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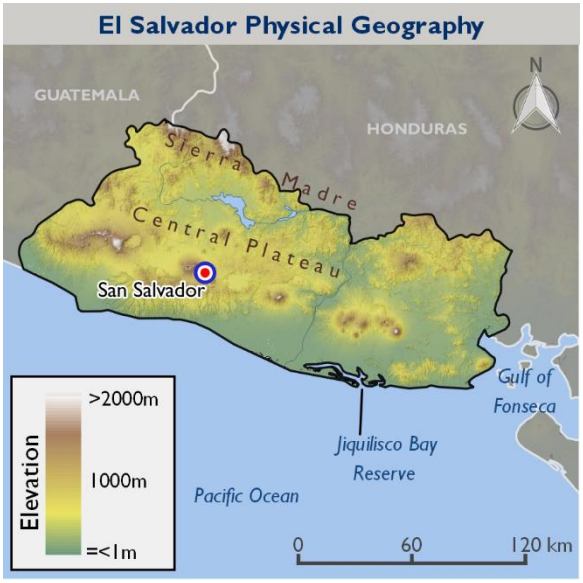
FACT SHEET

CLIMATE CHANGE RISK PROFILE
EL SALVADOR

COUNTRY OVERVIEW



El Salvador, the smallest and most densely populated country in Central America, has a population of 6.2 million and is largely urbanized (66 percent). Rural areas suffer from higher rates of poverty (50 percent) and illiteracy (20 percent). Severe deforestation and land degradation have negatively impacted agricultural lands, and only a fraction of the country's historic forest cover remains, increasing the country's vulnerability to climate variability and change. Along with the rest of Central America, El Salvador has seen a steady increase in extreme events (storms, floods and droughts) during the last 30 years, impacting the population and economy. From 2000 to 2009, for example, there were 39 hurricanes in Central America compared to 15 in the 1980s and 9 in the 1990s. El Salvador's geography is dominated by a region known as the Dry Corridor, characterized by recurrent drought and heavy precipitation events that lead to flooding and landslides. The country lies in the path of both Atlantic and Pacific tropical storms that have increased in both frequency and intensity in recent decades. The 307-km Pacific coastline is already experiencing rising sea levels and it is expected that 10–28 percent of the country's coastal zone territory will be lost by the end of the century. Coastal areas, home to over 30 percent of the population, are highly vulnerable to the combination of sea level rise and El Niño events. (6, 8, 10, 12)

CLIMATE PROJECTIONS

- 1.4°-2°C increase in temperatures by 2050s
- Increased incidence of extreme weather, including droughts, tropical storms and floods
- 18 cm rise in sea levels by 2050

KEY CLIMATE IMPACTS

Agriculture
Crop loss/failure
Declining yields of staple and export crops
Increased incidence of pests and disease

Water
Increased water stress
Increased flooding
Decreased water quality

Human Health
Food insecurity and chronic malnutrition
Increased risk of waterborne diseases
Expanded range of vector-borne disease

Ecosystems
Biodiversity loss
Land degradation and erosion of mountains
Reduced fish stocks and mangrove habitat

Infrastructure and Energy
Destruction and damage of roads, buildings, bridges and ports
Disruption of energy services

April 2017
This document was prepared under the Climate Change Adaptation, Thought Leadership and Assessments (ATLAS) Task Order No. AID-OAA-I-14-00013 and is meant to provide a brief overview of climate risk issues. The key resources at the end of the document provide more in-depth country and sectoral analysis. The contents of this report do not necessarily reflect the views of USAID.

CLIMATE SUMMARY

El Salvador's warm climate is characterized by a dry season (November to April) and a rainy season with heavy rains known as *temporales* (May to October). From November to February, the dry season has occasional rains while March to April is hot and dry. Despite the country's small size, its mountainous topography, with elevations up to 2,730 m, creates geographic variability in temperature and precipitation. Average annual precipitation ranges from 1,100–1,500 mm in the interior valleys to 1,800–2,500 mm in the mountains, while the Pacific coastal areas receive approximately 1,700 mm. Temperature varies primarily with elevation rather than season. The lowlands of the Pacific coast and the Lempa River Valley in the center have average temperatures of 25–29°C while the mountains have average temperatures of 12–23°C. (8, 12)

HISTORICAL CLIMATE

Historical climate trends since the 1950s include:

- Increased average temperature of 1.3°C.
- Increased warm days and nights, decreased cold days and nights.
- Increased frequency and intensity of extreme rainfall events, from 1 per decade (1960–1980) to 8 per decade (2000–2010); since 2009, a series of extreme rainfall records have been set.
- Decreased overall precipitation and more variable precipitation patterns.
- Increased drought and dry periods (consecutive days without precipitation).
- Sea level rise of 7.8 cm.

FUTURE CLIMATE

Projected changes in climate by the 2050s include:

- Increased temperature of 1.4°–2°C.
- Decreased precipitation by 2–15 percent.
- Longer and drier periods of drought.
- Increased frequency and intensity of weather and climate extremes, including increased rainfall during hurricanes.
- Sea level rise of 18 cm by 2050 and 37–44 cm by 2065.

SECTOR IMPACTS AND VULNERABILITIES

AGRICULTURE

Warming, drying and extreme weather trends are expected to lead to declines in El Salvador's agricultural production, including domestic staples such as maize and beans and the main agricultural export, coffee. Agriculture employs 21 percent of the population and contributes 10 percent of GDP. Of the country's 0.9 million ha of cultivated land, only 5 percent is irrigated. The Dry Corridor region, covering most of the country and the main agricultural areas, is particularly exposed to severe drought and floods. By 2070, maize production is projected to decline by 10 percent and beans by 29 percent. Similar projections exist for declining coffee yields, from 0.55 tons/ha to 0.1–0.3 tons/ha by 2070. Coffee is sensitive to temperature increase, particularly during blossom and fruit development. As coffee-producing regions become unsuitable for production due to rising temperatures (one estimate is 40 percent by 2050), producers will have limited alternatives. Unlike its neighbors, El Salvador does not have cooler highlands to which coffee production could shift. Climate trends are also likely to lead to increases in crop pests and diseases such as coffee leaf rust, potato psyllid and fall army worm. High temperatures and unseasonable rain increase the risk of post-harvest loss and reduced overall grain quality. Changing weather patterns threaten to bring more shocks, such as the 2012 drought, which led to an estimated $38 million in agricultural losses, and the 2014–2016 drought, which affected millions across Central America. Weather changes may also increase the incidence of destructive tropical storms, like the 2005 storm that destroyed 70 percent of the corn and bean crop and the 2011 storm that led to $105.3 million in agricultural losses. (6, 8, 9, 11, 12)

Climate Stressors and Climate Risks AGRICULTURE

Stressors	Risks
Increased temperatures	Declining yields of staple crops like maize and beans
Increased frequency of extreme storms	Declining yields and decreasing land suitability for coffee
Drought and reduced rainfall	Increased incidence of pests and disease, including coffee leaf rust, potato psyllid and fall army worm
	Increased post-harvest losses
Increased frequency of intense precipitation	Increased crop losses/failure and land degradation due to drought, storms and flooding

WATER RESOURCES

Warming combined with decreased and more variable precipitation is likely to lead to water stress for much of El Salvador's population. Projections suggest reduced surface water (currently 66 percent of water supply), decreased groundwater recharge rates for groundwater (33 percent of water supply), reduced flow from springs, and an increasing need for upstream irrigation, leading to downstream shortages. Decreasing river runoff is projected throughout the region, including a 13 percent decrease from the country's main river, the Lempa, by late this century. Coastal aquifers are under threat from saltwater intrusion as the rate of sea level rise has increased over the last 20 years. Extreme precipitation events are already affecting the country and increasingly breaking precipitation records. In November 2009, a record 350 mm of rain fell in six hours in San Vicente during Hurricane Ida.

Climate Stressors and Climate Risks
WATER RESOURCES

Stressors	Risks
Increased temperatures	Increased water stress for households, agriculture and hydropower production
Drought and reduced rainfall	Decreased surface water and reduced groundwater recharge
Increased frequency of intense precipitation and extreme storms	Increased upstream irrigation, leading to downstream shortages
	Reduced water quality
	Increased incidence of flooding and landslides, damaging water infrastructure
Sea level rise	Salinization of coastal aquifers

The event resulted in flooding and a massive landslide in Verapaz municipality, destroying bridges and agricultural land and leaving 199 people dead and 15,000 displaced. (2, 3, 8, 12).

ECOSYSTEMS

Climate change impacts are expected to lead to biodiversity loss and coastal degradation. Cool, moist forests are expected to decrease while cloud forests will likely disappear, diminishing the multiple benefits they provide, including water storage. The whole of El Salvador is within a hotspot of Mesoamerica biodiversity recognized to have 17,000 plant species and other spectacular endemic species, including the native bird (the quetzal) and the howler monkey. Human-driven deforestation is already a cause of land degradation and biodiversity loss – a trend that will be accelerated by climate change. Sea level rise and increased sea surface temperatures are already eroding beaches and threatening mangroves, fish stocks and wetlands,

Climate Stressors and Climate Risks
ECOSYSTEMS

Stressors	Risks
Increased temperatures	Increased rate of biodiversity loss
	Decrease in cool, moist forests; disappearance of cloud forests
Drought and reduced rainfall	Diminished forest water storage capacity
Increased frequency of extreme storms	Land degradation and erosion, particularly on mountain slopes
	Inundation and salinization of coastal wetlands and aquifers
Sea level rise	Beach erosion; reduced fish stocks and mangrove habitat

including saline intrusion in the RAMSAR site of Jiquilisco Bay Reserve and the habitat-rich Gulf of Fonseca. (8, 11, 12)

INFRASTRUCTURE AND ENERGY

Severe tropical storms in recent years negatively impacted El Salvador's infrastructure, damaging hundreds of roads, schools and health care centers. The 2011 Tropical Depression 12E caused an estimated $840 million in loss and damage, mainly to infrastructure. The expected loss of 10–28 percent of coastal zone territory due to sea level rise by the end of the century threatens El Salvador's two main ports, Acajutla and La Union, and coastal transportation and housing. Drying trends jeopardize hydroelectric production from El Salvador's Cerrón Grande, 5 de Noviembre and 15 de Septiembre dams on the Lempa River. A 33–53 percent decrease is projected in generation capacity in the Lempa River Basin by the end of the century.

Climate Stressors and Climate Risks
INFRASTRUCTURE AND ENERGY

Stressors	Risks
Increased temperatures and reduced rainfall	Destruction and damage of transportation, settlement and manufacturing infrastructure from storms, flooding and landslides
Increased frequency of extreme storms	Damage to ports and coastal infrastructure
	Diminished hydropower generation capacity
Sea level rise	Destruction of and damage to energy supply networks

This may lead to a decrease in El Salvador's energy security, as more than 36 percent of net energy generation comes from hydropower. (7, 10)

HUMAN HEALTH

Extreme weather, warming and drying impact El Salvador's population directly and indirectly. Heat stress induces dehydration and chronic kidney disease in construction and agricultural workers and threatens increased chronic respiratory and cardiovascular diseases, asthma and rhinitis throughout the population. Storms increasingly cause deaths and lead to flooding, with carryover effects for crop losses, water quality and diarrheal disease, the country's tenth leading cause of death. The 2014–2016 drought left 1.6 million people moderately or severely food insecure across El Salvador, Guatemala and Honduras due to substantial losses of crops and livestock. In 2015, 12.5 percent of the population was undernourished; further climate impacts to agriculture are likely to increase chronic malnutrition. Dengue, endemic in El Salvador and already expanding globally, is likely to continue increasing as dengue vectors reproduce more quickly and bite more frequently at higher temperatures. (1, 2, 4, 8, 13)

Climate Stressors and Climate Risks HUMAN HEALTH

Stressors	Risks
Increased temperatures	Increased incidence of dehydration, chronic kidney disease and respiratory and cardiovascular diseases
Increased frequency of extreme storms	Increased incidence of waterborne disease due to flooding and decreased water quality and increased mortality from severe storms
Drought and reduced rainfall	Destruction of and damage to health care facilities
Increased frequency of intense precipitation	Increased food insecurity and chronic malnutrition from storm-, drought -and high temperature-induced crop losses/failure
	Expanded range and incidence of vector-borne diseases, including dengue

POLICY CONTEXT

INSTITUTIONAL FRAMEWORK

El Salvador is a member of the Central American Integration System (SICA), which developed a strategy in 2010 to support regional cooperation in addressing climate change. The Ministry of Environment and Natural Resources (MARN) leads efforts to address climate risk, but the country emphasizes inter-agency initiatives to address climate change and established a cabinet-level coordinating entity to support broad participation in management of the Intended Nationally Determined Contributions (INDCs). The Ministry of Agriculture and the Ministry of Public Works, Transportation, Housing and Urban Development each have their own climate change divisions. (6)

NATIONAL STRATEGIES AND PLANS

El Salvador is currently working on a National Adaptation Plan (NAP) with expected completion in 2017 and a Climate Change Framework Law with expected completion in 2019.

- Initial National Communication (2000)
- Second National Communication (2013)
- National Climate Strategy (2012)
- National Plan for Environmental Adaptation and Mitigation to Climate Change (2015)
- Environmental Strategy for Adaptation and Mitigation to Climate Change in Agriculture, Forestry, Aquaculture and Fisheries (Ministry of Agriculture) (2012)

KEY RESOURCES

1. CDC. 2013. Global Health: El Salvador.
2. FAO. n.d. FAOSTAT: El Salvador.
3. FAO. 2015. Aquastat: El Salvador.
4. Glaser et al. 2016. Climate change and the emergent epidemic of CKD from heat stress in rural communities.
5. Grantham Research Institute. 2015. Climate change legislation in El Salvador.
6. Hannah et al. 2016. Regional modeling of climate change impacts on smallholder agriculture and ecosystems.
7. IDB. 2013. Hydropower development and ecosystem services in Central America.
8. Magrin et al. 2014. IPCC WG II Chapter 27: Central and South America.
9. Ovalle-Riviera et al. 2015. Projected shifts in *Coffea arabica* suitability among major global producing regions due to climate change.
10. Tegel. 2012. El Salvador in battle against tide of climate change.
11. USAID. 2014. Vulnerability and resilience to climate change in western Honduras.
12. USAID. 2016. Central America regional environment and climate change analysis.
13. WHO. 2016. Dengue and severe dengue.

Map source: Jarvis, A., H.I. Reuter, A. Nelson, E. Guevara, 2008, Hole-filled SRTM for the globe Version 4, available from the CGIAR-CSI SRTM 90m Database (http://srtm.csi.cgiar.org).

SELECTED ONGOING EXPERIENCES

Selected Program	Amount	Donor	Year	Implementer
Regional Climate Change Program	$21.5 million	USAID	2013–2018	Centro Agronómico Tropical de Investigación y Enseñanza (CATIE)
Partnership for Climate Smart Agriculture	$4.5 million	USAID	2016–2019	Inter-American Development Bank (IDB)
Climate Change Adaptation to Reduce Land Degradation in Fragile Micro-Watersheds Located in the Municipalities of Texistepeque and Candelaria de la Frontera	$8 million	GEF	2014–2017	FAO
National Programme of Rural Economic Transformation for Living Well – Rural Adelante	$ 18.7 million	IFAD	2015 – 2019	Ministry of Agriculture and Livestock
Building climate resilience of urban systems through Ecosystem-based Adaptation (EbA) in Latin America and the Caribbean	$28 million	UNEP	2014–ongoing	UNITAR
Disaster Risk Programme to strengthen resilience in the Dry Corridor in Central America	$12.2 million	FAO	2015–2018	FAO
Planning around temperature increases in the metropolitan area of San Salvador	£146,000	CDKN	2016	Fundación Tecnalia Research and Innovation
Institutional strengthening and tools to address climate vulnerability in El Salvador	£187,000	CDKN	2015–2016	ESSA Technologies Ltd
Support to the Implementation of National Climate Change Strategy in El Salvador	$0.75 million	IDB	2014–2015	Fondo Ambiental de El Salvador
Agricultural and Energy Risk Management: An Integral Strategy to Cope with Drought and Food Insecurity	$1.8 million	World Bank	2012–2015	ACICAFOC
Disaster Risk Management Development Policy Loan with a CAT DDO	$50 million	World Bank	2011–2014	Ministry of Finance