



**Arun Duggal Centre of Excellence for Research in
Climate Change and Air Pollution
Indian Institute of Technology Delhi
Monthly Newsletter April 2022**



Editorial

Dear Readers,

How ready are our cities to tackle air pollution?

We do not require more air pollution studies to underline the importance of clean air in our country or to establish a positive correlation between polluted air and negative GDP growth. What is needed are concrete, measurable time-bound targets to tackle air pollution. By tying economic incentives to pollution-based targets would lead to more efficient allocation of NCAP funds for cities thereby further incentivizing states to reach such targets in a time-bound manner. We also need to take an airshed approach, with specific annual targets for each of the cities in the airshed. A regional approach with states looking at air quality only within their administrative boundaries is likely to be unsuccessful but adopting an airshed approach will go a long way in helping improve air quality levels for the entire region. The Greenhouse Gas-Air pollution Interactions and Synergies model, popularly known as the GAINS Model explores cost-effective multi-pollutant emission control strategies that meet environmental objectives on air quality



impacts (on human health and ecosystems) and greenhouse gases. CERCA is working with the World Bank and IIASA, Austria to fine tune the already applied and publicly available -GAINS model with the local data of states from the Indo Gangetic Plain (IGP) plains of India and initiate an Air Quality Management modelling network based on air shed approach for the IGP region in India. The model would not only help the state government of IGP region and GOI to meet the air pollution level target set under National clean air Program (NCAP) but also help the state govts to understand the impact of major sectors on PM_{2.5} concentrations within a state and corresponding impact on other states. The model aims to investigate the impact of Transboundary Pollution on PM_{2.5} concentrations over the IGP region and will be able to provide advice on cost effective Air Quality Management (AQM) planning in India.



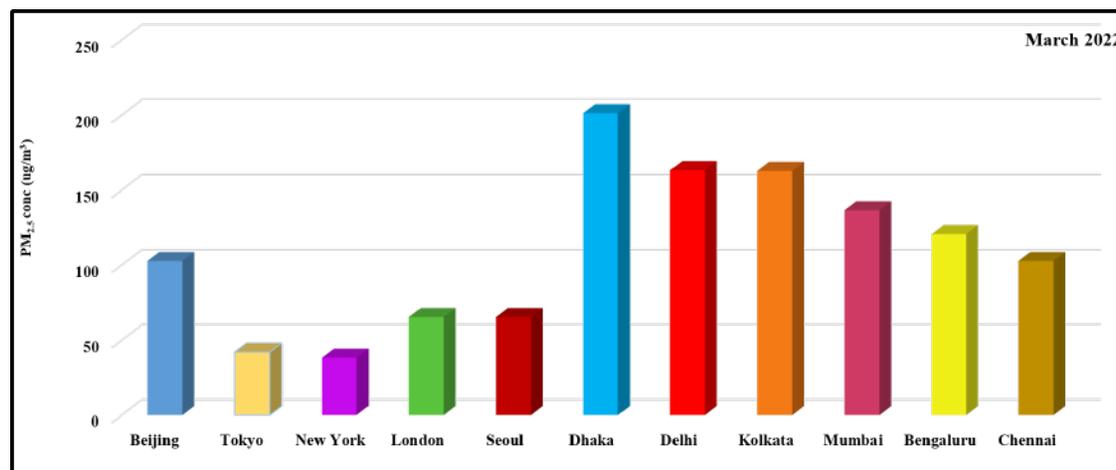
Yours sincerely,

Hemant Kaushal
Pr. Coordinator
Arun Duggal Centre of Excellence for Research in Climate Change and Air Pollution



Indian & International Cities- March 2022

Dhaka has the highest Air Pollution among all the major International Cities



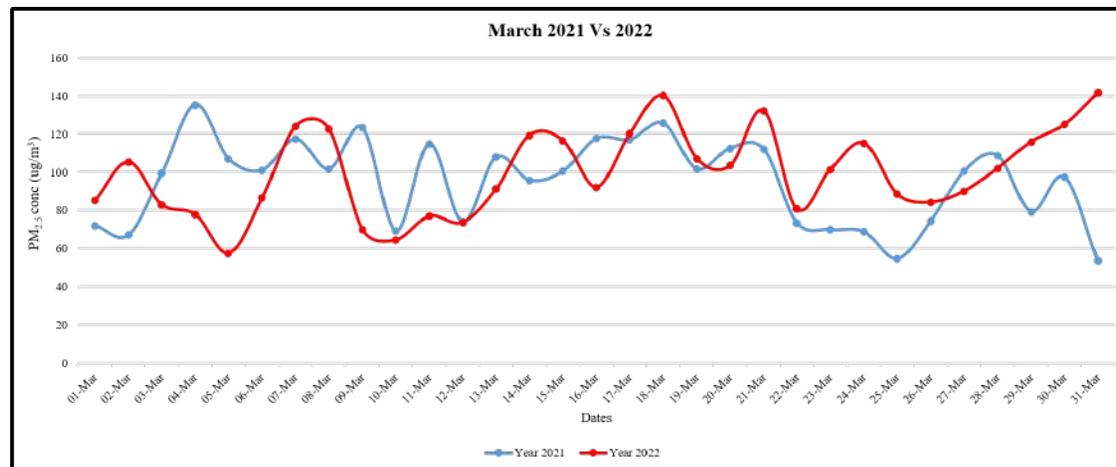
Data Source: aqicn.org

The graph above shows the daily average PM_{2.5} for the month of March 2022. Amongst the popular cities worldwide, Dhaka has shown the highest concentration of PM_{2.5} followed by Delhi. Delhi and Kolkata,

within India, rank amongst the topmost polluted cities worldwide while the other Indian cities in the graph are amongst the top 10 metropolitan cities.

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

March 2021 Vs March 2022



Data Source: CPCB

Air quality didn't improve much in Delhi in March 2022. The reasons attributed to this apart from anthropogenic activities, includes no rainfall in March 2022 that has actually intensified the summer heat. Hence, PM_{2.5} has increased slightly by 4.53 µg/m³ on an average in March 2022 as compared to March 2021 making air quality not better with respect to last year. But as the month ends, PM_{2.5} levels have started to increase further.



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.

Operational Air Quality Early Warning & Decision Support System For Delhi NCR : Success & Challenges

Friday 29TH April
11:00 AM, IST

scan to register

Dr. Sachin Dinkar Ghude
Scientist E, Indian Institute of Tropical Meteorology, Pune

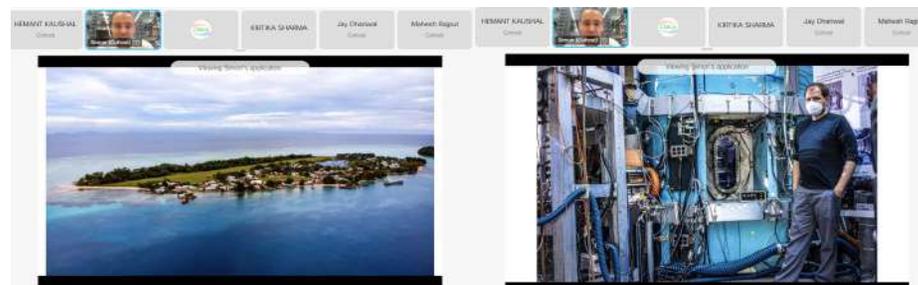
Hosted by:- Arun Duggal Centre of Excellence for Research in Climate Change and Air Pollution, IIT Delhi

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



Expert Talk delivered by [Simon Mundy](#) on 29th March 2022

[Simon Mundy](#) delivered a talk on “**Survival, Innovation and Profit on the Frontlines of Climate Crisis**” on **29th March 2022**. He talked about the extraordinary people he met on the front lines of the climate crisis and shared some unforgettable human stories. He also talked about the entrepreneurs chasing breakthroughs in fusion power, electric cars, and technology to suck carbon from the atmosphere. All these were showing how the struggle to respond to climate crisis is already reshaping the modern world-shattering communities, shaking up global business, and propelling a ground-breaking wave of cutting-edge innovation.



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

[Watch the complete Expert Talk Series Here.!](#)



CERCA Expert Opinion and Research Outcomes

Influence of meteorological parameters and air pollutants on the airborne pollen of city Chandigarh, India

Khaiwal Ravindra, Akshi Goyal, Suman Mor

- This study evaluates the influence of meteorological parameters and air pollutants on the airborne pollen in an urban city, Chandigarh, situated in the Indo-Gangetic Plains.
- It explores the relationship between airborne pollen, meteorology and air pollutants. Temperature and wind significantly influence the pollen concentration.
- Spearman's correlation of Annual and Seasonal Pollen Integral (APIn and SPIn) for key pollen taxon was computed. Relative humidity and precipitation were negatively correlated with pollen data.
- PM₁₀, PM_{2.5} and NO_x showed no clear relationship with pollen concentration.

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Threats of climate change and land use patterns enhance the susceptibility of future floods in India

Subodh Chandra Pal, Indrajit Chowdhuri, Biswajit Das, Rabin Chakraborty, Paramita Roy, Asish Saha, Manisa Shit

- This study works on future prediction of the floods in India due to climate and land change. Human activity and related carbon emissions are the primary cause of land use and climate change, which has a substantial impact on extreme weather conditions, such as floods.
- This study presents high-resolution flood susceptibility maps of different future periods (up to 2100) using a combination of remote sensing data and GIS modelling.
- To quantify the future flood susceptibility various flood causative factors, Global circulation model (GCM) rainfall and land use and land cover (LULC) data are envisaged.
- Maximum monthly rainfall will increase 40–50 mm in future monsoon periods.
- In India, rainfall and severe flood susceptible area will increase in future period. The severe flood event area will increase by up to 122% (0.15 million sq. km) from now on.

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Short-term ambient particulate air pollution exposure, microRNAs, blood pressure and lung function

Xiaowei Cong, Juan Zhang, Rongli Sun, Yuepu Pu

- The study aimed to investigate the mediation role of microRNAs on the association between personal PM_{2.5} exposure and blood pressure and lung function.
- Compared to truck drivers, there is a significant increase in lung function and a decrease in PM_{2.5} in office workers. Personal PM_{2.5} data showed a significant positive association with miR-644. The mediation effect of miR-644 on the negative association between PM_{2.5} with FEF25-75, PEF, and FEV1/FVC was significant.
- There were not similar associations with blood pressure.
- miR-644 was potential mediator in the association between PM_{2.5} exposure and lung function.

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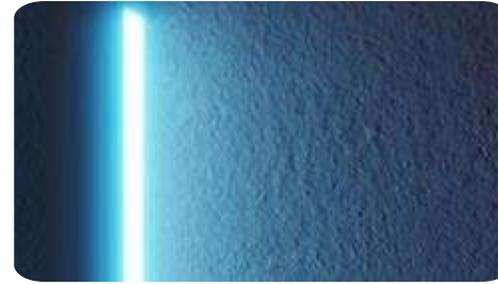
News in Circulation



Delhi has become 'EV capital of India'

Delhi has emerged as the 'EV Capital of India' within 18 months of the launch of Delhi Electric Vehicles Policy-2020. The Delhi government has taken a conscious decision to move towards electric vehicles in a bid to reduce air pollution in the capital. The share of EVs in the sale of new vehicles has increased from 1.2 per cent in 2019-20 to 10 per cent in February 2022. Delhi has become the first state in India to cross the 10 per cent mark in the sale of electric vehicles, which is more than the share of such vehicles in many developed countries like the UK, France and Singapore. The Delhi Electric Vehicles policy -- introduced in August 2020 -- aims at increasing the EV share in total vehicle sales to 25 per cent by 2024.

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New type of ultraviolet light makes indoor air as safe as outdoors

A new type of ultraviolet light that is safe for people took less than five minutes to reduce the level of indoor airborne microbes by more than 98%, a joint study by scientists at Columbia University Vagelos College of Physicians and Surgeons and in the U.K. has found. Even as microbes continued to be sprayed into the room, the level remained very low as long as the lights were on. The study was published March 23 in the journal Scientific Reports, a Nature journal. The study suggests that far-UVC light from lamps installed in the ceiling could be a highly effective passive technology for reducing person-to-person transmission of airborne-mediated diseases such as COVID and influenza indoors, and lowering the risk of the next pandemic.

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Older wildfire smoke plumes can affect climate

Aerosols carried in wildfire smoke plumes that are hundreds of hours old can still affect climate, according to a study out of the University of California, Davis. The research, published in the journal *Environmental Science and Technology*, suggests that wildfire emissions even 10 days old can affect the properties of aerosols -- suspended liquid or particles that are key to cloud formation. Research in aerosols and particulate matter pollution related to wildfires has most often focused on the early hours of smoke plumes, not several days later after smoke has traveled to other areas.

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Indian forest loss 'worse than feared' due to climate change

A national-scale study of the relationship between forest loss and rainfall and temperature trends in India reveals climate change may have contributed to huge declines during the last two decades, countering official reports that suggest small losses, and adding to existing concerns over deforestation. The first ever national-scale study was published in *Global Change Biology* and led by the University of Reading, in contrast to official



How climate change is making India's big dams dangerous

An assessment report of the Intergovernmental Panel on Climate Change, released in March 2022, notes that instances of floods in South Asia, including those caused by glacial lake outbursts, are going to increase with rising temperature. The report also says that "climate induced flood loads and reservoir level change may lead to dam failure". Designed in the 1970s, for the atmospheric realities of that time, these dams are ill-equipped for the dramatic changes in India's rainfall patterns.

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Big Findings from the IPCC 2022 Report on Climate Impacts, Adaptation and Vulnerability

The newest report from the Intergovernmental Panel on Climate Change (IPCC) paints a troubling picture: Climate change is already impacting every corner of the world, and much more severe impacts are in store if we fail to halve greenhouse gas emissions this decade and immediately scale up adaptation. Climate impacts are already more widespread and severe than expected. Climate change is also harming species and whole ecosystems. Animals

reports that show relatively small decreases in forest coverage in recent years. It looked at forest loss between 2001 and 2018 -- a period where little data exists. It also analyzed variability in climate change impacts across different regions and seasons, revealing that the impact of climate change on forest loss varied greatly between different locations and seasons. India is in the top 10 countries in the world for forest coverage, with tropical and subtropical forests covering more than a fifth of the country.

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such as the golden toad and Bramble Cays Melomys (a small rodent) are now extinct due to the warming world. The IPCC estimates that in the next decade alone, climate change will drive 32-132 million more people into extreme poverty. The IPCC projects that by 2030, extreme droughts across the Amazon will spur rural migration to cities, where Indigenous Peoples and traditional communities will likely be forced to live on the margins.

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