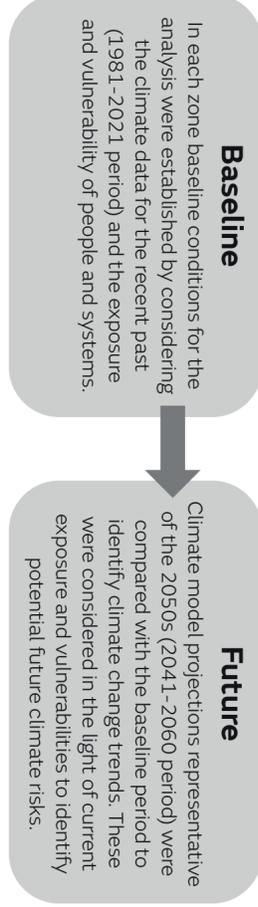


What is climate risk?

Climate risk is a combination of the climate **hazard** and exposure and vulnerability to that hazard. Action to manage risks requires information about the hazard within the context of the **exposure** and **vulnerability** of systems. Therefore climate risk is assessed here through combining climate analysis on the hazard with socio-economic analysis to assess the vulnerability and exposure of human systems to climate change.

Key findings from the climate risk analysis by zone and by sector are shown on the poster overleaf.



Climate analysis: identifying trends and associated risks across zones



- Climate risks by sector**
- Outputs from the zone analysis were brought together to identify climate risks for key sectors, including:
- Water security
 - Health
 - Coasts
 - Food security
 - Cities and infrastructure

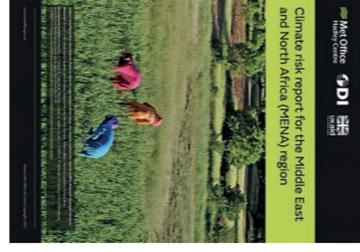
Future

Climate model projections representative of the 2050s (2041-2060 period) were compared with the baseline period to identify climate change trends. These were considered in the light of current exposure and vulnerabilities to identify potential future climate risks.

Baseline

In each zone baseline conditions for the analysis were established by considering the climate data for the recent past (1981-2021 period) and the exposure and vulnerability of people and systems.

- Dividing up the MENA region**
- The MENA region was divided into seven zones, over which the climate data was analysed. The zones were defined primarily as areas of similar climate, but also took into consideration:
- Geography of the region, e.g. coasts, rivers, mountains
 - Where people live
 - Climate sensitive activities e.g. farming systems and livelihoods

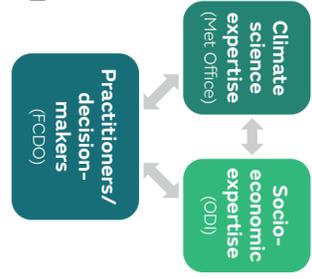


Background

This poster presents findings from the 'Climate risk report for the Middle East and North Africa (MENA) region' produced by Met Office and ODI for the UK's Foreign, Commonwealth & Development Office (FCDO). The report provides an evidence base on the MENA region's current climate, and looks at how this is expected to change by the 2050s. It also identifies how these changes could impact socio-economic development within individual countries. The aim is to inform and support development programming and policy dialogue within the FCDO.

Methodological approach

The report takes an interdisciplinary approach to translating and communicating climate information and risk. The climate information is interpreted through the lens of the socio-economic contexts most relevant to development planners. It combines expertise from the Met Office on climate science with socio-economic analysis of the MENA region provided by ODI. FCDO regional representatives have also provided input to ensure it is both usable and relevant. The interdisciplinary nature of the collaboration ensures that the quantitative climate projections can be interpreted in a way most relevant to development, and presented as a meaningful narrative on climate risk to input into planning.



Climate risk report for the Middle East and North Africa (MENA) region: Background and methods

Future climate trends to the 2050s for zones in the MENA region

<p>Zone 1: North-west Africa and Mediterranean coast</p> <p>Hotter throughout the year, days above 35 °C more frequent</p> <p>Drier on average, but rainfall events may be more intense</p>	<p>Zone 2: Desert regions of North Africa</p> <p>Hotter throughout the year, days above 35 °C more frequent</p> <p>Little change in rainfall as region remains dry</p>	<p>Zone 3: Highlands regions of Iran and Iraq</p> <p>Hotter throughout the year, days above 35 °C more frequent</p> <p>Drier on average, but rainfall events may be more intense</p>	<p>Zone 4: Lowlands of Iran</p> <p>Hotter throughout the year, days above 35 °C more frequent</p> <p>Wetter and drier futures plausible, and rainfall events may be more intense</p>	<p>Zone 5: Arabian Peninsula</p> <p>Hotter throughout the year, days above 40 °C more frequent</p> <p>Little change in rainfall, heavy downpours continue and may be more intense</p>	<p>Zone 6: Turkey</p> <p>Hotter throughout the year, days above 35 °C more frequent</p> <p>Drier on average, but rainfall events may be more intense</p>	<p>Zone 7: The Levant</p> <p>Hotter throughout the year, days above 40 °C more frequent</p> <p>Little change in rainfall, heavy downpours continue and may be more intense</p>
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Acknowledgements

This poster has been created based on the findings of the Climate risk report for the Middle East and North Africa (MENA) region, funded by the MENA Hub in the Research & Evidence Department of the Foreign, Commonwealth & Development Office.

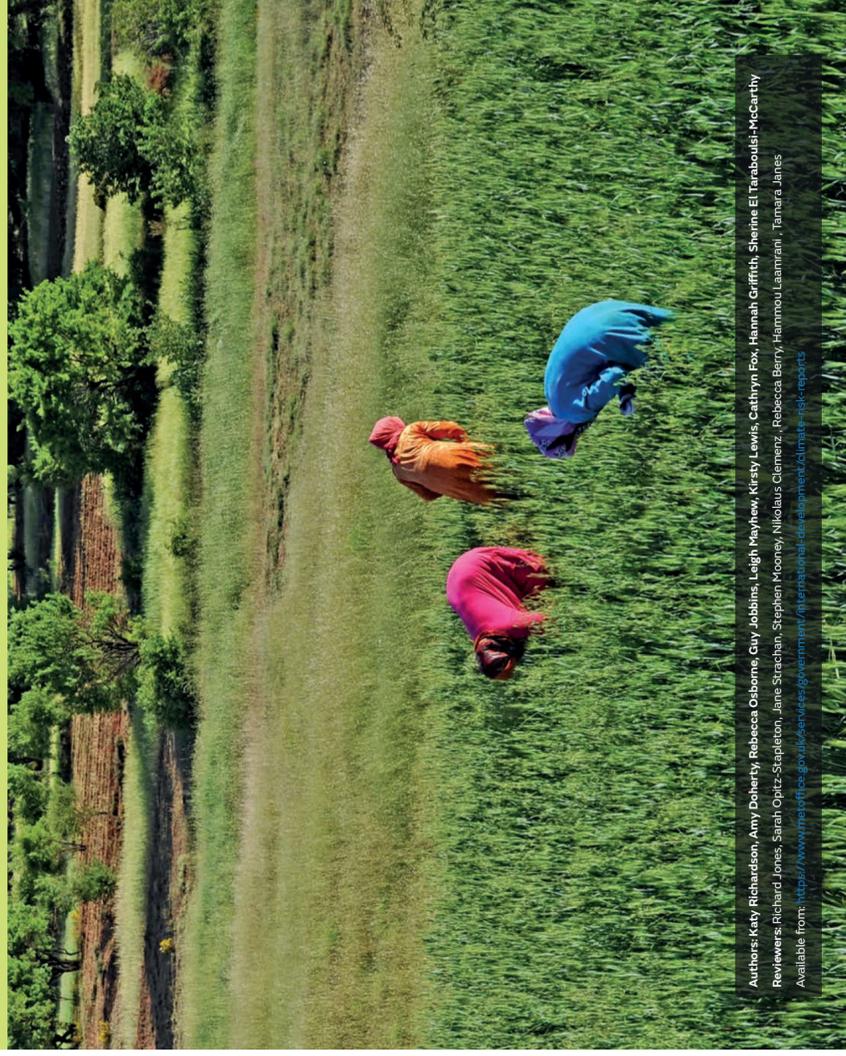
Contributors to the poster: Katy Richardson, Rebecca Osborne, Hannah Griffith, Hayley Jones, Niamh O'Brien (Met Office) and Josie Emanuel (ODI)

Report citation: Katy Richardson, Amy Doherty, Rebecca Osborne, Leigh Mayhew, Guy Jobbins, Kirsty Lewis, Cathryn Fox, Sherine El Taraboulsi-McCarthy (2021). Climate risk report for the Middle East and North Africa (MENA) region. <https://www.metoffice.gov.uk/services/government/international-development/mena-climate-risk-report>



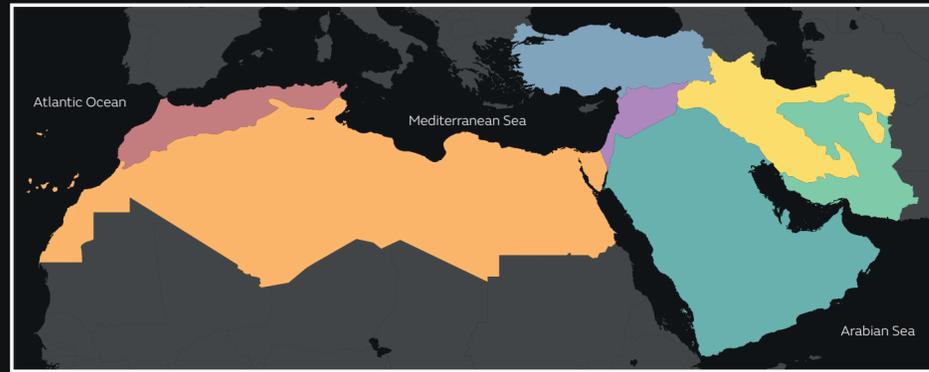
Climate risks in the Middle East and North Africa (MENA) region

A summary of findings from the Climate risk report for the Middle East and North Africa (MENA) region.



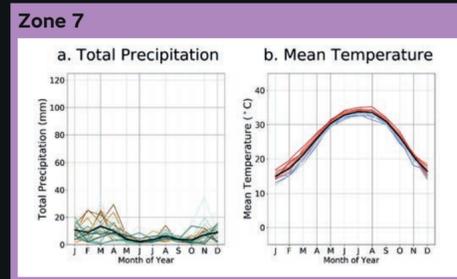
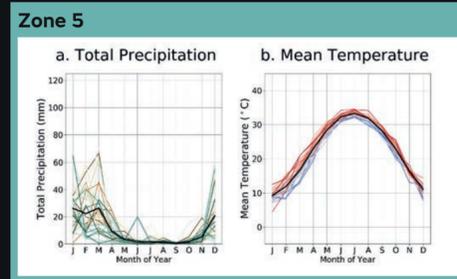
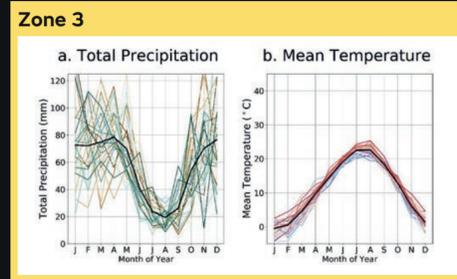
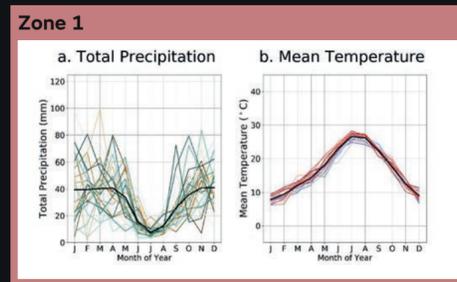
Authors: Katy Richardson, Amy Doherty, Rebecca Osborne, Guy Jobbins, Leigh Mayhew, Kirsty Lewis, Cathryn Fox, Hannah Griffith, Sherine El Taraboulsi-McCarthy
Reviewers: Richard Jones, Sarah Obitz-Stapleton, Jane Strachan, Stephen Mooney, Nikolaus Clemenz, Rebecca Berry, Hammou Laamrani, Tamará Jones
 Available from: <https://www.metoffice.gov.uk/services/government/international-development/climate-risk-reports>

Current climate for zones in the MENA region



- Zone 1:** North-west Africa and Mediterranean coast
- Zone 2:** Desert regions of North Africa
- Zone 3:** Highland regions of Iran and Iraq
- Zone 4:** Lowlands of Iran
- Zone 5:** Arabian Peninsula
- Zone 6:** Turkey
- Zone 7:** The Levant

These graphs show the baseline (a) total monthly precipitation and (b) monthly mean temperature for each MENA zone shown in the map above. The baseline period is from 1981 to 2010, each line represents one year, ordered brown (older years) to blue (most recent years) for precipitation, and blue (older years) to red (most recent years) for temperature. The bold black line indicates the average of the baseline period.



Future climate risks by the 2050s in the MENA region

Food security by 2050s

Shorter growing seasons in many areas, impacting crop yields.

Agricultural production further constrained by limited water, increasing temperatures and availability of suitable land, increasing crop water stress, drought risk and harvest failure.

Greater reliance on food imports, potentially raising food prices and exposure to climate impacts on agricultural production in global breadbaskets.

Water security by 2050s

INCREASING TEMPERATURES

Rising temperatures impact springtime snowmelt which feeds many important rivers, potentially reducing freshwater availability at key times in the growing season.

Increasing temperatures increase human and animal water demand.

Poor water management and degradation of natural water stores, combined with climate change impacts to reduce water supply.

Health by 2050s

Economic impacts associated with rising temperatures and increased heat stress include a reduction in outdoor labour productivity in summer months.

Increased heat stress across the region will disproportionately affect the poorest and most vulnerable, such as the elderly and workers in unregulated employment.

Cities & Infrastructure by 2050s

The current climate in the MENA region is around 1-1.5 °C warmer than pre-industrial times, and there is high confidence of substantial further warming by 2050.

The trends for past and future rainfall change over the MENA region are complex. Projections indicate little overall change in annual rainfall amounts in most areas, and a small decrease in others. This may impact seasonal variability and extreme rainfall events.

50°C

Expanding urban areas increase water demand as rising temperatures and changing rainfall patterns reduce water supply.

Increased energy demand for artificial cooling, as energy generation and distribution is reduced by high temperatures.

URBAN EXPANSION

Coasts by 2050s

Greater risk of coastal flooding, inundation and erosion to coastal areas as sea levels rise and intensity of coastal storms increases.

More frequent and severe extreme heat events will mean, in some regions, temperatures will occasionally exceed human tolerable limits, when it will be life-threatening to be outside for any period of time.

Sea water intrusion with rising sea levels increase salination of agricultural land and groundwater degradation.

SEA LEVEL RISE

Marine life, fisheries and aquaculture further impacted by rising sea temperatures.

INTRUSION

GROUNDWATER

Power, roads and other infrastructure come under stress from extreme heat events, with knock-on economic consequences.