Heatwaves

For Prelims: Heatwaves, Indian Meteorological Department (IMD), global warming, urban heat island effect, El Nino , Sendai Framework for Disaster Risk Reduction 2015-30, Nature-based solutions, Intergovernmental Panel on Climate Change (IPCC), Passive cooling technology.

For Mains: Criterion for Declaring Heat Wave in India, Impacts of Heat Waves.

Why in News?

Recently, casualties were observed from an apparent heat stroke while attending a **government award function in Navi Mumbai.** This incident highlights the **potential risks from** heatwaves, which are **expected to increase in intensity and frequency due to climate change.**

- Several factors, such as **long-distance travel, underlying health conditions**, and lack of access to drinking water and medical attention in large gatherings, can **increase vulnerability to** heat strokes.

What are Heat Waves?

- **About:**
  - Heatwaves are **prolonged periods of excessively hot weather** that can cause adverse impacts on **human health, the environment, and the economy.**
    - India, being a tropical country, is **particularly vulnerable to heatwaves,** which have become more frequent and intense in recent years.
- **Criteria for Declaring Heat Wave in India:**
  - **Plains and Hilly Regions:**
    - Heat wave is considered if the **maximum temperature of a station reaches at least 40°C or more for Plains** and at least 30°C or more for Hilly regions.
    - **Based on Departure from Normal Heat Wave:** Departure from normal is **4.50°C to 6.40°C.**
      - **Severe Heat Wave:** Departure from normal is >6.40°C.
    - **Based on Actual Maximum Temperature Heat Wave:** When actual maximum temperature ≥45°C.
      - Severe Heat Wave: When actual maximum temperature ≥47°C.
    - If the above criteria are met in at least 2 stations in a Meteorological subdivision for at least two consecutive days, it is declared so on the second day.
  - **Coastal Areas:**
    - When maximum temperature departure is **4.50°C or more from normal,** a heat wave may be described provided the actual **maximum temperature is 37°C or more.**
- **Fatality:**
  - High temperature in itself is not fatal but the combination of **high temperature and high humidity, referred to as the** wet bulb temperature, is what **makes heatwaves deadly.**
  - **High moisture content in the atmosphere makes it difficult for the sweat to**

evaporate and bodies to cool down, as a result of which the internal body temperature increases sharply and is often fatal.

- **Causes:**
  - **Global Warming:** One of the primary causes of heatwaves in India is **global warming**, which refers to the long-term increase in Earth's average temperature due to human activities such as burning fossil fuels**, deforestation, and industrial activities.**
    - Global warming can result in higher temperatures and changes in **weather patterns**, leading to heatwaves.
  - **Urbanisation**: Rapid **urbanisation** and the growth of concrete jungles in cities can lead to the phenomenon known as the **"urban heat island effect."**
    - Urban areas with high population density, buildings, and concrete surfaces absorb and retain more heat, **leading to higher temperatures, particularly during heatwaves.**
  - **El Nino Effect: During an** El Nino **event**, the warming of the Pacific Ocean can affect **global weather patterns, causing changes in temperature, rainfall, and wind patterns around the world.**
    - The summer of the year 2023 is predicted to be **excessively hot because of the** end of the strong La Nina phase **in equatorial Pacific Ocean** and the earlier-than-expected occurrence of **El Nino event.**
- **Impacts:**
  - **Impact on Health:**
    - Rapid rises in heat gain can **compromise the body's ability to regulate temperature** and can result in a cascade of illnesses, including heat cramps, heat exhaustion, heatstroke, and hyperthermia.
      - Deaths and hospitalizations from heat can occur extremely rapidly or have a lagged effect.
  - **Impact on Water Resources:** Heatwaves can **exacerbate** water scarcity **issues in India;** drying up of water bodies, reduced water availability for agriculture and domestic use, and increased competition for water resources.
    - This can lead to **conflicts over water, affect irrigation practices, and impact water-dependent industries.**
  - **Impact on Energy:** Heatwaves can **increase electricity demand for cooling** purposes, leading to strain on power grids and potential blackouts.
    - This can disrupt economic activities, **affect productivity, and impact vulnerable populations** who may not have access to reliable electricity for cooling during heatwaves.

Way Forward

- **A Heat Waves Action Plan:** The adverse impacts of heat waves indicate that **effective disaster adaptation strategies** and more robust disaster management policies are required in **heatwave zones** to lessen the impact of heatwaves.
  - As deaths due to heatwaves are preventable, the **government must prioritise preparing a long-term action plan to safeguard human lives, livestock, and wildlife.**
  - Effective implementation of the **Sendai Framework for Disaster Risk Reduction 2015-30** with the State playing a leading role and sharing responsibility with other stakeholders is now the need of the hour.
- **Implementing Climate Action Plans:** National Action Plan for Climate Change (NAPCC) should be implemented in true spirit for inclusive growth and ecological sustainability.
  - Nature-based solutions **should be taken into account,** not just for tackling climate change induced heat waves but also doing it in a way that is **ethical and promoting intergenerational justice.**
- **Sustainable Cooling:** Passive cooling technology**,** a widely-used strategy to create naturally ventilated buildings, can be a **vital alternative to address the urban heat island for residential and commercial buildings.**
  - The **Intergovernmental Panel on Climate Change (IPCC)** in the third part of its AR6 stated that **ancient Indian building designs that have used this technology, can be adapted to modern facilities in the context of global warming.**

- **Heatwave Mitigation Plans:** Heat-related fatalities can be mitigated through effective measures such as **access to water, oral rehydration solutions (ORS), and shade, especially at public places** along with **flexible working hours in workplaces,** and **special arrangements for outdoor workers.**
    - Proactive implementation by **vigilant local administration, monitored by higher authorities, is also crucial.**

UPSC Civil Services Examination, Previous Year Question (PYQ)

Q. What are the possible limitations of India in mitigating global warming at present and in the immediate future? (2010)

1. Appropriate alternate technologies are not sufficiently available.
2. India cannot invest huge funds in research and development.
3. Many developed countries have already set up their polluting industries in India.

Which of the statements given above is/are correct?

(a) 1 and 2 only
(b) 2 only
(c) 1 and 3 only
(d) 1, 2 and 3

Ans: (a)

Source: IE