



CLIMATE CHANGE RISK PROFILE

West Bank and Gaza

COUNTRY OVERVIEW

The West Bank and Gaza Strip are located in the Middle East, west of Jordan and south of Lebanon. The region is home to approximately 4.4 million people, with the population expected to reach 8.9 million by 2050. The region faces ongoing political and economic instability, greatly hindering development progress. Among the various socio-economic and environmental challenges, key issues include water scarcity, limited land and natural resources, rapid population growth, urbanization, land degradation, and high levels of poverty.

Water scarcity, especially, is a critical concern in the West Bank and Gaza, because the annual share of renewable internal freshwater resources for inhabitants is less than 200 cubic meters per capita, well below the World Health Organization's water scarcity threshold of 500 cubic meters per capita. Climate change will likely exacerbate the region's water scarcity concerns, as well as increase challenges to agricultural productivity, coastal areas, and human health. (1, 5)



CLIMATE PROJECTIONS



Increase in average annual temperatures of 2°C by 2055



More extreme weather, with intense precipitation, floods, and droughts



Decrease in average annual rainfall of ~10% by 2055

KEY CLIMATE IMPACTS

Agriculture

Reduced agricultural productivity
Increased desertification
Loss of livelihoods



Water Resources

Increased water scarcity
Reduced water quality
Stormwater flooding



Coastal Zones

Increased coastal erosion
Saltwater intrusion
Reduced fish catches



Human Health

Increased food insecurity
Intensified epidemics (e.g., cholera)
Damage to health care infrastructure



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This document was prepared under the Global Environmental Management Support Project (GEMS) 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 or the United States government.

CLIMATE SUMMARY

The West Bank and Gaza have temperate climates, with temperatures and precipitation levels that vary with altitude. Mean summer temperatures range from 30°C in Jericho (eastern West Bank) to 25°C in Gaza and 22°C in Hebron (southern West Bank). Mean winter temperatures range from 13°C in Jericho and Gaza to 7°C in Hebron. The West Bank includes six climate zones, ranging from extremely arid to humid. Annual rainfall in the West Bank ranges from less than 100 millimeters (mm) in the east to 650 mm in the west. The long-term historical average annual rainfall amounts in the West Bank and Gaza are approximately 454 mm and 372 mm, respectively. The West Bank terrain is mostly rugged, with some vegetation in the west and predominantly barren areas in the east. Gaza has flat and rolling terrain, and a sand- and dune-covered coastal plain. (5, 6)

HISTORICAL CLIMATE

- Average temperature increased by approximately 1°C during the 19th century, with the highest rate of increase occurring during the last 20 years of the century.
- Since 1950, maximum and minimum temperatures have increased, as have the frequency of warm days and nights.
- Rainfall trends over the past 50 years are not clear, although one study noted that specific humidity very likely increased in the eastern Mediterranean region starting in the 1970s.
- Annual rainfall has decreased modestly in both the West Bank and Gaza since 2001. (4, 5)

FUTURE CLIMATE

- Temperatures are projected to increase by approximately 2°C by 2055 and approximately 3°C by 2090.
- Cold periods and warm periods are expected to become shorter, but more prominent, over time.
- One GHG emissions scenario of possible climate change impacts suggests precipitation is expected to remain the same or increase slightly, while two other scenarios anticipate a decrease in rainfall and increased seasonal variation over the course of the 21st century.
- Drought events, heat waves and drastic changes in temperatures during summer, as well as more intense rainfall events, are expected throughout the coming years.
- Sea level is projected to increase by 0.1-0.4 m by 2100 along the Gaza coastline. (2, 5, 6, 8)

SECTOR IMPACTS AND VULNERABILITIES

AGRICULTURE

The agricultural sector in West Bank and Gaza accounts for approximately 5 percent of GDP. The sector’s productivity is hindered by several political and economic factors, including a weak institutional framework and increasing costs accompanied by declining profits. Agriculture is also the region’s most sensitive sector to climate change impacts.

Increased temperatures, decline in annual rainfall, and more intense and frequent drought events will likely reduce crop yields, diminish soil quality, and reduce access to water resources that are necessary for irrigation. Intense rainfall events and flooding may also inundate and damage agricultural land and produce. Climate-sensitive agricultural exports include wheat, barley, olives, animal products, vegetables (e.g., tomatoes, cucumbers, and eggplants), and fruits (e.g., strawberries, mangos, and citrus fruits).

Climate Stressors and Climate Risks AGRICULTURE	
Stressors	Risks
Increased temperatures	Decreased agricultural productivity
	Loss of arable land due to desertification
Heat waves	Changes in economic viability of crops (shorter growing seasons)
Increased drought	Reduced access to and availability of water resources for irrigation
Floods	Soil erosion and damage to agricultural land and crops due to floods
Increased intensity of rainfall events	Diminished soil quality
	Loss of livelihoods

Recent periods of drought, particularly since 2001, have contributed to desertification. Further, severe drought in 2005 significantly affected crop yields in rain-fed farming communities in Hebron, requiring an international emergency response consisting of food distribution. Heat waves have also greatly impacted livestock and crops. In 2010, heat waves contributed to a 20 percent reduction in olive production, a particularly important crop in the region. Similarly, in 2015, 15 percent of chickens died in Gaza because of a heat wave in which temperatures climbed to 12°C above the annual average. (1, 3, 4, 5, 6)

WATER RESOURCES

Population growth, over-extraction of groundwater resources, and future climate impacts could lead to a deficit of 28 million liters per year in water resources by 2020 in the West Bank and Gaza. This projected shortfall may be increased by damage to water infrastructure during conflicts, something which has been a significant issue in some areas within the West Bank and Gaza in recent years.

In the West Bank, water demand is primarily met by groundwater aquifers, from which water is being extracted at an unsustainable rate. This is also an issue for Gaza, which draws water at a rate approximately three times greater than the sustainable limit from its own coastal aquifer. More frequent droughts, less rainfall, and increased temperatures are projected to further exacerbate water scarcity, increasing the rate of source water depletion and reducing groundwater recharge rates. Contamination of water sources also poses significant threats to the West Bank and Gaza, particularly from salinization and inadequate wastewater management. Saltwater intrusion into groundwater sources is expected to increase as sea level rises along Gaza’s coast and water withdrawal from coastal aquifers grows, rendering these water sources increasingly unsuitable for consumption. Floods already damage stormwater and wastewater infrastructure, and their impacts may increase with greater rainfall intensity and/or more frequent flood events. In 2008, a high-precipitation event led to flash floods, which devastated stormwater and wastewater drainage systems in Gaza. (1, 3, 4, 5, 6, 7)

Climate Stressors and Climate Risks WATER RESOURCES	
Stressors	Risks
Increased temperatures	Reduced groundwater recharge rates and increased rate of depletion
Decreased average rainfall	Decreased access to safe drinking water
Increased drought	Increased water shortages
Sea level rise	Saltwater intrusion into groundwater sources
Floods	Damage to stormwater and wastewater infrastructure

COASTAL ZONES

Gaza is vulnerable to sea level rise, which may lead to salt water intrusion and erosion of land and infrastructure in coastal areas. It is estimated that the sea level rose approximately 0.2 meters during the 20th century, and it is expected to continue rising during the 21st century. Sea level rise already contributes to saltwater intrusion, making limited groundwater sources saline. Saltwater intrusion may also degrade soils and coastal agricultural land, which constitute 43 percent of Gaza’s coastal area. More intense rainfall events along the coast can damage homes and infrastructure. Increased storm surges may lead to coastal flooding and potential displacement of coastal communities. Furthermore, increased temperatures may reduce fish catch, as fish could move from warm shallow waters to cooler, deeper waters away from the coast. This would directly impact the livelihoods of fishermen in Gaza. (2, 5, 6)

Climate Stressors and Climate Risks COASTAL ZONES	
Stressors	Risks
Sea level rise	Saltwater intrusion into groundwater sources
Floods	Displacement of coastal communities
	Reduced fish catch
Increased intensity of rainfall events	Coastal erosion
	Damage to and destruction of infrastructure

HUMAN HEALTH

Already, approximately 25 percent of the West Bank’s population, and 56 percent of Gaza’s population, is food insecure. Climate change has both the potential to directly exacerbate food security issues, as well as introduce or worsen additional threats. Intense rainfall events and floods can damage health care facilities and other vital infrastructure. Floods may also cause injury and loss of life. Reduced precipitation, warmer temperatures, and an increase in evaporation rates can reduce water supply and decrease water quality, which can lead to an increase in cholera, diarrhea, and other diseases. Water-related diseases are especially prevalent in Gaza, accounting for 26 percent of all diseases observed. Vector-borne diseases are also expected to become more widespread with a growing mosquito problem and spread of new and existing parasites due to changing climate conditions. (5, 6)

Climate Stressors and Climate Risks HUMAN HEALTH	
Stressors	Risks
Increased temperatures	Reduced quality and quantity of drinking water, leading to increased risk of waterborne illnesses (e.g., cholera)
Heat waves	
Decreased average rainfall	Heightened food insecurity
Increased drought	Displacement, injuries, and death from floods and storms
Increased intensity of rainfall events	Damage to health care infrastructure

POLICY CONTEXT

INSTITUTIONAL FRAMEWORK

The Palestinian Government recently established the National Committee on Climate Change (NCCC), which includes members from different sector ministries and agencies, academia, NGOs, and the private sector. The Environment Quality Authority (EQA) serves as the NCCC Secretariat. The overarching role of the NCCC is to support the Palestinian Government in implementing and evaluating climate policies. The NCCC has proposed a National Institutional Framework for Climate Change (NIFCC) as an integrated approach to address climate change. In addition, the NCCC developed the Initial National Communication Report (INCR) to the United Nations Framework Convention on Climate Change (UNFCCC). In March 2016, the State of Palestine (West Bank and Gaza) became the 197th party to the UNFCCC. Palestine signed and ratified the Paris Agreement in April 2016. (5)

NATIONAL STRATEGIES AND PLANS

- [Initial National Communication Report to UNFCCC](#) (2016)
- [National Adaptation Plan](#) (2016)
- [National Development Plan 2014-16](#) (2014)
- [The National Strategy, Action Programme and Integrated Financing Strategy to Combat Desertification in the Occupied Palestinian Territory](#) (2012)
- [Climate Change Adaptation Strategy and Programme of Action for the Palestinian Authority](#) (2010)
- Other related sectoral policies include: [National Agriculture Sector Strategy “Resilience and Development” 2014-2016](#) (2014), [National Water and Wastewater Strategy for Palestine](#) (2013), [National Biodiversity Strategy and Action Plan for Palestine](#) (1999).

KEY RESOURCES

1. Drakenberg, O., et al. 2013. [Environment and Climate Change Policy Brief Occupied Palestinian Territory \(oPt\)](#).
2. Haddad, M. 2011. [Water Scarcity and Degradation in Palestine as Challenges, Vulnerabilities, and Risks](#). In: *Coping with Global Environmental Change, Disasters and Security*.
3. Mason, M., et al. 2012. [Compounding Vulnerability: Impacts of Climate Change on Palestinians in Gaza and the West Bank](#).
4. Richard, M., et al. 2012. [Analysis of Climatic Variability and Its Environmental Impacts across the Occupied Palestinian Territory](#).
5. State of Palestine Environment Quality Authority. 2016. [Initial National Communication Report to the United Nations Framework Convention on Climate Change \(UNFCCC\)](#).
6. United Nations Development Program (UNDP). 2011. [Climate Change Adaptation Strategy and Programme of Action for the Palestinian Authority](#).
7. World Bank. 2016. [West Bank and Gaza: Overview](#).
8. State of Palestine Environment Quality Authority. 2016. [National Adaptation Plan to Climate Change](#)

Map from: Public Broadcasting Service (www.pbs.org)

SELECTED ONGOING EXPERIENCES

Selected Program	Amount	Donor	Year	Implementer
Enhancing Capacities of Palestinian Institutions in Mainstreaming Environment and Climate Change	\$1.6 million	Government of Belgium	2013-2016	UNDP and Palestinian Environment Quality Authority (EQA)
Gaza Sustainable Water Supply Program	\$2.5 million	World Bank	2015-ongoing	Palestinian Water Authority
Palestinian Community Assistance Program (PCAP)	\$750,000	Economic Support Fund	Ongoing	USAID
Palestinian Community Infrastructure Development Program (PCID)	\$100 million	Economic Support Fund	2013-2018	USAID, ANERA
Resilience Against Natural Disasters	\$455,000	Iceland Ministry of Foreign Affairs	2014-ongoing	UNDP