



Premium

Why the recent rain is no relief

Despite the recent showers, this year is expected to be hotter and drier. As the world heats up, what is the situation in India? How do different states fare?

Written by **Amitabh Sinha** [Follow](#)

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Despite the recent showers, this year is widely expected to be hotter and drier. Though the IMD has forecast a normal monsoon, the development of El Nino, which is known to suppress monsoon rainfall over India, is happening faster than expected.

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The first two days of May have been unusually wet. Except the northeastern states, Jharkhand, and West Bengal, the entire country has received plenty of rain, with some areas in Maharashtra, Gujarat, Uttar Pradesh and Madhya Pradesh getting as much as 10 to 15 times the expected rainfall.

This exceptional spell of rainfall was the result of a number of relatively local weather phenomena over different parts of the country coming together at the same time. According to the India Meteorological Department (IMD), this spell is expected to get over by Thursday. But the unusual rainfall is also a reminder of the increasing uncertainties in weather patterns becoming evident not just in India but across the world.

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Meteorological
Organisation report says

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Globally, the month of March this year was the second warmest March ever since the beginning of records in the mid-1800s. And an analysis in Carbon Brief, a climate change focused online publication in the UK, said the year 2023 was shaping up to become one of the top four warmest years on record, citing the rapid development of the El Niño event, which has an overall warming impact on the planet.

TABLE 1**TEN STATES WITH MAXIMUM WARMING IN 2022**

State	Observed temp in 2022*	Normal temp for the states**	Deviation from Normal
Uttarakhand	16.4 °C	15.23 °C	1.17 °C
Himachal Pradesh	17.6 °C	16.44 °C	1.16 °C
Punjab	22.4 °C	21.35 °C	1.05 °C
Sikkim	23.9 °C	22.97 °C	0.93 °C
Assam	23 °C	22.1 °C	0.9 °C
Nagaland	23.5 °C	22.6 °C	0.9 °C
Arunachal Pradesh	20.6 °C	19.8 °C	0.8 °C
Manipur	22.37 °C	21.57 °C	0.8 °C
Meghalaya	20.55 °C	19.75 °C	0.8 °C
Tripura	18.6 °C	17.8 °C	0.8 °C

*Average annual mean

**Average of 1981-2010 period

How much is India warming up?

The increase in temperatures evident all over the world is being experienced in India too, though at a slightly lower level than the global average.

The year 2022, for example, was 1.15 degree Celsius warmer than pre-industrial times (the average temperature of 1850-1900 period) and was the fifth or sixth warmest year on record. In India, average temperature in 2022 was 0.64 degree Celsius higher than normal (average of 1981-2010 period). The difference from the pre-industrial temperatures is not clear, but the warming over India is known to be lower than the global average.

The most comprehensive assessment of India's climate, done by the Ministry of Earth Sciences in 2020, had shown that average annual mean temperatures in India had risen by about 0.7 degree Celsius from 1900. That is significantly less than the global rise in temperatures, which has exceeded one degree Celsius for several years now. By the end of the century, the warming over India is likely to be in the range of 2.4 to 4.4 degree Celsius from the current levels in different emission scenarios.

The warming over the seas around India has been much higher. Sea surface temperatures in the tropical Indian Ocean have risen by almost one degree Celsius between 1950 and 2015, this assessment said, and were projected to increase even further.

TABLE 2**HOW WARM WAS 2022 FOR STATES (SINCE 1901)**

Warmest year on record	Sikkim
Second Warmest	Himachal Pradesh, Meghalaya, Punjab
Third Warmest	Assam, Manipur
Fourth Warmest	Arunachal Pradesh, Mizoram, Nagaland, Tripura
Fifth Warmest	Odisha

TABLE 3**LONG-TERM WARMING**

Himachal Pradesh	1.5
Goa	1.44
Kerala	1.05
Mizoram	0.83
Uttarakhand	0.8
Assam	0.72
Chhattisgarh	0.7
Sikkim	0.7
Manipur	0.68
Tamil Nadu	0.67

(Temp rise per 100 years between 1901 and 2022)

TABLE 4**DEATHS CAUSED BY EXTREME WEATHER EVENTS**

Lightning	1,608
Floods and Heavy Rains	917
Cyclones	6
Snowfall	33
Gale	8
Heat Wave	30
Cold Wave	1
Dust Storm	22
Thunderstorm	32

Based on data from 29 states

**Total
2,657**

What about the different states in India?

The warming over India is not uniform across regions. Some states have become much hotter than others. Last week, the IMD released state-level warming trends for the first time. Data from 29 states showed that temperatures in Himachal Pradesh, Goa and Kerala had increased at the rate of more than 1 degree Celsius per 100 years in the last 120 years (see box). Most of the northeastern states — Mizoram, Assam, Sikkim, Manipur, Tripura — have seen their temperatures climb at the rate of more than 0.7 degree Celsius per 100 years.

However, the eastern states of Bihar, Jharkhand, and Odisha have experienced the least warming. Bihar's temperature has been nearly flat, registering a rise of just 0.02 degree Celsius over 100 years. Uttar Pradesh, with a warming of 0.13 degree Celsius, is also in the same bracket.

Goa has seen the maximum increasing trend in annual rainfall. Its rainfall has increased at the rate of 21 mm over a 100 year period. It is followed by Gujarat and Tripura. Rainfall has decreased in Arunachal Pradesh, Nagaland, and Manipur.

Last year, several states in India saw temperature records being broken. The year 2022 was the warmest year on record for Sikkim, while it was the second warmest for Himachal Pradesh, Meghalaya, and Punjab. Interestingly, at least two states — Karnataka and Telangana — were cooler than normal in 2022, though only marginally.

Uttarakhand, Himachal Pradesh, and Punjab saw the maximum rise in temperatures last year, compared to their normal. In Uttarakhand, average annual mean temperature in 2022 was 1.17 degree Celsius higher than the average for 1981-2010 period.

Which weather event kills most people?

For the first time, the IMD also presented data on deaths caused by extreme weather events. While heatwaves have attracted a lot of attention, lightning strikes have been killing a far greater number of people in India.

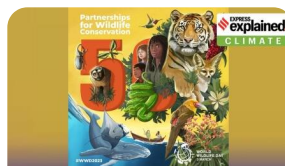
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More than 60 per cent of deaths caused by weather events in India in 2022 (1,608 out of 2,657 recorded deaths) were due to lightning strikes. **Floods and extreme rainfall events claimed 937 lives.** These numbers are only indicative and could be much larger, since the IMD and the state governments relied on media reports to compile the list of casualties.

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