# IRAQ

# HEALTH AND CLIMATE CHANGE
# COUNTRY PROFILE 2021

World Health Organization

United Nations
Framework Convention on
Climate Change

# CONTENTS



## ACKNOWLEDGEMENTS

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# HOW TO USE THIS PROFILE

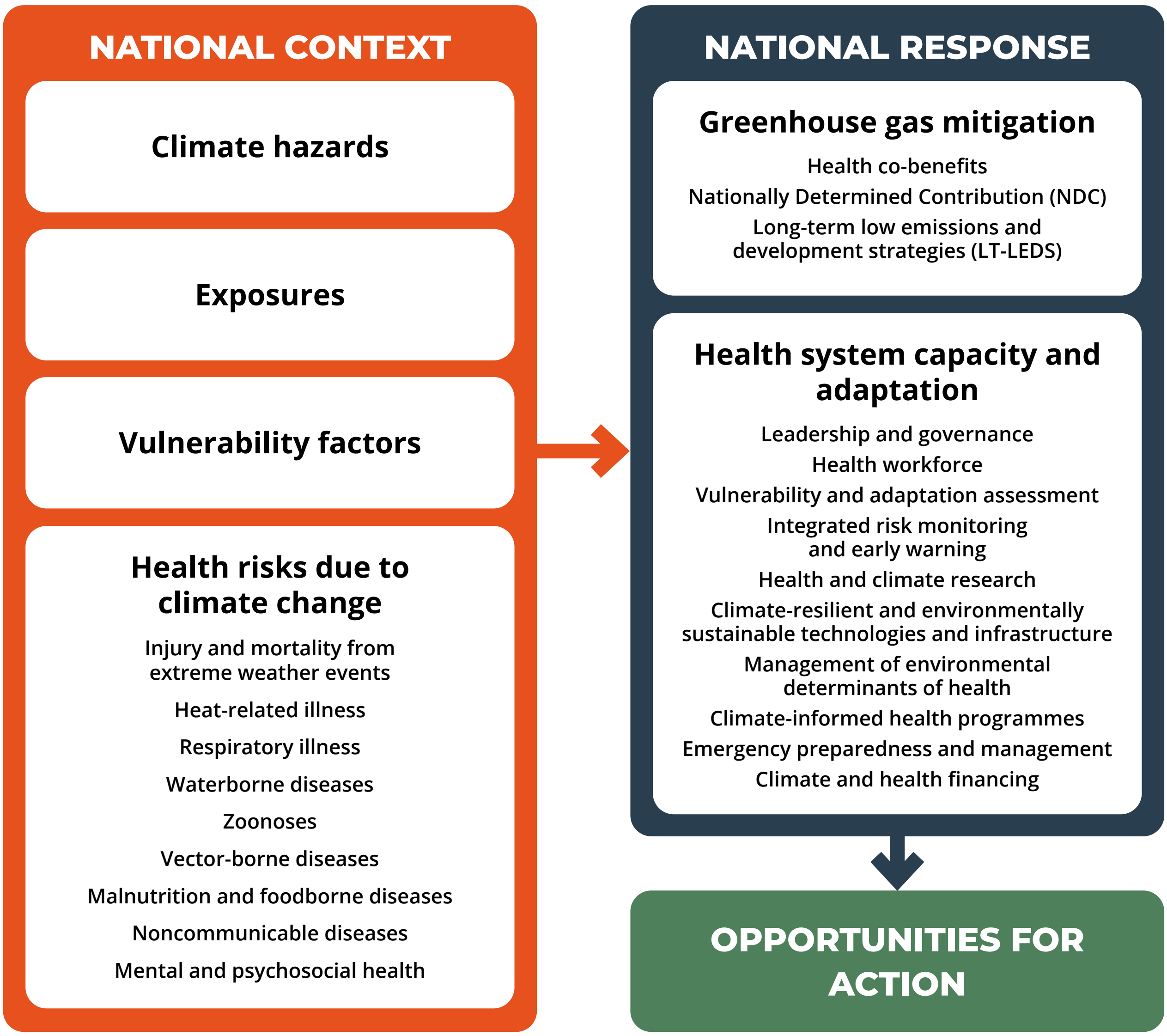
This health and climate change country profile presents a snapshot of country-specific climate hazards, climate-sensitive health risks and potential health benefits of climate change mitigation. The profile is also a key tool in monitoring national health sector response to the risk that climate variability and climate change pose to human health and health systems. By presenting this national evidence, the profile aims to:

- Raise awareness of the health threats of climate change within the health sector, other health-related sectors and among the general public;
- Monitor national health response;
- Support decision-makers to identify opportunities for action;
- Provide links to key WHO resources.

Tools to support the communication of the information presented in this country profile are available. For more information please contact: nevillet@who.int

The diagram below presents the linkages between climate change and health. This profile provides country-specific information following these pathways. **The profile does not necessarily include comprehensive information on all exposures, vulnerability factors or health risks** but rather provides examples based on available evidence and the highest priority climate-sensitive health risks for your country.

## CLIMATE CHANGE AND HEALTH



# COUNTRY BACKGROUND

Located in the East Mediterranean region, Iraq has a land area of about 435 052 km$^2$ and is divided into four main geographical regions: the Mountainous region, the Undulating region, the Desert plateau, and the Sedimentary plain *(1)*. Iraq's economy depends largely on oil, which accounts for around 60% of its national GDP *(2,3).* The Iraqi population has significantly increased in recent decades, with the vast majority living in urban areas, which has led to more informal settlements on the outskirts of cities *(1).*

Iraq's climate varies between Mediterranean, steppe and warm desert climate *(1).* As a country located in the Middle East and North Africa (MENA) region, Iraq is vulnerable to climate change due to its arid and semi-arid conditions *(4)*. Increasing temperatures and changing precipitation patterns have led to recurrent droughts, desertification and more frequent sand storms *(4,5,6).* Moreover, climate change exposes countries of the MENA region to sea level rise, particularly those with deltaic areas (Tigris–Euphrates delta) as in Iraq *(4)*. Such climatic changes pose significant health risks, including heat stress, foodborne diseases, waterborne diseases, respiratory diseases and malnutrition *(1).*

The Nationally Determined Contribution (NDC) of Iraq seeks to mitigate 14% of its greenhouse gas emissions by 2035, compared with their 'business as usual' scenario. Agriculture, water and health are identified as some of the most vulnerable sectors to climate change in the NDC *(7).*

NATIONAL CONTEXT

# CURRENT AND FUTURE CLIMATE HAZARDS

## CLIMATE HAZARD PROJECTIONS FOR IRAQ

Country-specific projections are outlined up to the year 2100 for climate hazards under a 'business as usual' (BAU) high emissions scenario compared to projections under a 'two-degree' scenario with rapidly decreasing global emissions (see Figures 1–5).

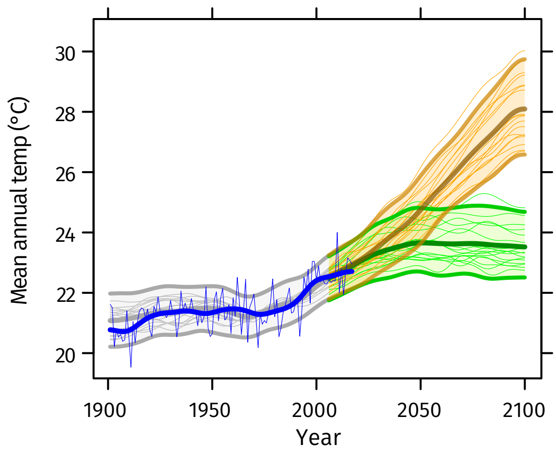
The climate model projections given below present climate hazards under a high emissions scenario, Representative Concentration Pathway 8.5 (RCP8.5 – in orange) and a low emissions scenario (RCP2.6 – in green).[a] The text describes the projected changes averaged across about 20 global climate models (thick line). The figures[b] also show each model individually as well as the 90% model range (shaded) as a measure of uncertainty and the annual and smoothed observed record (in blue).[c] In the following text the present-day baseline refers to the 30-year average for 1981–2010 and the end-of-century refers to the 30-year average for 2071–2100.

Modelling uncertainties associated with the relatively coarse spatial scale of the models compared with that of geographically small countries are not explicitly represented. There are also issues associated with the availability and representativeness of observed data for some locations.

NATIONAL CONTEXT

### Rising temperature

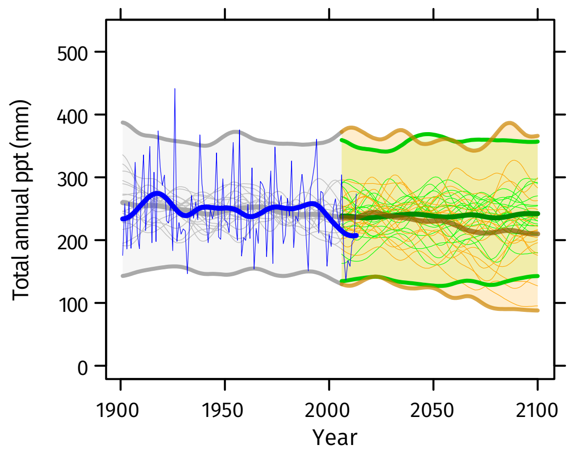
**FIGURE 1:** Mean annual temperature, 1900–2100




Under a high emissions scenario, the mean annual temperature is projected to rise by about 5.4°C on average by the end-of-century (i.e. 2071–2100 compared with 1981–2010). If emissions decrease rapidly, the temperature rise is limited to about 1.6°C.

### Small decrease in total precipitation

**FIGURE 2:** Total annual precipitation, 1900–2100




Total annual precipitation is projected to decrease by about 10% on average under a high emissions scenario, although the uncertainty range is large (-37% to +20%). If emissions decrease rapidly, there is little projected change on average, with an uncertainty range of -10% to +15%.

### NOTES

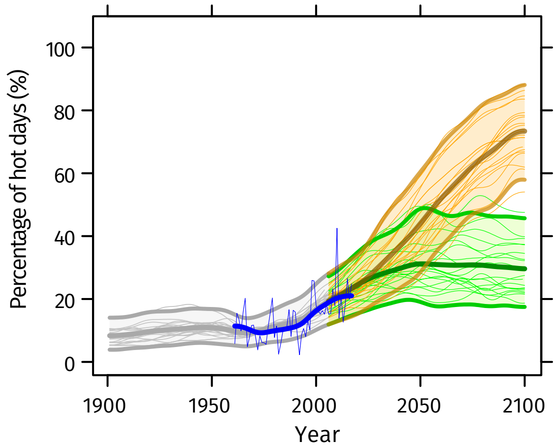
[a] Model projections are from CMIP5 for RCP8.5 (high emissions) and RCP2.6 (low emissions). Model anomalies are added to the historical mean and smoothed.

[b] Observed historical record of mean temperature and total precipitation is from CRU-TSv3.26. Observed historical records of extremes are from JRA55 for temperature and from GPCC-FDD for precipitation.

[c] Analysis by the Climatic Research Unit, University of East Anglia, 2018.

## More high temperature extremes

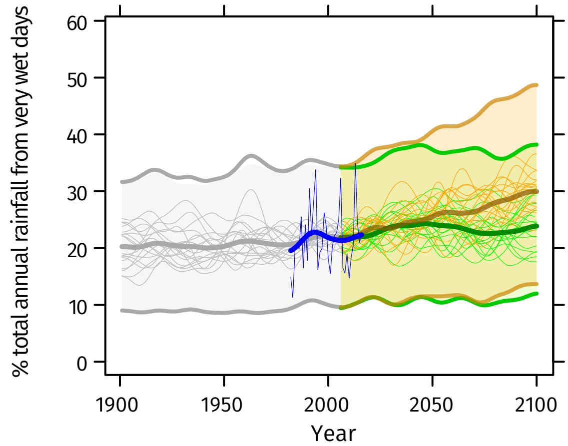
**FIGURE 3:** Percentage of hot days ('heat stress'), 1900–2100




The percentage of hot days[d] is projected to increase substantially from about 15% of all days on average in 1981–2010 (10% in 1961–1990). Under a high emissions scenario, about 70% of days on average are defined as 'hot' by the end-of-century. If emissions decrease rapidly, about 30% of days on average are 'hot'. Similar increases are seen in hot nights[d] (not shown).

## Increase in extreme rainfall

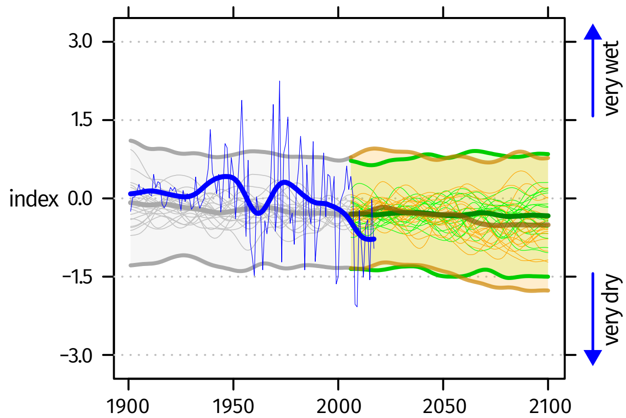
**FIGURE 4:** Contribution of very wet days ('extreme rainfall' and 'flood risk') to total annual rainfall, 1900–2100




Under a high emissions scenario, the proportion of total annual rainfall from very wet days[e] (about 20% for 1981–2010) could increase by the end-of-century (to almost 30% on average with an uncertainty range of about 10% to 45%), with little change if emissions decrease rapidly. These projected changes are accompanied by a small decrease in total annual rainfall under a high emissions scenario (see Figure 2).

## Drought frequency and intensity

**FIGURE 5:** Standardized Precipitation Index ('drought'), 1900–2100




The Standardized Precipitation Index (SPI) is a widely used drought index which expresses rainfall deficits/excesses over timescales ranging from 1 to 36 months (here 12 months, i.e. SPI12).[f] It shows how at the same time extremely dry and extremely wet conditions, relative to the average local conditions, change in frequency and/or intensity.

Under a high emissions scenario, SPI12 values are projected to decrease from about -0.2 to -0.5 on average by the end-of-century (2071–2100) indicating an increase in the frequency and/or intensity of dry episodes and an increase in the frequency and/or intensity of drought events. Year-to-year variability remains large with wet episodes continuing to occur into the future.[f]

[d] A 'hot day' ('hot night') is a day when maximum (minimum) temperature exceeds the 90th percentile threshold for that time of the year.

[e] The proportion (%) of annual rainfall totals that falls during very wet days, defined as days that are at least as wet as the historically 5% wettest of all days.

[f] SPI is unitless but can be used to categorize different severities of drought (wet): above +2.0 extremely wet; +2.0 to +1.5 severely wet; +1.5 to +1.0 moderately wet; +1.0 to +0.5 slightly wet; +0.5 to -0.5 near normal conditions; -0.5 to -1.0 slight drought; -1.0 to -1.5 moderate drought; -1.5 to -2.0 severe drought; below -2.0 extreme drought.

# HEALTH RISKS DUE TO CLIMATE CHANGE
# HEAT STRESS



## CLIMATE HAZARDS[a]

Up to 5.4°C mean annual temperature rise by the end-of-century.

About 70% of days could be 'hot days' by the end-of-century.

## EXPOSURES

Population exposure to heat stress is likely to rise in the future, due to increased urbanization (and the associated urban heat island effect) and climate change increasing the likelihood of severe heat waves (periods of prolonged heat).

## EXAMPLE VULNERABILITY FACTORS[b]

- Age (e.g. the elderly and children)
- Biological factors and health status
- Geographical factors (e.g. urbanization)
- Socioeconomic factors (e.g. occupation and poverty)

## HEALTH RISKS[c]

**FIGURE 6:** Heat-related death in elderly people (65+ years), by high and low emission scenarios[d]
Source: Honda et al. (2015) *(8)*