

## Delhi's air pollution puzzle

There were 4.24 million deaths globally in 2015 attributable to PM<sub>2.5</sub>—fine particulate matter with a diameter less than 2.5 micrometer—of which the share of India's 1.09 million deaths is 26%, according to the latest report of the World Health Organization (WHO). PM<sub>2.5</sub> are more harmful to human health than PM<sub>10</sub> (particles with a diameter between 2.5 and 10 micrometer) because unlike PM<sub>10</sub>—which only goes down to the lungs—PM<sub>2.5</sub> can enter the blood supply from the lungs and turn into invisible killers.

Among megacities—cities with the population of at least 14 million—Delhi has the worst air quality, according to the WHO report. Delhi witnessed widespread public protests in November 2016 after the city was engulfed in a toxic smog when the PM<sub>2.5</sub> level rose to 999 micrograms (mg)/metre cube (m<sup>3</sup>)—16 times higher than the Indian ambient air quality standard of 60mg/m<sup>3</sup>, and 40 times higher than the WHO standard of 25mg/m<sup>3</sup>—on a 24-hour average basis.

Terming Delhi's air "a public health emergency", the Supreme Court in 2016 had asked the Union government to prepare a graded response action plan specifically for the city—similar to what Beijing, Paris, and Singapore had done to improve their air quality. The plan, enforced on 12 January, describes a series of measures to be implemented by the court-mandated, environment pollution control authority (EPCA) in coordination with relevant state agencies. The measures range from shutting down schools to stopping construction activities to putting in place traffic rationing schemes—depending on the degradation in air quality.

The graded response programme is described as a big step forward because for the first time there is a legal framework for coordination among Delhi's various pollution controlling agencies and its neighbouring states. This is important because the sources of PM<sub>2.5</sub> air pollution in Delhi are both internal and external, according to a study by the Indian Institute of Technology, Kanpur (IIT-K).

The contribution of the neighbouring states of Rajasthan, Haryana, Uttar Pradesh and Punjab to Delhi's air pollution—mainly due to the burning of crop residue—is variable and depends on the time of the year: it is about 26% during winters and 12% during the summer.

However, several months after the plan, hailed as a panacea for all of Delhi's air quality woes, came into effect, official data from the country's top pollution watchdog, the Central Pollution Control Board (CPCB), indicates that the air continues to be unhealthy in Delhi. In the 182 days since the plan's launch, air quality has been healthy only for 20 days if we compare it with the national PM<sub>2.5</sub> health standards. Furthermore, it did not meet the WHO air quality guidelines of PM<sub>2.5</sub> even for a day.

If we look at the existing framework used to tackle air pollution in Delhi, the reasons for its continued failure become obvious.

The CPCB, which is responsible for developing air pollution guidelines at the national level, and the state pollution control boards (SPCBs) which enforce these guidelines in the states, face institutional, technical, and manpower constraints. All SPCBs have a combined manpower shortage of 35% to 40%. This hampers the ability of the EPCA to enforce the plan.

For example, if the air quality hits the "severe" mark (PM<sub>2.5</sub>>250 mg/m<sup>3</sup>), the plan requires the EPCA to direct the Delhi Pollution Control Committee (DPCC) to halt all construction activities, stop the use of diesel generators, and close brick kilns and power plants. But in the absence of adequate manpower, these actions become difficult to execute.

Delhi has 15 air pollution monitoring stations manned by the CPCB, of which only 10 are functional. In comparison, Beijing has 35 and London 100. Many of these stations are not properly calibrated, and there are quality concerns regarding the data they generate, former CPCB member secretary B. Sengupta said recently.

An air pollution forecasting platform is a prerequisite for efficient functioning of the graded plan. Think about this: The plan mandates to increase parking fee when the air quality becomes poor but doing so requires meetings among multiple levels of municipal administration, which can take up to at least a week's time for decision-making and coordination among relevant agencies. Air quality models, real-time data on emission sources, local meteorology, and characterization of size and chemical speciation of the PM are needed for such a platform. At present these capabilities are limited and only a work in progress, says S.N. Tripathi, professor of civil engineering, IIT-K.

The graded plan requires coordination among at least 16 agencies of Delhi and its neighbouring states. These inter-state agencies often represent competing political interests but their coming together is critical for the execution of the plan. There is not much leverage with the Centre in such cases.

On the contrary, think of what the US—a successful example—does. Under the US Clean Air Act, the environmental protection agency has been given the ability to withhold federal dollars (e.g., for highways) if local authorities do not come up with plans to solve air pollution non-compliance situations. The cutoff of funds was never actually implemented, but the threat was enough. “That would get them moving on the problem fast”, says George Thurston, director of the programme in exposure assessment and human health effects at the department of environmental medicine, New York University.

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