4 million | USAID | 2015-2018 | Fundación REDDOM |
| Climate Adaptation Measures Program | $3.9 million | USAID | 2015-2019 | Instituto Dominicano de Desarrollo Integral (IDDI) |
| Climate Resilience and Index Insurance | $2.4 million | USAID | 2012-2016 | Fundación REDDOM |
| Climate Smart Agriculture | $1.4 million | USAID | 2015-2018 | Fundación REDDOM |
| Improved Climate Information | | USAID | 2015-2018 | Instituto Tecnológico de Santo Domingo (INTEC) |
| Water and Sanitation in Tourist Areas | $34 million | World Bank | 2009-2017 | Ministry of Economy, Planning and Development |
| Conserving Biodiversity in Coastal Areas Threatened by Rapid Tourism and Physical Infrastructure Development | $18.8 million | UNDP/ GEF | 2012-2016 | Ministry of Environment and Natural Resources; Ministry of Tourism |
| Dominican Republic First Biennial Update Report (fBUR) | $397,000 | UNDP/ GEF | 2017 | Ministry of Environment and Natural Resources/National Council on Climate Change and Clean Development Mechanism |
| USAID Climate Resilience and Index Insurance Program for Small Farmers in the Dominican Republic | $897,000 | USAID | 2013-2017 | REDDOM/UC Davis |