

IRAQ



HEALTH AND CLIMATE CHANGE **COUNTRY PROFILE 2021**



United Nations
Framework Convention on
Climate Change

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HOW TO USE THIS PROFILE

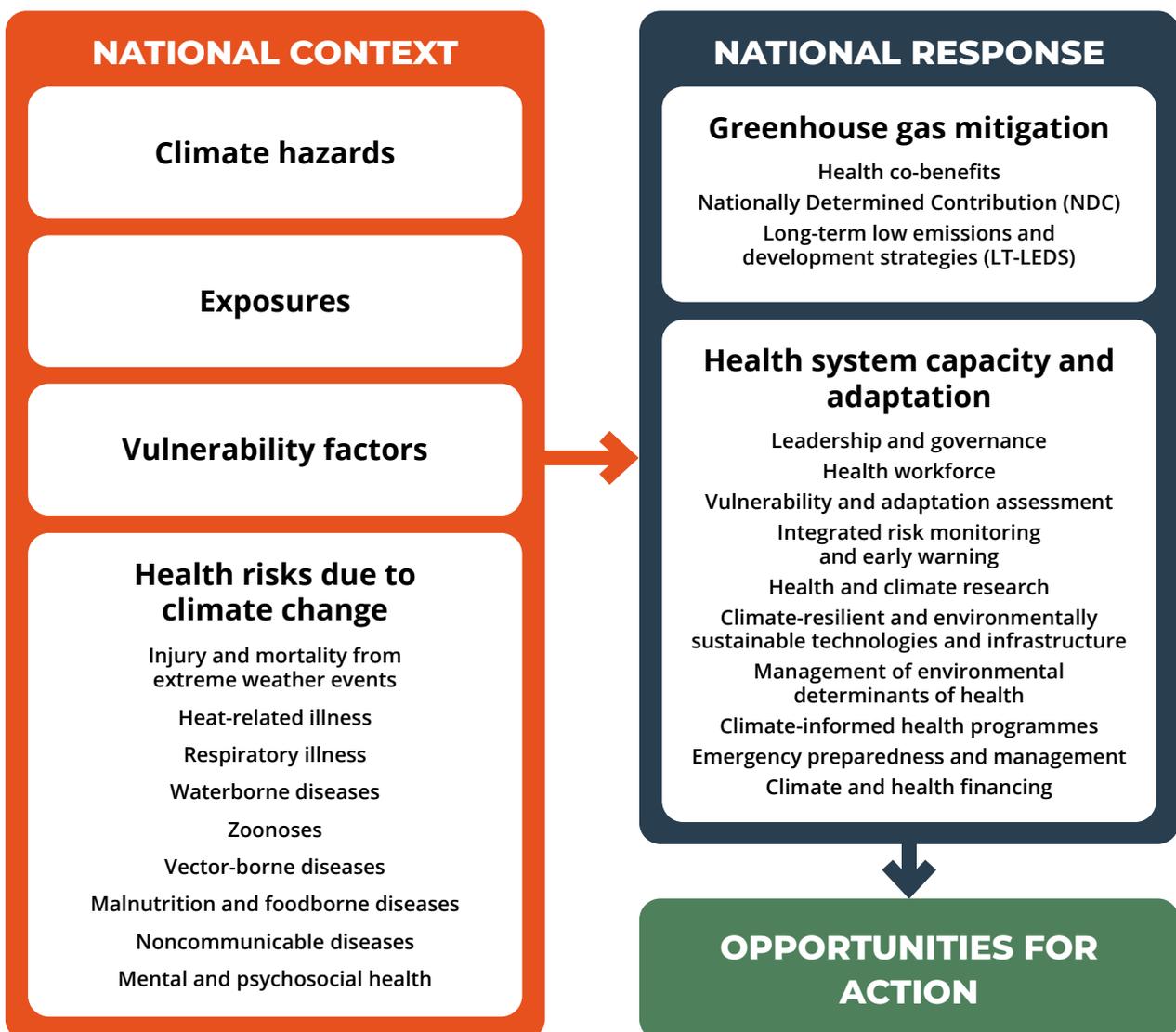
This health and climate change country profile presents a snapshot of country-specific climate hazards, climate-sensitive health risks and potential health benefits of climate change mitigation. The profile is also a key tool in monitoring national health sector response to the risk that climate variability 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 km² 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).



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).

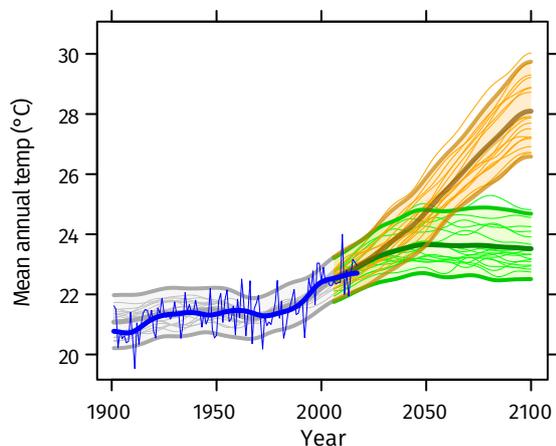
The climate model projections given below present climate hazards under a high emissions scenario, Representative Concentration Pathway 8.5 (RCP8.5 – in orange) and a low emissions scenario (RCP2.6 – in green).^a The text describes the projected changes averaged across about 20 global climate models (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.



Rising temperature

FIGURE 1: Mean annual temperature, 1900–2100

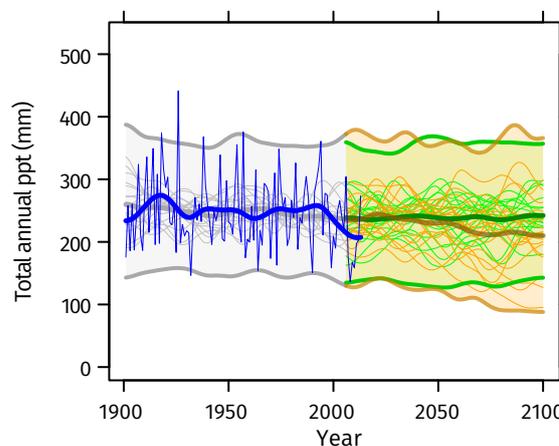


Under a high emissions scenario, the mean annual temperature is projected to rise by about 5.4°C on average by the end-of-century (i.e. 2071–2100 compared with 1981–2010). If emissions decrease rapidly, the temperature rise is limited to about 1.6°C.



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.

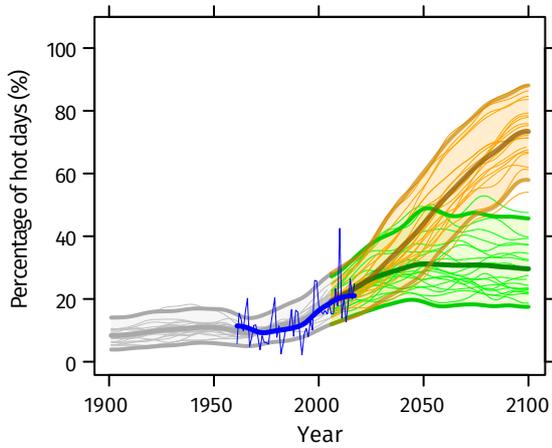
^b Observed historical record of mean temperature and total precipitation is from CRU-TSv3.26. Observed historical records of extremes are from JRA55 for temperature and from GPCP-FDD for precipitation.

^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

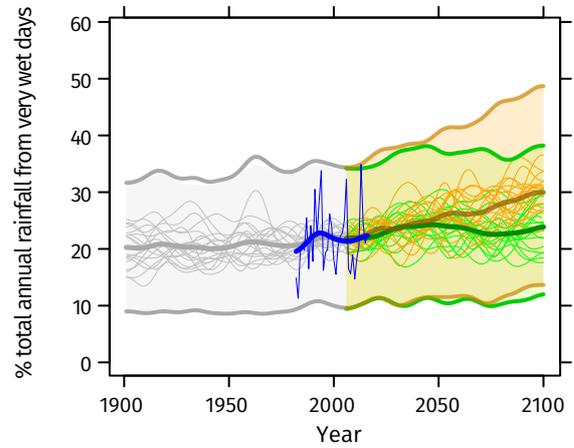


The percentage of hot days^d is projected to increase substantially from about 15% of all days on average in 1981–2010 (10% in 1961–1990). Under a high emissions scenario, about 70% of days on average are defined as 'hot' by the end-of-century. If emissions decrease rapidly, about 30% of days on average 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).

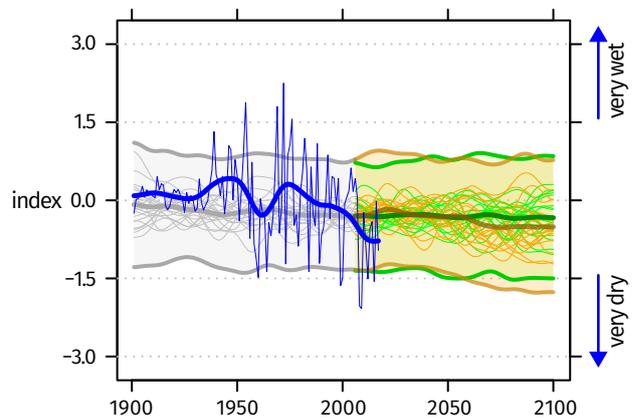


Drought frequency and intensity

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



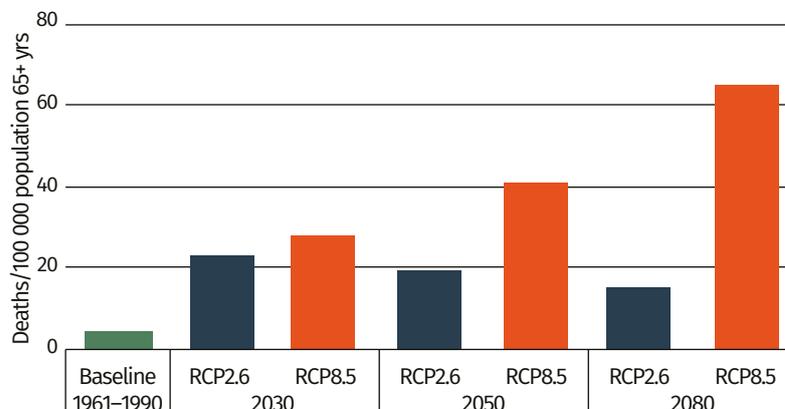
Geographical factors (e.g. urbanization)



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)



The health risks of heat stress include heat-related illnesses such as dehydration, rash, cramps, heatstroke, heat exhaustion and death.

Baseline (1961–1990) heat-related deaths among the elderly (65+ years) are around 4 deaths per 100 000 population. Under a high emissions scenario (RCP8.5), heat-related deaths among the elderly (65+ years) are projected to rise to about 64 per 100 000 by 2080. A rapid reduction in emissions (RCP2.6) could significantly reduce deaths among the elderly in 2080 to around 14 per 100 000 population (8).

^a For details see "Current and future climate hazards".

^b These vulnerability factors are not comprehensive but rather examples of relevant vulnerability factors. Please see the WHO Quality Criteria for Health National Adaptation Plans for more details: <https://www.who.int/publications/i/item/quality-criteria-health-national-adaptation-plans>.

^c See "National health response: health system capacity and adaptation" for the national response to heat stress.

^d Country-level analysis, completed by Honda et al. (2015), was based on health models outlined in the "Quantitative risk assessment of the effects of climate change on selected causes of death, 2030s and 2050s". Geneva: World Health Organization, 2014. The mean of impact estimates for three global climate models are presented. Models assume continued socioeconomic trends (SSP2 or comparable).

FOOD SAFETY AND SECURITY

CLIMATE HAZARDS^a

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

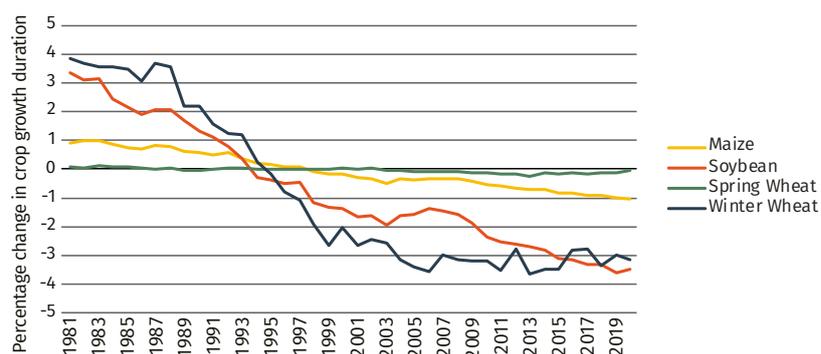
 About 70% of days could be 'hot days' by the end-of-century.

 Total annual precipitation could decrease by about 10% by the end-of-century.

 Large year-to-year variability in drought conditions.

EXPOSURES

FIGURE 7: Percentage change in crop growth duration in Iraq in 1981–2020, relative to the 1981–2010 average, expressed as the running mean over 11 years (5 years before and 5 years after) (9,10)



Reliable food resources are essential to good health. Climate change significantly increases exposure to changes in the safety and sustainability of food systems, directly through its effects on agriculture and indirectly by contributing to underlying risk factors such as water insecurity, dependency on imported foods, urbanization and migration, and health service disruption.

EXAMPLE VULNERABILITY FACTORS^b



Age (e.g. the elderly and children)



Biological factors and health status (e.g. pregnant women)



Environmental factors (e.g. loss of biodiversity)



Gender and equity



Socioeconomic factors

HEALTH RISKS^c

Food security is an ongoing concern in Iraq; it is estimated that approximately 1.77 million people in Iraq are susceptible to food insecurity (11). Agricultural productivity is limited in Iraq, with farmers lacking the supplies and resources they need (12). Conflict and lack of income have resulted in the internal displacement of around 1.44 million people, which has put further burdens on the agricultural sector and increased pressures on hosting communities (11,12). Nutritional concerns go hand-in-hand with food security concerns in Iraq. For example, the poorest populations who rely on government food rations are unable to supplement these rations with fresh, nutritious food and so are at increased risk of health burdens associated with malnutrition (12). Climate change is likely to exacerbate these existing challenges, with crop productivity threatened by weather extremes, rising temperatures and changing precipitation patterns (3).

^a For details see "Current and future climate hazards".

^b These vulnerability factors are not comprehensive but rather examples of relevant vulnerability factors. Please see the WHO Quality Criteria for Health National Adaptation Plans for more details: <https://www.who.int/publications/i/item/quality-criteria-health-national-adaptation-plans>.

^c See "National health response: health system capacity and adaptation" for the national response to food safety and security.

WATER QUANTITY AND QUALITY

CLIMATE HAZARDS^a

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

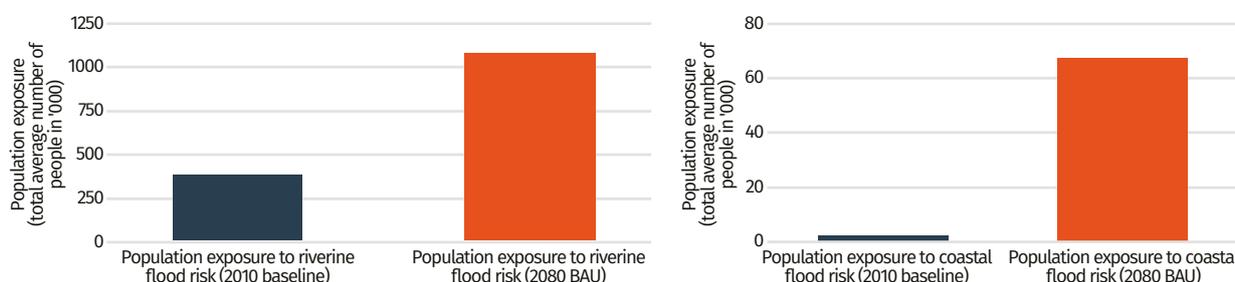
 Annual rainfall from very wet days could increase by the end-of-century.

 Total annual precipitation could decrease by about 10% by the end-of-century.

 Large year-to-year variability in drought conditions.

EXPOSURES

FIGURE 8: Change in population exposure to riverine and coastal flooding in Iraq from 2010 (baseline) to 2080 (under a BAU scenario)^b (13)



Climate change increases the intensity and frequency of extreme weather events including drought and floods. Rising sea levels can lead to storm surges, coastal erosion, saltwater intrusion of groundwater aquifers and ecosystem disruption. These events can lead to population displacement and affect water and sanitation infrastructure and services, contaminate water with faecal bacteria (e.g. *E. coli*, salmonella) from run-off or sewer overflow. Increasing temperatures and precipitation can also lead to water contaminated with *Vibrio* bacteria or algae blooms.

EXAMPLE VULNERABILITY FACTORS^c



Access to clean and safe water and sanitation services



People living near flood and drought zones



Socioeconomic factors



Gender and equity

HEALTH RISKS^d

Iraq is vulnerable to water insecurity, with salinity, desertification and river flow fluctuations sometimes restricting water availability. Human influence has also reduced water availability, notably due to climate change, population growth, and loss of infrastructure due to conflict. Besides the quantity of water available the quality of water is also of concern. Water treatment and sanitation services are generally low across Iraq, particularly in rural areas. Thus, the risk of waterborne disease is relatively high (14). All of these challenges will likely be worsened by climate change.

^a For details see "Current and future climate hazards".

^b This analysis, conducted by Aqueduct, shows projections for changing population exposure to riverine and coastal flood risk under a BAU scenario, which reflects RCP8.5 and SSP2. SSP2 is the socioeconomic pathway representing "middle of the road", whereby global social, economic and technological trends do not shift significantly from historical patterns.

^c These vulnerability factors are not comprehensive but rather examples of relevant vulnerability factors. Please see the WHO Quality Criteria for Health National Adaptation Plans for more details: <https://www.who.int/publications/i/item/quality-criteria-health-national-adaptation-plans>.

^d See "National health response: health system capacity and adaptation" for the national response to water quantity and quality.

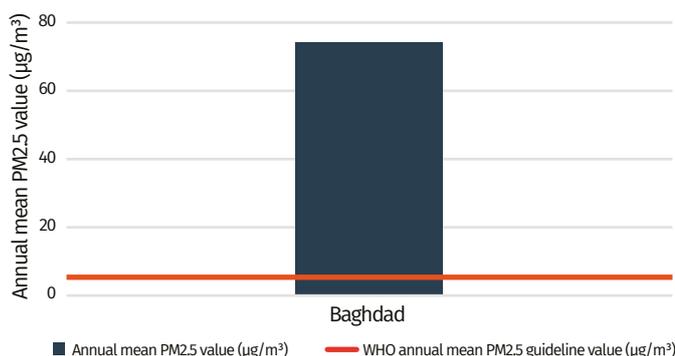
HEALTH RISKS DUE TO AIR POLLUTION

Many of the drivers of climate change, such as inefficient and polluting forms of energy and transport systems, also contribute to air pollution. Air pollution is now one of the largest global health risks, causing approximately seven million deaths every year. There is an important opportunity to promote policies that both protect the climate at a global level, and also have large and immediate health benefits at a local level.

EXPOSURES

Data have been reported only for one city in Iraq (Baghdad), which had annual mean PM_{2.5}^a levels above the WHO guideline value of 5 µg/m³ (see Figure 9) (15).

FIGURE 9: Annual mean PM_{2.5} in Baghdad compared with the WHO guideline value of PM_{2.5} of 5 µg/m³. Source: Ambient Air Pollution Database, WHO, 2018. A standard conversion has been used, see source for further details (15)



EXAMPLE VULNERABILITY FACTORS^b



Age
(e.g. the elderly and children)



Biological factors and health status
(e.g. pre-existing conditions)



Gender and equity



Geographical factors
(e.g. rural/urban areas)



Socioeconomic factors
(e.g. poverty)

HEALTH RISKS^c

Ambient air pollution can have direct and sometimes severe consequences for health. Fine particles, which penetrate deep into the respiratory tract, subsequently increase mortality from respiratory infections, lung cancer and cardiovascular disease. Sand and dust storms have severe impacts on human health, by increasing particulate matter and carrying harmful substances and pathogens, all of which contribute to air pollution and associated respiratory problems. Furthermore, sand and dust storms increase desertification, drought and soil salinity, as well as decreasing water resources. This has severe implications for people's livelihoods as well as their health, with agricultural land being particularly badly affected. Indeed, farmland can be made unusable by sand and dust storms, with such events sometimes stripping away the fertile layer of soil agriculture is dependent upon. There has been an observed increase in the frequency and severity of sand and dust storms globally. This is expected to worsen with climate change and be further exacerbated by drought, land degradation, and unsustainable land and water management (18).

12 575

deaths from ambient air pollution in Iraq in 2016 (16)^d

742

deaths from household air pollution in Iraq in 2016 (17)^d

^a PM_{2.5} is atmospheric particulate matter (PM) with a diameter of <2.5 µm.

^b These vulnerability factors are not comprehensive but rather examples of relevant vulnerability factors. Please see the WHO Quality Criteria for Health National Adaptation Plans for more details: <https://www.who.int/publications/i/item/quality-criteria-health-national-adaptation-plans>.

^c See "National health response: health system capacity and adaptation" for the national response to air pollution.

^d Some ambient and household air pollution deaths may overlap.

HEALTH CO-BENEFITS FROM CLIMATE CHANGE MITIGATION

Health co-benefits are local, national and international measures with the potential to simultaneously yield large, immediate public health benefits and reduce greenhouse gas emissions.

GLOBAL EXAMPLES

TRANSPORT

A shift towards active transportation and sustainable public transport systems could see reductions in greenhouse gas emissions; decreases in illnesses related to physical inactivity, reduced outdoor air pollution and noise exposure. Compact urban planning can also improve health equity by making urban services more accessible to the elderly and poor.



ENERGY

The health benefits of transitioning from polluting fuels, such as coal, to lower carbon sources and renewables are clear: reduced rates of cardiovascular and respiratory diseases; cost-savings for health systems; improved health equity where populations are disproportionately affected by household or ambient air pollution; and improved economic productivity from a healthier and more productive workforce.



FOOD AND AGRICULTURE

Food systems emissions constitute a significant proportion of total global greenhouse gas emissions. Interventions to build sustainable and secure food systems can have significant public health benefits, by addressing malnutrition associated with food and nutrition insecurity while reducing diet-related noncommunicable diseases (NCDs).

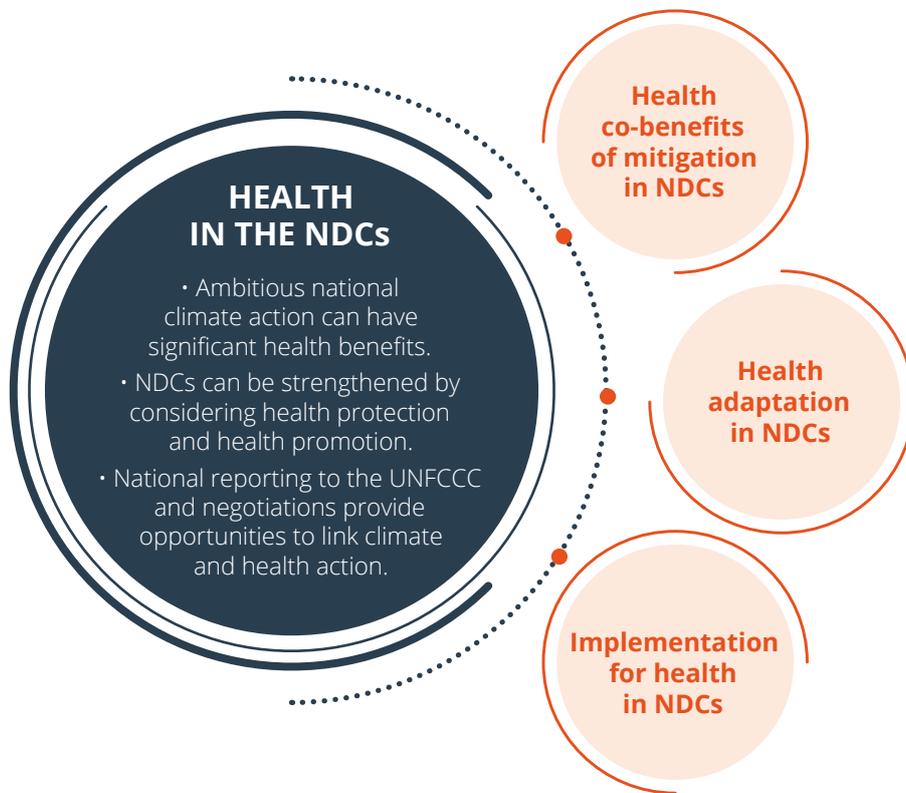


HEALTH CARE SYSTEMS

Health care activities are an important source of greenhouse gas emissions. Major sources include procurement and inefficient energy consumption. Low-carbon and efficient energy solutions can lower the health sector's carbon footprint while improving the quality and reliability of energy services in many settings.



HEALTH IN THE NATIONALLY DETERMINED CONTRIBUTION (NDC)



Total 1997 emissions

72.66 Mt CO₂ equivalent (19)



NDC target

Reduce greenhouse gas emissions by 14% by 2035, compared with the projected BAU scenario (7)

Iraq's NDC includes health adaptation measures such as the implementation of disease surveillance and control systems, which involve the provision of potable water and the monitoring of infectious diseases (7).

NATIONAL HEALTH RESPONSE: HEALTH SYSTEM CAPACITY AND ADAPTATION

The following section measures progress in the health sector in responding to climate threats based on country reported data collected in the WHO Health and Climate Change Global Survey (20).

GOVERNANCE AND LEADERSHIP

National planning for health and climate change

Has a national health and climate change strategy or plan been developed? ^a	Under development
Title: N/A	
Year: N/A	
Content	
Are health adaptation priorities identified in the strategy/plan?	<input type="radio"/>
Are the health co-benefits of mitigation action considered in the strategy/plan?	<input type="radio"/>
Have performance indicators been identified?	<input type="radio"/>
Level of implementation of the strategy/plan	<input type="radio"/>
Portion of estimated costs to implement the strategy/plan covered in the health budget	<input type="radio"/>

yes
 no
 unknown / not applicable

Intersectoral collaboration to address climate change

Is there an agreement in place between the ministry of health and this sector which defines specific roles and responsibilities in relation to links between health and climate change policy?

Sector ^b	Agreement in place
 Transportation	<input checked="" type="radio"/>
 Electricity generation	<input checked="" type="radio"/>
 Household energy	<input checked="" type="radio"/>
 Agriculture	<input checked="" type="radio"/>
 Social services	<input checked="" type="radio"/>
 Water, sanitation and waste-water management	<input checked="" type="radio"/>

yes
 no
 unknown / not applicable

^a In this context, a national strategy or plan is a broad term that includes national health and climate strategies as well as the health component of national adaptation plans (HNAPs).

^b Specific roles and responsibilities between the national health authority and the sector indicated are defined in the agreement.

EVIDENCE AND IMPLEMENTATION

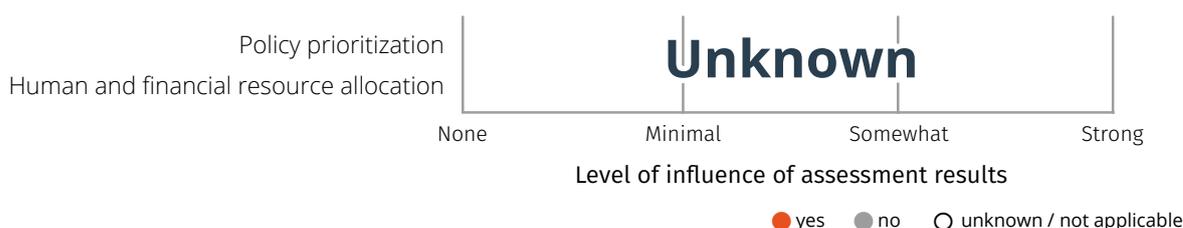
Vulnerability and adaptation assessment for health

Has an assessment of health vulnerability and impacts of climate change been conducted at the national level?

Title: N/A
Year: 2010



Have the results of the assessment been used for policy prioritization or the allocation of human and financial resources to address the health risks of climate change?



Integrated risk monitoring and early warning

Climate-sensitive diseases and health outcomes	Monitoring system in place ^a	Monitoring system includes meteorological information ^b	Early warning and prevention strategies in place to reach affected population
Thermal stress (e.g. heat waves)	●	○	○
Vector-borne diseases	●	○	○
Foodborne diseases	●	●	○
Waterborne diseases	●	●	○
Nutrition (e.g. malnutrition associated with extreme climatic events)	●	○	○
Injuries (e.g. physical injuries or drowning in extreme weather events)	●	○	●
Mental health and well-being	●	○	●
Airborne and respiratory diseases	●	●	●

● yes ● no ○ unknown / not applicable

^a A positive response indicates that the monitoring system is in place, it will identify changing health risks or impacts AND it will trigger early action.

^b Meteorological information refers to either short-term weather information, seasonal climate information or long-term climate information.

Emergency preparedness

Climate hazard	Early warning system in place	Health sector response plan in place	Health sector response plan includes meteorological information
 Heat waves	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
 Storms (e.g. hurricanes, monsoons, typhoons)	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
 Flooding	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
 Drought	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
 Air quality (e.g. particulate matter, ozone levels)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
 Sand/dust storms	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

yes no unknown / not applicable

CAPACITY, INFRASTRUCTURE AND SUSTAINABILITY

Human resource capacity

	International Health Regulations (IHR) Monitoring Framework Human Resources Core Capacity (2018) (21)	100%
	Does your human resource capacity, as measured through the IHR, adequately consider the human resource requirements to respond to climate-related events?	Partially
	Is there a national curriculum developed to train health personnel on the health impacts of climate change?	<input type="radio"/>

yes no unknown / not applicable

Health care facilities, infrastructure and technology

	Has there been an assessment of the climate resilience of any public health care facilities?	<input checked="" type="radio"/>
	Have measures been taken to increase the climate resilience of health infrastructure and technology?	<input type="radio"/>
	Is there a national initiative/programme in place to promote the use of low-carbon, energy-efficient, sustainable technologies in the health sector?	<input type="radio"/>

yes no unknown / not applicable

OPPORTUNITIES FOR ACTION



1. DEVELOP A HEALTH NATIONAL ADAPTATION PLAN (HNAP) FOR IRAQ

Iraq is developing a national health and climate change plan/strategy. Develop an HNAP, led by the Ministry of Health, as part of the National Adaptation Plan (NAP) process of the United Nations Framework Convention on Climate Change (UNFCCC). The HNAP is an integrated part of the overall climate change process and can support the mobilization of resources and prioritization of health and climate change policies. See “WHO resources for action” for further details.



2. STRENGTHEN MULTISECTORAL COLLABORATION ON HEALTH AND CLIMATE CHANGE

There are no multisectoral agreements in place on climate change and health. Enhance collaboration between health and health-determining sectors with agreements on climate change and health action (e.g. with transport, energy, water and sanitation, national meteorological and hydrological services sectors, etc.). Promote climate mitigation and adaptation policies that protect and promote health and strengthen health systems.



3. STRENGTHEN INTEGRATED RISK SURVEILLANCE AND HEALTH EARLY WARNING SYSTEMS

Strengthen the use of meteorological information to inform risk surveillance of all climate-sensitive diseases. The use of climate/weather information can be integrated into health surveillance systems and used to predict outbreaks of climate-sensitive diseases (i.e. climate-informed health early warning systems) to help ensure a preventive approach to specific climate-sensitive health programmes.



4. BUILD CLIMATE-RESILIENT AND ENVIRONMENTALLY SUSTAINABLE HEALTH CARE FACILITIES

Measures can be taken to prevent the potentially devastating impacts of climate change on health care facilities and health service provision while decreasing the climate and environmental footprint of health care facilities. A commitment towards climate-resilient, environmentally sustainable health care facilities can improve system stability, promote a healing environment and mitigate climate change impacts.

WHO RESOURCES FOR ACTION

-  **Operational framework for building climate-resilient health systems**
<https://www.who.int/publications/i/item/operational-framework-for-building-climate-resilient-health-systems>
-  **WHO guidance to protect health from climate change through health adaptation planning**
<https://www.who.int/publications/i/item/who-guidance-to-protect-health-from-climate-change-through-health-adaptation-planning>
-  **Quality Criteria for Health National Adaptation Plans**
<https://www.who.int/publications/i/item/quality-criteria-health-national-adaptation-plans>
-  **Protecting health from climate change: vulnerability and adaptation assessment**
<https://www.who.int/publications/i/item/protecting-health-from-climate-change-vulnerability-and-adaptation-assessment>
-  **Integrated risk surveillance and health early warning systems**
<https://www.who.int/activities/supporting-countries-to-protect-human-health-from-climate-change/surveillance-and-early-warning>
-  **WHO guidance for climate-resilient and environmentally sustainable health care facilities**
<https://www.who.int/publications/i/item/9789240012226>
-  **Heat early warning systems guidance**
<https://www.who.int/publications/i/item/heatwaves-and-health-guidance-on-warning-system-development>
-  **Climate services for health fundamentals and case studies**
<https://public.wmo.int/en/resources/library/climate-services-health-case-studies>
-  **Climate-resilient water safety plans**
<https://www.who.int/publications/i/item/9789241512794>

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