Chapter 7: Impact of Climate Change on Human Health

Authors: Prof. Ahmed Gaber, Prof. Randah Hamadeh, Dr. Djihan Hassan, Ms. Hayam El Shirbiny

Presenter: Dr. Djihan Hassan
Adjunct Assistant Professor at the American University in Cairo

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I. Introduction

- Climate change (CC) and health are two of the greatest challenges facing the Sustainable Development Goals (SDGs) 2030 Agenda.
  - SDG 3 aims to ensure healthy lives and promote well-being for all.
  - SDG 13 calls for taking urgent action to combat CC and its impacts.
- Environmental health impacts include the rise and fall in mean annual temperature, sea level rise and loss of biodiversity.
- Humans’ vulnerability to the potential health impacts of CC are divided into direct and indirect impacts.
HEALTH AND THE ENVIRONMENT IN ARAB COUNTRIES

Timeline for Global Milestones On CC and HH

1992
- UNFCCC stated that climate change adversely affects human health (Article 1) and that countries are committed to assess the effect of “adaptation and mitigation policies” on health (Article 4)

2010
- UNFCCC conference in Cancun identified health as a priority in climate change actions

2014
- WHO 1st Conference on Health and Climate Change: The conference’s objective was to empower health and sustainable development in the world by enhancing resilience and health protection affected from climate change, ascertain that human health is linked with reduction of greenhouse gas emissions and pollution, and endorse health related climate change policies.

2015
- 2015 Paris Agreement: At the 21st conference of the parties (COP), the UNFCCC parties reached a milestone agreement to take action and intensify investments in order to fight climate change and maintain sustainable low carbon future.

2016
- WHO Special Initiative (Climate change in SIDS): The initiative aimed to address national health authorities in SIDS and provide for them with the necessary political, technical and evidence and financial support since the small island developing states are the ones most affected by climate change.

2017
- WHO’s 2nd Conference on Health and Climate Change: The objective of the conference was to showcase how the public health community could provide the necessary support to implement the Paris agreement for the sake of healthier and more sustainable societies.

2018
- WHO 3rd Conference on Health and Climate Change: It was held in three locations: in the Pacific (Nadi, Fiji; 15-16 March), the Indian Ocean (St Louis, Mauritius; 21-22 March), and the Caribbean (Grenada; October 2018), and the meetings brought global experts and representatives together to engage and take action.

2019
- Red Cross organized the first “humanitarian COP” on climate change and health in Cannes, France where the WHO was asked to join efforts and participate in the discussions.
- Global Climate and Health Summit at COP25 in Madrid
II. Global Effects of CC on Health – Direct and Indirect Impacts

Direct and indirect impacts of climate change on health and related health consequences

II. Global Effects of CC on Health – Other factors

Environmental
- Geography, baseline weather, baseline air/water quality, soil/dust and vegetation.

Social
- Poverty, inequality, conflict, displacement and population factors such as age and gender.

Economic
- Income and occupation.

Resiliency
- Early-warning systems, socioeconomic status, health and nutrition, and primary healthcare.

Given the complex associations between climate change and global health, it is important to understand the various influencing factors at play in order to design effective mitigation and adaptation strategies with direct and clear effects on global health.
III. The Impact of Climate Change on Health in the Arab Region

• The available literature indicates that climate change has already imposed a health burden in the Arab region and causes a public health concern.

• Increases in overall mortality, mortality and morbidity from communicable diseases and NCDs have been reported in countries of the region.

• Few Arab countries identified vulnerable populations like children, elderly and outdoor workers and a small number made projections.

• The impact of climate change on health is not given adequate attention by stakeholders and researchers in the region and there is variability in the information provided by countries.
### IV. Current Strategies and Benefits to HH from Addressing CC

#### Global Adaptation Strategies and Initiatives

<table>
<thead>
<tr>
<th>Health Risks</th>
<th>Legislative</th>
<th>Technical</th>
<th>Educational / Advisory</th>
<th>Cultural / Behavioural</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Thermal stress</strong></td>
<td>Building guidelines</td>
<td>Housing, public buildings, urban planning to reduce heat island effects, air conditioning</td>
<td>Early warning systems</td>
<td>Clothing, siesta</td>
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<tr>
<td><strong>Extreme weather events</strong></td>
<td>Planning laws</td>
<td>Urban planning</td>
<td>Early warning systems</td>
<td>Use of storm shelters</td>
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<tr>
<td></td>
<td>Building guidelines</td>
<td>Storm shelters</td>
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<td>Forced migration</td>
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<td>Economic incentives for building</td>
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<tr>
<td><strong>Air quality</strong></td>
<td>Emission controls</td>
<td>Improved public transport</td>
<td>Pollution warning</td>
<td>Carpooling</td>
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<td>Traffic restrictions</td>
<td>Catalytic converters</td>
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<td>Smokestacks</td>
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<tr>
<td><strong>Vector-borne diseases</strong></td>
<td>N/A</td>
<td>Vector control</td>
<td>Health education</td>
<td>Water storage practices</td>
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<td></td>
<td></td>
<td>Vaccination, impregnated bed nets</td>
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<td></td>
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<td>Sustainable surveillance, prevention and control programs</td>
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<tr>
<td><strong>Water-borne diseases</strong></td>
<td>Watershed protection laws</td>
<td>Genetic/molecular screening of pathogens</td>
<td>Boil water alerts</td>
<td>Washing hands and other hygiene behaviour</td>
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<td>Water quality regulation</td>
<td>Improved water treatment (e.g., filters)</td>
<td></td>
<td>Use of pit latrines</td>
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<tr>
<td></td>
<td></td>
<td>Improved sanitation (e.g., latrines)</td>
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</tbody>
</table>

**Options for adaptation strategies to reduce health impacts of climate change** *(Source: McCarthy et. al (2001))*
IV. Current Strategies and Benefits to HH from Addressing CC

Adaptation Strategies and Initiatives in the Arab Region

*Identified actions in climate change adaptation* including:

1. Conducting a national assessment of climate change impacts;
2. Including climate information in an *Integrated Surveillance and Response system* with early warning; and
3. Strengthening adaptive capacity by *building climate resilient infrastructure*. However, Egypt still does not have an integrated national health adaptation strategy (WHO, 2015a).

Climate change is expected to increase *water scarcity in the country* (WHO, 2013; WHO, n.d). As a response, Jordan has implemented the “Climate change adaptation to protect human health” project between 2010-2014, which aimed to *increase adaptive capacity to respond to health risks* resulting from water scarcity induced by climate change (WHO, 2015b).

### IV. Current Strategies and Benefits to HH from Addressing CC

#### Global Mitigation Strategies and Initiatives

<table>
<thead>
<tr>
<th>Examples of Mitigation Strategies to reduce GHG emissions</th>
<th>Health Co-benefits</th>
</tr>
</thead>
</table>
| Clean energy sources / Reduction in fossil fuel combustion                                   | • Improve urban air quality  
• Decrease CVD and respiratory diseases                                                                                                                     |
| Reduced use of wood burning and other biomass for indoor cooking / the use of clean fuels and household cookstoves | • Improve indoor air quality  
• Reduce deaths from household air pollution (Especially women and children)  
• Less risk of injury during fuel collection  
• Reduce burning accidents                                                                                                                                     |
| Energy-efficient and climate-adapted housing and buildings (e.g. using minimal energy for heating, cooling, or lighting) | • Reduce morbidity and mortality related to heat and cold exposure, risks of airborne infectious disease transmission; and respiratory diseases related to indoor air pollution risks  
• Protects occupants not only from heat and cold, but storms and extreme weather, as well as diseases borne by pests and vectors. |
| Well planned urban public transport policies encouraging use of public transport, walking and cycling | • Increase physical activity and reduce obesity  
• Reduce traffic injury and deaths  
• Reduce air pollution-related mortality (from strokes, respiratory and heart disease)  
• Reduce noise pollution                                                                                                                                         |
| Reduction in meat consumption / shifting to diets richer in fresh, in-season vegetables, fruits and legumes | • Reduce risks of obesity, heart disease and cancers associated with excessive consumption of red meat and some processed foods  
• Reduced diet-related non-communicable diseases                                                                                                                 |
| Improve wastewater treatment (including sanitation)                                           | • Reduces infectious disease risks  
• Improves air quality                                                                                                                                             |
### IV. Current Strategies and Benefits to HH from Addressing CC

#### Mitigation Strategies and Initiatives in the Arab Region

<table>
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<tr>
<th>Examples of Mitigation Actions or Strategies Impacting Human Health</th>
<th>Arab Countries Implementing</th>
</tr>
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<tbody>
<tr>
<td><strong>Clean Air Initiative</strong>: Commit to achieving air quality that is safe for populations, and to align their CC and air pollution policies, by 2030. Financial institutions commits to scale up investment to support climate action, health and sustainable development.</td>
<td><strong>• Algeria, Morocco, Palestine, Tunisia, UAE</strong></td>
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<td><strong>Great Green Wall for Sahara and the Sahel Initiative (GGWSSI)</strong>: Restore 50 million hectares of land, sequester 250 million tons of carbon and support 300 million people across the Sahel by 2030.</td>
<td><strong>• Algeria, Egypt, Mauritania, Somalia, Sudan, Tunisia</strong></td>
</tr>
<tr>
<td><strong>Blue Growth Initiative</strong>: Reduce CO₂ emissions by 10% in 5 years and 25% in 10 years and reduce overfishing by 20% in 5 years and 50% in 10 years in 10 developing countries.</td>
<td><strong>• Algeria, Mauritania, Morocco</strong></td>
</tr>
<tr>
<td><strong>Global Fuel Economy Initiative (GFEI)</strong>: Double vehicle fuel efficiency globally by 2050.</td>
<td><strong>• Algeria, Egypt, Jordan, Morocco, Tunisia, UAE</strong></td>
</tr>
<tr>
<td><strong>International Solar Alliance (ISA)</strong>: Mobilize more than USD 1 trillion of investments by 2030 for the massive deployment of affordable solar energy.</td>
<td><strong>• Algeria, Comoros, Egypt, Mauritania, Oman, Saudi Arabia, Somalia, Sudan, UAE</strong></td>
</tr>
<tr>
<td><strong>Africa Renewable Energy Initiative (AREI)</strong>: Scale up the Africa’s renewable energy potential to achieve at least 10 GW of new and additional renewable energy generation capacity by 2020 and at least 300 GW by 2030.</td>
<td><strong>• Algeria, Comoros, Mauritania, Somalia, Tunisia</strong></td>
</tr>
<tr>
<td><strong>Climate Ambition Alliance</strong>: Net Zero 2050: Commit to achieve net zero CO₂ emissions by 2050</td>
<td><strong>• Comoros, Mauritania, Somalia, Sudan</strong></td>
</tr>
</tbody>
</table>
V. Conclusions and Recommendations

- The available literature indicates that climate change has already imposed a health burden globally and in the Arab region and causes a public health concern.

- Given the complex associations between CC and global health, it is important to understand the various influencing factors at play in order to design effective mitigation and adaptation strategies.

- It can be concluded that the impact of CC on health is not given adequate attention by stakeholders and researchers in the Arab region and that there is variability in the information provided by countries.

CC Adaptation

- The WHO has undertaken many global adaptation initiatives and programs in cooperation with other international organization.

- In the Arab region, there seems to be a lack of regional adaptation strategies targeting the health sector and in many Arab countries there is a need for national adaptation plans.
V. Conclusions and Recommendations (cont’d)

**CC Mitigation**

- Mitigation measures are primarily driven by economic costs and energy implications, the importance of considering health in CC mitigation policies has been highlighted in recent years.
- In the Arab region, most countries have ratified the UNFCCC, the Kyoto Protocol and the Paris Agreement and are undertaking a significant number of regional and national mitigation actions. However, more work still needs to be done, especially on the policy front of climate change mitigation measures with direct health benefits.

**The One Health Approach**

- The approach recognizes that human health, animal health, and environmental health are linked and that human health cannot be protected unless animal health and environmental health are also addressed.
- The One Health perspective is very relevant to a global challenge such as CC, since it affects the environment in which humans and animals, as well as the disease vectors and pathogens affecting them.
- Using the One Health approach in designing and implementing programs, policies, legislation and research is an efficient way to address the emergence of zoonotic diseases such as COVID-19.
“Climate change is intrinsically linked to public health, food and water security, migration, peace, and security. It is a moral issue. It is an issue of social justice, human rights and fundamental ethics. We have a profound responsibility to the fragile web of life on this Earth, and to this generation and those that will follow.”

– United Nations Secretary-General Ban Ki-moon
Backup slides
III. Current Strategies and Benefits to HH from Addressing CC

Driving Forces
Population growth, energy, agriculture, transport policies, change in land use and urbanization

Pressures
Greenhouse gases, aerosols and CFCs

State
Climate change and variability

Exposure
Heat waves, flooding, droughts, temperature increase and air pollution. Changes in environmental conditions, water scarcity, changes in food availability and quality

Health Outcome
CV acute and chronic respiratory diseases, acute diarrhoeal diseases, injuries, vector-borne diseases, allergic diseases and others

ACTION
International and national policies
Risk management
Global and national monitoring
Mitigation and adaptation strategies
Treatment

Driving forces-pressures-state-exposure-effect-action framework for the linkages between climate change and health
(Source: Kovats et. al, 2003)
II. Global Effects of Climate Change on Health

Climate Change Impacts

- Rising Temperatures
- Changes in precipitation, humidity, sunshine and wind
- Sea-level rise
- Extreme weather events
- Social disruption, forced displacement

Infectious Diseases

- Vector-borne (i.e. Malaria, Dengue Fever)
- Water-borne (i.e. Cholera, Dysentery)
- Food-borne (i.e. Diarrheal diseases, Salmonellosis)
- Air-borne (i.e. Meningitis, Tuberculosis)

Pathogen

Pathogen refers to disease agents such as virus, bacterium and fungi. The impact of climate change on pathogens can be direct, through influencing their survival, reproduction, and life cycle, or indirect, through influencing their habitat or environment. For example, rising temperature can influence the reproduction and incubation period of some pathogens and unusual precipitation can result in an increase of certain pathogens.

Transmission

Disease transmission can be direct from one person to another through droplet or physical contact, air-borne or fecal–oral transmission, or indirect transmission from a vector, or an intermediate host to humans. Climate change may affect disease transmission. For example, wind and dust storms can transport pathogens of airborne diseases from one endemic region to another. Forced displacement due to extreme weather events will increase vulnerability to diseases as a result of compromised immunity.

Host

Hosts refer to animals or plants on or in which disease pathogens reside. Vectors (such as mosquitoes) are intermediate hosts that transmit pathogen to other living organisms. Climate change may influence the range, period, and intensity of infectious diseases through its impacts on vectors. For example, rising temperatures can expand the habitats of mosquitoes, which will transmit diseases such as malaria to a wider range. Sea-level rise is likely to decrease or eliminate breeding habitats for salt-marsh mosquitoes.

The impacts of climate change on various aspects of infectious diseases

Adapted from: (Wu et al., 2015), (McMichael & Lindgren, 2011) and (WHO, 2003)
II. CC and COVID-19

• Currently, there is no evidence of a direct connection between CC and the emergence or transmission of COVID-19 (WHO, 2020). However, CC may have an indirect effect on zoonotic diseases which include COVID-19 along with Ebola, Bird flu, Swine flu, MERS, SARS, West Nile virus...etc. (WHO, 2020; UNEP, 2020).

• The pandemic has shown some signs of positive impact on the environment. For example, NO₂ air pollution has decreased across Europe and scientists expect carbon emissions to fall by 5% in 2020 (RFI, 2020; Euronews, 2020).

• The pandemic might also have negative environmental impacts such as an increase in the amounts of medical and hazardous infectious wastes (UN, 2020).

• Very little impact on CC and experts warn that without structural systemic changes the reduced greenhouse gas (GHG) emissions will only be temporary with no real long-term effect (RFI, 2020; UN, 2020).

• The pandemic has highlighted the effect and significance of global response to a global issue and it offers some lessons that can support such response to climate change.