



### *Editorial*

Dear Readers,

Despite how much still needs to be achieved in our fight against air pollution, we have come a long way in the past few years. We have reached a stage where we have the right science and technology for monitoring air quality and understanding how it is impacting our lives. We possess much more data and evidence compared to the past and, therefore, it is the right time to start focusing on using it to identify and implement solutions. The fight for clean air in India is important and unique since it is not championing one approach and one solution for all. Moreover, since different cross-section of stakeholders have stood up to act underlines the fact that everybody is at risk and, therefore, each one of us has a responsibility. We need to act with greater urgency to ensure clean air in our homes, cities, and villages through Citizen science initiatives to ensure wider public participation in scientific endeavors that generate new knowledge and education. Citizen science is an emerging tool for creating enthusiasm in air quality monitoring for accessing real-time air quality information and promoting air quality awareness.



Wishing all our readers a very Happy World Environment Day 2022!

Hemant Kaushal  
(Pr. coordinator)  
Arun Duggal Centre of Excellence for Research in Climate  
Change and Air Pollution (CERCA)

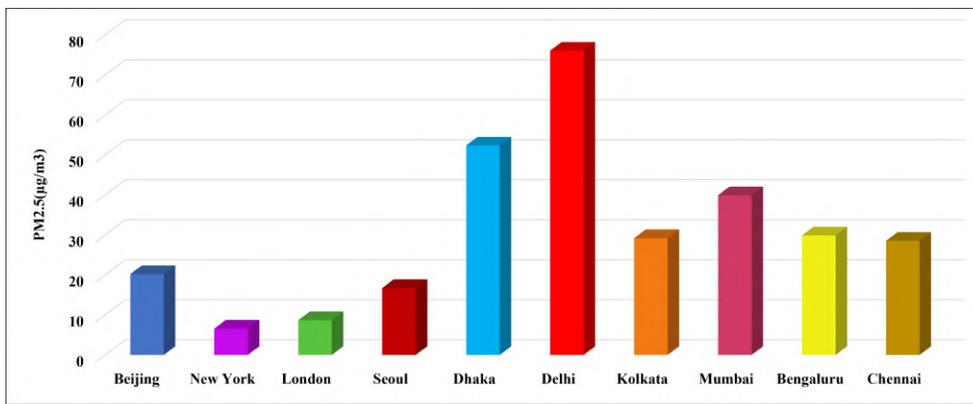


## Air Quality Trends



Indian & International Cities- May 2022

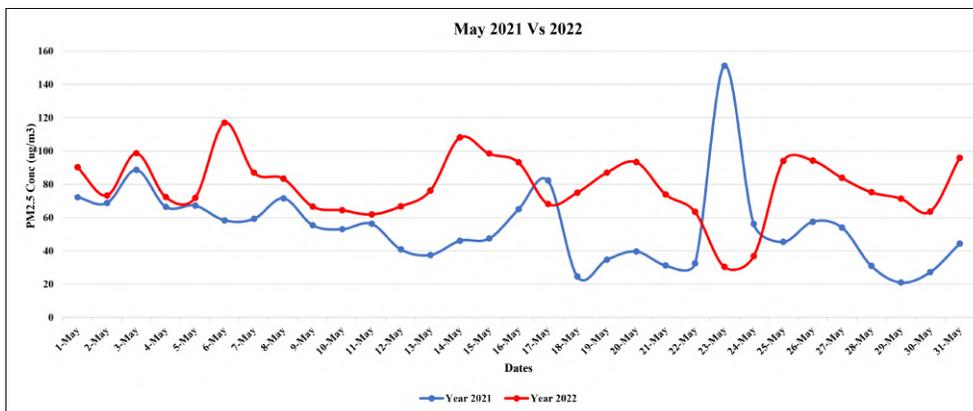
Delhi is found to be the highly Polluted city.



Data Source : berkeleyearth.org

The graph above shows the daily average PM<sub>2.5</sub> for the month of May 2022. Amongst the popular cities worldwide, Delhi has shown the highest concentration of PM<sub>2.5</sub> followed by Dhaka and Mumbai. Delhi and Kolkata within India rank among the topmost polluted cities worldwide while the other Indian cities in the graph are among the top 10 metropolitan cities.

### Delhi PM<sub>2.5</sub> (24 hr. daily average) Trend May 2021 Vs May 2022



Data Source : CPCB

May 2022 recorded poor air quality as the meteorological conditions like less rainfall impacted the dispersion of pollutants and resulted in trapping the local pollutants. In addition to these, a long-running decline in COVID-19 cases resulted in an increase in social gatherings and anthropogenic activities whose impact is visible on the Delhi Air Quality, which can be clearly correlated and observed in the graph. Hence, PM<sub>2.5</sub> has increased by 24.15µg/m<sup>3</sup> on an average in May 2022 as compared to May 2021.



From Air pollution to Climate change, CERCA virtual **Expert Monthly Talk series** spotlights a range of contemporary issues while providing a platform for renowned speakers from around the world to share their knowledge and views.

CERCA IIT DELHI EXPERT TALK SERIES






# " The Role of Air Quality Management in Low Carbon Healthy Buildings "

**Nita Soans**  
CEO, Kaiterra India



**11:00 AM, IST**  
30 June 2022, Thursday



scan to register

Hosted by:- Arun Duggal Centre of Excellence for Research in Climate Change and Air Pollution, IIT Delhi

To register for this June 2022 Talk Series, [Click here](#)

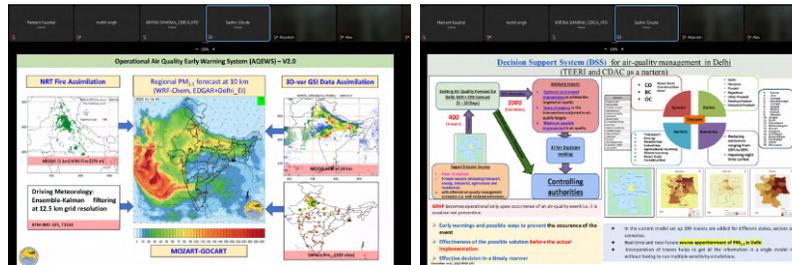


## CERCA Events



Expert Talk delivered by [Dr. Sachin D Ghude](#) on 13th May, 2022

[Dr. Sachin D Ghude](#) delivered a talk on “Operational air quality early warning and decision support system for Delhi NCR: Success and challenges” on May 13th, 2022. He discussed the Air quality early warning (AQEWS) and Decision Support System (DSS), developed by IITM, that helps to timely alert the public of forthcoming air pollution episodes. He highlighted how these systems provide quantitative information about the contribution of emissions, sectors and biomass-burning to the air quality in Delhi. His talk was highly informative.

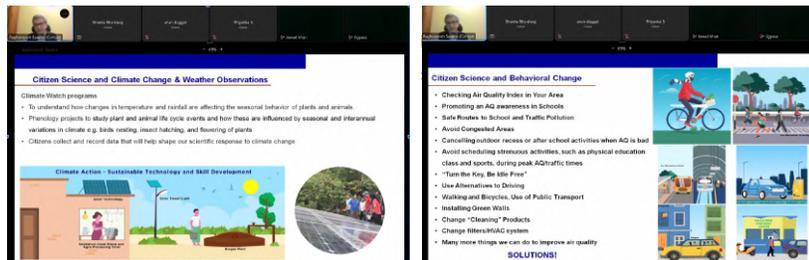


If you have missed this event, the link below will direct you to the recorded video.

Watch the complete Expert Talk Series Here.!

Expert Talk delivered by [Raghuvansh Saxena\\*\\*](#) on 30th May 2022

[Raghuvansh Saxena](#) delivered a talk on “Citizen Science and Air Quality’ - A Unique Approach for People’s Participation in Scientific Research” on May 30th, 2022. He talked about various citizen science initiatives and highlighted how these initiatives help in involving the public at large using well-designed scientific projects making them more aware and educated. He mentioned how citizen science can bring behaviour change in people and has become one such instrument that helps not only in monitoring air quality and weather observations, but also disseminating air quality information. His talk was highly informative and interesting.



\*\*\*\* CEO, Earthwatch Institute India

## World Environment Day 2022



[Watch the complete Video Here.!](#)

## Air Quality Action Forum

UN Environment Programme, with support from Paytm Foundation, has launched the Air Quality Action Forum (AQAF) - the first of its kind platform with a vision towards addressing the issue of air quality in a collective manner. The AQAF was launched on December 13th, 2021 with the aim to bring together all relevant stakeholders. The Forum Launch had high-level participation from different stakeholders; Mr N. P. Gangwar, (Joint Secretary, Ministry of Environment, Forest and Climate Change), Mr Atul Bagai, (UNEP India Country Office Head), Ms Dechen Tsering (Regional Director, UNEP- Asia and the Pacific Office), Mr. Vijay Shekhar Sharma (Founder and CEO, Paytm), and Dr. Valentin Foltescu (Senior Programme Management Officer UNEP/Climate and Clean Air Coalition Secretariat) and other participants from different agencies and organizations.

As part of the forum different stakeholders under six pillars of the corporate sector, expert institutions (including NGOs, CSOs, Academia), international development agencies, international philanthropic organizations, national philanthropic organizations, and the UN system of organizations— are to be brought together on a common platform to support efforts of the Government of India (GoI) in improving air quality and its management. Additionally, as part of AQAF, wider stakeholder engagement will be facilitated by UNEP to undertake better coordination with the MoEFCC in achieving the broader national goals set forth under NCAP.

Stakeholder discussions across 6 pillar groups will be conducted to identify perspectives on various issues concerning air pollution in India and the possible solutions that could lead to its reduction in the short and long timeframes. The inputs from various stakeholders on challenges, gaps, needs, and possible solutions will be compiled into a report to be shared during the Forum Convention scheduled around mid of 2022. To know more about the forum contact [cerca@iitd.ac.in](mailto:cerca@iitd.ac.in) or [unepindia@un.org](mailto:unepindia@un.org).



## CERCA Expert Opinion and Research Outcomes

### Chemical speciation and source apportionment of ambient PM<sub>2.5</sub> in New Delhi before, during, and after the Diwali fireworks

*Chirag Manchanda, Mayank Kumar, Vikram Singh, Naba Hazarika, Mohd Faisal, Vipul Lalchandani, Ashutosh Shukla, Jay Dave, Neeraj Rastogi, Sachchida Nand Tripathi*

- This study assesses the impact of Diwali on the concentration, composition, and sources of ambient PM<sub>2.5</sub>.
- It was observed the total PM<sub>2.5</sub> concentrations rose to 16 times the pre-firework levels, while each of the elemental, organic, and black carbon fractions of ambient PM<sub>2.5</sub> increased by a factor of 46.1, 3.7, and 5.6, respectively. The concentration of species like K, Al, Sr, Ba, S, and Bi displayed distinct peaks during the firework event and was identified as tracers.
- The source apportionment study, undertaken using positive matrix factorization, revealed the fireworks to account for 95% of the total elemental PM<sub>2.5</sub> during Diwali.

- Delhi has encountered serious haze events following Diwali in recent years; this study highlights that biomass burning emissions rather than the fireworks drive the poor air quality in the days following Diwali.

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### Climate and air pollution implications of potential energy infrastructure and policy measures in India

*Brinda Yarlagadda, Steven J. Smith, Bryan K. Mignone, Dharik Mallapragada, Cynthia A. Randles, Jon Sampedro*

- This study examines the implications of possible future energy, climate, and air pollution control policies and measures in India through 2050.
- A scenario approach using the GCAM global energy-climate-land model combined with the Hector simple climate model was taken and the TM5-FASST air quality source-receptor model to examine energy, climate, and air quality outcomes.
- It was observed that reducing the use of traditional biomass in buildings can reduce primary carbonaceous particulate emissions well below 2015 levels.
- However, policies that are more ambitious than current plans would likely be required to reduce SO<sub>2</sub> and NO<sub>x</sub> emissions well below 2015 levels.
- Among single policy cases considered, pricing of greenhouse gas (GHG) emissions and expansion of natural gas infrastructure have the largest impacts on overall energy system changes relative to the reference scenario.

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### Indoor and Ambient Air Pollution in Chennai, India during COVID-19 Lockdown: An Affordable Sensors Study

*Puttaswamy, N., Sreekanth, V., Pillarisetti, A., Upadhya, A.R., Saidam, S., Veerappan, B., Mukhopadhyay, K., Sambandam, S., Sutaria, R., Balakrishnan, K.*

- The Tamil Nadu Air Pollution and Health Effects Study (TAPHE-2) aimed to evaluate the relationship between air pollution and birth outcomes in a rural-urban cohort of 300 pregnant women.
- The impact of graded COVID-19 lockdown on indoor particulate matter (PM<sub>2.5</sub> and PM<sub>10</sub>) levels based on calibrated data from affordable real-time PM sensors called atmos™ and ambient PM levels from publicly available regulatory monitors was checked
- The study period was between 11 March and 30 June 2020 (i.e., 100 days of continuous monitoring), which coincided with four phases of a nationwide graded lockdown.
- The indoor PM<sub>2.5</sub>/PM<sub>10</sub> ratio decreased during the lockdown, suggesting a decline in the fine mode dominance in PM<sub>10</sub>.
- The indoor-to-outdoor (I/O) ratios in PM<sub>2.5</sub> marginally increased during the lockdown, suggesting an uneven reduction in indoor and ambient PM<sub>2.5</sub> levels during the lockdown.

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#### 97.6% in Maharashtra exposed to unsafe levels of air pollution: Report

In a recently published paper by the World Bank Group, Maharashtra has ranked third in the list of most populated sub-national regions globally, with 97.6% of its population exposed to either hazardous or unsafe levels of air pollution, specifically PM<sub>2.5</sub> aerosols. It used remote sensing data for aerosol concentration, population numbers from the WorldPop Global High-Resolution Population data set (WPGP), and a chemical transport model to ascertain the movement of PM<sub>2.5</sub>



#### UP claims air pollution down, the first state to launch air shed based action plan

Uttar Pradesh government said it is all set to implement its air shed-based action plan – the first for any state in India - for combating air pollution with the help of the World Bank. An air shed is the geographic area wherein meteorological factors influence the air quality within that area and in turn, get influenced too. This approach has been first initiated with Delhi-NCR, Punjab, Haryana, etc. However, Uttar Pradesh becomes the first

pollutants. Maharashtra has the highest number of non-attainment cities in the country as per the National Clean Air Program (NCAP), at 25. These are all rapidly expanding urban centers which are struggling to curb emissions at source, whether due to vehicles, construction and development works, poor waste management, or industries. These cities are regularly recording daily PM2.5 averages in excess of 35 ug/m3,

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### **Air panel for increasing plantation target by 17% in Delhi-NCR**

Commission for Air Quality Management in NCR & Adjoining areas (CAQM) in consultations with the governments of NCR states finalize the greening and plantation action plan for 2022-23 in the region. For 2022-23, CAQM has mandated an enhanced plantation target. The Commission stated that the timeline, covering various activities including site selection, pit digging, soil weathering, the commencement of plantation, completion of the plantation, weed removal, mortality refreshment, and replacement, has been finalized. Greening is one of the major actions for abatement of air pollution, emphasis on large scale greening, plantation, and urban foresting initiatives including the Miyawaki technique for better utilization of both small and large patches of land and considering the larger impact on biodiversity and urban ecology

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### **Air pollution is killing millions — it's time to hold ourselves accountable for the harm it causes**

Air pollution causes a slew of negative health impacts for those affected by it and claims the lives of 7 million people every year. It also accelerates and is worsened by climate change, with the effects most acute for the 70% of the global population who live in cities. Tackling air pollution is an imperative that can be accomplished by ensuring cross-sectoral accountability for planetary and human health. Estimates by the World Health Organization (WHO) reveal that 7 million people lose their lives every year as a result of air pollution. WHO estimates that 9 in 10 people breathe the air containing high levels of pollutants.

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state to bring out the action plan. The largest and most densely populated state in the Indo-Gangetic Plains (IGP) has 17 Non-Attainment cities, those that did not qualify for certain air pollution norms at the time of the launching of the National Clean Air Programme (NCAP). Its average PM10 and PM2.5 values were higher than the national average for five consecutive years.

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### **Gujarat to launch India's first carbon trading market: How does this aid climate action?**

India's first carbon trading market in Gujarat has been a trendsetter in the emission trading arena. It has been running the world's first 'Emissions Trading Market for Particulate Pollution' from Surat since 2019. The Gujarat government has announced its plans for setting up a cap-and-trade market for carbon emissions from large sources. This will be the first-of-its-kind market in the emerging and growing economies, outside of China. The Gujarat government aims to incentivize carbon trading to the industries in the state with minimal disruption to their businesses. The aim is to achieve a growth-friendly model to cut its carbon footprint and help India move towards its 'net zero' goal. On the other hand, it will offer the state government a flexible tool to meet climate goals as it sets an overall cap on the quantum of emissions.

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### **Coal phase-out can avoid over 14.5mn premature deaths from air pollution: Study**

The assessment by researchers in Germany at NewClimate Institute shows the enormous scale of public health benefits of urgently phasing out operating and planned coal plants in 24 countries, covering over 90 percent of the global fleet. An early phase-out of coal plants around the world could help avoid over 14.5 million premature deaths from air pollution over the next three decades, according to a new analysis published, delivering an economic benefit of \$16.3 trillion. This equates to saving around 425 million years of life or gaining an additional 20 days for each of today's 7.9 billion global population. It shows existing coal plants around the world are contributing to more than 900 thousand premature deaths per year.

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