

UNITED ARAB EMIRATES



HEALTH & CLIMATE CHANGE COUNTRY PROFILE 2019

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EXECUTIVE SUMMARY

Climate change threatens all aspects of the society in which we live. The severity of the impacts of climate change on human health are increasingly clear, and further delay in action will increase the risks. The United Arab Emirates (UAE) is addressing climate change by taking action in line with the global sustainable development agenda. Building national policies has been a priority. The UAE Green Agenda 2015–2030 has been endorsed along with the National Climate Change Plan, which serves as a roadmap to nationwide actions for climate mitigation and adaptation in the UAE until 2050. The UAE has also conducted a comprehensive risk assessment of the impact of climate change on health as part of the National Climate Change Adaptation Program.

Climate change undermines the social and environmental determinants of health, including people's access to clean air, safe drinking-water, sufficient food and secure shelter. It is affecting health particularly in the poorest, most

vulnerable communities and thus widening health inequities.

The health sector is highly trusted and serves an important role in raising awareness of the health risks of climate variability and climate change, responding to increasing climate-related health pressures and determining the most effective adaptation measures that will protect our citizens. The health sector also has a responsibility to reduce its contribution to greenhouse gas emissions and highlight the potential health considerations of national mitigation policies.

This health and climate change country profile for the UAE, developed with the World Health Organization and the United Nations Framework Convention on Climate Change (UNFCCC), provides a summary of available evidence on climate hazards, health vulnerabilities, health impacts and progress to date in realizing a climate-resilient, sustainable health system.

KEY RECOMMENDATIONS

1

STRENGTHEN IMPLEMENTATION OF THE NATIONAL STRATEGY AND ACTION PLAN FOR HEALTH AND CLIMATE CHANGE

A consolidated action plan with focused priority objectives and initiatives is vital to tackle challenges to full implementation. The main challenges have been identified as capacity building and surveillance.

2

PROMOTE CROSS-SECTORAL COLLABORATION ON HEALTH AND CLIMATE CHANGE

Enhance collaboration between health and other sectors, and promote measures with health co-benefits.

3

STRENGTHEN INTEGRATED RISK SURVEILLANCE AND EARLY WARNING SYSTEMS

Strengthen early warning and response to extreme events with all concerned entities and strengthen surveillance and monitoring of existing and new health risks. Evaluate existing national information systems as a factor in reducing vulnerability and to ensure an integrated approach.

4

IDENTIFY AND ADDRESS BARRIERS TO HEALTH ADAPTATION TO CLIMATE CHANGE

Continue efforts to raise awareness, training and capacity building within the health sector. Estimate the costs to implement health resilience to climate change and include these costs in planned allocations.

5

QUANTIFY THE HEALTH IMPLICATIONS OF NATIONAL MITIGATION AND ADAPTATION POLICIES

Support research initiatives, such as impact studies, to measure the effectiveness of national mitigation and adaptation policies.

6

ENSURE THE INCLUSION OF HEALTH IN THE UNITED ARAB EMIRATES' NATIONALLY DETERMINED CONTRIBUTION (NDC) TO THE UNFCCC

Work closely with the national entities to have health reflected as an important component of the NDC to the UNFCCC.

INTRODUCTION

The United Arab Emirates (UAE), located in the Arabian Peninsula, has a predominantly hot and humid climate. With approximately four fifths of its land area covered by desert, it is a water-scarce and hyperarid environment. The coastline of the UAE extends over 1300 km into the Arabian Gulf and the Gulf of Oman (1,2). Oil and gas have helped boost the economy of the UAE in recent years, although the government is looking for opportunities to diversify the economy and promote sustainable development (3).

Potential impacts of climate change on the UAE include extreme heat, storm surge, sea level rise, water stress, dust and sand storms, and desertification. Even small variations in weather patterns could significantly affect the country's economic, environmental, and social well-being. The most vulnerable areas to climate change in the UAE are: water, coastal, marine and dryland ecosystems; buildings and infrastructure; agriculture and food security; and public health (4).

The UAE is taking action to protect the public's health from climate change impacts. The National Climate Change Plan of the United Arab Emirates 2017–2050 (Climate Plan) emphasizes climate change as an urgent development agenda through three priorities: mitigation; adaptation; and green economic diversification (4). As a part of the implementation of the Climate Plan, the Ministry of Climate Change and Environment (MOCCA) launched the National Climate Adaptation Program. The first step of this programme was to carry out a systematic and participatory risk assessment in four sectors, including the health sector, as a basis for planning adaptation measures (4). Furthermore, the UAE's Nationally Determined Contribution (NDC) highlights the impacts of climate change on human health, particularly the negative impacts of air pollution associated with greenhouse gas emissions (3).

HIGHEST-PRIORITY CLIMATE-SENSITIVE HEALTH RISKS FOR UNITED ARAB EMIRATES

Direct effects	
Health impacts of extreme weather events	✓
Heat-related illness	✓
Indirect effects	
Water security and safety (including waterborne diseases)	
Food security and safety (including malnutrition and foodborne diseases)	
Vector-borne diseases	✓
Zoonoses	✓
Respiratory illness	✓
Disorders of the eyes, ears, skin and other body systems	
Diffuse effects	
Mental/psychosocial health	✓
Noncommunicable diseases (NCDs)	✓
Health systems problems	
Population pressures	

Source: Country-reported responses. Table categories taken from *Human Health and Climate Change in Pacific Island Countries*, WHO Regional Office for the Western Pacific (2015), p 25 (5).

For further information on categories see reference (5).

CLIMATE HAZARDS RELEVANT FOR HEALTH

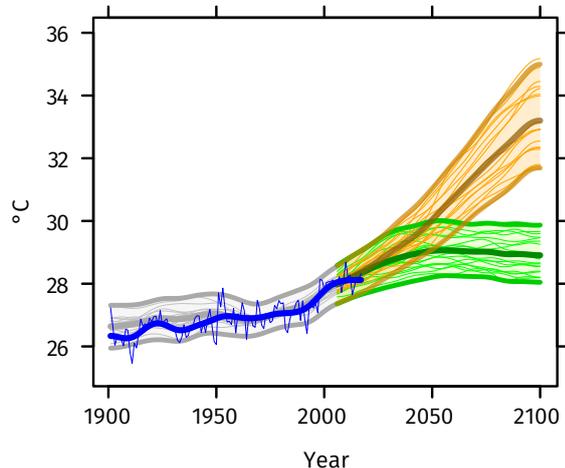
Climate projections for the United Arab Emirates

Country-specific projections are outlined up to the year 2100 for climate hazards under a 'business as usual' high emissions scenario compared to projections under a 'two-degree' scenario with rapidly decreasing global emissions (see Figs 1–4).

The climate model projections 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).¹ The text describes the projected changes averaged across about 20 global climate models (thick line). The figures² 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).³ 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.

Rising temperature

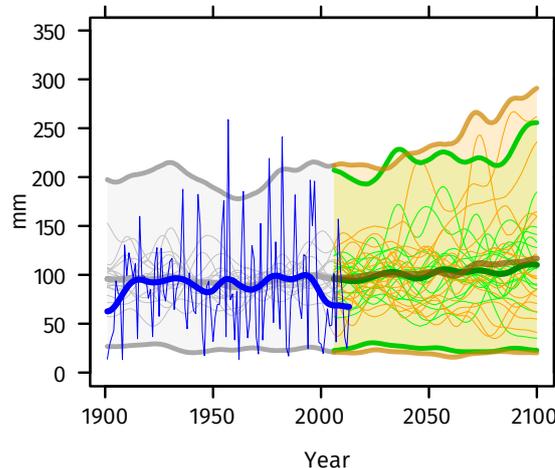
FIGURE 1: Mean annual temperature, 1900–2100



Under a high emissions scenario, mean annual temperature is projected to rise by about 5°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 1.4°C.

Increase in total precipitation

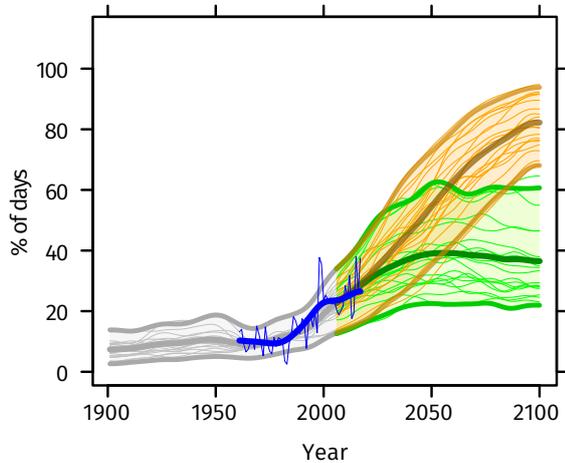
FIGURE 2: Total annual precipitation, 1900–2100



Total annual precipitation is projected to increase by almost 20% on average under a high emissions scenario, although the uncertainty range is large (-45% to +120%). If emissions decrease rapidly there is less projected change on average: an increase of 10% with an uncertainty range of -15% to +40%.

More high temperature extremes

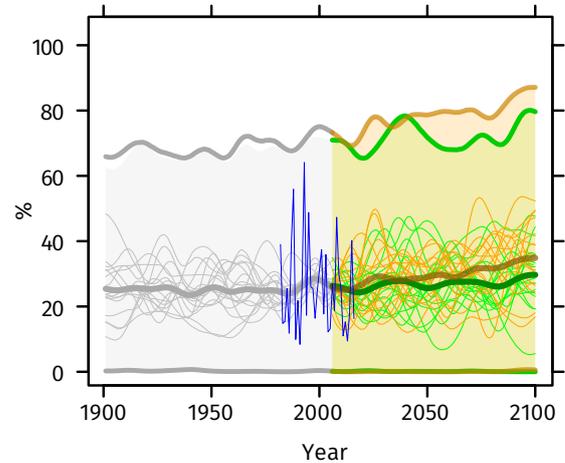
FIGURE 3: Percentage of hot days ('heat stress'), 1900–2100



The percentage of hot days⁴ is projected to increase substantially from about 20% of all observed days on average in 1981–2010 (10% in 1961–1990). Under a high emissions scenario, about 80% of days on average are defined as 'hot' by the end-of-century. If emissions decrease rapidly, about 35% of days on average are 'hot'. Similar increases are seen in hot nights⁴ (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 days⁵ (about 25% for 1981–2010) could increase a little by the end-of-century (to about 33% on average with a very large uncertainty range due to the generally low rainfall totals of less than 1% to 80%), with little change if emissions decrease rapidly. These projected changes are accompanied by increasing total annual rainfall although average totals remain relatively low (see Figure 2).

¹ 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.

² Observed historical records of mean temperature and total precipitation are from CRU-TSv3.26. Observed historical records of extremes are from JRA55 for temperature and from GPCC-FDD for precipitation.

³ Analysis by the Climatic Research Unit, University of East Anglia, 2018.

⁴ A 'hot day' ('hot night') is a day when maximum (minimum) temperature exceeds the 90th percentile threshold for that time of the year.

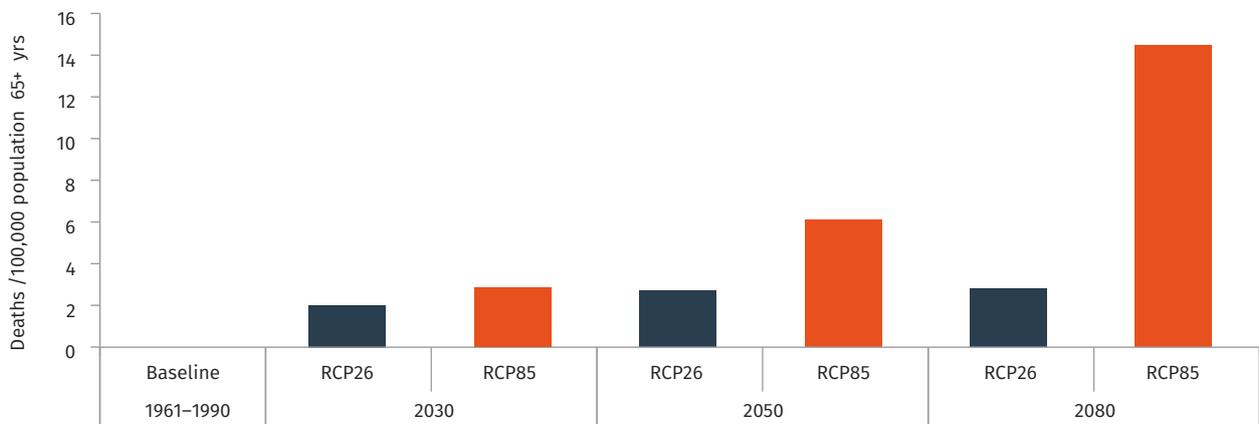
⁵ The proportion (%) of annual rainfall totals that falls during very wet days, defined as days that are at least as wet as the historically 5% wettest of all days.

HEALTH IMPACTS OF CLIMATE CHANGE

Heat stress

Climate change is expected to increase mean annual temperature and the intensity and frequency of heatwaves resulting in a greater number of people at risk of heat-related medical conditions. Heatwaves, i.e. prolonged periods of excessive heat, can pose a particular threat to human, animal and even plant health, resulting in loss of life, livelihoods, socioeconomic output, reduced labour productivity, rising demand for and cost of cooling options, as well as contribute to the deterioration of environmental determinants of health (e.g. air quality, soil, water supply). Particularly vulnerable groups include: elderly people (see Fig. 5); children; individuals with pre-existing conditions (e.g. diabetes) and individuals who are socially isolated.

FIGURE 5: Heat-related death in elderly people (65+ years), by high and low emission scenarios^a



Source: Honda et al., 2015 (6).

Under a high emissions scenario heat-related death in elderly people (65+ years) is projected to increase to about 15 deaths per 100 000 by 2080 compared to the estimated baseline of nearly zero deaths per 100 000 annually between 1961 and 1990. A rapid reduction in emissions could limit heat-related deaths in elderly people to just under 3 deaths per 100 000 in 2080.

^a Country-level analysis, completed in 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).

Noncommunicable diseases, food and nutrition security

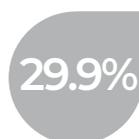
The UAE faces distinct challenges that render it particularly vulnerable to the impacts of climate change on food and nutrition security including: population pressures; fragile natural environments and lack of arable land; high vulnerability to climate change; and a high dependence on food imports. Climate change is also likely to exacerbate the metabolic and lifestyle risk factors for diet-related NCDs.



AVERAGE HEALTHY LIFE EXPECTANCY at birth (both sexes) (7)



Total deaths attributed to CARDIOVASCULAR DISEASES (all ages) (8)



Prevalence of obesity among adults (both sexes, 18 yrs+) (9)



Prevalence of OBESITY AMONG CHILDREN (5-19 yrs) (10)

(Unless indicated, all estimates are for 2016)

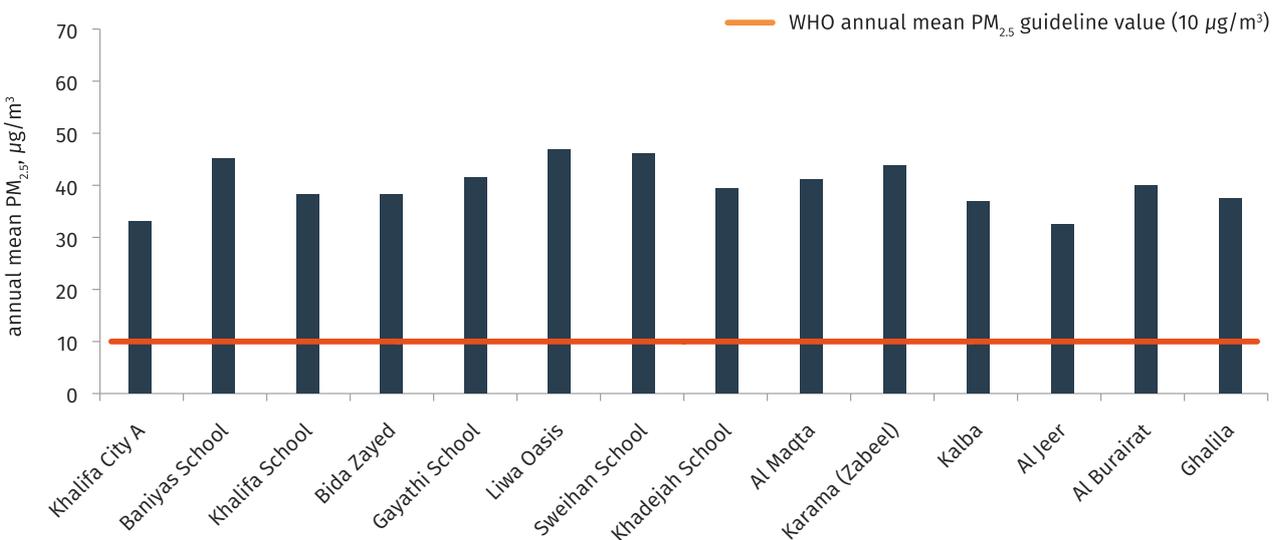
HEALTH RISKS DUE TO AIR POLLUTION, SAND AND DUSTSTORMS

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.

In 2017, all UAE cities for which data has been reported, had annual mean $PM_{2.5}$ ¹ levels above the WHO guideline value of $10 \mu\text{g}/\text{m}^3$ (see Fig. 6) (11). In the Middle East, it has been found that natural dust is the main contributor of $PM_{2.5}$ at 52% (12).

Ambient air pollution

FIGURE 6: Annual mean $PM_{2.5}$ levels in United Arab Emirates cities, 2017. WHO guideline value of $10 \mu\text{g}/\text{m}^3$ is shown in orange.



Source: United Arab Emirates Ministry of Climate Change and Environment (11).



1432
deaths from ambient air pollution
in UAE in 2016 (13)

¹ $PM_{2.5}$ is atmospheric particulate matter (PM) with a diameter of $<2.5 \mu\text{m}$.

HEALTH CO-BENEFITS FROM CLIMATE CHANGE MITIGATION AND ADAPTATION

Health co-benefits are local, national and international measures with the potential to simultaneously yield large, immediate public health benefits and reduce the upward trajectory of greenhouse gas emissions. Lower carbon strategies can also be cost-effective investments for individuals and societies. Presented here are examples of opportunities for health co-benefits that could be realised by action in important greenhouse gas emitting sectors.



TRANSPORT

More than 3000 people were killed and 30 000 injured in car accidents in the UAE from 2014 to 2018 (14). The transport sector is also responsible for around 35 000 kilotonne CO₂ equivalents (KtCO₂e) or 18% of carbon emissions in the country (15). Walking and cycling could see reductions in illnesses related to physical inactivity and reduced outdoor air pollution. Today, Dubai has nearly 300 km of cycling tracks with plans to add 200 km more by 2021 (16). In Abu Dhabi, hundreds of kilometres of walking tracks are already in place as part of the Abu Dhabi Walking and Cycling Master Plan 2030 (17). Efforts in the UAE to improve the public transport network are also gaining traction. For example, more than 600 000 people use Dubai Metro daily, the backbone of the city's public transport since it opened in 2009 (18). Dubai Metro has helped avoid 1340 KtCO₂e in the period 2012–2016, while also reducing mobility and vehicle operation costs, decreasing traffic accidents, cutting road maintenance costs, and boosting employment prospects. Public transport is also made accessible to the elderly and the disabled across the UAE through dedicated facilities and reduced charges (19).



FOOD AND AGRICULTURE

The agricultural sector contributes less than 1% to the UAE's total greenhouse gas emissions (20). The small agricultural sector in the UAE will be under increasing stress due to climate change. Increasing temperatures will lead to an increase in plant transpiration and respiration, thus negatively impacting yield and water use efficiencies. The change in rainfall patterns will reduce water availability in fresh water aquifers, while extreme heat events can lead to significant losses. The UAE imports around 86% of its food supply and is the 15th largest food importer (21). Under all climate change scenarios, tightening markets might constrain trade flows to the UAE, especially for cereals, vegetables, and fruits (22). This would most likely result in price increases and a greater percentage of household income spent on food. In order to adapt to climate change, the UAE is already taking measures to diversify its food import sources and develop a more advanced local agricultural industry.



ELECTRICITY GENERATION

Nearly 100% of electricity generation in the UAE comes from natural gas (23). Electricity generation in the UAE is coupled with water desalination, and is responsible for 77 000 KtCO₂e or 38.5% of total emissions (15). The country is now transitioning towards a cleaner energy mix, with greater contribution of nuclear and solar in the next few years. The Baraka nuclear project, the Mohammed bin Rashid Solar Power Park in Dubai, and various major solar projects in Abu Dhabi will raise the proportion of clean energy in the mix to 24% by 2021 and to 50% by 2050 (24). This will help avoid 70% of greenhouse gas emissions from electricity production (25). A number of waste-to-energy projects are also underway in the UAE. Sharjah, for example, will complete a 30 MW waste-to-energy plant in 2021, which will process more than 37.5 tonnes per hour of municipal solid waste and help reach the emirate's "zero waste-to-landfill" target (26).



HEALTHCARE SYSTEMS

Health care activities are an important source of greenhouse gas emissions. Major sources include procurement and inefficient energy consumption. UAE is supporting lowering the health sector carbon footprint and adopting building and equipment energy efficiency measures. MOHAP has launched environmental initiatives for its facilities, such as rationalizing the use of energy and the use of renewable energy and energy preservation for future generations. It has used the latest technologies to reduce electricity usage by using solar energy production system in one of its main new hospitals. Moreover, MOHAP has policies on reducing water consumption, reducing the use of paper through e-transformation initiatives in its main operations, and the disposal of medical waste by using environmentally-friendly practices. Such solutions can improve the quality and reliability of energy saving activities. In this way, low carbon energy for health care could not only mitigate climate change, it could enhance access to essential health services and ensure resilience (27).

NATIONAL RESPONSE: PROGRESS ON RELATED SUSTAINABLE DEVELOPMENT GOALS (SDGS)

SDG indicators related to health and climate change

Many of the public health gains we have made in recent decades are at risk due to the direct and indirect impacts of climate variability and climate change. Sustainable development across sectors can strengthen health resilience to climate change.

1. NO POVERTY



Percentage of the population living below the national poverty line (28)

NO DATA AVAILABLE

6. SAFE WATER AND SANITATION



Total population using at least basic **drinking-water services** (2017) (31)

98%

Total population using **safe sanitation services** (2017) (31)

96%

7. AFFORDABLE, RELIABLE, SUSTAINABLE AND MODERN ENERGY FOR ALL



Renewable energy share in the total final energy consumption (2016) (32)

0.15%

3. GOOD HEALTH AND WELL-BEING

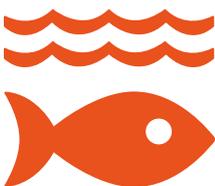


63

Universal Health Coverage Service Coverage Index (2015)^a (29)

3.5%

Current health expenditure as percentage of gross domestic product (GDP) (2016) (30)



13. STRENGTHEN RESILIENCE AND ADAPTIVE CAPACITY TO CLIMATE CHANGE AND NATURAL DISASTERS

National disaster risk reduction strategy in place (2019) (33)

DRAFT

^a The index is based on low data availability. Values greater than or equal to 80 are presented as ≥80 as the index does not provide fine resolution at high values; 80 should not be considered a target.

NATIONAL RESPONSE: BUILDING HEALTH SYSTEM RESILIENCE TO CLIMATE CHANGE

The following section measures progress in the health sector in responding to climate threats based on country reported data collected in the 2018 WHO Climate and Health Country Survey (34).

Governance and leadership

National planning for health and climate change

Has a national health and climate change strategy or plan been developed?^a	
Title: National Strategy and Action Plan for Climate Change and Health Year: 2017	
Content and implementation	
Are health adaptation priorities identified in the strategy/plan?	
Are the health co-benefits of mitigation action considered in the strategy/plan?	
Performance indicators are specified	
Level of implementation of the strategy/plan	MODERATE

=yes, = no

^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 (H-NAPs).

Intersectoral collaboration to address climate change

Is there an agreement in place between the ministry of health and other sectors in relation to health and climate change policy?

Sector^a	Agreement in place
Transportation	PARTIAL^b
Electricity generation	PARTIAL^b
Household energy	PARTIAL^b
Agriculture	PARTIAL^b
Social services	PARTIAL^b
Water, sanitation and waste-water management	PARTIAL^b

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

^b A multisectoral action plan is in place but no official agreement.

Evidence and implementation

Vulnerability and adaptation assessments for health

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

TITLE: Adaptation of the UAE's Public Health to Climate Change: Risk Assessment and Options for Action
YEAR: 2019

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?

Policy prioritization			
Human and financial resource allocation			
	None	Minimal	Somewhat

Level of influence of assessment results

Integrated risk monitoring and early warning

Climate-sensitive diseases and health outcomes	Monitoring system is 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

^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	✓	✓	✓
Storms (e.g. hurricanes, monsoons, typhoons)	✓	✓	✓
Flooding	✓	✓	✓
Drought	NA	NA	NA
Air quality (e.g. particulate matter, ozone levels)	✗	✗	✗
Sand/dust storms	✓	✓	✓

✓=yes, ✗=no, NA=not applicable

Capacity, infrastructure and sustainability

Human resource capacity

International Health Regulations (IHR) Monitoring Framework Human Resources Core Capacity (2018) (35)	60
Does your human resource capacity, as measured through the IHR, adequately consider the human resource requirements to respond to climate-related events?	Fully
Is there a national curriculum developed to train health personnel on the health impacts of climate change?	✗

✗=no

Health care facilities, infrastructure and technology

Has there been a national assessment of the climate resilience of health infrastructure and technology?	✓
Have measures been taken to increase the climate resilience of health infrastructure and technology?	✓
Is there a national initiative/programme in place to promote the use of low-carbon, energy-efficient, sustainable technologies in the health sector?	✓

✓=yes

ALIGNING NATIONAL AND REGIONAL FRAMEWORKS AND PLANS OF ACTION

Since the WHO Regional Committee for the Eastern Mediterranean convened in 2017, the UAE has made progress on several key action items. One of the strategic response targets of regional Climate Change and Health Framework include the delegation of responsibility for the coordination of a public health response to climate change. In accordance with this goal, the UAE has established responsibility within its Ministry of Climate Change and Environment (MOCCA) and Ministry of Health and Prevention (MOHAP). Both Ministries have designated national climate and health focal points working on the development of integrated climate change and health policy.

The UAE National Framework for Action on Climate Change and Health was the product of national and international consultation, and has since been integrated as a national action plan. In line with the goals derived from the national framework, MOHAP aims to further define governance in the intersection of climate change and health. By the fourth quarter of 2019, the ministry intends to have established a multi-sectoral committee that would ultimately guide climate-informed decision-making and implementation within the UAE's public health system. A key strategy of MOHAP in ensuring the protection of health from climate change is to legislate the goals of the committee by revising and updating the nation's public health law.

The regional Climate Change and Health Framework maintains the need for robust surveillance within national health systems. In response, MOHAP conducts extensive assessment of health vulnerability to climate change with a focus on revising prior operating procedures within the nation's public health system. The ministry further commits to updating the vulnerability assessment on a yearly basis. As a means to gather more robust data, MOHAP will also expand its health surveillance for more climate-sensitive diseases and outcomes. Ultimately, the ministry aims to internalize the goals of the regional Climate Change and Health Framework as targets for the nation, and to develop a national strategy that will pave the way to the establishment of health resilience against climate change.

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