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## TRAGEDY OF HEAT WAVES

THIS ARTICLE COVERS 'DAILY CURRENT AFFAIRS' AND THE TOPIC DETAILS OF "TRAGEDY OF HEAT WAVES". THIS TOPIC IS RELEVANT IN THE "POLITY AND GOVERNANCE" SECTION OF THE UPSC CSE EXAM.

### Why in the News?

At least 61 people have reportedly died from suspected heat stroke across several states. Among these fatalities, 23 were polling personnel participating in the last phase of the Lok Sabha election. The deaths primarily took place in Uttar Pradesh and Bihar, where 18 of the poll workers succumbed to heat waves-related conditions.

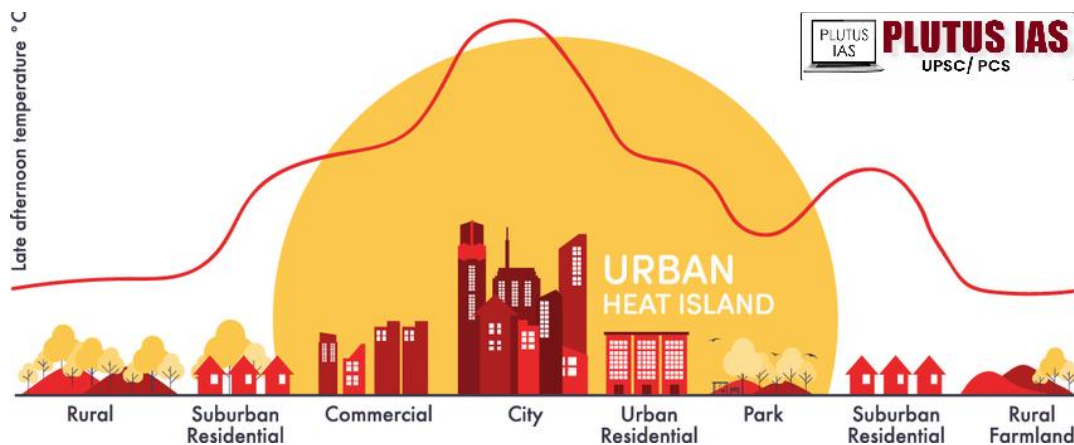
### WHAT ARE HEAT WAVE CONDITIONS?

According to the **India Meteorological Department (IMD)**, a heat wave is characterised by an extended period of unusually high temperatures, lasting several days or even weeks. The IMD uses two main criteria to declare a heat wave:

1. **Temperature Criteria:** A heat wave is declared if the maximum temperature at a station reaches 45°C or higher for at least two consecutive days.
2. **Frequency Criteria:** To confirm a heat wave, the above temperature threshold must be met in at least two stations within a meteorological subdivision for a minimum of two consecutive days.
  - For **coastal areas**, the IMD has specific criteria: a heat wave is declared if the maximum temperature is 37°C or higher and shows a departure of 4.5°C or more from the normal.
  - In **hilly regions**, the threshold temperature is set at 30°C.

### URBAN HEAT ISLAND EFFECT

The urban heat island (UHI) effect refers to the phenomenon where urban areas absorb and retain more heat than their rural surroundings, resulting in higher temperatures. This effect intensifies during heat waves, causing cities to become even hotter.



## IMPACT OF THE URBAN HEAT ISLAND EFFECT

1. **Increased Temperatures:** The UHI effect can elevate urban temperatures by up to 5°C (9.0°F) compared to nearby rural areas.
2. **Air Quality:** Higher temperatures from the UHI effect can worsen air quality by increasing the production of pollutants like ozone, a greenhouse gas that forms more rapidly at elevated temperatures.
3. **Water Quality:** Warmer waters flowing into local streams and rivers can stress ecosystems and degrade water quality.

## WHAT ARE THE MAJOR HEALTH RISKS ASSOCIATED WITH HEAT WAVES?

- **Heatstroke:** This is a severe form of hyperthermia where the body's temperature regulation system fails, leading to a rapid increase in body temperature. Symptoms include confusion, seizures, and loss of consciousness. Without immediate medical intervention, heatstroke can be fatal.
- **Heat Exhaustion:** This condition results from excessive sweating, leading to dehydration and electrolyte imbalance. Symptoms include heavy sweating, weakness, dizziness, nausea, and headache. If not addressed promptly, heat exhaustion can progress to heatstroke.
- **Dehydration:** High temperatures increase the body's need for fluids. Without adequate hydration, individuals can experience severe dehydration, which can cause kidney failure, seizures, and other complications.
- **Heat Rash:** Also known as prickly heat, this condition is characterised by red, itchy skin caused by excessive sweating. It commonly affects areas of the body that are covered by clothing.
- **Cardiovascular Issues:** Heat waves put extra strain on the heart, increasing the risk of heart attacks and other cardiovascular problems. People with pre-existing heart conditions are particularly vulnerable.
- **Respiratory Problems:** Extreme heat can exacerbate respiratory issues, especially in individuals with asthma or **chronic obstructive pulmonary disease (COPD)**. High temperatures can also increase the levels of air pollutants, further aggravating respiratory conditions.
- **Impact on Mental Health:** Prolonged exposure to high temperatures can lead to heat-induced irritability, anxiety, and other mental health issues. There is also evidence suggesting a link between heat waves and increased rates of mental health-related emergencies.
- **Increased Mortality in vulnerable populations:** Vulnerable populations such as the elderly, infants, and individuals with chronic illnesses face a higher risk of mortality during heat waves due to their reduced ability to regulate body temperature and cope with extreme heat.

## HEAT WAVES ACTION PLAN PROPOSED BY IMD

### Key Components of Heatwave Action Plan

- **Early Warning System:** Develop a system to notify residents about anticipated high and extreme temperatures in advance.
- **Inter-Agency Coordination:** Facilitate collaboration among various agencies to ensure a prompt and effective response to heat waves and timely communication with the public.
- **Capacity Building and Training:** Implement training programs for professionals and stakeholders to enhance their ability to manage heat-related health issues.
- **Public Awareness and Community Outreach:** Conduct public education campaigns using hoardings, posters, workshops, and other methods to inform people about preventive measures during heat waves.
- **Collaboration with NGOs and Civil Society:** Work with non-governmental organisations and civil society groups to extend the reach and effectiveness of heat action plans.
- **Health Impact Assessment:** Perform epidemiological studies on heat-related deaths, gather data on risk factors and illnesses, and use the findings to improve future Heat Action Plans.
- **Monitoring and Response:** Track heat-related illnesses and fatalities, record daily mortality rates and analyse this data to assess and refine the plan's effectiveness.
- **Adaptation and Mitigation Measures:** Implement a range of measures, including awareness campaigns, capacity-building workshops, mitigation strategies, early warning communications, medical preparedness, and ongoing monitoring and analysis.

### DIFFERENT STRATEGIES ADOPTED BY VARIOUS STATES TO TACKLE HEAT WAVES

- **Madurai** is organising medical camps in high-traffic areas
- **Bhubaneswar** has set up cool wards in hospitals, and Nagpur is minimising traffic stoppages.
- In **Delhi**, school hours are staggered, and there is a ban on construction and other labor-intensive activities from 12 PM to 3 PM to avoid peak heat hours.
- Additionally, cities are promoting cost-effective solutions like **cool roofs and green roofs to reduce household heating**. Large-scale implementation of these measures, such as in Ahmedabad and Jodhpur, has primarily been driven by the non-government sector.
- Telangana has introduced a state-wide cool roof policy that mandates a gradual increase in coverage.
- Many Indian cities are also initiating greening projects to provide shade and mitigate the heat island effect. As part of the **Resilient Kerala initiative**, Kerala is conducting a '**bare earth program**,' demolishing all abandoned buildings and grey infrastructure.

### Prelims Based Question

#### Q1. Consider the following statements:

1. **IMD has described different conditions to declare heat waves in different regions such as coastal, hilly and plains.**
2. **Prolonged exposure to heat waves can also cause mental health issues.**

Choose the correct answer using the codes given below:

(a). 1 Only

- (b). 2 Only
- (c). Both 1 and 2
- (d). Neither 1 nor 2

**ANSWER: C**

### **Mains Based Question**

**Q1. Tropical countries like India have faced unprecedented Heatwave crises in recent times. Why have heat wave conditions increased, and what measures could be employed to tackle the issue of heat waves?**

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