



No clear way ahead: smog in northern India

New Delhi and the surrounding region have faced emergency levels of air pollution, but a stronger long-term public health response is needed. Dinesh C Sharma reports.

On Nov 1, 2019, the residents of New Delhi and the surrounding towns in the National Capital Region woke up to a thick blanket of smog, with sunlight barely reaching the ground. People were coughing, had teary eyes, and reported headaches. At noon, the Air Quality Index (AQI) was hovering around 530—more than ten times the safe value of 50. An AQI above 500 is categorised as “severe plus” or “emergency” level. The levels of particulate matter (PM) pollutants PM₁₀ and PM_{2.5} had reached 500 µg/m³ and 300 µg/m³, respectively, five times above what is considered “good” air quality.

Within hours, the Environment Pollution (Prevention & Control) Authority of the National Capital Region declared that “this is a public health emergency as air pollution is now hazardous and will have adverse health impacts on all”. The authority advised people to “minimise personal exposure as far as possible and not to exercise in the open” and to reduce exposure of children, the elderly, and vulnerable people. The state government ordered the closure of schools and enforced a road rationing plan to cut emissions from motor vehicles, besides ceasing all construction activity.

Causative factors

The air quality in the Indian capital remains poor throughout almost all of the year, but it peaks during the winter months (October to January). The smog during this period has become a recurring phenomenon in the past few years. The rise in air pollution has been attributed to multiple factors: emissions from motor vehicles, the industrial sector, coal-based power plants, construction, open burning of solid

waste, use of diesel generators, household emissions, burning of stubble leftover after harvesting in the northern states of Haryana and Punjab, burning of firecrackers during festivities, and meteorological factors such as low wind speeds.

“...the average citizen living in the Indo-Gangetic Plain will likely lose about 7 years of life expectancy because of the high levels of fine particulate pollution.”

The problem is not confined to Delhi but extends to a large swath of land known as the Indo-Gangetic Plain, which stretches across the whole north of India, from Pakistan in the west, to Bangladesh in the east. PM_{2.5} pollution in the region has risen by 72% from 1998 to 2016. “700 million people live in this region and contribute to emissions from all possible sources. In addition, natural dust is transported from the western arid regions during the summer. All this makes the Indo-Gangetic Plain, stretching across 2500 km, a regional pollution hotspot where annual PM_{2.5} remains more than double the Indian standard of 40 µg/m³”, Sagnik Dey, coordinator of the Centre of Excellence for Research on Clean Air (Indian Institute of Technology Delhi, New Delhi), told *The Lancet*.

Health impacts

Both the year-long poor air quality and the episodic rise during winter are resulting in health impacts on the population. Several global, regional, and national studies have quantified these impacts in terms of morbidity and mortality due to air pollution. A state-level Global Burden of Diseases, Injuries, and Risk Factors

Study on the effects of air pollution on human health, published in 2018, concluded that “air pollution contributed to more disease burden in India than tobacco use, primarily through causing lower respiratory infections, chronic obstructive lung disease, heart attacks, stroke, diabetes, and lung cancer”. Using a methodology called the Air Quality Life Index, researchers from the Energy Policy Institute at the University of Chicago estimate that the average citizen living in the Indo-Gangetic Plain will likely lose about 7 years of life expectancy because of the high levels of fine particulate pollution.

Although some regional and global information is available, data on the health impacts of the smog in New Delhi are scant, despite the regularity of the pollution episodes. “Limited studies are available on the health effects of short-duration episodic smog in Indian cities like Delhi...Some hospitals are currently conducting a study to track the trend in hospital admission and to see how it is correlated with daily air pollution”, said Anumita Roychowdhury, from the Centre for Science and Environment in New Delhi.



“While hospital statistics of the present year are yet to be analysed, past records and recent anecdotal reports reveal a surge in cardiovascular and respiratory disorders during the periods of heightened pollution. Neonatal mortality too has been found to be higher in rural Haryana (neighbouring Delhi) than in rural areas of West Bengal. Several other health effects too have been documented, from increased risk of diabetes and cancer to cataracts and cognitive impairment”, pointed out K Srinath Reddy, from the Public Health Foundation of India, New Delhi.

Government agencies have no specific strategy to spread awareness about the health impacts of air pollution. The state government in Delhi distributed masks to school children and shut down schools when air quality hit the hazardous level. People were advised to stay indoors, but government bodies such as the India Trade Promotion Organisation went ahead with prescheduled events such as the annual trade fair, which is visited by thousands of people every day. Homeless people and people who live in shanties continued to be exposed to high levels of pollution.

Although the Ministry of Health and Family Welfare has been disseminating public health advice online, government ministers have been criticised for their response. On Nov 2, Prakash Javadekar, the Minister of Environment, Forest and Climate Change tweeted: “Start your day with music.” Health Minister Harsh Vardhan had this advice: “Eating carrots helps the body get vitamin A, potassium, & antioxidants which protect against night blindness common in India. Carrots also help against other pollution-related harm to health”.

Long-term plans

Clean air in Delhi remains a distant dream despite the recent initiation of several measures to address air quality. In the past decade, all coal-based

power plants in Delhi have been shut down, industries have shifted to the use of natural gas, dirty fuels such as furnace oil have been banned, tailpipe emission standards have been made

“...the monitoring and enforcement agencies significantly lack the workforce and skills’...”

stringent, and movement of trucks through the city has been restricted. The entire fleet of public transport buses runs on compressed natural gas. “With all this, we have seen a long-term year-on-year reduction in air pollution [in Delhi], but this is not enough. Even after this reduction, Delhi needs to reduce pollution by another 65% to meet clean air standards. To be able to do this, we need massive energy and technology transition in industry, mobility transition, and a paradigm shift in waste management. In short, we need more disruptive measures”, said Roychowdhury.

In January, 2019, the Ministry of Environment, Forest and Climate Change launched the National Clean Air Programme (NCAP), which seeks to expand air-quality monitoring in urban and rural areas, build an emissions inventory, and establish an actionable plan to reduce air pollution levels by 20–30% by 2024. “It is a good initiative for air pollution mitigation, but looking at the current situation, we all have to work on a war footing if we want to mitigate air pollution. Currently, we do not have enough workforce and skills to combat air pollution. [In particular], the monitoring and enforcement agencies significantly lack the workforce and skills”, added Ajay Nagpure, from the WRI Ross Center for Sustainable Cities in New Delhi.

Michael Greenstone, from the Energy Policy Institute at the University of Chicago, said: “If successful in meeting its goals and sustaining the reduced pollution levels, the NCAP

would produce substantial benefits, extending the life expectancy of the average Indian by about 1.3 years”.

In 2015, the central Ministry of Health and Family Welfare convened an expert panel on health-related aspects of air pollution that made several recommendations, including integration of air pollution in all health-related policies, systematic collection of air-quality data, and research on health impacts of pollutants as well as capacity building of public health professionals. Yet the plan has not been taken up. “The health ministry, based on the committee’s recommendations, had developed a multisectoral plan and engaged other ministries to form an inter-agency working group for implementation. However, the responsibility for implementation of mitigation measures lies mainly with other ministries and agencies. It requires political will and administrative skill to ensure coordination across different governments (states and centre) and implementing agencies”, noted Reddy, who co-chaired the panel. Other potential steps, such as ensuring strict compliance with environmental laws, investing more in public transport, and giving incentives to farmers to stop burning, have not been taken.

While government ministries sit on expert recommendations, education and awareness campaigns can help to spur action by the population. The use of firecrackers, which contribute to pollution, has fallen in Delhi following a sustained campaign among school children over the past 20 years. Dey called for similar campaigns focusing on the causes and health effects of air pollution to be launched in other parts of the Indo-Gangetic Plain as air pollution is a regional problem and needs to be tackled at that level. “If we continue in business-as-usual mode, other cities will also face a Delhi-like situation in the near future”, he warned.

Dinesh C Sharma