

# **Heatwave Conditions**

For Prelims: Criteria for Heat Waves, El Nino, Indian Meteorological Department, National Action Plan for Climate Change (NAPCC)

For Mains: Causes, Impact, Mitigation strategies of Heat Waves, <u>Urban Heat Island, Sendai Framework</u> for Disaster Risk Reduction

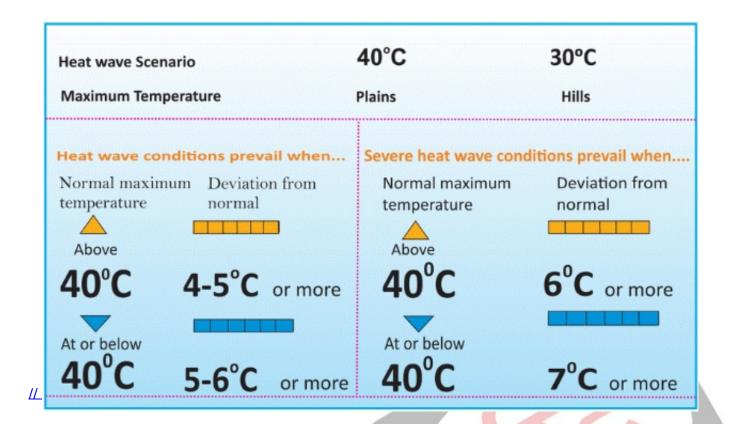
## Why in News?

Odisha is currently facing an intense heatwave since April 2023, with temperatures exceeding 40°C in most monitoring centers across the state.

Delayed monsoon could be a contributing factor for this heat wave. In 2023, the monsoon arrived over the Kerala coast on June 8, which is a delay compared to its normal onset date of June 1.

#### 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.
- IMD Criteria for Declaring Heat Wave in India:
  - Heat Wave need not be considered till maximum temperature of a station reaches at least 40°C for Plains and at least 30°C for Hilly regions.
  - If the normal maximum temperature of a station is less than or equal to 40°C, then
    an increase of 5°C to 6°C from the normal temperature is considered to be heat
    wave condition.
    - Further, an increase of 7°C or more from the normal temperature is considered a severe heat wave condition.
  - If the normal maximum temperature of a station is more than 40°C, then an increase of 4°C to 5°C from the normal temperature is considered to be heat wave condition.
     Further, an increase of 6°C or more is considered a severe heat wave condition.
    - Additionally, if the actual maximum temperature remains 45°C or more irrespective of normal maximum temperature, a heat wave is declared.



## What are the Causes of Heat Waves?

## 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.

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 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 <u>"urban heat island effect."</u>
- Urban areas with high population density, buildings, and concrete surfaces absorb and retain more heat, leading to higher temperatures, particularly during heatwaves.

#### Sparse Pre-Monsoon Season Showers:

- Less moisture in many areas, leaving large parts of India arid and dry.
- The sudden end of pre-monsoon rain showers, an uncommon trend in India, has contributed to the heat waves.

## El Nino Effect:

- El Nino often increases temperatures in Asia, combined with the weather pattern to create record high temperatures.
- Trade winds coming from South America normally blow westward towards Asia during the Southwest Monsoon and warming of the Pacific Ocean results in weakening of these winds.
  - Therefore, moisture and heat content get limited and results in reduction and uneven distribution of rainfall across the Indian sub-continent.

## What are Its 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:

- 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 <u>Sendai Framework for Disaster Risk Reduction</u>
   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 <u>Intergovernmental Panel on Climate Change (IPCC)</u> 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.

## **UPSC Civil Services Examination, Previous Year Question (PYQ)**

## Prelims

# 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)

## **Mains**

Q. Bring out the causes for the formation of heat islands in the urban habitat of the world. (2013)

**Source: DTE** 

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