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# Reducing the impacts of drought in Jordan

How the MENAdrought project is supporting Jordan to enhance its water and food security



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## Jordan: Key water facts

### Water audit

- Annual per capita water availability is at absolute scarcity level.
- Half the water is lost between abstraction and the tap.

### Causes

- Decades of high groundwater abstraction rates.
- Reliance on upstream nations for freshwater.
- Decaying water infrastructure.
- Influx of refugees from Iraq and Syria.
- Intensifying climate change impacts.

## The causes and impacts of drought in Jordan

Climate disruption is making droughts more likely in the Middle East and North Africa (MENA) region, with related detrimental impacts on water and food security. Jordan is already one of the most water-scarce countries in the world. With an annual per capita water availability of approximately 100 m<sup>3</sup>, the country's freshwater supplies fall considerably below the global benchmark of 'absolute scarcity' established at 500 m<sup>3</sup> of water per capita per year. Exacerbating this situation, transmission losses mean that more than half the water in Jordan's networks does not reach the taps<sup>1</sup>.

The country's current crippling water deficit can be attributed to five main factors that have occurred almost simultaneously: climate change impacts of increasingly limited and variable rainfall, and increasing temperatures/evapotranspiration; decades of high groundwater abstraction rates; heavy reliance on upstream nations for surface freshwater; decaying water conveyance infrastructure; and a rise in the number of refugees arriving from neighboring areas.

Jordan relies on aquifers for two-thirds of its water supplies. However, ten of its 12 groundwater basins are experiencing a deficit at twice the rate of replenishment. This presents many challenges for the development of groundwater resources; as aquifer levels drop, they can become contaminated by seawater infiltration, affecting municipal and agricultural usage. According to the United States Geological Survey's pre-crisis analysis, it is estimated that by 2030, 40% of Jordan's groundwater basins are likely to be severely depleted to levels preventing profitable usage.

Limits to investments in water system infrastructure are also contributing to this situation. Non-revenue water is primarily accounted for by leaks from small pipes and house connections, illegal usage and meter inaccuracies<sup>1</sup>.

According to estimates from the Organisation for Economic Co-operation and Development (OECD) and the World Bank, the population of Jordan increased between 1990 and 2008 by 86%. This has been attributed to the successive waves of regional refugees and the accelerated domestic birth rate. Since 2011, an additional 1.3 million refugees from Syria have settled in Jordan, increasing the challenges faced by the Jordanian government in its public duty of water provision.

In 2016, the government developed Jordan's National Water Strategy (2016 – 2025) with the aim of building a resilient water sector based around comprehensive social, economic, and environmentally viable development. However, droughts are challenging water resources management and planning. For example, in the Mafraq River Basin, poor fodder production and dwindling water supplies during periods of drought are presenting immense challenges to herders, whose animals are getting sick or dying from thirst due to poor water quality. There is little planned proactive management of these events in Jordan, with no official definition for declaring a drought, or a framework in place to trigger actions once a drought begins or ends.

<sup>1</sup> Al-Sheriadeh, M.S.; Amayreh, L.K. 2020. Non-revenue water works in Jordan – Lessons learnt and suggested strategy and workplan. *International Journal of Engineering Research and Technology* 13(8):1968–1973.

## How the MENAdrought project is supporting nations to manage drought

Led by the International Water Management Institute (IWMI), the MENAdrought project aims to empower Jordan, Morocco, and Lebanon with the tools to anticipate, prepare for and mitigate the worst impacts of drought. In Jordan, the project team is working with government officials and partner organizations to support the development of robust drought policy for the country. Specifically, it is working to develop technical monitoring and forecasting capabilities, alongside a drought framework combining institutional planning and a task force to supervise and coordinate the development of drought policy. The work is being conducted at the national level, as well as within three specific key basins: Azraq, Mafraq and Yarmouk.

### Promoting effective drought management within Jordan

The project focus is on strengthening in-country capacity and locally led developments to create an environment where improved drought management can flourish. The aim is to enhance the self-reliance capacities of the nation – so it can effectively manage drought and reduce its impacts – and to support ownership of the drought-management responses with the help of open-source data and software.

The project also aims to catalyze sustainable, enterprise-driven enhancement of drought resilience by focusing on the three pillars of integrated drought risk management.

### Project aims across the MENA region

Spearheaded by IWMI, the MENAdrought project aims to empower decisionmakers and practitioners in Jordan, Lebanon and Morocco with the tools and action plans needed to anticipate, prepare for and mitigate the impacts of drought. With increasing climate disruption, the detrimental effects of droughts on water and food security are having a greater impact on economic sectors and communities across the MENA region. The countries are increasingly prone to unpredictable rainfall, and higher temperatures and evapotranspiration rates. The environmental, economic, political, and social settings, all influence how droughts are managed and experienced within a country. The project seeks to support the three countries to be more self-reliant in managing the impacts of drought on water and food security.

### Three pillars of action for change

#### Pillar 1: Monitoring and early warning systems

IWMI has developed a map-based monitoring system using an enhanced Composite Drought Indicator (eCDI) to detect drought impacts on both irrigated and rain-fed water systems. This is now operational in various ministries and government agencies. In Jordan, during the coming months, the project will establish an early warning rainfall forecasting system to predict the likely onset of drought. This will enhance farmers', water and agricultural managers' and policymakers' resilience and preparedness through forward planning. The mapping and monitoring tools are being put into operation within relevant ministries to create long-term sustainability beyond the project life cycle. They are an important component for developing official drought definitions and determining triggers for the actions of Pillar 3.

#### Pillar 2: Assessments of vulnerability to drought

If policy and planning actions are to be targeted and effective, it is crucial to know which communities, economic sectors, and environments are most impacted by droughts, and why they are



particularly vulnerable. By examining the economic, environmental, and social costs of past droughts in each of the project countries, the resulting insights are then used to inform and orient investments in infrastructure, institutions, and information systems needed for enhanced drought management. To add important detail to this assessment within Jordan, IWMI is conducting case study analyses in critical river basins, with a focus on Azraq, Mafraq and Yarmouk.

### Pillar 3: Mitigation, preparedness and response

Pillar 3 focuses on mitigation, preparedness and response. The findings of Pillars 1 and 2 are the starting points for co-designing policy and planning interventions. The monitoring technology of Pillar 1 provides critical evidence used for triggering actions. And Pillar 2 assessments capture the drivers, vulnerabilities and systemic interlinkages of drought impacts within a country – from which targeted, cost-effective and sustainable mitigation policies and responses can be developed. For mitigation, the focus is on developing water and agricultural technology packages that can help build resilience to drought in the context of the river basins involved. To enhance preparedness, IWMI is working closely with multi-ministerial, interdisciplinary teams from across the Government of Jordan and at various levels – from technical drought monitoring to policy and management planning. This involves working sessions and ‘write shops’ that bring together ideas, experiences and insights from many stakeholders. The insights gained will be used to define the Jordan Drought Action Plan, outlining the actions, roles and responsibilities needed for drought response.

<b>Project</b>	MENAdrought
<b>Participating countries</b>	Jordan, Lebanon, and Morocco
<b>Timeframe</b>	August 2018 – September 2022
<b>Donor</b>	United States Agency for International Development (USAID)
<b>Partners</b>	International Water Management Institute (IWMI); National Drought Mitigation Center, University of Nebraska-Lincoln; Daugherty Water for Food Global Institute, University of Nebraska; Goddard Space Flight Center, National Aeronautics and Space Administration (NASA); and Johns Hopkins University.  <b>National leader:</b> Ministry of Water and Irrigation  <b>National partners:</b> Ministry of Environment; Ministry of Agriculture; Jordan Meteorological Department; Ministry of Health; Department of Statistics; National Agricultural Research Center; National Center for Security and Crisis Management; and the University of Jordan
<b>For more information</b>	Project website: <a href="https://menadrought.iwmi.org/">https://menadrought.iwmi.org/</a>  <b>Contact:</b> Rachael McDonnell, Deputy Director General - Research for Development, IWMI (R.Mcdonnell@cgiar.org)

