



## India's Climate and Weather Trends

**For Prelims:** [EL Nino](#), [Southwest Monsoon Season](#), [Heatwaves](#).

**For Mains:** El Nino on India's monsoon season, role of climate change in the increasing frequency and intensity of extreme weather events in India.

### Why in News?

Although India has received some rain recently, experts predict that the year 2023 will be hotter and drier.

- The [Indian Meteorological Department \(IMD\)](#) has predicted a normal monsoon, but the development of [El Nino](#) could lead to a **reduction in monsoon rainfall**.
- Additionally, the **IMD has released data on fatalities caused by extreme weather events**, marking the first time they have done so.

### What is the Current Situation in India?

- **Uneven Rainfall Distribution:**
  - Despite the recent showers, the entire country has received ample rainfall, except for the **northeastern states, Jharkhand, and West Bengal**.
  - Some areas in Maharashtra, Gujarat, Uttar Pradesh, and Madhya Pradesh have experienced up to **15 times more rainfall than expected** due to various local weather phenomena.
- **El Nino and Global Warming:**
  - The **IMD** has predicted normal monsoon, but the development of **El Nino could suppress rainfall over India**.
  - Globally, 2023 is expected to be **one of the top four warmest years on record due to the rapid development of the El Nino event**, which has an overall warming impact on the planet.
- **India's Warming Trend:**
  - **India's warming trend is slightly lower than the global average**, with the year 2022 being 1.15 degree Celsius warmer than pre-industrial times.
  - The warming over India is not uniform across regions. Some states like **Himachal Pradesh, Goa, and Kerala have become much hotter than others**, while eastern states such as **Bihar, Jharkhand, and Odisha have experienced the least warming**.
  - Sea surface temperatures in the tropical **Indian Ocean have risen by almost one degree Celsius between 1950 and 2015**.

### What do the Climate Models Say About the Impact of Upcoming El Nino?

- **Weak Monsoon for India:** The development of an El Nino in May or June 2023 may cause a weakening of the [southwest monsoon season](#), which brings around 70% of the total rainfall India receives and on which most of its farmers still depend.
  - However, sub-seasonal factors such as the [Madden-Julian Oscillation \(MJO\)](#) and monsoon low-pressure systems can temporarily enhance rainfall in some parts as

witnessed in the year 2015.

- **Hot Temperatures:** It may also cause [heatwaves](#) and [droughts](#) in India and other regions around the world such as South Africa, Australia, Indonesia and the Pacific Islands.
- **Heavier Rainfall in the West:** It brings heavy rainfall and flooding to other regions such as California in the United States and could cause [bleaching and death of coral reefs](#).
- **Rising Global Average Temp:**
  - The El Nino in 2023 and going into 2024 may push the global average temperature towards 1.5°C warmer than the preindustrial average.
  - The warming of the oceans is also one of the major impacts of an El Nino event.
    - This is when ocean heat content is already at a record high, according to the [World Meteorological Organization \(WMO\)](#).

## Which Weather Event Causes the Most Fatalities?

- [Lightning strikes](#) caused more deaths than any other weather event in India.
  - In 2022, lightning strikes were responsible for 60% of weather event-related deaths in India (1,608 out of 2,657 recorded deaths).
- Floods and extreme rainfall events claimed 937 lives.
- The actual number of casualties could be higher, as IMD and state governments relied on media reports to compile the list.

**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 are India's Climate Change Mitigation Initiatives?

- **National Action Plan on Climate Change (NAPCC):**
  - Launched in 2008 to **address climate change challenges** in India.
  - Aims to **achieve low-carbon and climate-resilient development for India.**
  - There are **8 national missions** forming the core of the NAPCC which represent multi-pronged, long term and integrated strategies for achieving key goals in climate change. These are-
    - **National Solar Mission**
    - **National Mission for Enhanced Energy Efficiency**
    - **National Mission on Sustainable Habitat**
    - **National Water Mission**
    - **National Mission for Sustaining the Himalayan Ecosystem**
    - **National Mission for A Green India**
    - **National Mission for Sustainable Agriculture**
    - **National Mission on Strategic Knowledge for Climate Change.**
- **Nationally Determined Contributions (NDC):**
  - India's commitments to reduce greenhouse gas emissions and adapt to climate change.
  - Pledged to **reduce the emissions intensity of GDP by 45%** by 2030 from 2005 levels and generate **50% of electricity from non-fossil fuel sources by 2030.**
  - Pledged to create additional carbon sink and **achieve net zero emissions by 2070.**
- **National Adaptation Fund on Climate Change (NAFCC):**
  - Established in 2015 to **provide financial assistance to state governments for implementing adaptation projects** in various sectors.
- **State Action Plan on Climate Change (SAPCC):**
  - Encourages all states and union territories to prepare their own SAPCCs based on their specific needs and priorities.
  - SAPCCs outline strategies and actions for addressing climate change at the sub-national level.
  - Aligned with the objectives of the NAPCC and the NDC.

## UPSC Civil Services Examination Previous Year Question (PYQ)

### **Prelims**

**Q. With reference to 'Indian Ocean Dipole (IOD)' sometimes mentioned in the news while forecasting Indian monsoon, which of the following statements is/are correct? (2017)**

1. IOD phenomenon is characterised by a difference in sea surface temperature between tropical Western Indian Ocean and tropical Eastern Pacific Ocean.
2. An IOD phenomenon can influence an El Nino's impact on the monsoon.

**Select the correct answer using the code given below:**

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

**Ans: (b)**

### **Mains**

**Q. 'Climate change' is a global problem. How India will be affected by climate change? How Himalayan and coastal states of India will be affected by climate change? (2017).**

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