



1 - March 2023

HEATWAVE

*This article covers "Daily current events" and the topic is about '**Heatwave**' which is in news, it covers "Important Geophysical Phenomena" in GS-1 and "Climate Change" in GS-3, and the following content has relevance for UPSC.*

For Prelims: Heatwave

For Mains: GS-1, Important Geophysical Phenomena; GS-3, Climate Change

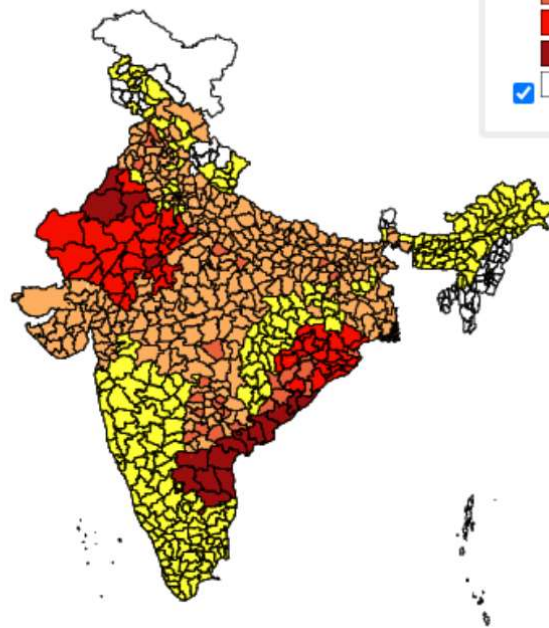
Why in the news:

The maximum temperatures throughout northwest, west, and central India, according to the India Meteorological Department (IMD), would be 3-5° C higher than the long-term average.

ABOUT HEATWAVE

- A heat wave is a period of very hot weather that may also be accompanied by significant humidity, especially in nations with maritime climates.
- Although definitions vary, heat waves are usually measured relative to the region's normal climate and the normal temperature for the season.
- If temperatures are higher than what someone from a hotter environment would consider normal for that region, they may be referred to as a heat wave there.
- Since the 1950s, nearly everywhere has experienced an increase in the frequency and intensity of heat waves, according to the IPCC.
- Heatwaves are not regarded as a natural catastrophe under the National Disaster Management Act of 2005 or the National Policy on Disaster Management of 2009.
- It is not listed among the 12 catastrophes that qualify for aid from federal or state disaster relief funds.

Heatwave in India



Number of Heat Wave Days

1 - 50

51 - 200

201 - 400

401 - 700

701 - 1113

India District



Heatwave

CAUSES OF A HEATWAVE

- Heat waves are caused by high pressure at the ground level, which is most common in the summer. Air sinks through the atmosphere when there is an accumulation of high pressure over a region. As the air sinks, it constricts and warms. The temperature rises by 1°C for every 100 meters of air pressure.
- **Heat Dome:** High pressure can also cause a heat dome, which intensifies the heat wave. When a high-pressure area remains over a region for several days, it traps extremely warm air underneath and produces a heat dome. The dome prevents air that would normally rise, cool, and then return to the surface, causing a continuous buildup of heat and lowering the likelihood of precipitation.
- In the summer, when weather patterns are slower moving, longer high-pressure periods are more frequent. As high-pressure systems take longer to exit an area, they have knock-on effects on other weather systems. Less cloud cover and weak winds might result in the stuffier, more humid air.
- **Industrialization:** The surplus greenhouse gases (such as carbon dioxide) created since the Industrial Revolution trap heat in the Earth's atmosphere, which is why all of this is happening. The average temperature of the Earth has increased by about 1°C as a result of this phenomenon since the late 1800s. This kind of average temperature rising results in an excessively huge increase in intense heat.

FORMATION OF HEAT WAVE

- Heatwaves develop when high pressure develops in the atmosphere [between 10,000 and 25,000 feet (3,000 to 7,600 meters)] and persists over a region for several days to several weeks.
- Because the jet stream “follows the sun,” it frequently happens during the summer (in both the Northern and Southern Hemispheres). The high-pressure area is found in the higher layers of the atmosphere on the jet stream’s equator side.
- Weather patterns typically vary more slowly in the summer than they do in the winter. This upper level of high pressure consequently moves slowly as well.
- The high pressure causes the air to descend (subside) towards the surface where it warms and dries adiabatically, reducing convection and cloud formation.
- Cloud cover lessening increases the amount of shortwave radiation reaching the surface. Because of the surface low pressure, surface winds from lower latitudes carry warm air, accelerating the warming.
- As an alternative, the surface winds might originate from the warm continental interior and blow towards the coastal region, causing heat waves there, or they might originate from a high elevation and blow towards a low elevation, causing subsidence and hence adiabatic warming.

IMPACT OF HEATWAVE

Agriculture

- Agriculture may suffer from high temperatures.
- High daytime temperatures have a deleterious effect on plant growth, while some crops need cool nights.
- Livestock is more likely to experience heat stress during heat waves, especially when nighttime temperatures are high and the animals are unable to cool off. Cattle that are overheated may produce less milk, grow more slowly, and have fewer calves.

Energy

The U.S. energy system is impacted by rising temperatures in numerous ways, including demand, transmission, and production.

While greater summertime temperatures raise the need for electricity for cooling, they can also reduce transmission lines’ capacity to transport power, which could result in problems with electrical reliability like rolling blackouts during heat waves.

Infrastructure

Heat waves can and often do cause electricity transformers to explode, causing fires, water lines to burst, and roads and highways to bend and melt.

Heat waves can also harm railroads by buckling and kinking the rails, which can slow down traffic, cause delays, or even cause service cancellations if the rails are too risky for trains to travel on.

Health Effects

Heat edema: Heat edema typically results from increased aldosterone secretion, which enhances water retention, and manifests as temporary swelling of the hands, feet, and ankles.

Heat rash: The maculopapular rash known as heat rash, commonly referred to as prickly heat, is accompanied by acute inflammation and clogged sweat ducts. The sweat ducts may enlarge and then rupture, resulting in tiny pruritic vesicles with an erythematous base.

Heat cramps: Heat cramps are uncontrollable, painful spasms of the big muscular groups engaged during hard exertion. Heat cramps usually happen after a lot of physical activity. They typically appear in individuals who are engaging in vigorous exercise, perspiring heavily, and replacing the lost fluid with water that does not include electrolytes.

Heat syncope: Heat exposure causes orthostatic hypotension, which leads to heat syncope. A near-syncopal episode may be triggered by this hypotension. The causes of heat syncope are thought to be excessive perspiration, dehydration, peripheral vasodilation, and diminished venous blood return in the face of impaired vasomotor control.

Source:

- [The Hindu](#)
- [IMD](#)

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