



# Report on Heat-trapping Gases in the Atmosphere: WMO

## Why in News

According to the [World Meteorological Organization \(WMO\) Greenhouse Gas Bulletin](#), the **abundance of heat-trapping greenhouse gases in the atmosphere once again reached a new record last year (2020)**, with the annual rate of increase above the 2011-2020 average.

- This is **despite the approximately 5.6% drop in fossil fuel CO<sub>2</sub> emissions in 2020** due to restrictions related to the **pandemic**.
- Earlier, the **WMO** released a report named [United in Science 2021](#). WMO is a **specialized agency of the United Nations** for meteorology (weather and climate), operational hydrology and related geophysical sciences.
- The **WMO Global Atmosphere Watch Programme** coordinates systematic observations and analysis of greenhouse gases and other atmospheric constituents.

## Unclean air

Key greenhouse gas emissions rose faster in 2020 than the average for the previous decade. A comparison of the key trends to pre-industrial levels:



Parameter	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
2020 global mean abundance	413.2 ± 0.2 ppm	1889 ± 2 ppb	333.2 ± 0.1 ppb
Pre-industrial levels	278 ppm	722 ppb	270 ppb
2020 abundance relative to 1750	149%	262%	123%
2019-2020 absolute increase	2.5 ppm	11 ppb	1.2 ppb
Mean annual absolute increase over past 10 years	2.4 ppm	8 ppb	0.99 ppb

// ppm: parts per million | ppb: parts per billion

## Key Points

- **Data Analysis:**
  - **Concentration of Carbon Dioxide (CO<sub>2</sub>)**, the most important greenhouse gas, reached 413.2 parts per million in 2020 and is **149% of the pre-industrial level**.

- Many countries are now setting **carbon neutral targets** and it is hoped that **COP26** (Climate Conference) will see a dramatic increase in commitments.
- **Methane (CH<sub>4</sub>) is 262%** and **Nitrous Oxide (N<sub>2</sub>O) is 123% of the levels in 1750** when human activities started disrupting Earth's natural equilibrium.
- The **economic slowdown from Covid-19 did not have any distinguishable impact** on the atmospheric levels of greenhouse gases and their growth rates, although there was a temporary decline in new emissions.
- **From 1990 to 2020, radiative forcing** - the warming effect on our climate - by long-lived greenhouse gases **increased by 47%**, with CO<sub>2</sub> accounting for about 80% of this increase.
- The **ability of land ecosystems and oceans to act as "sinks" may become less effective in future**, thus reducing their ability to absorb carbon dioxide and act as a buffer against larger temperature increases.

▪ **Concerns:**

- An **increase in the temperature is expected** by the end of this century far in excess of the **Paris Agreement targets** of 1.5 to 2 degrees Celsius above pre-industrial levels.
- **Parts of the Amazon rainforest** have gone from being a carbon sink that sucks carbon dioxide from the air to a source of CO<sub>2</sub> due to **deforestation** and reduced humidity in the region.
- Given the long life of CO<sub>2</sub>, the **temperature level already observed will persist for several decades** even if emissions are rapidly reduced to net zero. Alongside rising temperatures, this means **more weather extremes** including intense heat and rainfall, ice melt, sea-level rise and ocean acidification, accompanied by **far-reaching socioeconomic impacts**.

▪ **Related Indian Initiatives:**

- Seaweed-Based Animal Feed to reduce methane emissions in bovine
- India Greenhouse Gas Program
- [National Action Plan on Climate Change](#)
- [Bharat Stage-VI Norms](#)

Type of Greenhouse Gases	Source	Removal Source	Gas Reaction
Carbon dioxide (CO <sub>2</sub> )	<ul style="list-style-type: none"> <li>• Burning of fossil fuels</li> <li>• Deforestation</li> </ul>	<ul style="list-style-type: none"> <li>• Photosynthesis process</li> <li>• Ocean</li> </ul>	
Nitrous oxide (N <sub>2</sub> O)	<ul style="list-style-type: none"> <li>• Burning of biomass</li> <li>• Combustion of fossil fuels</li> <li>• Fertilizers</li> </ul>	<ul style="list-style-type: none"> <li>• Removal by soil</li> <li>• Photolysis in the stratosphere</li> </ul>	<ul style="list-style-type: none"> <li>• Absorption of infrared radiation</li> <li>• Indirectly affect the ozone concentration in the stratosphere</li> </ul>
Fluorinated gases	<ul style="list-style-type: none"> <li>• Emitted through various industrial processes.</li> </ul>	<ul style="list-style-type: none"> <li>• Photolysis and reaction with oxygen</li> </ul>	
Methane (CH <sub>4</sub> )	<ul style="list-style-type: none"> <li>• Burning of biomass</li> <li>• Rice paddies</li> <li>• Fermentation by enteric bacteria</li> </ul>	<ul style="list-style-type: none"> <li>• Microorganism uptake</li> <li>• Reaction associated with hydroxyl groups</li> </ul>	<ul style="list-style-type: none"> <li>• Absorption of infrared radiation</li> <li>• Indirectly affect ozone concentration and water vapor in the stratosphere</li> <li>• Production of CO<sub>2</sub></li> </ul>

**Source:** [TH](#)

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