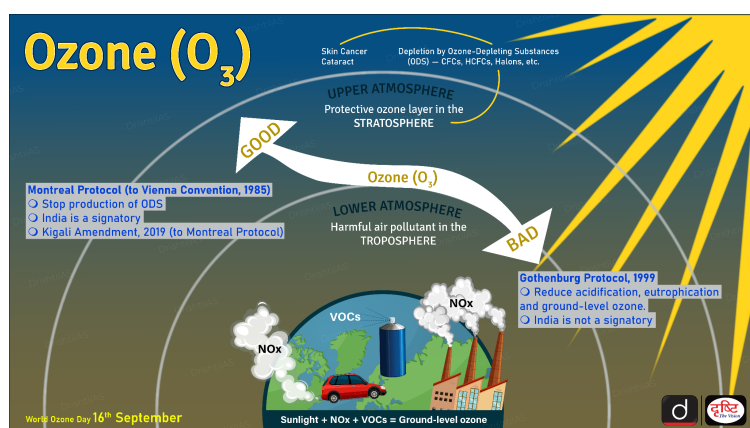




Surface Ozone Pollution

Why in News?

Indian Institute of Technology (IIT) Kharagpur study reveals that [surface ozone pollution](#) is severely **affecting India's major food crops**, especially in the [Indo-Gangetic Plain](#) and **central India**.



Key Points

- **About Surface Ozone Pollution:**
 - **Surface ozone (O_3) 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](#), Surface ozone is a harmful pollutant that poses significant health risks and environmental damage.
- **About the study:**
 - Surface ozone pollution is damaging major food crops such as **wheat, rice, and maize**.
 - The study argues that rising **ozone pollution jeopardizes** India's progress toward [Sustainable Development Goal 1 \(No Poverty\)](#) and [Goal 2 \(Zero Hunger\)](#) by **2030**.
 - Declining crop yields could **directly affect livelihoods and food access**, especially for vulnerable populations.
 - **Key Findings of the Study:**
 - The research at the **Centre for Oceans, River, Atmosphere and Land Sciences (CORAL)**, highlights the “lesser-known but potent” threat posed by surface ozone.
 - Ozone acts as a **strong oxidant that damages plant tissues**, causes foliar injuries, and leads to significant drops in crop productivity.
 - Using data from the **Coupled Model Intercomparison Project Phase-6 (CMIP6)**, the study assessed both historical and future trends of ozone-induced damage.
 - Without adequate mitigation, **wheat yields may decline by up to 20%**, while **rice and maize could see losses of around 7%**.

- In the worst-case scenarios, **ozone exposure** in key agricultural zones could **exceed safe limits by six times**.
- The research warns that **ozone-related yield losses** could **undermine India's ability to ensure food security** at home and impact food grain exports to Asian and African nations.
- **Gaps in Current Air Quality Initiatives:**
 - The **National Clean Air Programme (NCAP)** largely focuses on urban air pollution, leaving agricultural regions underserved.
 - The study highlights the need for **targeted interventions to monitor and curb** surface ozone pollution in farmlands.
- **Call for Policy Action:**
 - The researchers advocate for **urgent policy measures to reduce ozone emissions** and protect crop health.
 - Effective **pollution control strategies** in agricultural areas could boost food production and help meet both national and global food security goals.

Formation of Surface Level Ozone

- Surface-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.

National Clean Air Programme (NCAP)

- **About:**
 - The NCAP aims to systematically **address air pollution by involving all stakeholders and ensuring necessary action**.
 - Under NCAP, **131 cities have been identified** for implementation of city specific action plans.
- **Objective:**
 - This is the **first attempt in the country to develop a national framework** for air quality management with the goal of time-bound reduction .
 - It aims to reduce the **concentration of coarse (PM10)** and **fine particles (PM2.5)** by at least 20% over the next five years (base year for comparison – 2017).