

PRESS RELEASE

CSTEP Report Predicts a Warmer and Wetter Future for India

For Immediate Release

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The Center for Study of Science, Technology and Policy (CSTEP)—a Bengaluru-based think tank—has published the *Climate Atlas of India: District-Level Analysis of Historical and Projected Climate Change Scenarios*. The report summarises the findings from CSTEP’s historical climate analysis and future climate projections at a district level for the 28 states of India (excluding union territories), published as regional reports in 2022.

The short-term period from 2021 to 2050 (the 2030s) has been compared with the climate of the near past historical period from 1990 to 2019 at a district level.

Climate change projections have been done for two Representative Concentration Pathways (RCP) or climate scenarios, namely RCP 4.5 (moderate emissions scenario) and RCP 8.5 (high emissions scenario).

Historical trends in summer (March to May) and winter (December to February) minimum temperatures and the kharif (June to September) season rainfall from 1990 to 2019 are presented in the report. Future trends in temperature, rainfall, and extreme events for the 2030s as change compared to the historical period for RCP 4.5 and RCP 8.5 scenarios are also available in the report.

Historical climate data and gridded data for climate change projections are from the India Meteorological Department (IMD).

Highlights from the report

Temperature and rainfall have increased in most regions of India during the historical period. The analysis of historical climate data (1990–2019) shows that around 70% of the districts in India experienced an increase in the summer maximum temperature by up to 0.9°C. Likewise, winter minimum temperature has increased by up to 0.5°C in 54% of the districts. Rainfall during the kharif or the monsoon season has increased, and the increase is particularly high in the north-east and Western Ghats districts—about 10% to 15%.

A warmer and wetter future is projected for almost the whole of India during the short-term period of the 2030s under both climate scenarios.

- **Temperature**

- An increase in the summer maximum temperature by 1.5°C to 2°C is projected for 15% of the districts under the RCP 4.5 scenario and 63% of the districts under the RCP 8.5 scenario.

- Under the RCP 8.5 scenario, higher levels of warming ($>2^{\circ}\text{C}$) in the summer maximum temperature are projected for 7% of the districts as compared to the historical period.
- An increase in the winter minimum temperature by 1.5°C to 2°C is projected for 18% of the districts under the RCP 4.5 scenario and 63% of the districts under the RCP 8.5 scenario.
- **Rainfall**
 - An increase in the kharif season rainfall of 15%–25% is projected for 17% of the districts under the RCP 4.5 scenario and 50% of the districts under the RCP 8.5 scenario.
 - A higher increase of 25%–35% is projected for 2% of the districts under the RCP 4.5 scenario and 7% of the districts under the RCP 8.5 scenario.
- **Extreme events**
 - Heatwaves are projected to further increase under both climate scenarios. An increase in the number of days with temperature departure from the normal by 4.5°C to 6.4°C and $>6.4^{\circ}\text{C}$ is projected under both climate scenarios compared to the historical period in all the 15 districts analysed for heatwaves.
 - The number of high-intensity (51–100 mm/day) rainfall events is projected to increase from 4 to 615 days during the historical period to 15 to 760 days under the RCP 4.5 scenario and 23 to 805 days under the RCP 8.5 scenario.
 - The increase per annum is by one to four events under the RCP 4.5 scenario and one to five events under the RCP 8.5 scenario.
 - The number of very high-intensity rainfall events is projected to increase from 0 to 550 days during the historical period to 0 to 600 days under the RCP 4.5 scenario and 2 to 612 days under the RCP 8.5 scenario. It is important to note that of the 723 districts, only 629 (87%) districts had recorded very high-intensity rainfall events during the historical period.
 - Annually, very high-intensity rainfall events are projected to increase by one to two events under the RCP 4.5 scenario and one to three events under the RCP 8.5 scenario.

This district climate profile provides an understanding of the changes in climate during the current day or near past and the near or short-term future. It is evident from this analysis that the future climate will not be the same and this will impact natural resources, dependent livelihoods, and infrastructure. The need of the hour is, therefore, to create awareness on the likely changes and build the capacity to integrate climate information into policies and plans to minimise loss and damage.

The full report is available [here](#).

For more details and interviews, please write to us at cpe@cstep.in

About CSTEP: The Center for Study of Science, Technology and Policy (CSTEP) is one of India's leading think tanks, involved in solving Grand Challenges that the country faces. These include Sustainable and Secure Future, India's Green Energy Transition, Clean Air for All, and Digital Transformation.