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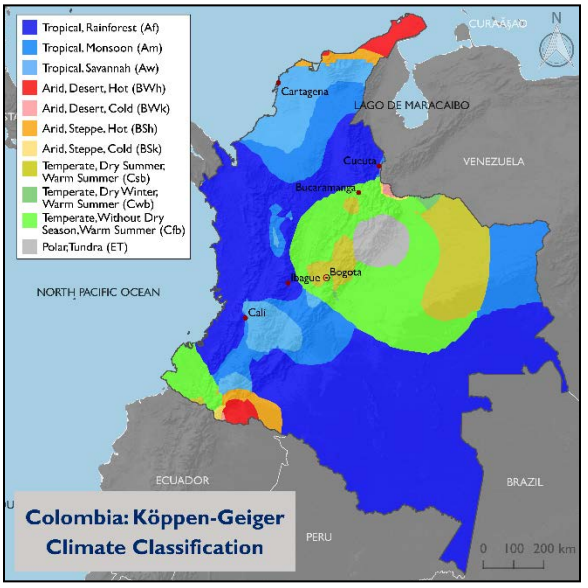
FACT SHEET

CLIMATE RISK PROFILE
COLOMBIA

COUNTRY OVERVIEW

Colombia is the third most populous country in Latin America with 48 million people. Approximately 68 percent of the labor force works in the service sector, which provides about half of the country's $274 billion GDP. While Colombia is a middle-income country, 52 percent of the population lives in poverty. Most Colombians reside in the elevated Andes, where water shortages and land degradation exist, and in the coastal areas, where sea level rise and floods can impact human settlements and economic activities. Colombia routinely experiences drought- and flood-related disasters that correspond to El Niño and La Niña, respectively. Heavy rains in 2010 and 2011 resulted in floods that caused more than $6 billion in damages to crops and infrastructure, while millions were displaced and hundreds died. Temperature increases and changes in precipitation patterns will likely lead to water shortages in Colombia. This could impact irrigated agriculture, human health and sectors such as hydropower that rely on a consistent water supply. Sea level rise is likely to have localized impacts, with significant effects in cities like Cartagena that rely on tourism; it can also lead to loss of key ecosystems such as coral reefs and fisheries, impacting key livelihoods. (Citations: 3, 7, 20, 21, 22)



CLIMATE PROJECTIONS

1.3 – 1.8° C increase in temperatures by 2050

0.8 – 1.6% increase in average annual rainfall; 26 – 37% increase in extreme rainfall days by 2050

0.4 - 0.7 m rise in sea level by 2090

KEY CLIMATE IMPACTS

Infrastructure
Damage to buildings and transportation
Damage to human settlements and coastal infrastructure

Water Resources
Reduced water supply and hydropower potential in certain regions
Decline in water quality

Agriculture
Reduced crop yields; Soil erosion
Damage to crops and livestock
Increase in pests and diseases

Ecosystems
Loss of biodiversity
Loss of marine ecosystems
Changes in fish populations/distributions

Human Health
Increased incidence of heat stroke
Spread of vector-borne and waterborne 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

Colombia's climate spans a wide range -- from arid desert to wet tropical rainforest. The climate variations across the country are due in part to the varied terrain, which includes the Andes Mountains, Amazon forest, Pacific and Caribbean coasts and Orinoquía plains. Average annual temperature is 24.5°C (1960-2015), ranging from 24-27°C in lower lying tropical zones (below 1,000 m), to 18°C in the temperate zones (between 1,000 m and 2,000 m) and 13-17°C in higher elevation zones (above 3,000 m). Average annual rainfall is 2,650 mm; wettest along the West Pacific coast and in the Andean interior (~6 - 7,000 mm per year), and driest in the arid desert zone (below 500 mm per year). In Bogotá, precipitation occurs most heavily and consistently during the periods of April-June and October-December. Northern areas have a single rainy season, from May-October. The northern Caribbean coast occasionally experiences tropical storms and hurricanes. Inter-annual rainfall variability is influenced by the El Niño Southern Oscillation. The climate between June and August is on average warmer and drier during El Niño years, and colder and wetter during La Niña years. (2, 8, 9, 10, 11, 12, 13,15, 16, 22)

HISTORICAL CLIMATE

Observations since 1960 indicate:

- A slight increasing trend in average annual temperature from 1960 to 2015.
- An increase in average number of "hot" days[1] and nights by ~20 percent (1960 to 2006).
- A statistically significant increase in average March and December rainfall from 1960 to 2015, offset partially by decreases (not statistically significant) in June and April.
- Extreme rainfall[2] events have increased in magnitude.
- Frequency of tropical cyclones passing through the Colombian maritime zone increased from an average of 1.7 per year (1851-1881) to 3.4 per year (1976-2005).

FUTURE CLIMATE

Projected changes by 2050[3] include:

- An increase in average annual temperature of 1.3°C to 1.8°C.
- An increase in the number of "hot" days and nights; decrease in the number of "cold" days and nights.[4]
- An 0.8 to 1.6 percent increase in average annual rainfall, with the largest increases December and January and decreases in September and October.
- An increase in extreme rainfall days of 26 to 37 percent.
- An increase in sea level along the Caribbean and Pacific Coast of 0.4 to 0.7 m by the 2090s relative to 1986-2005.

SECTOR IMPACTS AND VULNERABILITIES

INFRASTRUCTURE

Extreme rainfall and floods can damage property and road infrastructure, while subsequent landslides and mudslides, exacerbated by poor urban planning and deforestation, pose risks to human settlements. Runoff levels are expected to rise in coastal regions, affecting areas that already exhibit frequent floods and landslides, increasing the occurrence of natural disasters. Salinity intrusion from sea level rise can interfere with commerce and damage settlements, affecting the livelihoods and well-being of millions of inhabitants in Colombia's coastal zones. (3, 20, 22)

Climate Stressors and Climate Risks INFRASTRUCTURE

Stressors	Risks
Increased frequency of extreme storms	Damage to human settlements
	Damage to roads, bridges, air transport and river transport
Increased temperatures	Flooding and salinity damage to coastal infrastructure and services, including tourism
Sea level rise	

[1] "Hot" day or night is defined by the temperature exceeded on 10% of days or nights in current climate of region or season (for further reference, see Karmalkar under Key Resources).
[2] Extreme rainfall is defined as maximum 1- and 5-day rainfall, which are measurements of the magnitude of the annual maximum 1- or 5-day total rainfall in a given period of time (mm), expressed as anomalies from the 1970-1999 average.
[3] Relative to 1986 – 2015.
[4] "Cold" day or night is defined by the temperature below which 10% of days or nights are recorded in current climate of that region or season (for further reference, see Karmalkar under Key Resources).

WATER RESOURCES

Changes in precipitation patterns are projected to vary by region in Colombia. Climate models project rainfall will increase in the coastal areas and the Amazon, while in the highland areas, rainfall is projected to decrease. Rainfall and temperature scenarios for 2071-2100 indicate that some regions may see a 30 percent reduction in rainfall, which would reduce runoff to rivers, water stored in dams and aquifer recharge. Increased temperatures and decreases in precipitation are expected to contribute to a disappearance of snow-covered areas by as early as 2030. A projected 56 percent decrease in moorland would further contribute to water shortages in certain regions. Since the Magdalena river basin provides 70 percent of Colombia's hydropower, electricity production could be severely reduced. Decreased runoff could also compromise rural and municipal water supplies. Along the coast, watershed runoff is expected to rise, increasing the likelihood of natural disasters from floods and mudslides. Saltwater intrusion into coastal aquifers from rising seas will further deplete freshwater supply. (3, 5, 7, 14, 20, 22)

Climate Stressors and Climate Risks WATER RESOURCES

Stressors	Risks
Increased temperatures	Increased water stress for agriculture and households
Rainfall variability	Reduced hydropower potential in some regions
	Reduced water quality
Increased drought conditions	Increased flooding in some regions
Sea level rise	Salinization of coastal aquifers

AGRICULTURE

Agriculture in Colombia is vulnerable to increases in soil erosion and desertification due to increasing climate variability of both temperature increases and unpredictable rainfall. By 2050, 80 percent of crops could be impacted in more than 60 percent of current areas of cultivation due to rising temperatures. High-value crops, such as tropical fruit, cocoa, bananas and coffee, are most at risk. Coffee farming may have to move to higher altitudes or other regions to maintain present yields. Increases in La Niña events could lead to higher incidence of droughts, affecting water supplies and crop production. An increase in extreme rainfall events could cause flooding and landslides, damaging crops and livestock, putting subsistence farmers most at risk. (6, 20, 21, 22)

Climate Stressors and Climate Risks AGRICULTURE

Stressors	Risks
Increased temperatures	Reduced yields
	Increased food insecurity
Higher rainfall variability; increased drought conditions	Increased incidence of pests and diseases
	Reduced soil moisture and increased desertification
	Expansion of cultivation of highlands
Increased storms	Increase incidence of floods and landslides, damaging crops and increasing soil erosion

ECOSYSTEMS

Colombia hosts rich aquatic resources, including 10 percent of the world's biodiversity. Increasing temperatures are projected to be more significant at higher elevations, posing risks to fragile and unique mountain ecosystems and accelerating the pace of land degradation. This may also contribute to the decline of rare species such as high-altitude flora and fauna. Sea level rise can disrupt fisheries through the loss of key ecosystems, such as coral reefs and mangroves and erode beaches. In the Tumaco Bay, reduced survival rates of mangroves is projected (12-47 percent), which could reduce fisheries, thereby impacting key livelihoods. (7, 22)

Climate Stressors and Climate Risks ECOSYSTEMS

Stressors	Risks
Increased temperatures	Loss of ecosystems/ biodiversity
Higher rainfall variability	Reduced mangroves/fish stocks
Sea level rise	Loss of coastal ecosystems

HUMAN HEALTH

With more intense rainfall and an increase in temperatures, vector-borne diseases such as malaria and dengue fever will spread; over the past 30 years, malaria has increased at higher elevations in the northwest. Greater frequency of storms can also lead to the spread of waterborne diseases through water supply contamination. Rising temperatures can lead to more intense and frequent heat waves, putting the elderly most at risk. In cities such as Bogota and Cali, where high levels of air pollution already exist, higher temperatures can raise the levels of ozone and other pollutants in the air, increasing the risk for respiratory infections and cardiovascular diseases. (5, 7, 18, 19, 21)

Climate Stressors and Climate Risks HUMAN HEALTH

Stressors	Risks
Increased temperatures	Expansion of range and incidence of vector-borne diseases (e.g., malaria, dengue fever, leishmaniasis)
Increased rainfall variability; frequency and intensity of intense rainfall	Increased incidence of heat stress
	Increased risk of waterborne diseases
	Increased risk of injury/death from floods and landslides

POLICY CONTEXT

INSTITUTIONAL FRAMEWORK

The Government of Colombia's (GoC) 2010-2014 National Development Plan listed climate adaptation as a priority and established a National Climate Change System to improve coordination among the institutions. Since 2014, a National Climate Change Policy has focused on mitigation and adaptation actions by increasing resilience and achieving low carbon development. In 2015, the GoC submitted its INDC which reiterates a commitment to adaptation and resiliency efforts. A year later, the GoC established the Colombia National Climate Change Decree, which creates the Intersectional Commission on Climate Change to implement and coordinate climate change efforts at the national level and Regional Nodes for Climate Change for regional efforts. In 2017, the GoC completed a National Climate Change Adaptation Plan. (4, 6, 16)

NATIONAL STRATEGIES AND PLANS

- First National Communication to the UNFCCC (2001) (executive summary)
- Second National Communication to the UNFCCC (2010) (Spanish only)
- Colombia's Intended Nationally Determined Contribution (2015)
- Colombia's First Biennial Update Report, BUR (2015) (Spanish only)
- Colombia's Climate Change Adaptation Plan (2017) (Spanish only)

KEY RESOURCES

1. Adaptation Partnership. 2011. Review of Current and Planned Adaptation Actions: South America- Colombia.
2. Encyclopedia Britannica. 2017. Colombia: Climate.
3.GFDDR. 2014. Country Program Update: Colombia.
4. Government of Colombia. 2015. Colombia's Intended Nationally Determined Contribution.
5. Government of Colombia. 2010. Second National Communication to the UNFCCC (executive summary).
6. Grantham Research Institute on Climate Change and the Environment. 2015. Climate Change Legislation in Colombia.
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8. IPCC. 2013. Sea Level Change.
9. Karmalkar, et al. 2010. UNDP Climate Change Country Profiles: Colombia.
10. KNMI. 2017. Climate Explorer.
11. León, G. 2009. Tropical Cyclones in Colombia and Frequency Tendency during the Past Century.
12. NOAA. 2017. National Hurricane Center.
13. Ortiz, et al. 2012. Exposure of the Colombian Caribbean coast, including San Andrés Island, to tropical storms and hurricanes, 1900-2010
14. SEI for USAID. 2015. Building Climate Adaptation Capacity in Water Resources Planning.
15. UNDP. 2010. Climate Change Adaptation Colombia.
16. USAID. 2012. Colombia: Climate Vulnerability Profile.
17. USAID.2014. Colombia Country Development Cooperation Strategy FY2014-2018.
18. WHO. 2015. Climate and Health Country Profile: 2015 Colombia.
19. WHO. 2015. Colombia: WHO Statistical Profile.
20. World Bank. 2012. Analysis of Disaster Risk Management in Colombia.

21. World Bank. 2014. Turn Down the Heat: Confronting the New Climate Normal.
22. World Bank. 2017. Climate Change Knowledge Portal.

Map source: Adapted from Koppen-Geiger Classification information

SELECTED ONGOING EXPERIENCES

Selected Program	Amount	Donor	Year	Implementer
Amazon Sustainable Landscapes Program *(Brazil, Colombia, Peru)*	$796 million	GEF/ Country Governments	2015-2021	WB, WWF, UNDP and Country governments
Boosting climate resilience for Colombian coffee growers	$816,569	International Development Research Center	2016-2018	Cenicafé
Forest Conservation and Sustainability in the Heart of the Colombian Amazon	$45.9 million	WB	2014-2019	Ministry of Environment and Sustainable Development (MESD)
Support for the consolidation of a climate change agenda for the Ministro de Hacienda y Credito Publico	$0.34 million	IDB	2014-2018	Ministry of Finance and Public Credit
Adaptation to Climate Impacts in Water Regulation and Supply for the Area of Chingaza - Sumapaz - Guerrero	$28 million	GEF/IDB	2014-2019	MESD
Ecosystem-based adaptation to climate change in Colombia and Ecuador	$3.4 million	German Federal Environment Ministry	2014-2018	MESD
Reducing Risk and Vulnerability against Climate Change in the Region of the Depression Momposina in Colombia	$8.5 million	Adaptation Fund (AF)	2013-2018	MESD
Reducing risk and vulnerability to climate change in the Mojana	$7.5 million	AF/UNDP	2013-2017	MESD
Partnering for Adaptation and Resilience-AGUA (PARA-Agua) Project *(Colombia and Peru)*	$8 million	USAID	2013-2017	AECOM International Development Inc.