



Editorial

Dear Readers,

Air pollution and climate change represent two interconnected crises that threaten not only the environment but also profoundly affects human health. Despite being distinct issues, their interface is undeniable and demands urgent attention from policymakers, industries, and individuals alike. As we stand at the crossroads of environmental degradation, it is imperative to recognize and address the intricate relationship between these two pressing challenges.



Firstly, air pollution and climate change share common sources and drivers. Combustion of fossil fuels for energy production, transportation, and industrial processes is a major contributor to both air pollution and greenhouse gas emissions, leading to the deterioration of air quality and the exacerbation of climate change. Secondly, the impacts of air pollution and climate change are mutually reinforcing. For instance, aerosols and black carbon emitted from burning fossil fuels not only degrade air quality but also contribute to the warming of the atmosphere by absorbing sunlight and altering cloud formation processes. Conversely, climate change exacerbates air pollution by influencing atmospheric conditions and exacerbating weather patterns conducive to the formation and accumulation of pollutants. Extreme weather events such as heatwaves and wildfires, exacerbated by climate change, can result in the release of harmful pollutants into the air, posing significant risks to public health and exacerbating environmental degradation.

Efforts to mitigate climate change must go hand in hand with measures to reduce air pollution, recognizing the interconnected nature of these challenges. Transitioning to renewable energy sources, improving energy efficiency, stringent emissions standards, sustainable transportation infrastructure, promoting green urban planning, and enhancing agricultural practices can significantly reduce emissions of air pollutants and greenhouse gases while fostering resilience to the impacts of climate change. Additionally, international cooperation is crucial for addressing cross-border pollution and ensuring a concerted global response to these interconnected crises. Further, by adopting sustainable lifestyle choices, individuals can contribute to improving air quality and mitigating climate change impacts in their communities and beyond.

In conclusion, the interface between air pollution and climate change underscores the need for urgent and concerted action at all levels. Failure to address these interconnected crises not only threatens the health and well-being of current and future generations but also undermines global efforts to achieve sustainable development and environmental stewardship.

Yours sincerely

Hemant Kaushal
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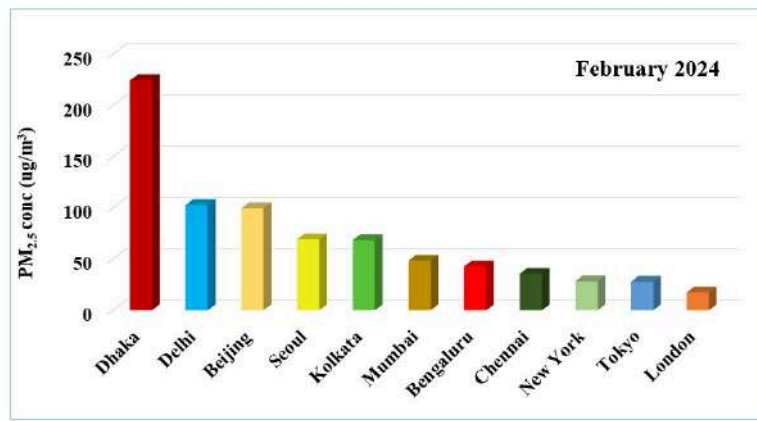


Air Quality Trends



Indian & International Cities- February 2024

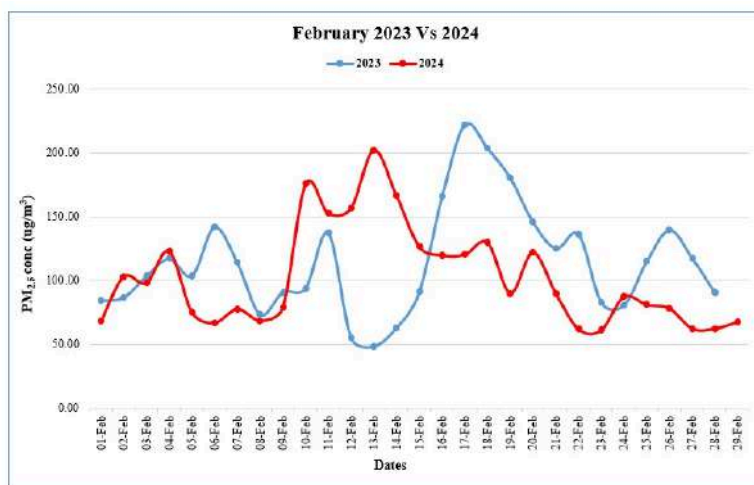
[Dhaka has the highest pollution levels](#)



Source:
CPCB (Indian Cities)
aqicn.org (Other Cities)

The graph above shows the daily average PM_{2.5} for the month of February 2024. Amongst the major metros worldwide, **Dhaka** has shown the highest concentration of PM_{2.5} followed by Delhi and Beijing.

Delhi PM_{2.5} (24 hr. daily average) Trend



Source: CPCB

In February, the average PM_{2.5} concentration was 102.70 ug/m³ for the current year 2024 as compared to the previous year (114.86 ug/m³ for February 2023). The amount of PM_{2.5} has fluctuated in some days and increased in others.

****Stations with missing values for more than 15 days have been excluded*



Henceforth, the CERCA expert talk series shall be organised on a quarterly basis. We shall announce our next expert speaker soon.



Workshop for Brainstorming on methodologies for establishing a standard methodology for calculation of burnt area caused as a result of crop residue burning along with GDI partners



Objective

The primary objective of the workshop was to facilitate focused brainstorming sessions among diverse stakeholders from different domains for the development/selection/adoption of methodology to accurately

calculate the area burnt after crop residue burning. This collaborative effort aimed to propose a standard operating procedure for calculating burnt area and submit it to CAQM for further consideration.

Expected Outcomes

- A whitepaper based on workshop discussions will be published
- Enhanced collaboration and communication between agencies for a more unified approach to post-paddy harvesting burnt area analysis
- Improved accuracy, consistency, and comparability in burnt area estimations
- Development of a standardised methodology for burnt area calculation that remote sensing agencies can uniformly adopt

Event Date

16th February 2024, IIT Delhi



With a vision to support India's commitment to combat climate change and air pollution, CERCA is delighted to announce a collaboration with **Clean Air Fund**. **Prof. Sagnik Dey**, faculty coordinator in CERCA is the PI of the project, along with **Prof Dilip Ganguly**, co-PI, from **IIT Delhi** will be leading this project.

India's strong commitment to combat climate change and air pollution requires an interdisciplinary and evidence-based approach. This project aims to generate India-specific evidence on the health and climate impacts of air pollution. By linking clean air and climate actions seamlessly, the project will provide strategic knowledge to Indian policymakers, aiding in prioritizing emission reduction sectors for maximum health and climate benefits.

The **Arun Duggal Centre of Excellence for Research in Climate Change and Air Pollution (CERCA)** at **IIT Delhi** will assist in implementing various outreach activities envisaged under the project. At CERCA, we have always been dedicated to creating positive change, and this new partnership takes our commitment to a whole new level. With a shared vision and aligned goals, we are confident that this project will bring about transformative results. As we embark on this exciting journey, we invite all stakeholders to register for our newsletter subscription and know more about its future activities.

Stay tuned for regular updates on the progress and impact of this project.

Kindly use this button below to register:

[Register here](#)

Expert Opinion and Research Outcomes

Air pollution hides increases in rainfall

Mark D. Risser, William D. Collins, Michael F. Wehner, Travis A. O'Brien, Huanping Huang, Paul A. Ullrich. Anthropogenic aerosols mask increases in US rainfall by greenhouse gases. Nature Communications, 2024; 15 (1) DOI: 10.1038/s41467-024-45504-8

A study by researchers at the Lawrence Berkeley National Laboratory reveals that the expected increase in rain has been largely offset by the drying effect of aerosols, emissions like sulfur dioxide produced by burning fossil fuels. The research, published in Nature Communications, provides the first time that we can understand what's causing extreme rainfall to change within the continental U.S. The study uses a new method and measurements from rain gauges from 1900 to 2020 to determine how human activities have influenced rainfall in the U.S. The study confirms that increased greenhouse gas emissions cause an increase in rainfall.

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Air pollution linked to more signs of Alzheimer's in brain

Grace M. Christensen, Zhenjiang Li, Donghai Liang, Stefanie Ebel, Marla Gearing, Allan I. Levey, James J. Lah, Aliza Wingo, Thomas Wingo, Anke Hüls. Association of PM 2.5 Exposure and Alzheimer Disease Pathology in Brain Bank Donors—Effect Modification by APOE Genotype. Neurology, 2024; 102 (5) DOI: 10.1212/WNL.000000000209162

A study published in Neurology® found that people with higher exposure to traffic-related air pollution were more likely to have high amounts of amyloid plaques in their brains associated with Alzheimer's disease after death. The study examined the brain tissue of 224 people who agreed to donate their brains at death to advance research on dementia. The average level of exposure was 1.32 micrograms per cubic meter (µg/m³) in the year before death and 1.35 µg/m³ in the three years before death. The researchers found that people with 1 µg/m³ higher PM_{2.5} exposure in the year before death were nearly twice as likely to have higher levels of plaques, while those with higher exposure in the three years before death were 87% more likely to have higher plaques.

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EU strikes deal to strengthen air quality standards

EU negotiators have reached a provisional agreement on the revised Ambient Air Quality Directive, aiming to align EU air quality standards with WHO recommendations. This is a crucial step towards protecting vulnerable European society from harmful air pollution. Delaying limits could lead to more early deaths and health issues.

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Economic cost of clean air inaction in Europe

Air pollution is the EU's top health threat, causing over 300,000 premature deaths annually. Delaying stricter air quality directives can lead to socio-economic losses, especially in cities where over 95% of the population breathes harmful air. The ISGlobal Barcelona Institute for Global Health warns that the economic costs outweigh the benefits of clean air action.

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Air pollution is changing the scent of flowers and confusing insects

Insects may struggle to locate flowers due to air pollutants degrading the chemical compounds responsible for their enticing floral scents. Researchers at the University of Washington investigated the effects of anthropogenic pollutants on plant pollinators, focusing on ozone and nitrate radicals. They found that nitrate radicals broke down the scent compounds more completely than ozone and nitrate radicals.

Exposure to flowers with degraded scents led to a 70% decrease in visitation of primroses, potentially affecting hawk moth health and the wider ecosystem. The decline in moth visitation could result in a 28% reduction in the amount of fruit plants produce.

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Clean air can become a reality for the Global South

Air pollution is a silent but deadly threat, affecting nine out of 10 people worldwide, causing 8 million deaths annually. This crisis disproportionately affects developing nations, who struggle with limited resources and technical capabilities. Air pollution is a public health emergency, increasing the risk of diseases like Type 2 diabetes, obesity, systemic inflammation, Alzheimer's, and dementia. It also affects mental health, triggering depression, bipolar disorder, and personality disorders. The World Bank estimates that the annual cost of air pollution-related illness and premature death is in the trillions of dollars globally. In 2019, the public health cost alone was estimated at \$8.1 trillion, or around 6.1% of global GDP. The urgent need to construct a compelling global case for clean air is highlighted by the U.N. Climate Change Conference in Dubai, which acknowledged the issue and highlighted the necessity of reducing greenhouse gases. According to Dr Saumya Swaminathan, Former Chief scientist at the World Health Organization (WHO), the vision of clean air can become a reality with the knowledge, technology, and resources, and the political will.

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Rare 'triple-dip' La Nina improved air quality in north India, increased pollution in peninsular region in 2022-23, study says

A study by scientists led by Gufran Beig from the National Institute of Advanced Studies has found that air quality in northern India improved during the 2022-23 winter season, while in peninsular India, pollution levels increased. The study, published in the Elsevier Journal, found that air quality worsened in peninsular Indian cities but improved in the northern part of India. Ghaziabad, Rohtak, and Noida recorded the most significant improvement in air quality, while Mumbai recorded the highest deterioration with a 30% increase in PM2.5 levels. The study also found that the winter of 2022-23 coincided with the last phase of an unusual triple-dip La Niña event, influenced by climate change, which impacted the large-scale wind pattern, preventing stagnation conditions in north Indian cities and improving air quality. However, it led to calmer conditions in peninsular Indian cities, accelerating transboundary pollution and significantly deteriorating air quality.

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Smog towers, cloud seeding not solution to India's air pollution problem: US scientist

In an interview with PTI, Richard Peltier, a member of the World Health Organization's (WHO) Global Air Pollution and Health Technical Advisory Group, said there is a good understanding that air pollution is "really quite bad" across India but precision is lacking due to the limited distribution of air pollution monitors. The senior US scientist emphasized that improving air quality in India requires a long-term effort, stating that cost-intensive technologies like smog towers and cloud seeding are not sustainable solutions. He cited the US as an example of how long it took to develop good air quality in US. Smog towers work on a small scale but are impractical for entire cities due to cost and maintenance challenges. Cloud seeding technology is not sustainable and is not a long-term solution. Peltier also noted that the severity of the air pollution problem in India is underestimated due to a lack of sensors and air quality monitoring institutions.

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