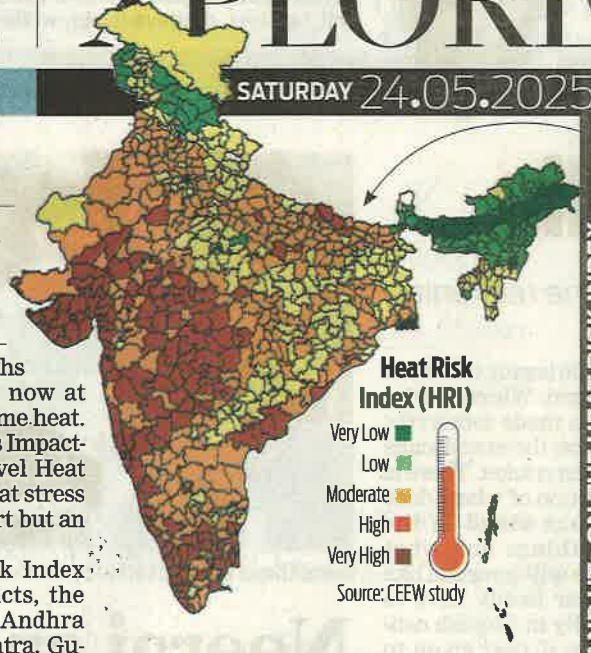


RISING HEAT RISKS THREATEN OVER 76% OF INDIA'S POPULATION

Since heatwaves are eligible for mitigation funding, the study urges states where over 50% of districts fall in the high-risk category to formally notify heatwaves as state-specific disasters so as to unlock an additional 10% funds from the State Disaster Response Fund

S V KRISHNA CHAITANYA @ Chennai

A recent study by the Council on Energy, Environment and Water (CEEW) has found that 57% of India's districts—home to over three-fourths of its population—are now at high to very high risk from extreme heat. The report, "How Extreme Heat is Impacting India: Assessing District-level Heat Risk", issues a stark warning: heat stress is no longer a seasonal discomfort but an accelerating disaster.

Using a composite Heat Risk Index (HRI) developed for 734 districts, the CEEW study identifies Delhi, Andhra Pradesh, Goa, Kerala, Maharashtra, Gujarat, Rajasthan, Tamil Nadu, Karnataka, and Uttar Pradesh as the 10 most heat-risk-prone states and Union Territories. The report is based on 35 indicators including frequency of very hot days, warm nights, rising humidity, population exposure, urbanisation trends, and health vulnerabilities.

One of the study's most alarming findings is the rapid increase in very warm nights—defined as nights where minimum temperatures exceed the 95th percentile of historical norms. Over the past decade (2012–2022), nearly 70% of districts saw at least five more such nights per summer compared to the 1982–2011 average. In contrast, only 28% of districts experienced similar increases in very hot days.

Cities are bearing the brunt. Mumbai saw 15 additional very warm nights, Bengaluru 11, Bhopal and Jaipur 7 each, Delhi 6, and Chennai 4. This trend is largely attributed to the urban heat island effect, where concrete-heavy infrastructure traps heat during the day and releases it at night.

"Very warm nights prevent the human body from recovering after intense daytime heat. This significantly increases the risk of heat strokes and exacerbates conditions like hypertension and diabetes," said Dr Vishwas Chitale, Senior Programme Lead at CEEW and co-author of the report.

The report also highlights a growing secondary risk: increasing relative humidity. The agriculturally dense Indo-Gangetic Plain has witnessed up to a 10% rise in humidity over the past decade. Cities traditionally considered dry, such as Delhi, Chandigarh, Kanpur, and Varanasi, are now recording humidity levels that push the "felt" temperature several degrees above the actual reading.

"High humidity hampers the body's natural cooling mechanism—sweating—and elevates health risks even during moderately hot days," said Arunabha Ghosh, CEO of CEEW. "We're entering an era of prolonged heat, rising humidity, and dangerously warm nights. The science is unequivocal—we must act now."

The study points out that extreme heat does not affect all districts or communities equally. Rural districts in Maharashtra, Kerala, Uttar Pradesh, and Bihar—where large populations work outdoors in agriculture or construction—are among the most vulnerable. These areas face compounding risks from both heat exposure and socio-economic factors such as poor healthcare access and higher prevalence of chronic diseases.

The analysis also notes that dense and rapidly urbanising districts—especially those with expanding built-up areas like Pune, Gurugram, and Mysuru—are becoming heat hotspots.

According to Aakash Shrivastava from the Ministry of Health and Family Welfare, data on heat stroke cases remains sparse due to the absence of electronic systems capturing doctor-patient interactions. "Heat stroke is a diagnosis based on clinical judgement, with no specific lab markers. This he said. However, advances under the National Digital Health Mission and platforms like the International Health Information Platform are improving reporting and transmission. "Thresholds identified in cities like Ahmedabad now serve as early indicators for heat-related deaths," he added.

The report says, "India could lose the equivalent of 35 million full-time jobs and see a 4.5% GDP reduction by 2030 due to heat-related productivity losses." Despite growing risks, the report finds that 95% of existing Heat Action Plans (HAPs) do not include detailed heat vulnerability assessments. This makes it challenging for local authorities to prioritise actions or access funding.

"India has made important strides with HAPs, but now needs to integrate granular risk data," Chitale added. "States like Maharashtra and Odisha are pioneering this approach, but others must follow."

The Ministry of Home Affairs, in 2024, made heatwaves eligible for funding under the State Disaster Mitigation Fund, a critical policy shift. The CEEW report urges states where over 50% of districts fall in the high-risk category to formally notify heatwaves as state-specific disasters. This would unlock an additional 10% Fund.

The report also recommends scaling affordable, climate-smart solutions like cool roofs, net-zero cooling shelters, parametric heat insurance, and ward-level early warning systems. CEEW is already working to support the development of 50 such localised heat action plans, aiming to reach 300 by 2027.

Akhil Srivastava of the India Meteorological Department noted that while heatwaves are not new, anomalies have been increasing. "In 2010, we recorded 578 heatwave days; this dropped for a decade, then spiked again to 455 days in 2022 and 536 in 2024," he said. He attributed some of the spikes to El Niño conditions. "But intensity matters more than count—2015 saw high deaths with only 161 heatwave days. Other aggravating factors often worsen the toll on the public."

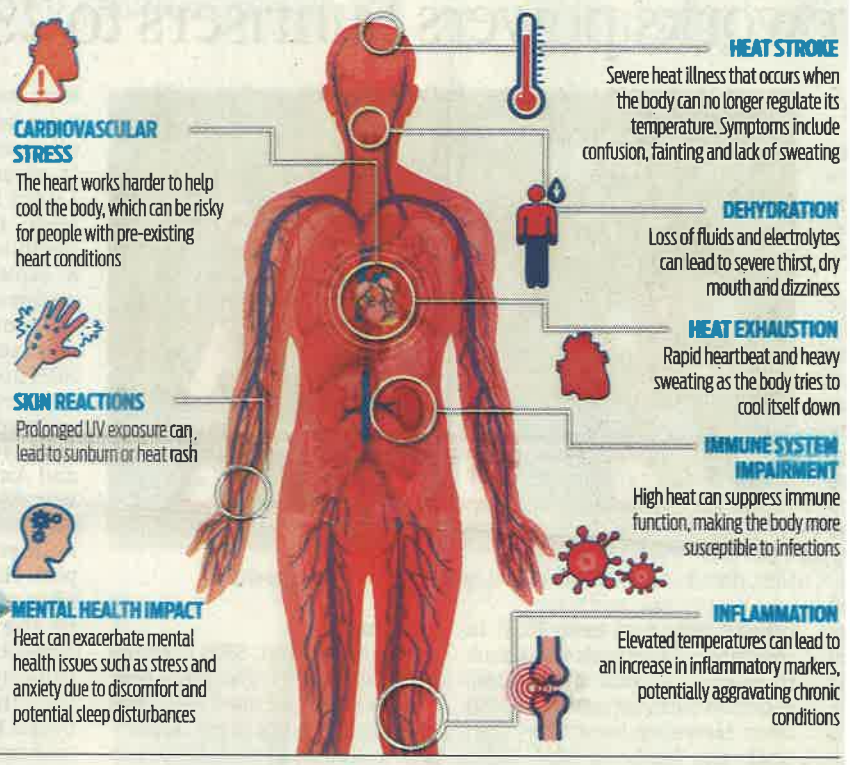
In Tamil Nadu, this urgency is being felt acutely. "Heat coupled with high humidity causes severe thermal discomfort," said Sudha Ramen, member of the Tamil Nadu State Planning Commission. "The urban heat island effect is spreading. Forest fires are rising, energy demand is surging, and vulnerable populations are increasingly at risk. This calls for collective action and greater sensitisa-

AGGREGATED FINDINGS AND RANKS OF STATES AND UTs ON THE HEAT RISK INDEX

STATE	Zone	Overall rank on the HRI	Percentage of districts falling in each category of HRI				
			Very low	Low	Moderate	High	Very high
Andhra Pradesh	South	1	0	0	0	62	38
Goa	West	1	0	0	0	0	100
Kerala	South	1	0	0	0	7	93
Maharashtra	West	1	0	0	0	22	78
Gujarat	West	2	0	0	3	21	76
Rajasthan	West	3	0	0	6	73	21
Karnataka	South	4	0	0	7	60	33
Tamil Nadu	South	5	0	0	11	43	46
Uttar Pradesh	North	6	0	0	24	71	5
Bihar	East	7	0	2	24	66	8
Telangana	South	8	0	0	30	43	27
Madhya Pradesh	Central	9	0	1	29	35	35
Punjab	North	10	0	0	41	59	0
Chhattisgarh	Central	11	0	0	48	52	0
Haryana	North	11	0	0	50	50	0
Odisha	East	12	0	0	53	43	4
Tripura	Northeast	13	0	12	50	38	0
Jharkhand	East	14	0	0	71	29	0
West Bengal	East	15	9	13	52	26	0
Uttarakhand	North	16	0	0	92	8	0
Assam	Northeast	17	76	18	3	3	0
Arunachal Pradesh	Northeast	18	28	68	4	0	0
Himachal Pradesh	North	18	0	83	17	0	0
Manipur	Northeast	18	0	81	19	0	0
Meghalaya	Northeast	18	18	73	9	0	0
Mizoram	Northeast	18	0	0	100	0	0
Nagaland	Northeast	18	0	100	0	0	0
Sikkim	Northeast	18	25	25	50	0	0

UT	Zone	Overall rank on the HRI	Percentage of districts falling in each category of HRI				
			Very low	Low	Moderate	High	Very high
Dadra & Nagar Haveli	West	1	0	0	0	0	100
Daman & Diu	West	1	0	0	0	100	0
Delhi	North	1	0	0	0	45	55
Puducherry	South	2	0	0	25	50	25
Andaman & Nicobar	South	3	0	0	67	33	0
Jammu & Kashmir	North	4	0	27	68	5	0
Chandigarh	North	5	0	0	100	0	0
Ladakh	North	5	0	0	100	0	0
Lakshadweep	South	5	100	0	0	0	0

THE BODY'S RESPONSE TO HEAT EXPOSURE



Climate change raises risk to maternal health and birth outcomes in India

JITENDRA CHOUBEY @ New Delhi

EXTREME heat, driven by climate change, poses an increasing threat to maternal health and birth outcomes in India and other developing countries due to limited access to healthcare, according to a new analysis by Climate Central, a US-based climate research organisation.

The analysis found that India recorded an average of six additional days of dangerously high temperatures for pregnant women each year over the last five years. Among the states, the number of "pregnancy heat-risk days" was highest in Goa, Kerala, Sikkim and Assam compared to others between 2020 and 2024.

The term "pregnancy heat-risk days" refers to extremely hot days that are associated with heightened risks of preterm birth (birth before 37 completed weeks of gestation) and complications in maternal health. Preterm birth can have lasting health effects on the baby and increase the risk of maternal health problems after birth.

The analysis by Climate Central, an independent group of scientists and communicators, is based on a counterfactual scenario – a world without human-caused climate change and compared that to the total number observed each year.

The study shows that heat exposure during pregnancy is linked to higher risks of complications like hypertension, gestational diabetes, maternal hospitalisations and severe maternal morbidity. Further, it is associated with an increased risk of adverse outcomes such as stillbirth and preterm birth.

Burning fossil fuels such as coal, oil and gas primarily causes climate change.

Indian sizzler

Between 2020 and 2024, India experienced an average of six additional pregnancy heat-risk days each year. The typical annual number of dangerous heat for pregnant women in India reached 19 days, with climate change accounting for one-third of this increase (i.e., six additional days).

Data shows that India's traditionally smaller and Himalayan states recorded more dangerous heat days for pregnant women than bigger and mainland states. At 32 days, Sikkim reported the highest number of pregnancy heat-risk days attributed to climate change. Goa and Kerala followed with 24 and 18 additional days, respectively.

Among the bigger and more populated states, Assam and Uttarakhand are at the top. The average annual dangerous heat days added by climate change are 22 days and 12 days, respectively.

However, densely populated states like Uttar Pradesh, Bihar, Delhi, Haryana, Punjab, Jharkhand, and West Bengal registered negative impact days. The study could not explain why.

Other bigger states like Maharashtra, Madhya Pradesh, Karnataka and Tamil Nadu, added dangerous heat days for pregnant women in the range of 4-8 days.

At the city level, Panjim, Thiruvananthapuram and Guwahati recorded over 90% additional pregnancy heat-risk days due to climate change. Panjim topped the list with 39 days, followed by Thiruvananthapuram with 36 days and Guwahati with 21 days. Smaller cities mostly in the Northeast region and in Union Territories like Daman and Port Blair recorded higher number of days compared to mainland cities.

Among larger cities, Mumbai reported 17 and Vasai-Virar 21 additional pregnancy heat-risk days related to climate change from 2020 to 2024. Chennai and Bengaluru (3 days), Indore and Jaipur (7 days) and Pune (8 days) recorded additional pregnancy heat-risk days during the same period.

GLOBAL SITUATION

1. As part of the study, researchers analysed daily temperatures from 2020 to 2024 in 247 countries and territories, and 940 cities, to determine the rise in pregnancy heat-risk days – days when maximum temperatures exceed 95% of historic local temperatures

2. It found that the number of dangerous heat days related to pregnant women had doubled in 90% of the countries and 63% of cities compared to a hypothetical world without climate change

3. It highlighted that in 222 out of 247 countries and territories, climate change has at least doubled the annual number of pregnancy heat-risk days. Additionally, in nearly one-third of these areas (78 out of 247), climate change has added at least an extra month's worth of pregnancy heat-risk days each year