USAID
FROM THE AMERICAN PEOPLE

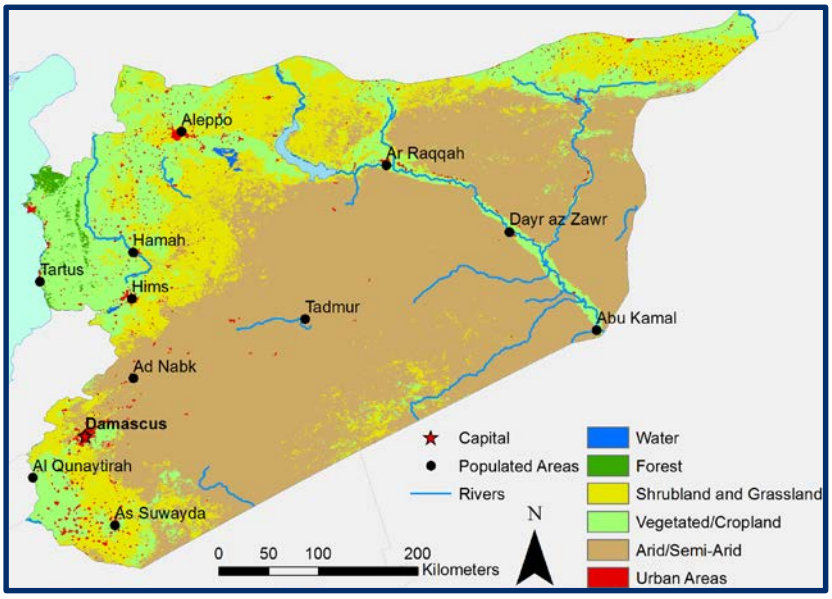
FACT SHEET

CLIMATE CHANGE RISK PROFILE

Syria

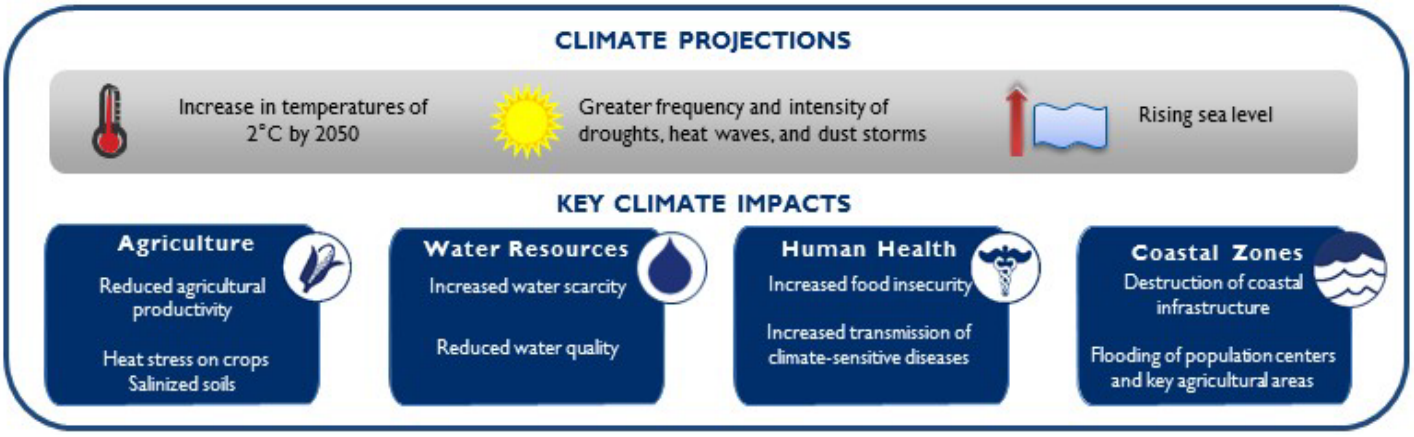
COUNTRY OVERVIEW

The historically robust agricultural sector in Syria has declined in recent years since the outbreak of the civil war. The ongoing conflict has hurt the economy and has affected millions. The conflict is estimated to have displaced more than 10 million Syrians, and an estimated 330,000 have died as of August 2015. Climatic research and ethnographic studies have shed light on the possibility that water shortages and climate variability contributed to the conflict. Between 2006 and 2011, an extreme drought characterized as "the worst long-term drought with the most severe set of crop failures" in the observed record destroyed farmlands across the country and upset herding patterns.



Multiple years of crop failure drove mass migration to urban areas, where unemployment, poor governance, and a multitude of other stressors led to the civil unrest in 2011. Today, more than 80 percent of Syrians live in poverty, and that number has risen by approximately 55 percent in the past five years.

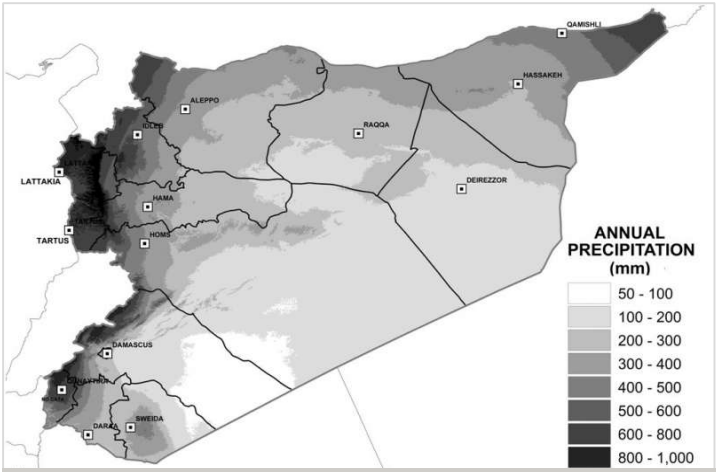
Climatic evidence suggests that anthropogenic climate change exacerbated this drought. Research also suggests that the frequency and intensity of droughts, particularly in the eastern Mediterranean region, will increase as global temperatures rise. With much of the infrastructure in ruin and minimal governance because of the civil war, Syria is more vulnerable than ever to future climate-influenced shocks. (3, 4, 6, 8, 11, 12)



February 2017
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

Syria has four geographic zones: the Mediterranean coast in the west, mountains east of the coast, steppe east of the mountains and along the northern border, and desert in the southeast bordering Jordan and Iraq. The western Mediterranean coast has an annual average temperature of 18.1°C. Though Damascus can occasionally experience extreme cold and periodic snow, the Mediterranean coast tends to have cool rainy winters with hot dry summers. Data for annual temperatures, rainfall, and humidity are shown in the figure below and annual precipitation rate is displayed in the map to the right. (1, 7, 9)



PRECIPITATION MAP OF SYRIA

Source: ICARDA, 2008 (5)

CURRENT CLIMATE IN SYRIA				
Region	COAST	MOUNTAINS	STEPPE	DESERT
Annual Min/Max Temperatures	8°C to 29.9°C (daily temperatures can vary as much as 13°C)	4°C to 27.4°C (below freezing temperatures are common in the winter)	2.5°C to 37.7°C (winter temperatures can reach well below freezing)	2.5°C to 39.7°C (daily temperatures can vary as much as 32°C)
Annual Rainfall	365 to 1365 mm/year	500 to 1820 mm/year	50 to 600 mm/year	20 to 370 mm/year
Annual Average Humidity	60% – 73%	67% – 76%	49% – 75%	31% – 71%

HISTORICAL CLIMATE

Key climate changes:

- Increased mean annual temperature at a rate of 0.8°C per century since the 1950s.
- Decreased mean rainfall of 18.23 mm per month per century.
- Increased autumn average monthly precipitation in the northern and central areas.
- Increased frequency, length, and intensity of droughts.
- Frequent heat waves during the spring and summer, resulting in temperature increases of 8-10°C above average. (7, 9)

FUTURE CLIMATE

Projected changes include:

- Increase in mean annual temperatures by 2°C by 2050.
- Decrease in precipitation by 11 percent by 2050.
- Decrease in runoff by 25-27 percent.
- Increase in the number of consecutive dry days by 5, and decrease in annual frost days by 13.
- Increase in frequency of dust storms and coastal flooding.
- Precipitation decrease most pronounced from September to November and from March to May. (7, 9)

SECTOR IMPACTS AND VULNERABILITIES

AGRICULTURE

Before the drought of 2006-2011, agriculture accounted for 25 percent of Syria's GDP, 32 percent of its land use, and 90 percent of its water use. Most crops are rain-fed, with about two thirds of farmers relying exclusively on rainwater to water their crops, with the rest irrigating from rivers or, more commonly, groundwater. Government-subsidized water-intensive crops, such as wheat and cotton, are not well suited to Syria's changing precipitation patterns. Decades of unsustainable agricultural policies have resulted in overexploitation of water and soil resources. As a result, water scarcity and high temperatures, exacerbated by acute pressure from the ongoing conflict, have resulted in a near collapse of the Syrian agricultural system.

Climate Stressors and Climate Risks AGRICULTURE

Stressors	Risks
Increased temperatures	Overall decreased agricultural productivity and total crop failure in some areas
Greater frequency and intensity of drought	Increased reliance on irrigation from rivers
	Increase in salt content of soil
	Migration from rural to urban areas due to crop failures and loss of livelihoods

Due to drought-induced crop failures between 2006 and 2011, an estimated 1.5 million people abandoned their lands and livelihoods to move to urban areas, frequently leading to unemployment. Small and medium-scale farmers and pastoralists have suffered significantly, with extremely low or nonexistent levels of production and complete or near-complete death of herds.

Climate forecasting suggests that rains will become less frequent, and groundwater will become more limited and contaminated. With a reduction in rainfall and decreased mountain runoff, rivers will flow at lower levels, leaving even less water available for agriculture. (4, 6, 8, 10)

WATER RESOURCES

Climate change and poor agricultural policies have created a water resource crisis in Syria. In 2011, Syria's annual water withdrawal was 160 percent of its internal renewable water resources, markedly higher than other in-region countries such as Iraq (80 percent) and Turkey (20 percent). Additionally, an estimated 78 percent of all groundwater use was deemed unsustainable in 2012, most of which was used for agriculture. Agricultural reliance on rain and groundwater have left Syria vulnerable to drought, compared to its neighbors. For example, over-withdrawal of groundwater in Syria's northeast has resulted in the drying up of the Khabur river, which in turn has created an even greater reliance on groundwater.

Climate Stressors and Climate Risks WATER RESOURCES

Stressors	Risks
Greater frequency and intensity of drought	Reduced recharge rates and increased rate of depletion
	Decreased access to safe drinking water
	Increased conflict over water
	Saltwater intrusion into groundwater sources
Decreased precipitation	Decreased runoff
	Decreased quantity and quality of groundwater

In the future, Syria is expected to experience a long-term drying trend as a result of climate change, with less precipitation, lower groundwater levels, and a decline in levels of vegetation. Expected salinization of fields and groundwater will make local wells unfit for drinking and decrease agricultural productivity. Studies have shown that severe, multiyear droughts, such as the one that occurred during the lead-up to the civil war, are now two to three times more likely due to climate change drivers. The anticipated reduction in precipitation and snow in the Syrian and Turkish mountains, and the resulting decrease in runoff, are projected to further threaten river resources in Syria, likely increasing dependence on groundwater and rainwater. (4, 6, 10)

COASTAL ZONES

While the coastal zones of Syria only make up 2 percent of the total landmass, coastal areas in 2011 were home to 11 percent of the total population and produced 12 percent of Syria's GDP. Historically, the coastal plains received the greatest amounts of rain and had the most robust groundwater resources. Before 2011, most of Syria's agricultural productivity and 50 percent of its oil refining occurred along the coast. Due to political alliances, the coast has been less affected by the fighting, and its infrastructure has remained largely intact. Given the relative stability of the coast, its economic importance has increased as the conflict has continued. In the future, however, rising sea levels are likely to result in flooding of Syrian coastal plains, causing erosion and threatening critical coastal infrastructure and agricultural areas. Saltwater intrusion could contaminate some of the only sustainable groundwater aquifers in the country, further threatening the region's agricultural productivity. This damage may have an outsized effect on stability due to the coast's importance for the country's food security and economic health. (2, 7)

Climate Stressors and Climate Risks COASTAL ZONES

Stressors	Risks
Sea level rise	Damage to coastal infrastructure and agricultural areas
	Displacement of coastal communities
Floods	Saltwater intrusion into groundwater sources

HUMAN HEALTH

Health institutions have been severely overstretched and damaged by the civil war, leaving Syria more vulnerable to the types of health impacts it may expect as a result of climate change. At the height of the drought lasting from 2006 to 2011, there was a dramatic increase in nutrition-related diseases in children. As these long and intense droughts are expected to become more common, nutritional deficiencies are likely to increase.

Disease incidence is also likely to increase. With the expansion of drought-tolerant rodent species and a decline in predators (e.g., hawks), more frequent rodent population booms have the potential to increase the incidence of leishmaniasis (Aleppo boil). There is also a risk that malaria could re-emerge, should it migrate from neighboring countries and find increasingly hospitable mosquito breeding conditions (due to projected increases in floods and stagnant water). As already observed in water-stressed besieged areas, the decreased water access and quality expected from climate change can result in significant spikes in waterborne disease, such as diarrhea and typhoid. Climate-related disasters such as heat waves, floods, droughts, and dust storms have an acute effect in the form of disaster mortality, and may further stress an already strained public health infrastructure. (6, 7)

Climate Stressors and Climate Risks HUMAN HEALTH

Stressors	Risks
Increased temperatures	Reduced quality and quantity of safe drinking water, leading to increased risk of waterborne illnesses
Drought	Spread and growth of vector-borne diseases (e.g., malaria and Aleppo boil)
Increased water scarcity	Heightened food insecurity leading to increased and severe malnutrition (particularly in children)
Sea level rise	Displacement, injuries, and death from floods and storms

POLICY CONTEXT

INSTITUTIONAL FRAMEWORK

Syria ratified the UNFCCC in 1995 and signed the Kyoto Protocol in 2005. The Ministry of State for Environment Affairs (MSEA), with financial support from the Global Environmental Facility and the UN Development Program, prepares all of Syria's National Communications to the UNFCCC. The MSEA is responsible for enacting all environmental law in Syria, and is the national agency responsible for climate change issues. (7)

NATIONAL STRATEGIES AND PLANS

- NCSA Strategy and Action Plan to Implement the UN Environmental Conventions in Syria (2007)
- Greenhouse Gas Inventory in Syria (2009)
- Initial National Communication (2010)
- National Report of the Syrian Arab Republic to the United Nations Conference on Sustainable Development (2012)

KEY RESOURCES

1. AQUASTAT. 2008. "Syrian Arab Republic." *Irrigation in the Middle East Region in Figures.* http://www.fao.org/nr/water/aquastat/countries_regions/syr/SYR-CP_eng.pdf
2. BBC. 2015. "Syria Crisis: Massive Russian Air Strikes on IS Targets." http://www.bbc.com/news/world-europe-34882503
3. CIA. 2016. "Syria." World Factbook. https://www.cia.gov/library/publications/the-world-factbook/geos/sy.html
4. Gleick, Peter H. 2014. "Water, Drought, Climate Change, and Conflict in Syria." Weather, Climate and Society. http://journals.ametsoc.org/doi/abs/10.1175/WCAS-D-13-00059.1
5. International Center for Agricultural Research in the Dry Areas (ICARDA). 2008. "Syria: Annual Precipitation." http://geoagro.icarda.org/en/cms/metadata/index/185/Syria%25253A%25252BAnnual%25252BPrecipitation
6. Kelley, Colin P. 2015. "Climate Change in the Fertile Crescent and Implications of the Recent Syrian Drought." PNAS. http://www.pnas.org/content/112/11/3241.full.pdf?with-ds=yes
7. Ministry of State for Environment Affairs. 2010. *Initial National Communication of the Syrian Arab Republic.* http://unfccc.int/resource/docs/natc/syrnc1.pdf
8. Syrian Centre for Policy Research. 2016. *Syria: Confronting Fragmentation!* http://www.sy.undp.org/content/syria/en/home/library/poverty/confronting-fragmentation.html
9. World Bank Group. 2016. "Syria." Climate Change Knowledge Portal. http://sdwebx.worldbank.org/climateportal/countryprofile/home.cfm?page=country_profile&CCode=SYR&ThisTab=ClimateFuture
10. World Bank Group. 2014. *Turn Down the Heat: Confronting the New Climate Normal.* https://openknowledge.worldbank.org/handle/10986/20595
11. Freedom House. 2016. *Freedom in the World 2016 Syria Report.* https://freedomhouse.org/report/freedom-world/2016/syria
12. UN Economic and Social Commission for Western Asia. 2016. *Syria at War: Five Years On.* https://www.unescwa.org/sites/www.unescwa.org/files/publications/files/syria-war-five-years-english_2.pdf

SELECTED ONGOING EXPERIENCES

Selected Program	Amount	Donor	Year	Implementer
LGGE Energy Efficiency Code in Buildings	$49 Million	GEF	2010 (Cancelled)	UNDP, National Energy Research Centre
Solid Waste and Debris Management in Crisis Time to Enhance Community Resilience and Improve Living Conditions	$15 Million	UNDP	2014-present	Various local NGOs
Rehabilitation of Basic and Social Infrastructure	$14.5 Million	UNDP	Ongoing	Various local NGOs
Water Treatment Response in Syria	$72 Million*	UNICEF	2011-present	Various local NGOs

*UNICEF WASH funding requirements above are only for 2016 programming.