Air Quality and Health in Cities

For Prelims: State of Global Air, World Health Organisation, WHO's New Air Quality Guidelines, Particulate Matter.

For Mains: Air Quality and Health in Cities Report, Effects of Air pollution, Environmental Pollution & Degradation.

Why in News?

Recently, a report was released titled **Air Quality and Health in Cities,** which analysed pollution and global health effects for more than 7,000 cities around the world between 2010 and 2019.

- The study ranked cities on the **basis of two major air pollutants found** — fine **Particulate Matter (PM2.5)** and **Nitrogen Dioxide (NO_2).**

What is the State of Global Air?

- The State of Global Air (SoGA) is a research and outreach initiative to provide reliable, meaningful information about air quality around the world.
- A collaboration of the US-based Health Effects Institute and the Institute for Health Metrics and Evaluation's Global Burden of Disease project, the program **gives citizens, journalists, policymakers, and scientists access to high-quality, objective information about air pollution exposure** and its health impacts.

What are the Findings?

- **PM 2.5 Levels:**
  - Delhi and Kolkata are ranked **first and second in the list of top 10 most polluted cities** when PM 2.5 levels were compared.
    - PM 2.5 is an atmospheric particulate matter of diameter of fewer than 2.5 micrometres, which is around 3% the diameter of a human hair. It causes respiratory problems and reduces visibility.
  - While exposures to PM 2.5 pollution **tend to be higher in cities located in low- and middle-income countries,** exposure to NO_2 is high across cities in high-income as well as low- and middle-income countries.
- **NO_2 Levels:**
  - No Indian city appeared in the list of top **10 or even top 20 polluted cities when NO2 levels were compared.**
    - Average NO_2 levels for Delhi, Kolkata and Mumbai, according to the report, ranged from 20-30 $\mu g/m^3$.
  - This list saw **Shanghai at the top with an average annual exposure of 41 $\mu g/m^3$.**

- NO$_2$ comes mainly from the **burning of fuels in older vehicles, power plants, industrial facilities and residential cooking** and heating.
- As city residents tend to live closer to busy roads with dense traffic, they are **often exposed to higher NO$_2$ pollution** than residents of rural areas.
  - Other cities with high NO$_2$ population levels included Moscow, Beijing, Paris, Istanbul and Seoul.
- **Death Burden:**
  - Beijing had the largest disease burden associated with a **PM 2.5-related illness,** with **124 attributable fatalities** per 100,000 persons.
    - Five Chinese cities were in the top 20.
  - Delhi came in 6th, with 106 deaths per 100,000 and Kolkata at 8th with 99 deaths.
- **Causes:**
  - Only 117 nations currently have **ground-level monitoring systems** to track PM 2.5, and only 74 nations are monitoring NO2 levels.
  - In 2019, exposure to pollutants in 86% of the more than 7,000 cities **exceeded WHO's standard**, therefore, impacting around 2.6 billion people.

What are the WHO's New Air Quality Guidelines?

- The 2021 guidelines **recommend** **new air quality levels** to protect the health of populations, by reducing levels of key air pollutants, some of which also contribute to climate change.
- WHO's new guidelines recommend **air quality levels for 6 pollutants**, where evidence has advanced the most on health effects from exposure.
  - 6 classical pollutants include **particulate matter (PM 2.5 and 10), ozone (O$_3$), nitrogen dioxide (NO$_2$), sulfur dioxide (SO$_2$) and carbon monoxide (CO).**

What are the Recommendations?

- **Leverage the expanding air quality monitoring toolbox:**
  - Efforts to expand ground monitoring of air quality **can improve the accuracy of estimates of Pollutant levels** and understanding of local air quality trends.
  - However, in addition to setting up monitors, it is **important to invest in resources for calibration and maintenance** to ensure the quality of data from these monitors.
- **Collect and digitize health records:**
  - Data on the burden of air pollution on health are vital for assessing the effectiveness of interventions, both in terms of public health benefits and economic impact.
  - It is important to **collect city-level health data consistently and systematically and make them accessible** to researchers. This can help researchers conduct more accurate and local analyses that inform communities and policymakers.

What are Initiatives taken by India for Controlling Air Pollution?

- **System of Air Quality and Weather Forecasting and Research (SAFAR) Portal**
- **Air Quality Index**
- **Graded Response Action Plan**
- **BS-VI Vehicles,**
- **Push for Electric Vehicles (EVs),**
- Odd-Even Policy as an emergency measure for reducing Vehicular Pollution.
- **New Commission for Air Quality Management**
- **Turbo Happy Seeder (THS) Machine**

UPSC Civil Services Examination, Previous Year Questions (PYQs)

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)

Exp:

- **National Air Quality Index (AQI)** is a tool for effective communication of air quality status to people in terms which are easy to understand. It transforms complex air quality data of various pollutants into a single number (index value), nomenclature and colour.
- There are six AQI categories, namely Good, Satisfactory, Moderately Polluted, Poor, Very Poor, and Severe.
- It considers eight pollutants namely:
    - Carbon Monoxide (CO), hence, 2 is correct.
    - Nitrogen Dioxide (NO_2), hence, 3 is correct.
    - Sulphur Dioxide (SO_2), hence, 4 is correct.
    - Ozone (O_3),
    - PM 2.5,
    - PM 10,
    - Ammonia (NH_3),
    - Lead (Pb).
- **Therefore, option (b) is the correct answer.**

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: IE