

Climate Change and Health: The Growing Threat to Global Health Security

Authors: Dr Katherine Rennie and Gareth Presch



Introduction

Climate change is increasingly recognised as one of the most pressing public health challenges of the 21st century(1). Rising global temperatures, changing weather patterns, and an increasing frequency of extreme weather events are not only environmental concerns but also critical health issues. As the climate changes, so does the landscape of global health, with the emergence and spread of diseases, increased threats to food and water security, and disruptions in healthcare access. This article explores the impact of climate change on health, focusing on the spread of diseases such as malaria and dengue, and how changing climates affect food, water, and medication security. We will also discuss the economic outlook and potential investment opportunities for mitigating these impacts.

What Is the Problem?

Climate change alters the global health landscape by exacerbating existing health challenges and creating new ones. Rising temperatures and shifting weather patterns are reshaping ecosystems, expanding the geographic range of vector-borne diseases like malaria and dengue fever, and increasing the frequency of extreme weather events such as floods, droughts, and heatwaves. These changes have profound consequences for human health, affecting the spread of diseases and access to essential resources like food, water, and medications.

1. **Vector-Borne Diseases:** As temperatures rise and weather patterns shift, disease-carrying insects such as mosquitoes are spreading to new regions. This has led to the expansion of diseases such as malaria, dengue fever, Zika virus, and chikungunya into areas that were previously unaffected(2). For instance, historically temperate regions in Europe and North America are now seeing cases of dengue and malaria, diseases that once thrived primarily in tropical and subtropical climates. Warmer temperatures, increased rainfall, and stagnant water create optimal breeding grounds for mosquitoes, significantly increasing the risk of transmission.

2. **Food and Water Security:** Climate change is also undermining food and water security, which are fundamental to human health. Rising global temperatures, erratic rainfall patterns, and extreme weather events are reducing agricultural productivity, especially in already vulnerable regions. Prolonged droughts and unpredictable growing seasons are disrupting food supplies, leading to malnutrition and hunger. At the same time, flooding and sea level rise are contaminating freshwater resources, contributing to waterborne diseases such as cholera and increasing competition for safe drinking water.

3. **Healthcare Access and Infrastructure:** Natural disasters like floods, hurricanes, and wildfires are increasingly disrupting healthcare systems and infrastructure. Hospitals and clinics are often damaged or destroyed in these events, making it difficult for people to access medical care. Additionally, extreme weather can cut off access to essential medications and medical

supplies, further threatening health outcomes, especially in low- and middle-income countries with limited resilience to such disruptions.



What Is the Scale of the Problem?

The scale of the health impacts of climate change is vast and growing. According to the World Health Organisation (WHO), climate change is expected to cause an additional 250,000 deaths per year between 2030 and 2050, due to malnutrition, malaria, diarrhoea, and heat stress alone(3). The economic cost of these health impacts is equally staggering, with estimates suggesting that the global economic losses from climate-related health issues could reach several billion dollars annually(3).

1. Expansion of Disease Burden: The geographic spread of vector-borne diseases is one of the clearest indicators of climate change's impact on global health. For example, mosquitoes which transmit dengue are now found in at least 128 countries, with over 4 billion people at risk of infection(4). Similarly, the malaria protozoan parasite, once largely confined to Sub-Saharan Africa, is now being reported in parts of Southeast Asia, Central America, and Southern Europe as warming temperatures create more favourable conditions for transmission.

2. Food Insecurity and Malnutrition: Climate change is already contributing to food insecurity in several regions. The UN Food and Agriculture Organisation (FAO) estimates that over 820 million people are chronically hungry, and climate change is a key driver behind this rising figure(5). Droughts in regions such as the Horn of Africa have devastated crops and livestock,

while floods and cyclones in South Asia have destroyed food stores and displaced millions. The Intergovernmental Panel on Climate Change (IPCC) warns that by 2050, crop yields in some regions could fall by up to 25%, drastically reducing food availability and exacerbating malnutrition, particularly in children(6).

3. Water Scarcity and Health Impacts: The World Bank estimates that by 2030, nearly half of the world's population will be living in areas of high water stress(7). Droughts and changing rainfall patterns are depleting freshwater resources while rising sea levels and extreme weather events are contaminating existing water supplies with salt water and pollutants. This scarcity not only limits access to clean drinking water but also increases the risk of waterborne diseases like cholera and typhoid, which thrive in areas with poor sanitation and contaminated water sources.



How Can This Problem Be Addressed?

Addressing the health impacts of climate change requires a multifaceted approach that combines public health strategies with climate resilience measures. Below are key interventions that can mitigate the effects of climate change on global health:

1. Strengthening Public Health Surveillance: Early detection of disease outbreaks is crucial for controlling the spread of climate-sensitive diseases. Governments and international organisations should invest in expanding surveillance networks that monitor the spread of vector-borne diseases, particularly in regions newly affected by malaria, dengue, and other

illnesses. Data from these networks can inform targeted interventions, such as vector control programs and the distribution of insecticide-treated bed nets.

2. Improving Climate-Resilient Healthcare Infrastructure: Healthcare systems must be adapted to withstand the increasing frequency of extreme weather events. This includes designing hospitals and clinics that are resilient to floods, hurricanes, and wildfires, ensuring that healthcare services remain operational in the aftermath of disasters.

3. Promoting Sustainable Agriculture and Food Security: Investing in climate-resilient agricultural practices is essential for mitigating food insecurity. This includes promoting drought-resistant crop varieties, improving irrigation systems, and encouraging sustainable farming practices that preserve soil health. Diversifying food sources and improving global food distribution networks can also reduce the vulnerability of food systems to climate shocks.

4. Water Management and Sanitation Improvements: Climate change requires the development of innovative water management strategies, particularly in regions facing water scarcity. Governments should invest in infrastructure that conserves water, such as rainwater harvesting systems and wastewater recycling plants. Ensuring access to clean water and improving sanitation systems can prevent outbreaks of waterborne diseases, particularly after flooding events.



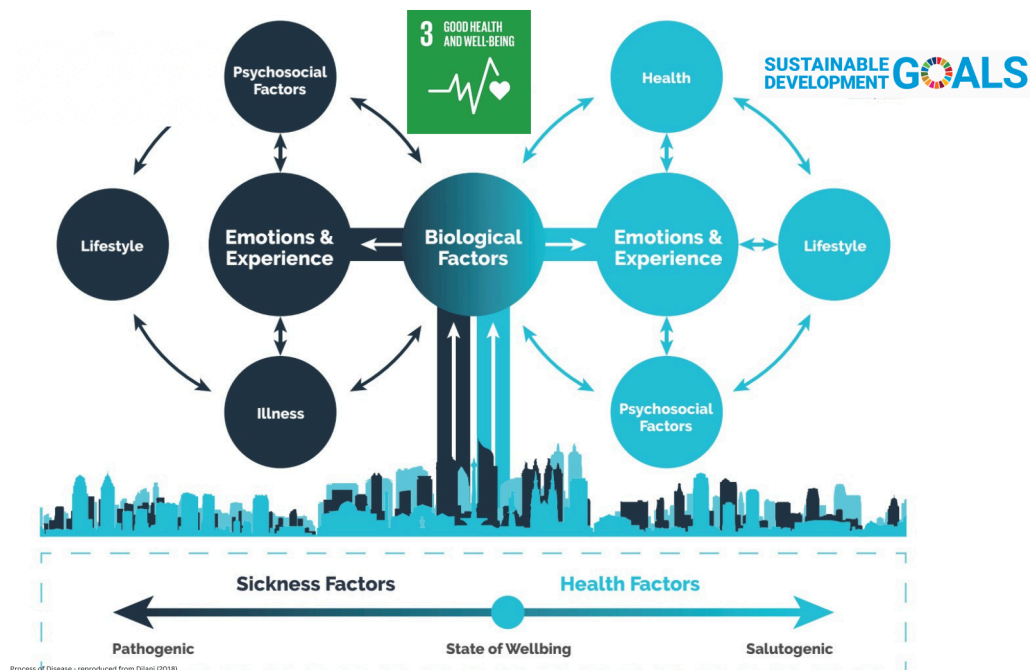
The economic costs of failing to address the health impacts of climate change are substantial. However, there are also significant opportunities for investment in climate resilience that could lead to long-term economic and health benefits.

1. **Cost of Inaction:** The economic burden of climate-related health impacts, including the treatment of diseases, loss of productivity, and damage to infrastructure, could reach trillions of dollars in the coming decades. Inaction will not only strain healthcare systems but also result in higher long-term costs for disaster response and disease management.
2. **Investment in Climate-Resilient Health Systems:** Investing in resilient healthcare infrastructure and disease prevention strategies can save lives and reduce future healthcare costs. For example, building climate-resilient hospitals and clinics not only ensures continuity of care during extreme weather events but also reduces the financial burden of reconstructing healthcare infrastructure after disasters. Similarly, investments in public health campaigns and disease surveillance can reduce the incidence of climate-sensitive diseases, lowering healthcare spending on treatment and emergency responses.
3. **Green Economy and Job Creation:** The transition to a green economy presents opportunities for job creation in areas such as renewable energy, sustainable agriculture, and climate-resilient infrastructure development. These investments address the root causes of climate change and create new industries that can drive economic growth and improve public health outcomes by reducing air pollution and increasing access to clean energy and water.

Costs of Investment and Barriers

While the long-term benefits of investing in climate resilience are clear, there are also significant upfront costs that must be considered.

1. **Initial Investment Costs:** Transitioning to climate-resilient healthcare systems, food security initiatives, and sustainable water management practices requires substantial initial investments. For low- and middle-income countries, these costs may be prohibitive without international support and funding. Governments and international organisations must prioritise funding for climate and health initiatives, recognising the long-term cost savings they can provide.
2. **Political and Social Barriers:** Achieving global consensus on climate change mitigation and adaptation measures remains a challenge. Political resistance, short-term thinking, and competing priorities can delay necessary actions. Additionally, social barriers, such as public resistance to behavioural changes and a lack of awareness about the health impacts of climate change, can impede progress.



THE FUTURE OF HEALTHCARE

We can save money, improve people's health and wellbeing, strengthen health systems, build trust and create new jobs by adopting proven models of healthcare that are focused on preventing disease.

£1 = £36 Social Return on Investment from UK pilot



Outcomes of COP29: Addressing Climate Change and Global Health Security

At COP29, the intersection of climate change and health was recognized as a critical priority for achieving global sustainability and resilience. Key health-related outcomes included:

1. Global Health Adaptation Initiative:

A landmark agreement was reached to establish a *Global Health Adaptation Initiative* aimed at supporting climate-resilient healthcare systems, particularly in low- and middle-income countries. This initiative focuses on:

- Building disaster-resilient healthcare infrastructure.
- Expanding early warning systems for climate-sensitive diseases like malaria and dengue.
- Increasing access to emergency healthcare and supplies during extreme weather events.

2. Funding for Climate-Health Resilience:

A commitment of \$50 billion over five years was announced to combat the health impacts of climate change. The funding will target:

- Research and development of vaccines for vector-borne diseases exacerbated by climate change.
- Sustainable agricultural practices to ensure food security in vulnerable regions.
- Infrastructure for clean water and sanitation to prevent waterborne diseases.

3. Vector-Borne Disease Control Framework:

The *Vector-Borne Disease Control Framework* was launched, promoting cross-border

cooperation and sharing of data to track and control the spread of diseases like malaria, dengue, and Zika. The framework includes investments in public health education, insecticide-treated net distribution, and community-based vector control programs.

4. Health and Climate Data Integration Platform:

A global platform integrating health and climate data was introduced to provide real-time tracking of climate-related health risks. This platform aims to:

- Inform policymakers and healthcare providers of emerging threats.
- Facilitate evidence-based interventions to mitigate health impacts.

5. Health as a Core Criterion in Climate Action:

COP29 marked the first time health was explicitly integrated into climate adaptation and mitigation strategies. Nationally Determined Contributions (NDCs) under the Paris Agreement will now include measurable health outcomes, such as reductions in heat-related mortality and disease burden from air pollution.

6. Climate-Resilient Agriculture and Nutrition Programs:

Recognizing the link between climate change, food security, and health, COP29 included commitments to support drought-resistant crops, innovative irrigation systems, and food distribution networks to mitigate malnutrition and hunger.

7. Collaboration with the Private Sector:

Partnerships with pharmaceutical companies, technology firms, and infrastructure developers were announced to accelerate investments in health resilience technologies. Examples include the development of portable clinics for disaster zones and AI-driven tools for disease surveillance.

The outcomes of COP29 represent a significant step toward addressing the growing threat of climate change to global health security. The agreements reached prioritize proactive investment in health resilience, creating a foundation for protecting vulnerable populations and reducing the long-term economic and human costs of inaction.

Conclusion

The intersection of climate change and health is one of the most critical issues facing global health security today. The changing climate is driving the spread of vector-borne diseases, undermining food and water security, and straining healthcare systems. However, with strategic investments in public health, climate resilience, and sustainable development, the world can mitigate the worst health impacts of climate change while unlocking economic opportunities in the green economy. By acting now, governments and international organisations can protect future generations from the dual threats of climate change and health insecurity.



References:

1. Water Papers - World Bank. Available at:

<https://documents1.worldbank.org/curated/en/099094102272331986/pdf/P1796370ef3e7a0609310020fd7be7cbb2.pdf> (Accessed: 19 November 2024).

2. Chapter 5: Food security – special report on climate change and land. Available at:

<https://www.ipcc.ch/srccl/chapter/chapter-5/> (Accessed: 19 November 2024).

3. Explainer: How climate change is amplifying mosquito-borne diseases | world mosquito program.

Available at: <https://www.worldmosquitoprogram.org/en/news-stories/stories/explainer-how-climate-change-amplifying-mosquito-borne-diseases> (Accessed: 01 November 2024).

4. Darrigo LG Jr, de Sant’Anna Carvalho AM, Machado CM. Chikungunya, Dengue, and Zika in Immunocompromised Hosts. *Curr Infect Dis Rep*. 2018 Mar 17;20(4):5. doi: 10.1007/s11908-018-0612-2. PMID: 29551005; PMCID: PMC5857271.

5. Climate and health: Applying all our health (2022) GOV.UK. Available at:

<https://www.gov.uk/government/publications/climate-change-applying-all-our-health/climate-and->

health-applying-all-our-health (Accessed: 01 November 2024).

6. Climate change World Health Organization. Available at: [https://www.who.int/health-](https://www.who.int/health-topics/climate-)
[topics/climate-](https://www.who.int/health-topics/climate-)

[change#:~:text=Between%202030%20and%202050%2C%20climate,billion%20per%20year%20by%202030.](https://www.who.int/health-topics/climate-change#:~:text=Between%202030%20and%202050%2C%20climate,billion%20per%20year%20by%202030.) (Accessed: 19 November 2024).

7. FAO's work on climate change (2018) Knowledge Repository. Available at:

<https://openknowledge.fao.org/items/91003e08-9a6f-42a0-b2b9-396f622a3866> (Accessed: 07
November 2024).