

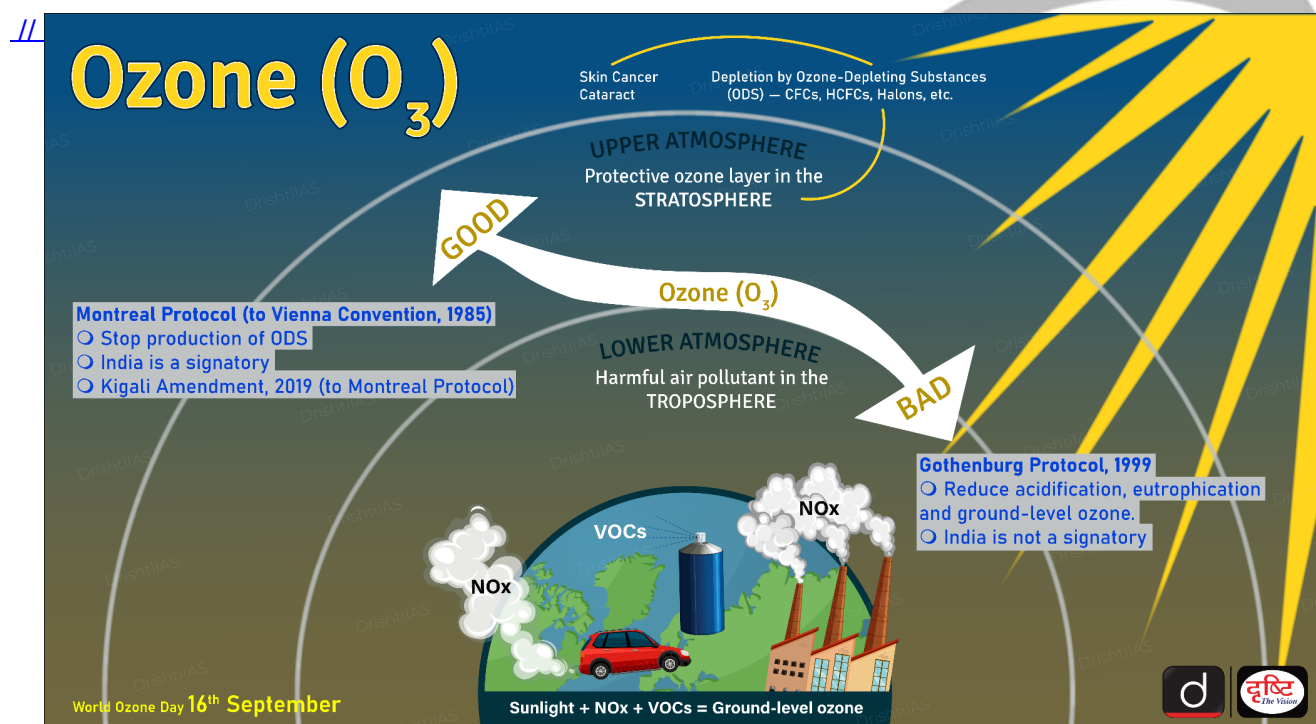


Ground Level Ozone Pollution

Source: PIB

Why in News?

Recently, the Ministry of Environment, Forest and Climate Change (MoEF&CC) highlighted the **steps being taken to control Ground Level Ozone Pollution (GLOP) in India.**



What is Ground Level Ozone Pollution?

- **Ground Level Ozone Pollution:** Ground-level **ozone (O₃)** pollution refers to the excess presence of **ozone at the Earth's surface**, which is formed through chemical reactions in the atmosphere.
 - Unlike the ozone layer in the stratosphere, which protects life from harmful ultraviolet radiation, ground-level ozone is a harmful pollutant that poses significant health risks and environmental damage.
- **Formation of Ground Level Ozone:** Ground-level ozone is a **secondary pollutant**, meaning it is not directly emitted but **formed through chemical reactions between nitrogen oxides (NOx) and volatile organic compounds (VOCs)**.
 - NOx (emitted by vehicles, power plants, and industrial processes) and VOCs (emitted from vehicles, petrol pumps, solvents, and waste burning).
 - These reactions occur in the **presence of sunlight**, making ozone formation more significant during sunny days and warmer seasons.

- **Regulation:** The [Central Pollution Control Board \(CPCB\)](#) in India has set **National Ambient Air Quality Standards (NAAQS) for ozone**, including an **8-hour average limit of 100 µg/m³** and a **1-hour limit of 180 µg/m³**.
 - Ground-level ozone is monitored under the [National Air Quality Monitoring Programme \(NAMP\)](#), managed by CPCB in collaboration with **State Pollution Control Boards (SPCBs)** and the [National Environmental Engineering Research Institute \(NEERI\)](#).
- **Impact:**
 - **Health Effects:** Ground-level ozone causes **respiratory issues** and worsen conditions like **asthma and heart disease**. Chronic exposure may reduce lung capacity, cause permanent damage.
 - By 2050, ozone exposure could lead to over a million deaths in India if emissions are not controlled.
 - **Environmental Impact:** Ozone damages crops, reducing agricultural productivity, and harms forests by inhibiting growth and photosynthesis.
- **Measures to Control GLOP:**
 - **Ozone Depleting Substances (ODS):** MoEF&CC has notified the [Ozone Depleting Substances \(Regulation and Control\) Rules, 2000](#), to regulate the use, import, and export of ODSs in India.
 - ODS, like [Chlorofluorocarbons \(CFCs\)](#), harm the ozone layer. They are **stable in the troposphere** but break down under UV light in the [stratosphere](#), leading to ozone depletion.
 - **Cleaner Fuels:** The government has encouraged the use of [Compressed Natural Gas](#), [Liquefied Petroleum Gas](#), and [ethanol-blended fuels](#) to reduce vehicular and industrial emissions.
 - **Vapour Recovery Systems (VRS):** Installation of VRS at petrol pumps, particularly in Delhi-NCR, to minimize VOC emissions during refueling operations.
 - [PM Electric Drive Revolution in Innovative Vehicle Enhancement \(PM-E Drive\)](#)
 - [Electric vehicles \(EVs\)](#)
 - [National Clean Air Programme \(NCAP\)](#)
 - [Bharat Stage - VI \(BS-VI\) compliant vehicles](#)



Air Pollutants

Sulphur Dioxide (SO₂)



It comes from the consumption of fossil fuels (oil, coal and natural gas). Reacts with water to form acid rain.

Impact: Causes respiratory problems.

Ozone (O₃)



Secondary pollutant formed from other pollutants (NO_x and VOC) under the action of the sun.

Impact: Irritation of the eye and respiratory mucous membranes, asthma attacks.

Nitrogen Dioxide (NO₂)



Emissions from road transport, industry and energy production sectors. Contributes to Ozone and PM formation.

Impact: Chronic lung disease.

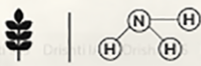
Carbon Monoxide (CO)



It is a product of the incomplete combustion of carbon-containing compounds.

Impact: Fatigue, confusion, and dizziness due to inadequate oxygen delivery to the brain.

Ammonia (NH₃)



Produced by the metabolism of amino acids and other compounds which contain nitrogen.

Impact: Immediate burning of the eyes, nose, throat and respiratory tract and can result in blindness, lung damage.

Lead (Pb)



Released as a waste product from extraction of metals such as silver, platinum, and iron from their respective ores.

Impact: Anemia, weakness, and kidney and brain damage.

Particulate Matter (PM)



PM10: Inhalable particles, with diameters that are generally 10 micrometers and smaller.

PM2.5: Fine inhalable particles, with diameters that are generally 2.5 micrometers and smaller.

Source: Emitted from construction sites, unpaved roads, fields, fires.

Impact: Irregular heartbeat, aggravated asthma, decreased lung function.

Note: These major air pollutants are included in the Air quality index for which short-term National Ambient Air Quality Standards are prescribed.

UPSC Civil Services Examination Previous Year Question (PYQ)

Prelims

Q. Consider the following: (2019)

1. Carbon monoxide
2. Methane
3. Ozone
4. Sulphur dioxide

Which of the above are released into atmosphere due to the burning of crop/biomass residue?

- (a) 1 and 2 only
(b) 2, 3 and 4 only
(c) 1 and 4 only
(d) 1, 2, 3 and 4

Ans: (d)

PDF Reference URL: <https://www.drishtiias.com/printpdf/ground-level-ozone-pollution-2>

