

## 'DELHI'S PM2.5 LEVELS WORST IN THE WORLD'

Relevant for: Environment | Topic: Environmental Pollution - Air, Water, Soil & E-waste

Gasping for air: Motorist and pedestrian travelling amid heavy smog conditions in New Delhi. File photo

A global analysis of air quality found that Indian cities, while recording particulate matter emissions (PM2.5) that are among the highest in the world, do relatively better on nitrogen dioxide (NO<sub>2</sub>) emissions.

The report, *Air Quality and Health in Cities*, released by U.S.-based Health Effects Institute on Wednesday, analyses pollution and global health effects for more than 7,000 cities around the world, focusing on two of the most harmful pollutants - fine particulate matter (PM2.5) and nitrogen dioxide (NO<sub>2</sub>).

The report, using data from 2010 to 2019, found that global patterns for exposures to the two key air pollutants were "strikingly different." While exposures to PM2.5 pollution tend to be higher in cities located in low- and middle-income countries, exposure to NO<sub>2</sub> is high across cities in high-income as well as low- and middle-income countries.

Delhi and Kolkata were ranked first and second in the list of top 10 most polluted cities when PM2.5 levels were compared, with Delhi and Kolkata reporting an average annual exposure of (relative to population) of 110 ug/m<sup>3</sup> and 84 ug/m<sup>3</sup> respectively. ug/m<sup>3</sup> refers to microgram per cubic metre.

However no Indian city appeared in the list of top 10 – or even top 20 - polluted cities when NO<sub>2</sub> levels were compared. This list saw Shanghai at the top with an average annual exposure of 41 ug/m<sup>3</sup>. Average NO<sub>2</sub> levels for Delhi, Kolkata and Mumbai, according to the report, ranged from 20-30 ug/m<sup>3</sup>.

NO<sub>2</sub> 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<sub>2</sub> pollution than residents of rural areas.

In 2019, 86% of the more than 7,000 cities analysed in the report exceeded the WHO's 10 ug/m<sup>3</sup> guideline for NO<sub>2</sub>, impacting about 2.6 billion people.

"While PM2.5 pollution tends to get more attention on known hotspots around the world, less data has been available for NO<sub>2</sub> at this global scale," the report notes.

An expert, who was not associated with the study, told *The Hindu* that this paradoxical situation in India was likely due to the relatively lower adoption of high-efficiency engine vehicles. "Complete combustion of fuel results in higher NO<sub>x</sub> (nitrogen oxides) where incomplete combustion sees other kinds of emissions," said Sachchida Nand Tripathi, Professor, IIT-Kanpur and an expert on air pollution in India. Other cities with high NO<sub>2</sub> population levels included Moscow, Beijing, Paris, Istanbul and Seoul.

Due to their highly reactive nature, nitrogen oxides also contributed to the formation of other pollutants, including ozone and particulate matter. NO<sub>2</sub> also has a shorter lifetime compared

with PM2.5 and other air pollutants. As a result, NO<sub>2</sub> levels show very high variability in space and time — levels can vary significantly even across a few kilometres. In comparison, PM2.5 levels tend to show less spatial variation.

In 2019, the global average NO<sub>2</sub> exposure was 15.5 ug/m<sup>3</sup>, but exposure levels varied considerably across cities.

Ground monitoring of air quality remains limited in many regions of the world, the report adds, obscuring the true degree of NO<sub>2</sub> pollution in countries such as India.

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