



### Climate change



- Himalayan glaciers have shrunk by 40%: Study
- Centre extends funding for weather, climate services to Rs 2135 crore
- How the climate has warmed over the last 24,000 years

### Air quality



- NO2 not in the safe limit for even a year since 2013: Study
- Air pollution killed 17 lakh Indians last year and led to loss of 1.4% of GDP

### Water quality



- IIT-M researchers identify molecular mechanisms for desalination techniques
- AMRUT 2.0 reforms on water conservation envisages recycle of treated wastewater to meet 20% of city water and 40% of industry water



**Himalayan glaciers have shrunk by 40%: Study.** Himalayan glaciers have lost ice 10 times more quickly over the last few decades than on average since the last major glacier expansion 400-700 years ago, a period known as the "Little Ice Age", a study has said. It warned that accelerating melting of the Himalayan glaciers threatens the water supply of millions of people in Asia. The study, led by the University of Leeds, also points out that Himalayan glaciers are shrinking far more rapidly than glaciers in other parts of the world, a rate of loss the researchers describe as "exceptional" as they lost around 40 per cent of their area. The paper -- [Accelerated Mass Loss of Himalayan Glaciers Since the Little Ice Age](#) -- published in *Scientific Reports* made a reconstruction of the size and ice surfaces of 14,798 Himalayan glaciers during the Little Ice Age.

**Centre extends funding for weather, climate services to Rs 2135 crore.** The government of India approved continuation of an umbrella scheme, at an estimated cost of Rs 2135 crore, for R&D into weather and climate services, improved forecast, and better early warnings among several other things, in the next finance cycle (2021-2026). The scheme will provide improved weather, climate, ocean forecast and services, and other hazard related services thereby ensuring transfer of commensurate benefits to the end-users as per the one of the mandates of the Ministry of Earth Sciences. The increased incidence of extreme weather events due to global climate change and the risk associated with severe weather has prompted the Ministry to formulate many target-oriented programmes, which are carried out in an integrated manner through its agencies. As a result, these activities are put together under the umbrella scheme termed as Atmosphere & Climate Research-Modelling Observing Systems & Services (ACROSS), with its eight sub-schemes. The eight sub-schemes include Commissioning of Polarimetric Doppler Weather Radars (DWRs) (IMD), Upgradation of Forecast System (IMD), Weather & Climate Services (IMD), Atmospheric Observations Network (IMD), Numerical Modelling of Weather and Climate (NCMRWF), Monsoon Mission III (IITM/NCMRWF/INCOIS/IMD), Monsoon Convection, Clouds and Climate Change (MC4) (IITM/NCMRWF/IMD), and High-Performance Computing System (HPCS) (IITM/NCMRWF). The scheme is being implemented by the Ministry, through its scientific agencies - the India Meteorological Department (IMD), the National Centre for Medium Range Weather Forecasting (NCMRWF), the Indian Institute of Tropical Meteorology (IITM), and the Indian National Centre for Ocean Information Services (INCOIS).

**Karnataka sees rise in extreme weather events in the last few decades.** Climate change is impacting the water cycle and the rainfall patterns, resulting in intense rainfall and associated flooding in some areas and drought in other regions of Karnataka. Extreme weather events have increased both in terms of frequency and intensity across Karnataka in the last decades.

During the south-west monsoon, rainfall is higher in coastal locations on the windward side of the Western Ghats (3,350 mm), which drops sharply on the leeward side (600-700 mm). Northern-interior regions, by contrast, have markedly semi-arid climates with low annual precipitation (500-600 mm). Variability of the south-west monsoon rainfall has increased significantly since 1960. Several districts are seeing an increase in long dry periods with low or no rainfall, or intermittent with short, intense spells of rainfall. The large-scale secular changes in monsoon rainfall are attributed to the increase in global emissions of greenhouse gases and air pollutants. At the same time, urbanisation, land-use changes, and deforestation at local levels have brought in a non-uniform response in these rainfall trends.

**How the climate has warmed over the last 24,000 years.** Scientists have reconstructed Earth's climate since the last ice age, about 24,000 years ago. The study, published in *Nature*, suggests that current

temperatures are unprecedented in 24,000 years. It has three main findings, according to the University of Arizona. It verifies that the main drivers of climate change since the last ice age are rising greenhouse gas concentrations and the retreat of the ice sheets.

It suggests a general warming trend over the last 10,000 years, settling a decade-long debate in the palaeoclimatology community about whether this period trended warmer or cooler. The magnitude and rate of warming over the last 150 years far surpasses the magnitude and rate of changes over the last 24,000 years. The team created maps of global temperature changes for every 200-year interval going back 24,000 years. They combined two independent datasets – temperature data from marine sediments and computer simulations of climate – to create a more complete picture of the past.

[The Pioneer](#), December 23, 2021 | [Business Standard](#), November 25, 2021 | [The Hindu](#), November 22, 2021 | [Indian Express](#), November 16, 2021



**NO2 not in the safe limit for even a year since 2013: Study.** Delhi has not experienced a between 2013 and 2020 where the annual average concentration of toxic nitrogen oxide (NO2) was within the safe limits, a study by NCAP Tracker has found. Pointing out that November 2021 had also seen NO2 at alarmingly high levels, the study stated that despite nationwide lockdowns in 2020, Delhi's annual NO2 average for the year remained at 61 ug/m3 (micrograms per cubic metres) against a limit of 10 ug/m3.

**Air pollution killed over 300,000 in EU in 2019: report.** More than half of the 307,000 premature deaths due to air pollution in the EU in 2019 could have been avoided with new air quality guidelines, according to a new report published by the European Environment Agency (EEA).

The report said that air quality — measured by the amount of fine particulate matter, nitrogen dioxide and ground-level ozone in the air — had improved from 2018 to 2019. This had a positive impact on health. But new guidelines from the World Health Organization (WHO), published this year, could have reduced the number of premature deaths caused by air pollutants by some 178,000, or 58%. The report indicates that meeting the air quality recommendations from the WHO could have helped the bloc reach its goal of 55% fewer premature deaths from exposure to fine particulate matter by 2030. The EU's Zero Pollution Action Plan targets are part of the European Green New Deal. Current reductions in air pollution mean that the EU is already on course to meet its targets. The report comes days before European leaders meet for the EU Clean Air Forum. It also follows the conclusion of the international COP26 summit, the outcomes of which have been questioned by scientists and climate campaigners.

[The Times of India](#), December 15, 2021 | [Indian Express](#), November 15, 2021



**AMRUT 2.0 reforms on water conservation envisage recycle of treated wastewater to meet 20% of city water and 40% of industry water demand.** Under reforms agenda of Atal Mission for Rejuvenation and Urban Transformation 2.0 (AMRUT 2.0), reforms on water conservation envisages recycle of treated wastewater to meet 20% of the total city water demand and 40% of industry water demand in aggregate at the state level. Under Sewerage component of the AMRUT2.0 for 500 AMRUT cities, tertiary treatment with end-to-end reuse plan (preferably in Public

Private Partnership mode);provision/ augmentation and rehabilitation of sewerage systems with end-to-end treatment and reuse; tapping of used water for recycling; identifying the bulk users of recycled used water and facilitating sale of used water to potential users (e.g. industrial clusters such as textile/ leather/ paper/ power plants/ railways, etc.) are admission components.

**AMRUT 2.0 has been envisaged to promote circular economy of water through development of city water balance plan for each city focusing on recycle/reuse of treated sewage, rejuvenation of water bodies and water conservation**

**IIT-M researchers identify molecular mechanisms for desalination techniques.** Researchers at the Indian Institute of Technology-Madras (IIT-M) have identified the possible molecular mechanisms in water flow through new nano-pore geometry for desalination techniques to convert seawater to drinking water. The results of the study, the researchers say, are “extremely useful” in the design of novel RO (reverse osmosis) systems that utilize carbon nanotubes-based membranes. The study was involved Swinburne University of Technology, Australia, and the Netherlands-based Delft University of Technology. Advanced research on desalination has always aimed to reduce the energy consumption of the process. Mainly, two approaches were carried out; the first one involves investigating novel methods that can effectuate desalination at high energy efficiency.

Studies have shown that graphitic carbon materials show a large water permeation capability than the conventional RO membranes, their tube-like structures suffer from a reduction in permeation rates due to the hydrodynamic resistance at their entrance. To solve this issue, the research team took inspiration from nature, specifically biological systems for making efficient desalination membranes.

[Press Information Bureau](#), December 13, 2021 | [Deccan Herald](#), November 18, 2021