LEBANON

HEALTH AND CLIMATE CHANGE
COUNTRY PROFILE 2021

World Health Organization

United Nations
Framework Convention on
Climate Change

CONTENTS

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HOW TO USE THIS PROFILE

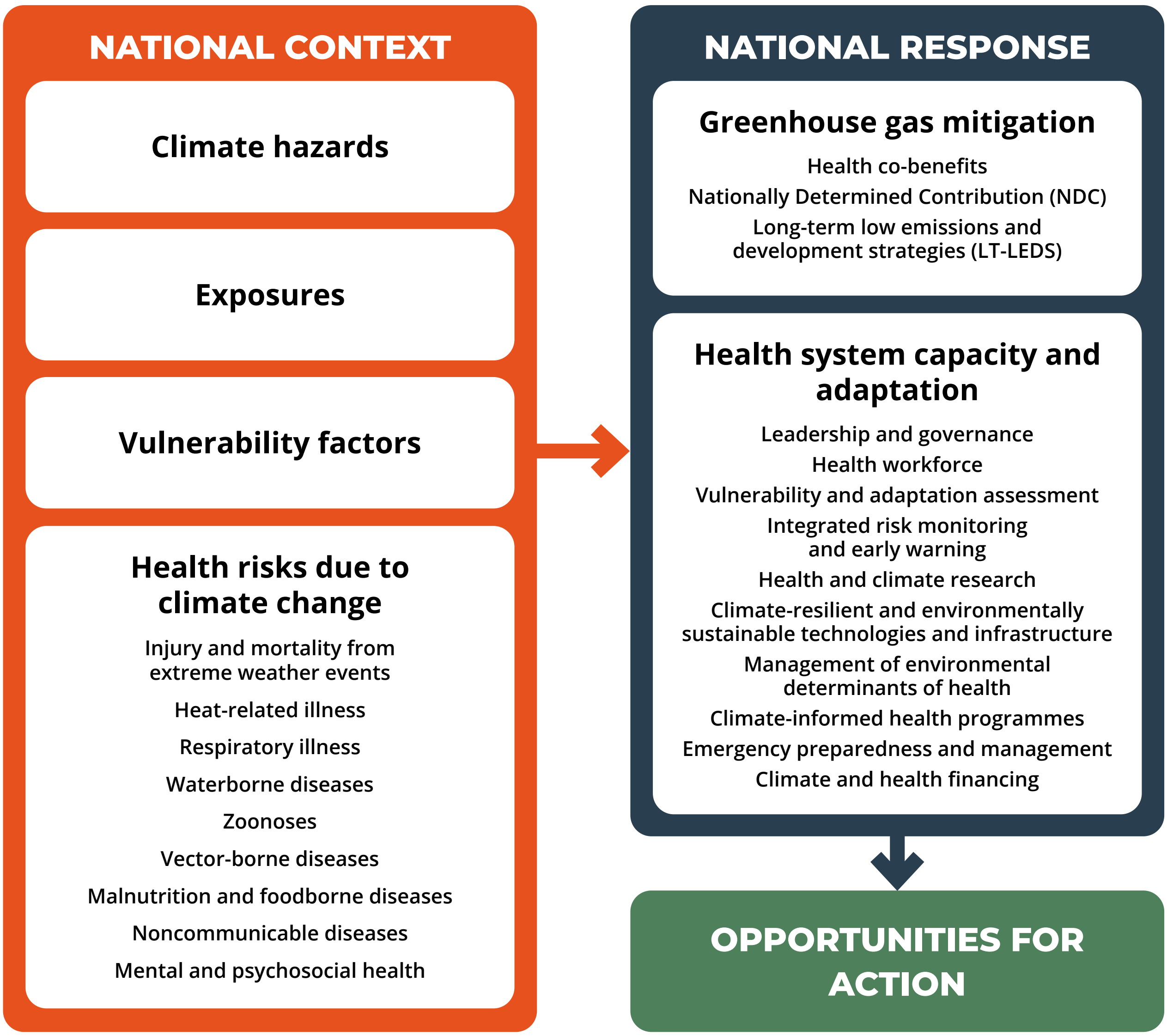
This health and climate change country profile presents a snapshot of country-specific climate hazards, climate-sensitive health risks and potential health benefits of climate change mitigation. The profile is also a key tool in monitoring national health sector response to the risk that climate variability 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 on the eastern shore of the Mediterranean Sea, Lebanon's territory is mostly mountainous with a land area of 10 452 km^2 and a coastline of 225 km *(1).* The economy is dependent upon the service sector, which contributes 45% of the national GDP *(2)*. While the agricultural sector accounts for only around 5% of GDP, agriculture has been impacted by higher world food prices and climate change, which could have significant implications for food security in Lebanon *(2,3).* Around 90% of Lebanon's population lives in urban areas, especially in the big cities along the coast *(1).*

Lebanon's climate is predominantly Mediterranean, with hot and dry summers from June to September and cool and rainy winters from December to March *(1)*. Due to arid and semi-arid conditions, water resources are scarce and vulnerable to the effects of climate change and consequential changes in precipitation patterns *(4)*. This threatens the agricultural sector, which is also pressured by population growth and urbanization *(5)*. Further, climate change is expected to result in less snow, increased droughts, sea level rise and forest fires. Higher temperatures and frequent extreme events, such as droughts and floods, could lead to health risks such as infectious diseases, increased morbidity and mortality from heat stress, waterborne and vector-borne diseases *(1)*. Encroaching seas are projected to expand seawater incursions into coastal freshwater aquifers and reduce the supply of freshwater for local use. Additionally, higher storm surges could increase damage to low-lying infrastructure and communities, and higher temperatures and reductions in annual precipitation could result in a hotter and drier climate, potentially diminishing future supplies of surface water.

Lebanon updated its Nationally Determined Contribution (NDC) in 2020, increasing its previous mitigation ambitions. The NDC commits unconditionally to reducing its greenhouse gas emissions by 20%, compared with the business-as-usual scenario, by 2030. Climate change is recognized as a threat multiplier in the NDC, which outlines numerous adaptation strategies, including implementing climate-resilient systems to ensure and protect public health, well-being and safety of all communities in Lebanon *(4).*

CURRENT AND FUTURE CLIMATE HAZARDS

CLIMATE HAZARD PROJECTIONS FOR LEBANON

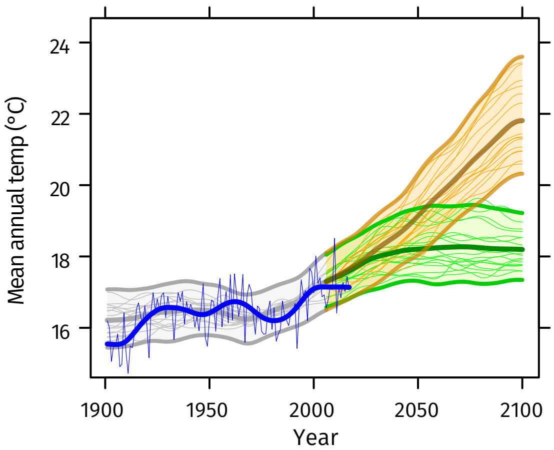
Country-specific projections are outlined up to the year 2100 for climate hazards under a 'business as usual' (BAU) high emissions scenario compared to projections under a 'two-degree' scenario with rapidly decreasing global emissions (see Figures 1–5).

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

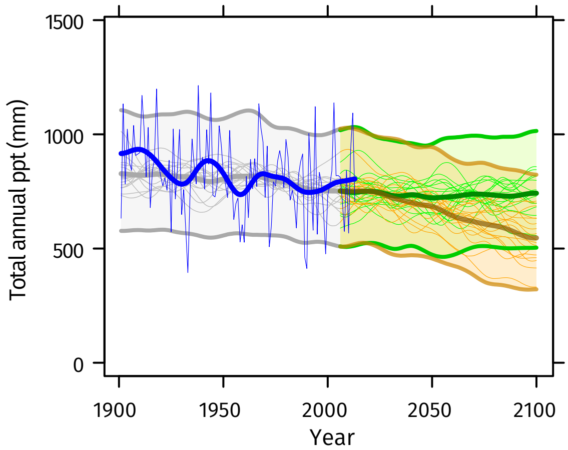
FIGURE 1: Mean annual temperature, 1900–2100



Under a high emissions scenario, the mean annual temperature is projected to rise by about 4.3°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 1.3°C.

Decrease in total precipitation

FIGURE 2: Total annual precipitation, 1900–2100



Total annual precipitation is projected to decrease by about 25% on average under a high emissions scenario, although the uncertainty range is large (-37% to -9%). If emissions decrease rapidly, there is little projected change on average: with a decrease of 3% and an uncertainty range of -17% to +4%.

NOTES

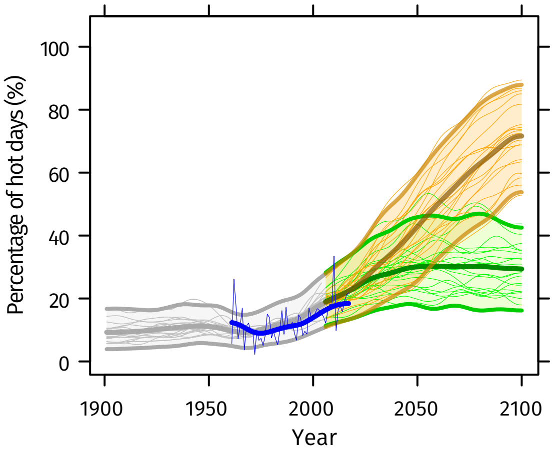
[a] Model projections are from CMIP5 for RCP8.5 (high emissions) and RCP2.6 (low emissions). Model anomalies are added to the historical mean and smoothed.

[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

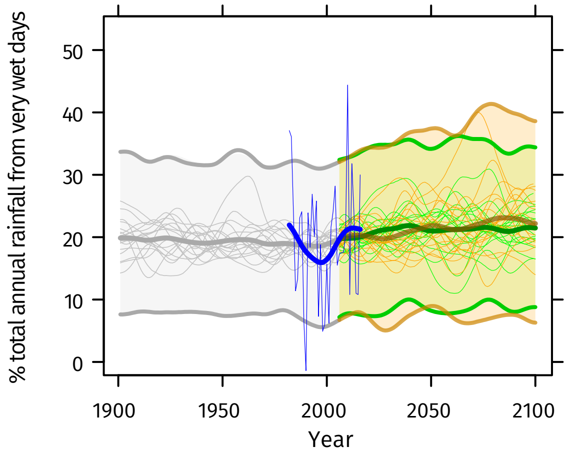
FIGURE 3: Percentage of hot days ('heat stress'), 1900–2100



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 65% 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).

Small increase in extreme rainfall

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



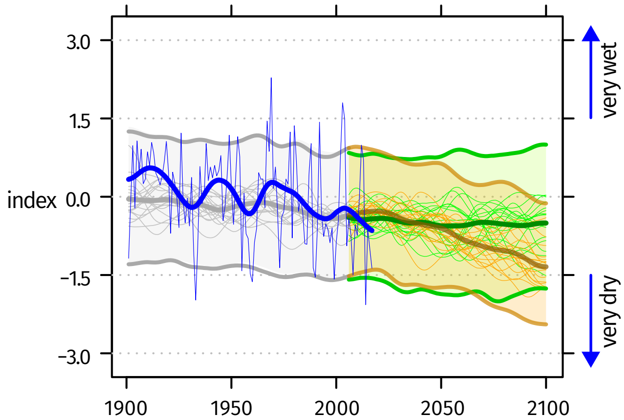
Under a high emissions scenario, the proportion of total annual rainfall from very wet days[e] (about 20% for 1981–2010) could increase slightly by the end-of-century (to about 23% on average with an uncertainty range of about 5% to 40%), with even less change if emissions decrease rapidly. These projected changes are accompanied by decreases in total annual rainfall (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 -0.3 to -1 on average by the end-of-century (2071–2100) indicating an increase in the frequency and/or intensity of dry episodes and drought events. If emissions decrease rapidly there is little change although year-to-year variability remains large.[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 4.3°C mean annual temperature rise by the end-of-century.

About 65% of days could be 'hot days' by the end-of-century.

EXPOSURES

Population exposure to heat stress is likely to rise in the future as heat waves are projected to increase. Increased urbanization (and the associated urban heat island effect) is expected to further exacerbate this risk.

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 mortality in population 65 years or above, Lebanon (deaths / 100 000 population 65+ yrs).[d] Source: Honda et al. (2015) *(6)*