Air Pollution

For Prelims: Air Pollution, Sentinel-5P satellite, Google Earth Engine, AQI, Covid-19, NCAP, SAFAR.

For Mains: Air Pollution.

Why in News?

Recently, a research has been published in the journal Nature titled- **"Machine learning-based country-level annual air pollutants exploration using Sentinel-5P and Google Earth Engine",** showing that, during 2018-2021, India witnessed the maximum levels of human-induced Air Pollution.

What Methodology did the Researchers Use?

- Researchers carried out machine learning-based country-level annual air pollution monitoring using **Sentinel-5P satellite and Google Earth Engine (GEE).**
    - Sentinel-5P satellite is a European satellite tracking the levels of air pollutants around the world.
- While **Sentinel-5P monitored** the atmospheric air pollutants and chemical conditions (from 2018-21), the **cloud computing-based GEE platform was used to analyse** the two factors.

What are the Findings of the Study?

- **Air Quality Index:**
    - The years 2020 and 2021 saw drastic changes in Air Quality Index (AQI), whereas 2018 and 2019 saw **low AQI throughout** the year.
        - AQI has been developed for eight pollutants viz. **PM2.5, PM10, Ammonia, Lead, nitrogen oxides, sulphur dioxide, ozone, and carbon monoxide.**
    - Delhi, Kolkata, Mumbai, Pune and Chennai recorded **huge fluctuations in terms of air pollution during the study period.**
    - High levels of nitrogen dioxide were observed in seven AQI monitoring stations of Kolkata: **102 in 2018, 48 in 2019, 26 in 2020 and 98 in 2021.**
        - Delhi also recorded high NO2 variations; 99 in 2018, 49 in 2019, 37 in 2020), and 107 in 2021.
- **Causes:**
    - This period, traversing the three phases of the Covid-19 Pandemic (pre, during and post), saw a surge in air pollution owing to the **development of transportation, industrial power plants, green space dynamics** and unplanned urbanization in the country.
    - Anthropogenic actions are the **foremost reason for climatic conditions** and atmospheric changes, and India is the country **most affected by such activities**.
    - In terms of rural air pollution, agricultural waste burning is also the main reason.
- **Implications:**
    - Anthropogenic activities in India are **causing an increase in health problems** and pollution-related diseases such as Asthma, Respiratory disease, Lung cancer, **and skin-related** diseases. The main pollutants of concern are NO2, carbon monoxide, ozone,

sulphur dioxide, and methane.
    - Air pollution and extreme weather conditions are interconnected. Air pollutants like **Methane**, **Ozone**, and aerosols affect sunlight.
    - The discharge of high voltage electricity has transformed oxygen into ozone, leading to **depletion of the ozone layer and increased penetration of ultraviolet rays.**
- **Recommendations:**
    - Awareness and planning are much needed for protecting the environment.
    - Proper planning, management and development strategies **can help protect the environment.**

What are the Government Initiatives to Combat Air Pollution?

- **Graded Response Action Plan (Delhi)**
- **Polluter Pay principle**
- **Smog Tower**
- **Tallest Air Purifier**
- **National Clean Air Programme (NCAP)**
- **BS-VI vehicles**
- **New Commission for Air Quality Management**
- **Turbo Happy Seeder (THS)**
- **Air Quality and Weather Forecasting and Research (SAFAR)**
- **Dashboard for Monitoring Air Quality**
- **National Air Quality Index (AQI)**
- **Air (Prevention and Control of Pollution) Act, 1981**
- **Pradhan Mantri Ujjwala Yojana (PMUY)**

UPSC Civil Services Examination Previous Year Question (PYQ)

Prelims

Q. In the cities of our country, which among the following atmospheric gases are normally considered in calculating the value of Air Quality Index? (2016)

1. Carbon dioxide
2. Carbon monoxide
3. Nitrogen dioxide
4. Sulfur dioxide
5. Methane

Select the correct answer using the code given below:

(a) 1, 2 and 3 only
(b) 2, 3 and 4 only
(c) 1, 4 and 5 only
(d) 1, 2, 3, 4 and 5

Ans: (b)

Mains

Q. Describe the key points of the revised Global Air Quality Guidelines (AQGs) recently released by the World Health Organisation (WHO). How are these different from its last update in 2005? What changes in India's National Clean Air Programme are required to achieve revised standards? **(2021)**

Source: DTE