

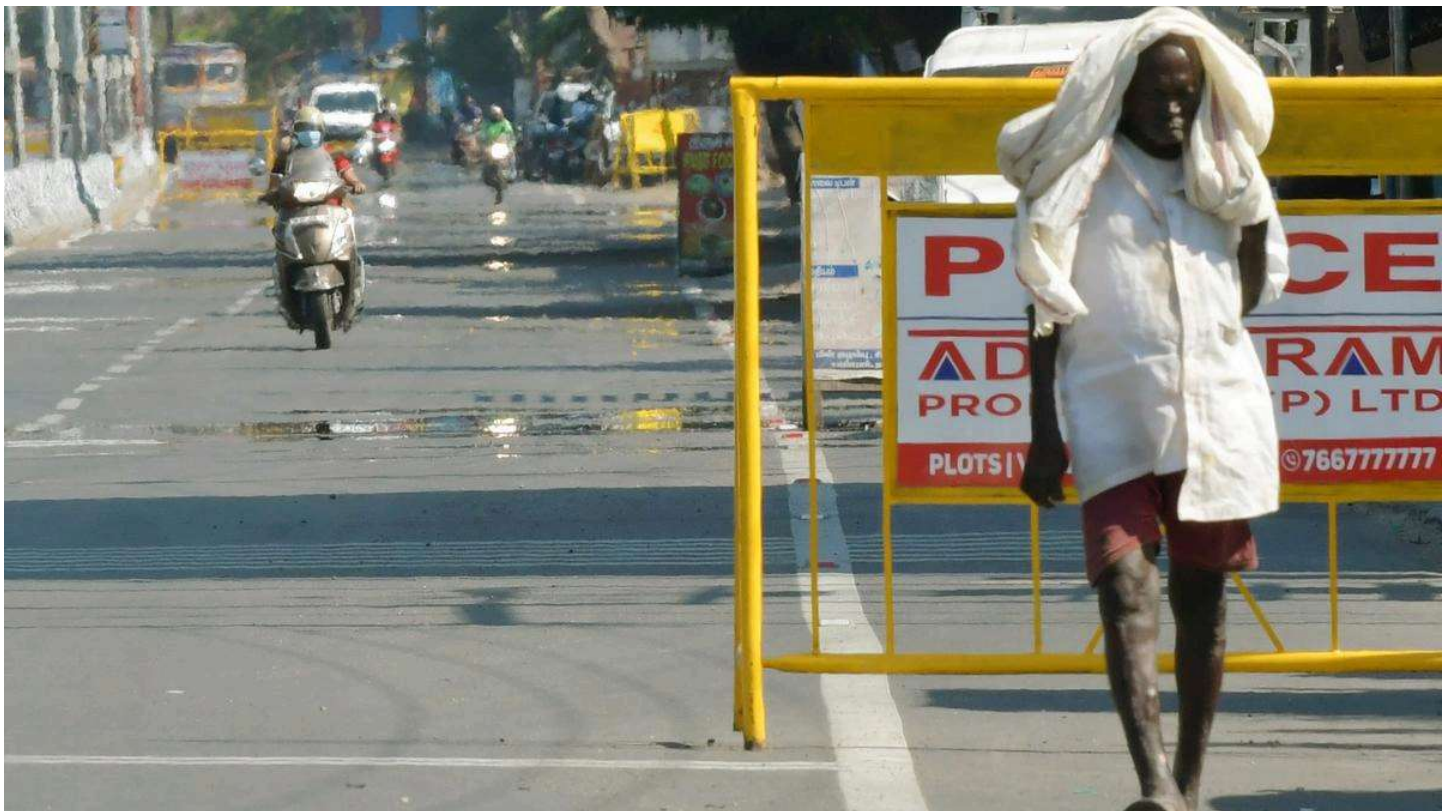
# How is Tamil Nadu bracing for heatwaves?

What is a heatwave condition? Why are Indian cities, towns and villages vulnerable both in the hills and the plains? Will notifying it as a State-specific disaster help? Why is it important to have a focused management plan in place?

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Children, senior citizens, pregnant women, those with pre-existing co morbidities, and people forced to work in the open are more vulnerable to the impact of heat. File | Photo Credit: The Hindu

**The story so far:** The Tamil Nadu government, last week, notified a heatwave as a State-specific disaster. This would entail providing relief to people affected by heatwaves, solatium for the family of those who have died of heat-related causes, and to launch interim measures to help manage the heat. Expenditure for this will be incurred from the State Disaster Response Fund.

## Is heat a crisis now?

The World Meteorological Organization declared that 2023 was the hottest year on record. The frequency of heatwaves has increased in recent years, consistent with anthropogenic climate change, as per the Sixth Assessment Report of the Intergovernmental Panel on Climate Change, 2023. Closer home, in India, people are already reeling under the impact of intense heatwaves. In a paper in the journal *Environment International*, titled *Impact of heatwaves on all-cause mortality in India: A comprehensive multi-city study*, the authors Jeroen de Bont et al record India's heatwaves that have been occurring with increased frequency during the last decades. In May 1998, India experienced a severe heatwave over a two-week period considered to be the worst in the preceding 50 years. During the summer of 1999, India experienced unprecedented heat in April, with maximum temperatures of 40°C or above for more than 14 days.

### Editorial | Sun signs: On extreme heat and Tamil Nadu's policy decision

Another heatwave in 2003 was estimated to have caused more than 3,000 deaths in Andhra Pradesh, the paper recounts. In May 2010, a heatwave in Ahmedabad led to approximately 1,300 deaths. In 2016, 2018, 2019 and 2023 extreme heatwaves have been observed across India. In the summer of 2024, a severe and long heatwave impacted India, blistering plains and hills, causing deaths and heat strokes. May 2024 was the worst, with Churu in Rajasthan recording a maximum of 50.5°C, recorded as the highest temperature in India in eight years. As per records, there were 219 deaths, including election officials on duty in the districts; over 25,000 people suffered from heatstroke.

## How is a heatwave defined?

A heatwave is defined generally as a prolonged period of unusually and excessively hot weather, which may also be accompanied by high humidity, but is primarily determined by regions for themselves. The India Meteorological Department (IMD), which determines heatwave conditions, has specified the following criteria: a heatwave 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. In the regional context, heatwave management has already emerged as a problem requiring focused attention. During April and May 2024, many parts of Tamil Nadu recorded temperatures above 40°C.

## Also read | **Understanding the heat and health conundrum**

Eun-Soon Im et al, in a paper on *Deadly heatwaves projected in the densely populated agricultural regions of South Asia* featured in *Science Advances*, stated that the crisis is all the more significant in South Asia, a region inhabited by about one-fifth of the global human population, where there exists an unprecedented combination of severe natural hazards and acute vulnerability. “The most intense hazard from extreme future heatwaves is concentrated around densely populated agricultural regions of the Ganges and Indus river basins,” the paper forecasts.

## How does heat impact health?

Extreme heat conditions have a definite deleterious impact on human health, life and productivity. In their paper, Jeroen de Bont et al say they found strong evidence of the impact of heatwaves on daily mortality. Longer and more intense heatwaves were linked to an increased mortality risk. This makes it a public health problem that governments must tend to. They further add that heat-related morbidity and mortality can be caused by the direct effects of exposure to extreme heat, including a spectrum of heat-related illnesses from heat exhaustion to heat stroke. “Equally challenging from a public health perspective are the indirect effects of extreme heat exposure, occurring when heat exposure stresses underlying physiological systems and results in other specific manifestations such as renal insufficiency, acute cerebrovascular and cardiovascular disease, and exacerbations of pulmonary disease,” the paper notes.

Further, existing vulnerabilities such as poverty, lack of access to shelter and health care, unplanned cities and working out in the open, add to the burden in mid and low middle income communities. Children, senior citizens, pregnant women, those with pre-existing co morbidities, and people forced to work in the open, as in construction and agriculture industries, are more vulnerable to the impact of heat. According to the WHO, heat-related mortality for people over 65 years of age increased by approximately 85% between 2000-2004 and 2017-2021.

A working paper from the Early Childhood Scientific Council on Equity and the Environment, Harvard University, (**Extreme Heat Affects Early Childhood Development and Health: Working Paper No. 1, 2023**) details the effect extreme temperatures can have



during pregnancy and early childhood, including on learning, sleep quality, and mental and behavioural health.

## What is wet bulb temperature?

Wet bulb temperature is the lowest temperature to which a surface can be cooled by water evaporating from it, or the lowest temperature to which the surface of the skin can be cooled by sweating. Beyond this threshold, the human body can no longer cool itself, leading to heat stroke or even death. This temperature accounts for not only the degrees but also helps measure humidity and understand how much evaporation can occur.

This is particularly significant to India, which has a vast coastline in the east and west, and where rising humidity levels are of concern. Steven C. Sherwood et al in the paper *An adaptability limit to climate change due to heat stress* point out that peak heat stress, quantified by the wet-bulb temperature, is surprisingly similar across diverse climates today. Exceeding a wet bulb temperature of 35°C for extended periods would induce hyperthermia in humans, as dissipation of heat becomes impossible.

## What should governments do?

The long-term goal is addressing the anthropogenic causes for climate change, and at the same time, tackling systemic shortfalls like poverty, unplanned cities, access to health care and nutrition. However, there is much that governments can do even in the interim, during periods of intense heat, as indicated by the Tamil Nadu government. These include keeping in readiness health centres, maternity and children hospitals to provide treatment for citizens, stockpiling adequate quantities of ORS and medicines that will be useful at hospitals, providing water and shelter to those who have to brave the elements and rescheduling work hours to protect outdoor workers.

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