

Impact of Air Pollution on Human Health

Why in news?

Recently, the State of Global Air (SoGA) 2024 was released which offers a stark reminder of the significant impacts air pollution has on human health.

What is air pollution?

- **Air pollution** It is contamination of the indoor or outdoor environment by any chemical, physical or biological agent that modifies the natural characteristics of the atmosphere.
- **Common sources** Household combustion devices, motor vehicles, industrial facilities and forest fires are common sources of air pollution.
- The major outdoor pollution sources include residential energy for cooking and heating, vehicles, power generation, agriculture/waste incineration, and industry.
- **Pollutants** Pollutants of major public health concern include particulate matter, carbon monoxide, ozone, nitrogen dioxide and sulfur dioxide.
- **Impact on climate** Many of the drivers of air pollution (i.e. combustion of fossil fuels) are also sources of greenhouse gas emissions.
- **Impact on human health** Outdoor and indoor air pollution cause respiratory and other diseases and are important sources of morbidity and mortality.
- Polluted air is a *big trigger for pneumonia* and other respiratory infections and allergic diseases in children.
- There is a strong connection between long-term exposure to <u>traffic-related air</u> <u>pollution and early death</u> due to cardiovascular diseases and lung cancer, asthma onset in children and adults, and acute lower-respiratory-tract infections in children.

WHO data show that almost all of the global population (99%) breathe air that exceeds WHO guideline limits and contains high levels of pollutants, with lowand middle-income countries suffering from the highest exposures.

State of Global Air (SoGA) 2024

- It is an *annual tracker of health impact of air pollution*.
- Prepared by It is a collaborative assessment by the
 - US-based Health Effects Institute (HEI)
- Institute for Health Metrics and Evaluation's Global Burden of Disease (GBD) project.
- This has been produced for the *first time in partnership with UNICEF*.

• **Data source** – These results are linked to the Global Burden of Disease (GBD) 2021 report which estimated about 200 countries.

• **Assessment** – It usually assess the impact of *Particulate Matter (PM2.5) and Ozone* on human health.

• This 2024 report also covers the impact of *nitrogen oxides (NO2)*.

What are the key findings of the report?



- **During the pre-pandemic phase (1990 to 2019)** The order of the leading global causes of death were ischemic heart disease, stroke, chronic obstructive pulmonary disorder (COPD), and lower respiratory disease.
- **Post pandemic in 2021** Covid-19 changed the order with age-standardised mortality from COVID ranking second after ischemic heart disease, and stroke and COPD dropping to third and fourth place, respectively.
- **Impacts of air pollution on human** It become the *second largest killer globally after blood pressure*, recording a dubious tally of 8.1 million deaths in 2021.



- **Impact on children under five years** With *more than 700,000 deaths*, air pollution become the *second leading risk factor* after malnutrition globally.
- As many as 500,000 of these child deaths are linked to household air pollution from cooking indoors using dirty fuels in Africa and Asia.
- Polluted air is a big trigger for pneumonia and other respiratory infections and allergic diseases in children.



• Impact of Climate Change – It can exacerbate the health burden of noncommunicable diseases, including heart and lung diseases, during heatwaves.

What is the status of pollutants causing air pollution?

• Even though <u>PM2.5</u> (both ambient and household together) <u>account for more than 90%</u> <u>of the total air pollution</u> disease burden, <u>NO2 and ozone are the growing risk</u> factors globally.

Status of NO2 in Air pollution

• Higher exposure to NO2 shows the growing risk *from traffic exhaust* in densely populated urban areas.

• Seven of the 10 countries with the highest NO2 exposures are in the <u>high</u> <u>income countries</u> in West Asia.

• The highest exposures to NO2 have been noted in countries with <u>high</u> <u>socio-development index</u>, including Singapore, Japan and Canada.

• **Impact on children** – NO2 is a *leading risk factor for the development of childhood asthma*.

• About 55% of 194 countries studied do not yet meet the annual WHO Air Quality Guidelines of 10 μ g/m3, resulting in 42% of the world's population being exposed to unacceptable levels.

• **Impact of climate** – It is a *catalyst for formation of ozone*, yet another very harmful gas.

• NO2 reacts with other chemicals in the atmosphere to produce both particulate matter and ozone.

Status of Ozone in Air pollution

• Ozone levels have also *increased in South Asia*.

• **Impact of Climate change** – The chemical reactions that form ozone *increase when the air is warmer*, especially during heatwaves.

• Evidence shows that ozone <u>spikes during heatwaves</u> in China and Europe.

• **Exposure** – The proportion of population experiencing high ozone exposures is also increasing in India, Nigeria, Pakistan, and Brazil.

• **Impact on vegetation** – It can *reduce crop yields, damage biodiversity,* and undermine food security and nutrition.

• **Impact on humans** – In 2021, ozone was responsible for <u>56% of all global</u> <u>ozone deaths</u> reported in South Asia.

• Exposure to ozone is associated with an increased risk of both <u>acute and</u> <u>chronic respiratory illnesses</u>.

• India - It has recorded about 237,000 ozone related deaths.

• In 2021, nearly 50% of all ozone-related COPD deaths were in India, followed by China and Bangladesh.

Status of PM 2.5 in Air pollution

 \bullet Evidently, nearly 20% of the global ambient PM2.5 is attributed to household air pollution.

• **Impact on humans** – India and China have recorded 2.1 million and 2.3 million deaths respectively and together account for nearly 55% the total global disease burden from particulate matter.

What lies ahead?

- **Emulate the successful policy decisions** There has been a 61% reduction in the age-standardised death rate from household air pollution.
- This improvement has been possible due to growing access to clean energy for cooking, grid electricity, cleaner-burning cookstoves, and cleaner fuels.
- **Tackle air pollution** It can be done by reducing toxic emissions and greenhouse gases, which will improve public health and combat climate change.

References

1. Down To Earth | Air Pollution is 2nd Leading Risk Factor for Children

2. <u>WHO| Air Pollution</u>

3. <u>State of Global Air| State of Global Air 2024 Report</u>

