



Climate Change and Infectious Diseases

This editorial is based on the Article [With climate change, tackling new disease scenarios](#) which was published in The Hindu on 27/09/2023. It talks about the link between climate change and the occurrence of infectious diseases.

For Prelims: [Intergovernmental Panel on Climate Change \(IPCC\)](#), [Dengue](#), [zoonotic diseases](#), [Nipah virus](#), [malaria](#), [Zika virus](#), [National Biofuel Policy](#), [Vehicle Scrappage Policy](#), [E20 Fuel Policy](#), [National Green Hydrogen Mission](#), [National Afforestation Programme \(NAP\)](#), [The Compensatory Afforestation Fund Management and Planning Authority \(CAMPA Funds\)](#), [The National Action Programme to Combat Desertification](#), [Integrated Health Information Platform \(IHIP\)](#)

For Mains: One Health Approach, Climate change and its impact on infectious diseases, Measures to address the issue

In its latest report released in March 2023, the [Intergovernmental Panel on Climate Change \(IPCC\)](#) delivers a stark warning: [climate change](#) heightens the global risk of infectious diseases. The close relationship between climate and disease is being demonstrated every year. For instance, the periodicity of mosquito-borne outbreaks no longer follows expected patterns.

[Dengue](#) manifests in two to three peaks throughout the year. Variability in temperature, precipitation, and humidity disrupt disease transmission cycles. These also alter the distribution of the vectors and animal reservoirs that host the parasite. Heat has been proven to interfere with the genomic structure of pathogens, changing their infectivity and virulence.

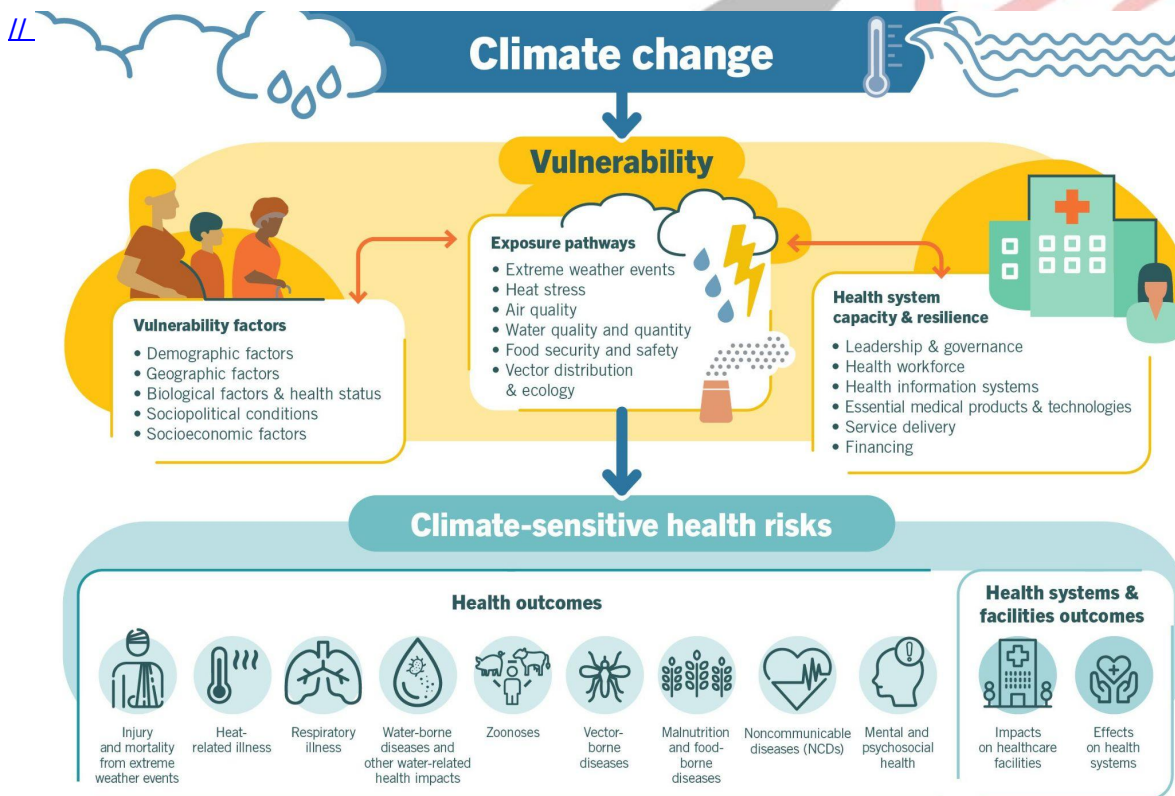
The direct damage costs to health (i.e. excluding costs in health-determining sectors such as agriculture and water and sanitation), is estimated to be between USD 2-4 billion/year by 2030.

How is Climate change linked to the Occurrence of Diseases?

- **Habitat Loss and Zoonotic Diseases:** As climate change alters ecosystems, habitat loss becomes more prevalent. This forces disease-carrying animals to encroach upon human territories as they search for suitable habitats and resources. This **increased interaction between humans and wildlife raises the risk of [zoonotic diseases](#)**, where pathogens transfer from animals to humans.
 - [Nipah virus](#), a prime example, has caused outbreaks in Kerala due to such spillover events.
- **Temperature and Disease Transmission:** Rising temperatures can affect the distribution and behavior of disease vectors, such as mosquitoes and ticks. These vectors play a crucial role in transmitting diseases like [malaria](#), [dengue fever](#), and Lyme disease.
 - Warmer temperatures can expand the geographic range of these vectors, allowing them to

thrive in areas that were previously too cold for them.

- **Changing Patterns of Precipitation:** Climate change can alter patterns of precipitation, leading to more intense and prolonged rainfall in some regions and droughts in others. These changes can create suitable breeding environments for disease vectors.
 - Increased flooding can contaminate water sources with sewage and pathogens, leading to outbreaks of waterborne diseases like [cholera](#) and [dysentery](#).
 - Heavy rainfall can create stagnant water pools, which are ideal breeding sites for mosquitoes that transmit diseases like [malaria](#) and [Zika virus](#).
- **Altered Vector Behavior:** Climate change can influence the behavior of disease vectors.
 - Warmer temperatures can accelerate the development of pathogens within the vectors, allowing for a shorter incubation period and more rapid transmission of diseases.
- **Food Security:** Climate change can disrupt agricultural systems, leading to changes in food production and distribution. **These disruptions can contribute to malnutrition and weaken immune systems**, making populations more susceptible to diseases.
- **Extreme Weather Events:** Climate change is associated with an increase in the frequency and intensity of extreme weather events, such as [cyclones](#), [heatwaves](#), and [wildfires](#). These events can lead to injuries, displacement, and disruptions in healthcare systems, creating conditions conducive to disease outbreaks.
- **Changing Disease Landscape:** Climate change has broadened the spectrum of infectious agents threatening humans. Over half of all known infectious diseases that affect humans worsen with changing climate patterns.
 - These diseases often discover new transmission routes, including environmental sources, medical tourism, and contaminated food and water.



What are Some of the Initiatives taken by the Government?

- **National Guidelines for Infection Prevention and Control in Healthcare Facilities:** provide a comprehensive framework for the patient safety and the capacity of health workers to prevent and control infections. These guidelines aim to prevent current and future threats from infectious diseases such as [Nipah](#), [Ebola](#), and to combat [antimicrobial resistance \(AMR\)](#) and improve the overall quality of health services.
- **National Health Mission:** It is an initiative undertaken by the government of India to address the

health needs of under-served rural and urban areas. It aims to prevent and control communicable and non-communicable diseases, including locally endemic diseases.

- **Universal Immunization programme:** It provides free vaccines to protect children and pregnant women from 12 vaccine-preventable diseases such as polio, measles, tetanus, and others. The programme also launched an ambitious initiative called **Mission Indradhanush**, which aims to accelerate full immunization coverage and to reach the unreached populations.

What measures should be taken to address this issue?

▪ Mitigating Climate Change:

- Reducing greenhouse gas emissions from various sources, such as fossil fuels, agriculture, industry, and waste, by using cleaner and more efficient technologies, switching to renewable energy sources, improving energy efficiency, and promoting low-carbon lifestyles.
 - **National Biofuel Policy, Vehicle Scrappage Policy, E20 Fuel Policy, National Green Hydrogen Mission** are the some steps taken by the government in this regard.
- Enhancing the sinks of greenhouse gases, such as forests, soils, and oceans, by protecting and restoring natural ecosystems, increasing carbon sequestration and storage, and avoiding land degradation and deforestation.
 - **National Afforestation Programme (NAP), The Compensatory Afforestation Fund Management and Planning Authority (CAMPA Funds), The National Action Programme to Combat Desertification** are some steps taken by the government.

▪ Strengthening Disease Surveillance Systems:

- Enhance Surveillance Technology: Invest in advanced surveillance technologies and systems that enable real-time tracking of emerging disease outbreaks. Promote the use of web-enabled platforms for disease reporting.
 - **Integrated Health Information Platform (IHIP):** IHIP was introduced in 2018 in seven states. IHIP was designed to be a web-enabled, near-real-time electronic information system capable of reporting on a broad range of disease conditions and providing disaggregated data.
 - However, IHIP is grappling with several challenges such as IHIP has not met expectations in terms of real-time tracking of emerging disease outbreaks. Despite technological advancements, there may be implementation or operational challenges which need to be addressed.
- **One Health Approach:** Adopt a **One Health approach** that integrates monitoring of human, animal, plant, and environmental health. This approach recognizes the interconnectedness of these factors and is crucial in preventing outbreaks, especially those originating from animals.
 - To effectively implement the One Health approach, India should establish greater synergies between the central government and states, as well as specialized agencies.
 - Departments responsible for animal husbandry, forest and wildlife, municipal corporations, and public health need to collaborate and create robust surveillance systems.
 - Building trust, data sharing, and defining lines of responsibility are critical components of this approach.

▪ Capacity Building and Resource Allocation:

- Invest in training and capacity building for healthcare workers, environmental scientists, and other relevant professionals to effectively monitor and respond to disease outbreaks.
- Allocate adequate resources, including funding and personnel, to support disease surveillance and response efforts.

▪ Public Awareness and Education:

- Educate the public about the risks associated with climate change-induced diseases and the importance of early reporting of symptoms. Encourage communities to participate in

disease surveillance efforts.

- Awareness programs like Delhi government's anti-dengue campaign need to be intensified.

▪ **International Collaboration:**

- The Office of the Principal Scientific Adviser to the Prime Minister has played a leading role in this initiative. However, with new funding sources like the World Bank, there is a need for greater coordination and management to ensure the success of **One Health** and infectious disease control programs.

▪ **Program Evaluation and Adaptation:**

- Regularly evaluate the effectiveness of disease surveillance and control programs and adapt strategies based on evolving disease patterns and climate change impacts.

Conclusion

- Climate change is not limited to infectious diseases. It also exacerbates injuries and deaths from extreme weather events, **respiratory and cardiovascular diseases**, and mental health issues.
- The re-emergence of **Nipah** in Kerala is a wake-up call, that mere biomedical response to diseases is inadequate. In the face of a changing climate and the growing threat of infectious diseases, protecting ecosystems, fostering collaboration, and embracing the **One Health** paradigm are our best defenses.
- The road ahead demands concerted efforts, not just to adapt but also to proactively safeguard our planet and its inhabitants.

Drishti Mains Question:

Discuss the various ways in which climate change impacts the occurrence and transmission of infectious diseases. Elaborate on the strategies that should be adopted to mitigate these risks.

UPSC Civil Services Examination Previous Year Question (PYQ)

Mains

Q. 'Climate change' is a global problem. How will India be affected by climate change? How Himalayan and coastal states of India be affected by climate change? **(2017)**

Q. "Besides being a moral imperative of a Welfare State, primary health structure is a necessary precondition for sustainable development." Analyse. **(2021)**