MAWRED Knowledge Hub

www.MAWREDH2O.org

Thematic Area: Climate Change Impacts and Management

Purpose: To empower decision-makers to plan for and manage the impacts of droughts on food and water security under current and future climate conditions

Geographic Scope: Middle East and North Africa (Jordan, Lebanon, Tunisia and Morocco)

Timeline: 2009 - present

Partners:

- University of Nebraska - Lincoln (UNL)
- Food and Agriculture Organization (FAO)
- National Aeronautics and Space Administration (NASA)
- National Oceanic and Atmospheric Administration (NOAA)

Funding Agency:

- United States Agency for International Development (USAID)

Project Lead:
Dr. Rachael McDonnell
r.mcdonnell@biosaline.org.ae

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Filling the data gap on the extent, location and severity of droughts is key to managing and mitigating their damaging effects. The Monitoring Agriculture, Water Resources and Drought (MAWRED) knowledge hub harnesses data on water, climate and agricultural crops to generate monthly drought monitoring information for decision-makers across the Middle East and North Africa (MENA) region. This information will help to ensure relief measures are implemented in a focused, effective and resource-efficient way to alleviate the effect of droughts on vulnerable communities and economic sectors. The knowledge hub, the outcome of two USAID-funded projects supporting new data development (MAWRED) and drought management and monitoring (MENA Regional Drought Management Systems), also provides regionally downscaled climate change data so that adaptation to future droughts can be planned.

The devastating impacts of drought add pressure to already water-scarce conditions in the MENA region. Droughts affect water and sanitation systems, and both rainfed and irrigated agricultural lands bringing often dire consequences for people's health and livelihoods. At present there are few monitoring systems in place to alert decision-makers in areas experiencing drought conditions. This means that a country's ability to act early to mitigate and reduce impacts is often limited.

Following the integrated drought management approach of the United Nations, which is based on the three pillars of a) drought monitoring and early warning systems integrated with b) assessments of drought vulnerability and impacts, and c) the development of actions and measures to mitigate and respond to drought risk, the MAWRED knowledge hub provides drought monitoring data, directly supporting one of these pillars for key countries in the MENA region.

By providing drought mapped information readily and freely to public, private and civil society sector organizations both in-country and internationally, the knowledge hub will facilitate management and mitigation planning of drought situations.

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Activities and Outcomes

The knowledge hub provides monthly maps of drought conditions. These maps are generated using data from cutting-edge developments in space-based earth observations, field observations and water, land and crop modeling. The selected data sets indicate drought conditions in an area, such as a below average rainfall over a series of months, low soil moisture, evaporative stress, vegetation stress and higher than normal temperatures. These data sources are combined in a Composite Drought Index (CDI) to show where drought conditions are found at the moment in a country. The CDI has been developed for each country to reflect local drought conditions based on the knowledge and experiences of stakeholders.

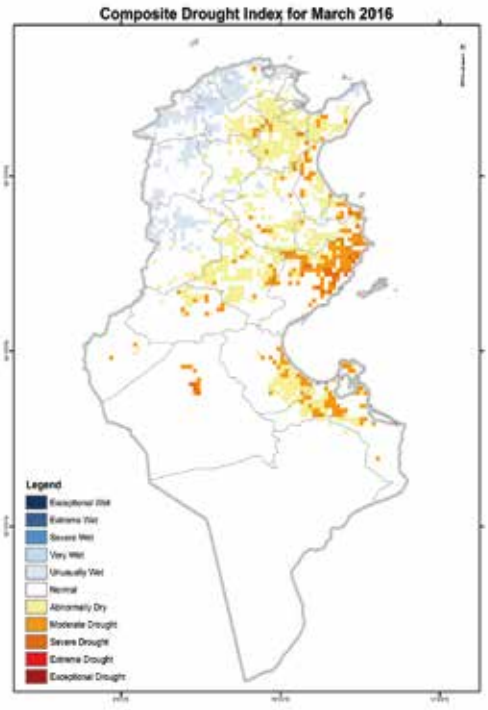
The data provided in the MAWRED knowledge hub is under four main headings:

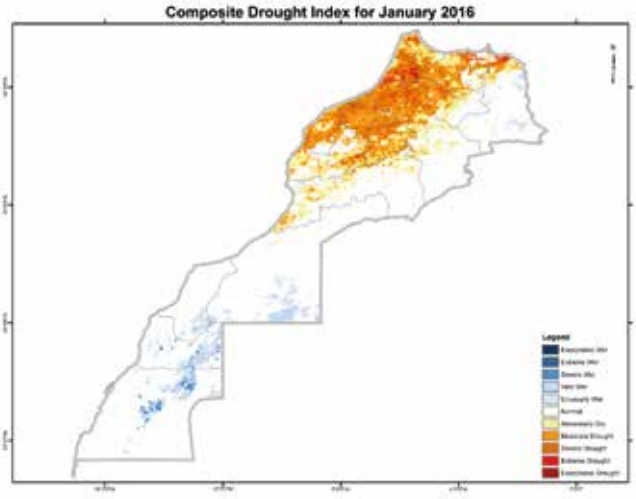
- Drought – current monthly drought conditions generated using a Composite Drought Index (CDI) that uses data on climate, water and vegetation conditions

Supporting data on:

- Climate – The current monthly conditions (anomaly values for precipitation, temperature); historical averages (precipitation, temperature); future conditions (annual temperature and precipitation for 2026-2045 and 2081-2100 for scenarios RCP and 8.5)
- Water – The current monthly conditions (evaporative stress index, water requirements stress index);
- Agriculture – vegetation stress index

Some recently generated drought maps highlight the ability of the combined data to detect droughts in Morocco and Tunisia in early 2016.





The MAWRED knowledge hub also provides data on future climate conditions so that adaptation planning in countries to future droughts can be included in their strategies. Climate change data for the MENA region suggests longer and more severe droughts are likely to occur. This will require considered adaptive thinking if the impacts on water and food security and health are to be countered.

Transferring knowledge and technology to in-country organizations

As part of the program, ICBA scientists are actively involved in training scientists and engineers in national centers across the region on how to transfer the drought monitoring and associated modeling and data generation methods and technologies. The aim is that drought monitoring is established in-country as part of everyday operations and is available to a wider audience through the MAWRED knowledge hub.

The partners in the project are also undertaking capacity development in-country to show how the knowledge hub data can be used in their everyday activities. This helps ensure the data is used effectively in local policy and management work.

Future Directions

The aim is to expand the geographical base of the knowledge hub to include and support more countries. There are also near-future plans to include early warning system data which will highlight likely future conditions. This is more scientifically complex with few current data sources, and is only able to support one to six months of forecasting. However, government agencies, agricultural and water user associations and the private sector have all highlighted the need for early warning system data. There are also plans to expand the data dissemination network to mobile phones. This will help to ensure that more information can be accessed and used in local operations and help in allocation of water and other resources to deal with drought.

International Center for Biosaline Agriculture - ICBA is an international, non-profit organization that aims to strengthen agricultural productivity in marginal and saline environments through identifying, testing and facilitating access to sustainable solutions for food, nutrition and income security.
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