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Climate and Security in the Middle East and North Africa

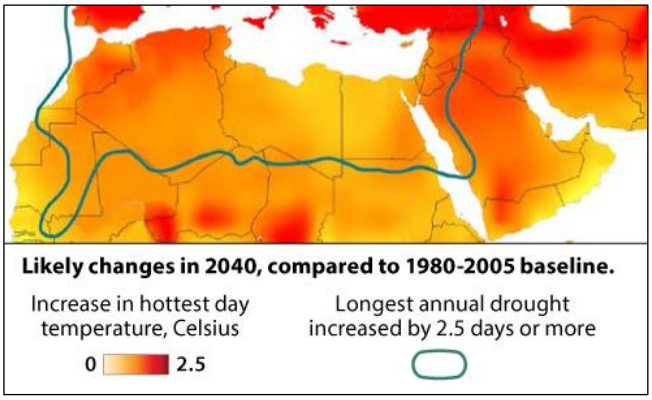
The Middle East and North Africa (MENA) region is among the world's most water-stressed and vulnerable to climate change impacts. Policymakers' concerns about a changing MENA climate include not only physical and economic impacts but also the potential implications for political stability and security in a volatile region.

A Region Under Stress

Projections of various effects of climate change on the largely arid and semi-arid MENA region are available, although regional analyses are often constrained by limited data for MENA and downscaling from global models. Given MENA's geographic span—from Morocco to Iran—and topographic variation (e.g., mountains, deserts, and deltas), local effects may differ from regional trends.

Average Temperatures and Hottest Days. Temperatures in the MENA region have increased for decades and are projected to continue increasing through the end of the century. **Figure 1** shows one projection of hottest day temperature increases by 2040. Some research suggests intensification of warm-season heat extremes in the region (e.g., Zittis et al. in *Climate and Atmospheric Science*, 2021). Hotter conditions generally increase energy demand for cooling and may negatively affect health, labor, and agricultural productivity.

Figure 1. 2040 Projections for MENA: Hottest Day Temperatures and Longest Annual Drought Days



Source: CRS adapted from U.S. National Intelligence Council (NIC), *Global Trends 2040*, March 2021.

Notes: The projections used the Representative Concentration Pathway 4.5. NIC's data source was Schwingshackl, Sillman, and the Centre for International Climate and Environmental Research. NIC's graphic source was Pardee Center, University of Denver.

Water and Storms. Both droughts and floods occur in MENA, with variability over time and place. Several studies project increasingly lengthy droughts in some parts of MENA, including annual dry spells projected to last longer by 2040 (**Figure 1**). Many (but not all) studies project less precipitation along MENA's Mediterranean coast through this century; less agreement exists regarding whether precipitation may increase or decrease in other parts of the MENA region (e.g., Arabian Peninsula, Sahara portion of various North Africa countries). Regarding precipitation extremes, some studies (e.g., Ozturk et al. in *Atmosphere*, 2021) project an increase in precipitation amounts on very wet days for the end of this century for much of the region, which may contribute to flooding.

In September 2023, Storm Daniel (a *medicane*—a *Med*iterranean Sea storm with hurr*icane*-type characteristics) led to torrential rains over eastern Libya, with flooding and dam failures affecting the city of Derna. Many thousands were displaced, and the loss of life may exceed 5,000. Some research indicates that with a warmer climate, medicanes with the strongest winds may become stronger while medicanes overall may decrease in frequency (e.g., Flaounas et al. in *Weather and Climate Dynamics*, 2022). Future trends in the development of medicanes may depend on competing climate-related variables (e.g., higher sea surface temperatures enhancing medicane strength versus higher air temperatures leading to less frequent medicanes).

Rising sea levels are encroaching on MENA coastlines and communities, thereby contributing to more frequent flooding and more extensive coastal storm flooding. According to some researchers, by 2050, portions of Iraq's second-largest city of Basra and other southern Iraqi areas could experience chronic coastal flooding. Alexandria, Egypt, one of the most populous coastal cities in the Middle East, also could be regularly flooded by rising sea levels.

Agriculture and Food. Much of MENA's agriculture and food production is rain-fed or consists of livestock. Production and many rural agricultural livelihoods are sensitive to changes in heat, drought, and precipitation patterns. Additionally, some production in the region relies on irrigation, which can be sensitive to surface water availability and can contribute to overuse of aquifers. Limited arable land, water scarcity, and other resource and environmental constraints limit regional agricultural production. The region has coped with population growth and urbanization by importing food. Reliance on food imports is anticipated to persist, with demographic and diet trends and changing agricultural growing conditions (e.g., effects of heat and drought on agricultural productivity) as contributing factors.

How Climate May Interact with Security

U.S. national security assessments have described climate change as a *threat multiplier* that may exacerbate existing tensions in regions facing other challenges, such as

intrastate conflict, rapid population growth, urbanization, or poor governance. The linkages from climate and weather events to political stability are complex, with intervening critical factors such as social schisms and governance. In the MENA region, where several countries (e.g., Syria, Iraq, and Lebanon) are divided along ethnic/sectarian lines, armed substate actors and terrorist groups could broaden their appeal to sectors of the population disaffected by hardships wrought by climate change.

Examples illustrate how climate conditions and weather events could affect MENA's future in terms of political unrest, violent conflicts, and the well-being of its people. For instance, rising food prices or water shortages previously have triggered urban unrest. Reliance on food imports links MENA's internal stability to agricultural conditions in exporting nations. Poor conditions in agricultural exporting countries contributed to reduced MENA food imports and associated food shortages in 2010-2011. In the case of Syria, decades of land and groundwater overuse in the nation's breadbasket, combined with a 2006-2010 drought and periods of spiking global oil and food prices, played a part in agricultural workers migrating to cities, where many were unable to find employment. When Syria's uprising began in 2011, disaffected rural migrants formed the base of opposition against the regime of President Bashar al Asad. In North Africa, local protests about water shortages reportedly occurred in 2017-2018. In Iraq, observers identified droughts as undermining rural Sunni livelihoods, which some argue may have helped fuel Islamic State recruitment.

> *Some countries will be able to afford expensive, new adaptations … but in many MENA countries, governments' inability to address water and heat challenges will increase public frustration with government performance and potentially spark new migration flows.*
> —U.S. National Intelligence Council, 2021 *Five-Year Regional Outlook: Middle East and North Africa*

Climate change adaptation is anticipated to challenge the capacities of poorer countries and politically unstable governments. Variations across MENA in national wealth and state capacity to respond to climate and weather events may lead to different efforts toward adaptation, such as improving regional drought monitoring, investing in water infrastructure and efficiency (e.g., Israel's water reuse), and shifting to more heat-resilient crop varieties. Regional water and energy cooperation also may expand. As of August 2023, Israel, Jordan, and the United Arab Emirates (UAE) continued their efforts to finalize a deal for "Project Prosperity." The project proposes UAE financing the construction of solar power capacity in Jordan and subsequent electricity export from Jordan to Israel in exchange for Israel supplying desalinated water to Jordan.

Energy and Emissions Policies

Some oil-rich members of the Gulf Cooperation Council (GCC, composed of Saudi Arabia, the UAE, Kuwait, Oman, Qatar, and Bahrain) have undertaken efforts to diversify their economies. In 2021, Saudi Crown Prince Mohammed bin Salman Al Saud announced that Saudi Arabia, the world's second-largest oil producer, seeks to generate half of its domestic energy from renewable sources by 2030. However, these types of pledges have engendered some skepticism. GCC state-owned oil companies may increase production to meet rising energy demands from China, India, and elsewhere.

Other MENA countries that are net hydrocarbon importers are adjusting or may adjust their energy policies. Morocco has attempted to reduce its dependence on fossil fuel imports and aims to generate over half of its electricity from renewable sources by 2030 (e.g., by building concentrated solar power capacity). Morocco's government announced in 2019 that renewable sources composed an estimated 35% of its electricity production the prior year.

The November 2022 United Nations Framework Convention on Climate Change (UNFCCC) 27th Conference of Parties (COP27) yielded a series of global discussions and agreements focused on greenhouse-gas (GHG) emissions reductions and other topics. Most countries—including many MENA countries—updated their Nationally Determined Contributions (NDCs) prior to COP26 in 2021. NDCs represent each country's commitment to meeting the objectives of the Paris Agreement (PA), a UNFCCC agreement intended to reduce the effects of climate change. For example, the UAE—the host country for COP28 in 2023—submitted an updated NDC in 2023, pledging to reduce its GHG emissions 19% by 2030 (compared with 2019 levels). In addition to NDCs, some countries, including Bahrain, Israel, Oman, Saudi Arabia, and the UAE, have pledged to reach net-zero emissions by mid-century. For the UAE, some observers question the interplay between its pledges to reduce emissions, its stated plans to achieve net-zero emissions by 2045 (e.g., adopting renewables and employing carbon capture), and its plans to increase its overall fossil fuel production.

Related Efforts and Policies

Various U.S. and MENA-related efforts to address climate change mitigation and adaptation are underway. In April 2021, President Biden hosted a summit on climate for 40 world leaders, including some leaders from the MENA region. At the summit, the Biden Administration committed to exerting U.S. leadership in addressing climate change. The Department of State and the U.S. Agency for International Development are to coordinate "U.S. government efforts to support countries around the world to enhance and meet their climate goals in ways that further their national development priorities." The White House also announced a Net-Zero Producers Forum; the forum, composed of the United States, Canada, Norway, Qatar, Saudi Arabia, and the UAE, is for developing ideas to reduce energy-related emissions. Also, since COP26, the United States and the UAE have led the Agriculture Innovation Mission for Climate; the coalition of 50 countries supports innovation and research to enhance climate resiliency and reduce emissions from agriculture. In September 2023, at the Africa Climate Summit, the UAE pledged $4.5 billion in clean energy investments in Africa.

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