

Jordan

1. Country overview

The Hashemite Kingdom of Jordan is located in the Middle East, surrounded by Israel, the West Bank, Lebanon, Syria, Iraq and Saudi Arabia. The Dead Sea and the Gulf of Aqaba are the two main water bodies, along with the Yarmouk, Zarqa and Jordan Rivers. The country occupies an area of approximately 88,700 square kilometres (km²) and is divided into 12 governorates. The capital of Jordan is Amman, and the majority of Jordan's population is concentrated in the metropolitan cities located in the north-east of the country. In 2019, around 8.8 per cent of Jordan's 10 million population lived in rural areas (World Bank 2019; World Bank Group n.d.).

Jordan's economy depends mostly on trade and service-related activities, such as mining, manufacturing and construction. Jordan's gross domestic product (GDP) has been steadily rising and was calculated at 43.7 billion US dollars in 2019 (World Bank n.d.).

Jordan ranks 68 out of 181 countries in the Notre Dame Global Adaptation Initiative (ND-GAIN) index. The ND-GAIN index summarizes a country's vulnerability to climate change and other global challenges in combination with readiness to improve resilience. This ranking indicates that Jordan has moderate vulnerability levels, and medium-to-high levels of readiness to adapt to climate change (ND-GAIN n.d.).



Figure 1: Map of Jordan.
Source: CIA gov, 2020

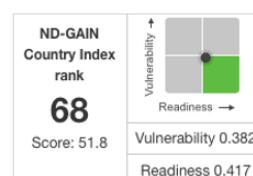


Figure 2: Jordan's ND-GAIN Ranking (ND-GAIN 2021).

1.1 Climate

Jordan can be divided into four physiological zones: the Rift Valley along the western border; the Highlands east of the Rift Valley with mountains and plains; the Plains; and the Badia Desert. The majority of Jordan is arid and houses an extension of the Arabian Desert. The Highlands and Plains can be characterized by hot and dry climatic conditions. The country is known for its cool wet winters and hot dry summers, with two transitional periods in between. The majority of Jordan's precipitation falls in October–May, with 75 per cent of it concentrated in the winter season of December–March. The majority of Jordan's population lives in the north-east because precipitation levels are highest there, providing fertile soils near the rivers. Major hazards include floods, droughts, heatwaves and earthquakes.

1.2 Climate change

Observed changes

Projected changes

Temperature

Historically, the Middle East region has been experiencing rising temperatures since the early 1970s. A rise in annual maximum temperatures of 0.3–1.8°C and a rise in annual minimum temperature of 0.4–2.8°C across all regions has been observed (United States Agency for International Development (USAID) 2017).

Jordan will likely experience a 2°C increase in its average annual temperatures by 2050. By mid-century, most global climate models project that Jordan will experience more frequent heatwaves and fewer frost days (Representative Concentration Pathway (RCP) 8.5 ensemble) (USAID 2017).

An increase in the number of heatwaves has also been recorded, especially in the desert region of Jordan (USAID 2017).

Precipitation

There has been a spike in the number of consecutive dry days across the country, and a decline in rainfall levels of 5–20 per cent (USAID 2017). However, the western highlands and the arid east have recorded an increase in precipitation of 5–10 per cent (USAID 2017).

Jordan will likely experience a decrease in annual precipitation, an increase in drought conditions and an increase in heatwaves. Precipitation projections are highly variable, but indicate an overall decrease of between 10–37 per cent by 2099; however, the intensity of rainfall will likely increase (USAID 2017; Abdulla 2020).

2. Humanitarian sectors and climate change

2.1 Water and habitat

Water scarcity is one of Jordan's greatest impediments, and it will likely only worsen with time as the climate continues to change. Resources are already limited and are far below the water poverty line of 1,000 cubic metres (m³) per capita per year. Projected increases in temperature and changes in precipitation patterns are expected to increase water scarcity (World Health Organization (WHO) 2020). Reduced precipitation levels, and drought in the most severe cases, reduce the replenishment rates of surface- and groundwater systems. In 2005, a WHO and United Nations Environment Programme (UNEP) project determined a direct link between low water consumption and the incidence of diarrhoea. The Jordanian government has prioritized the use of clean water for domestic supply to curb waterborne diseases and illnesses. Despite very limited water resources, in 2006, access to improved drinking water sources reached 98 per cent of the population, and sanitation coverage was up to 85 per cent (Aquastat 2008).

Water scarcity is felt acutely by farmers in Jordan who need water resources for irrigation. Jordan has developed a set of water management practices to partially address the shortages. The Jordanian government has been encouraging communities to reuse treated wastewater for irrigation and livestock needs. When the quantity of water is more than sufficient, it is deposited in wadis and reservoirs. Climate change is likely to increase the need for agricultural use of wastewater (Al-Mashaqbeh *et al.* 2012).

Most of Jordan's water resources are transboundary, requiring careful management. The lower Jordan River Basin in particular – access to it, quantities extracted etc. – is the source of contention, at times resulting in military intervention (Stockholm International Water Institute (SIWI) 2017).

The risk of flash flooding is high in Jordan, with frequent events causing mortality. The risk stems from the country's topography. Mountainous terrain in the Dead Sea area can produce sudden floods in lower caverns frequented by tourists. The 2018 rainy season was especially deadly. A group of local schoolchildren on a trip got caught in a flash flood in the Dead Sea area, which killed 21 people. A few weeks later in the ancient city of Petra, flash flooding occurred after heavy rainfall killing 11 people and requiring 4,000 tourists to be evacuated (BBC 2018).

2.2 Economic Security

Only about 10 per cent of Jordan's land is fertile enough for cultivation, and largely lies in high rainfall areas of the Highlands and the Jordan Rift Valley. High refugee influx and rapid urbanization are forcing development in these areas. Due to this urban expansion, agricultural production is being pushed further towards the Badia Desert in the east and south, which is an area more vulnerable to drought and requires greater irrigation. It is estimated that in

1975–2000 around 88,400 hectares (ha) of productive rainfed agricultural land was developed for settlement (Aquastat 2008). Reduced rainfall and increased temperatures have also forced many rural communities to migrate to the cities (USAID 2017).

Occasionally, half of the rainfed land is left fallow on purpose due to the erratic precipitation patterns that have been observed in recent years. "For instance, the harvested annual crops area was 168,435 ha in 2003 and 76,266 ha in 2004." (Aquastat 2008) Between 2008 and 2016 irrigated land has stayed relatively constant, varying between nine and ten per cent. (World Bank, n.d.)

Rising temperatures and diminishing rainfall levels associated with climate change risk crop losses or even crop failures. Desertification and degradation of arable land could lead to loss of income from an inability to cultivate export-quality crops. Additionally, it is likely that the growing seasons will shorten. As a result, food imports will likely increase, raising the trade deficit further (USAID 2017). Water-intensive crops, such as fresh fruits and animal products, would also be in jeopardy. A study comparing barley and wheat production in Jordan estimates that barely production will be severely impacted by climate change. While wheat scenarios have a broader range, production is also likely to decline given rainfall projections (Al-Bakri *et al.* 2011)

Livestock production represents more than half of all agricultural GDP revenue. Cattle and poultry are reared in the arid Badia region of Jordan. Sheep and goat herds are also tended in the Highlands. Since Badia is so dry, livestock populations usually fluctuate depending on access to water and pastureland. Levels of the dominant fodder for livestock, barley, have fallen significantly due to higher temperatures and rainfall variability. This decline in grazing lands has led to a shortage of feed by as much as 77 per cent, causing import prices to rise, too (USAID 2017). Higher temperatures associated with climate change may increase the incidence of livestock diseases and parasitic infections, such as toxoplasmosis and brucellosis. Livestock, by both volume and value, are the second-largest export. Climate change will adversely affect these vulnerable populations.

2.3 Health

Jordan is at high risk of many climate change-related health impacts. The Ministry of Health has assessed the following as ‘the most visible effects’ of climate change: increase in chronic respiratory diseases such as asthma and chronic obstructive pulmonary disease (COPD); increase in water- and food-borne diseases; increase in vector-borne diseases; diminished nutrition; and heatwaves (in general and for outdoor workers in particular). Based on these risks it has set a priority to: integrate health considerations into adaptation measures; increase knowledge and awareness of climate change impacts on health; and promote proactive preventative measures to reduce health risks, especially with regard to drinking water (Ministry of Environment 2013).

Heatwaves will impact vulnerable populations such as the elderly, children, those with comorbidities, and other marginalized groups. Rising temperatures and lack of proper storage infrastructure will lead to food-borne diseases, such as salmonella and shigella. Waterborne diseases likely to be on the rise are typhoid fever, cholera, hepatitis A and E, giardiasis and bilharzia (United Nations Framework Convention on Climate Change (UNFCCC) 2014).

2.4 Protection

Jordan hosts nearly 694,000 refugees, originating from around the region, with the largest group coming from Syria (United Nations High Commissioner for Refugees (UNHCR) 2019). Displaced people, including internally displaced people (IDPs) and refugees, are often particularly vulnerable to climate extremes. This includes flood events that can quickly destroy the limited infrastructure in camps, as well as heat waves that leave people with few options for cooling and shelter. Flooding is a frequent occurrence at Za’atari refugee camp, housing Syrians escaping the war (Oxfam 2019).

Around the world, people in detention frequently have heightened vulnerability to natural disasters due to: spatial marginalization resulting from prison locations on hazard-prone land and/or isolation from emergency evacuation services; limited to no connections to social networks, which are crucial aspects to hazard resilience; and political marginalization, including lack of policies and services to prevent disaster impacts on imprisoned populations (Gaillard and Navizet 2012). These vulnerabilities, coupled with more frequent and intense disasters due to climate change, may leave prison populations in especially precarious positions to hazards such as extreme heat and floods.

2.5 Policy

The National Climate Change Policy of the Hashemite Kingdom of Jordan was issued by the Ministry of Environment in 2013. This team set up long- and short-term goals related to mitigation, vulnerability and adaptation actions. Jordan’s Ministry of Environment is in the lead; responsible for overseeing all policy and legal frameworks that guide climate change-related adaptation and mitigation efforts. Jordan ratified the Paris Agreement in November 2016. In its Intended Nationally Determined Contribution (INDC), which was published by the UNFCCC in 2016, Jordan commits to a 2030 target to reduce greenhouse gas (GHG) emissions by a bulk of 14 per cent compared to the 2006 base year¹. The conditional target, which is subject to the availability of international funds, is to reduce its GHG emissions by an additional, at least, 12.5 per cent by 2030 (Hashemite Kingdom of Jordan 2016). Jordan vows to unconditionally fulfill a maximum 1.5 per cent cut in GHG emissions by its own means for a business as usual scenario (ClimateWatch 2016).

Jordan’s INDC also prioritizes a number of adaptation actions. The first priority centres on water resource management, especially municipal water supply, wastewater management, irrigation and training programmes. These are with an aim to better manage groundwater supplies, efficiently develop limited surface water and manage water demands. The INDC also prioritizes health sector adaptations, especially focused on “heatwaves; water- and food-borne diseases; vector-borne diseases; air-borne and respiratory diseases; nutrition and food security and occupational health.” The INDC’s agriculture and food security priorities include: improved policies, adaptive cropping strategies, establishing an integrated drought monitoring system, forest restoration, and training programmes. The final area, in addition to one centred on ecosystem issues, is socioeconomic adaptation. This outlines strategies to tailor programmes to specific vulnerable groups and to alleviate poverty. For example, it includes housing programmes, micro-enterprise support, disaster relief funds etc. (Hashemite Kingdom of Jordan 2016).

In 2017, Jordan’s Ministry of Environment also launched the National Adaptation Plan (NAP) process. The key prioritized sectors that have been identified for the NAP process are, similarly, water, health, gender, biodiversity, ecosystems and protected areas, sustainable development oriented socioeconomic adaptation and agriculture . Jordan developed its NAP communication strategy in 2018.

1 <https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Jordan%20First/Jordan%20INDCs%20Final.pdf>

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