

A Spatial Shift of Heatwaves in India

Why in News

Recently, a study has found a **spatial shift of <u>heatwaves</u>** in India, now occurring in new regions in the country.

- It also added that the <u>eastern</u> and <u>western coasts</u>, which are currently unaffected by heatwaves, wil be severely impacted in the future.
- It assessed the monthly, seasonal, decadal and long-term trends in heatwaves in the country from 1951-2016.

Key Points

Findings:

- A warming pattern was found over northwestern and southern India, while a
 progressive cooling phase over northeastern and southwest regions of the
 country.
- A "spatio-temporal shift" is revealed in the occurrence of heatwave events, with a significantly increasing trend in three prominent heatwave prone regions- northwestern, central, and south-central India, with the highest being in west Madhya Pradesh (0.80 events/year).
 - Heatwaves have been traditionally associated with UP, Bihar, Delhi and northern parts of Madhya Pradesh.
- Heatwaves were found in southern Madhya Pradesh, Andhra Pradesh, Karnataka and Tamil Nadu, where they would traditionally not take place.
 - Increases in heatwaves in Karnataka and Tamil Nadu are particularly significant, and point to increased events in the future.
- A significant **decrease in heatwaves over the eastern region,** that is Gangetic West Bengal (-0.13 events/year).
- An increasing trend of heatwave days and severe heatwave days was observed in the decade of 2001-2010 as compared to previous decades.

Factors:

Two elements that have exacerbated the heatwave conditions in the country are the
increase in night time temperatures, which disallows heat discharge at night, and
increasing humidity levels.

Heatwaves:

About:

- A heatwave is **a period of abnormally high temperatures**, more than the normal maximum temperature that occurs during the summer season in the North-Western and South Central parts of India.
- Heatwaves typically occur between March and June, and in some rare cases even

extend till July.

 India Meteorological Department (IMD) classifies heatwaves according to regions and their temperature ranges.

Criteria for Heatwaves:

- The heatwave is considered when the 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.**

Impact:

Heat Stress:

• The presence of humidity in the environment prevents the thermoregulatory mechanism of evaporative cooling of the body through the process of perspiration, which can cause heat stress.

Increase in Heat-Related Mortality

• An increase of 0.5 degrees Celsius in mean summer temperatures can cause an increase of heat-related mortality from 2.5 to 32%, and an increase in the duration of a heatwave from 6 to 8 days and result in an increase in the probability of mortality by 78%.

Heat Strokes:

- The very high temperatures or humid conditions pose an elevated risk of heat stroke or heat exhaustion.
- Older people avnd people with chronic illness such as <u>heart disease</u>, <u>respiratory disease</u>, <u>and diabetes</u> are more susceptible to heatstroke, as the body's ability to regulate heat deteriorates with age.

Increased Energy Demands:

• The sweltering heatwave also leads to rise in energy demand, especially electricity, leading to pushing up rates.

• Lessens Workers' Productivity:

- Extreme heat also lessens worker productivity, especially among the more than 1 billion workers who are exposed to high heat on a regular basis.
- These workers often report reduced work output due to heat stress.

Source: IE