Dear Readers,

India stands amongst the most vulnerable nations to climate change. While the regulators and government have a critical role to play in mitigating climate change impacts, the private sector also has an equally important part to play in a sustainable net-zero transition and in bettering the country's economic resilience. Climate change is increasing the severity and frequency of naturally occurring catastrophic events. The verdict is clear – organizations that embrace climate risk assessment and management into their functioning would have better growth and consequently, a better survival rate. With shifting consumer behaviors, evolving regulations and technologies, investors/shareholders, insurers, consumers, and civil society are becoming increasingly concerned about how climate change would impact organizations. An effective policy on climate risk management along with technology deployment to track and report climate change impact is necessary to minimize the far-reaching impact of climate risks on financial institutions and the economy. Through the implementation of appropriate legislative and regulatory measures, the government can support a transition to a low-carbon economy. The lack of regulatory measures and policy undermines the interest of stakeholders in taking dedicated climate change-specific investment decisions. The existence of climate change should make it mandatory to at least review new development strategies in terms of prioritizing, planning, designing, building, and operating to account for the climate changes that might occur over their lifetimes and existing infrastructure may need to be retrofitted or managed differently. Finally, we must learn and implement best practices followed by global counterparts on mainstreaming climate risk. There is an urgent need for integrated and cohesive action on preventing emissions, coping with impacts, and finally conscious acceptance of residual damages.

Hemant Kaushal
Pr coordinator
Arun Duggal Centre of Excellence for research in climate change and Air Pollution
Indian & International Cities- July 2022

Delhi has the highest pollution levels

The graph above shows the daily average PM$_{2.5}$ for the month of July 2022. Amongst the major metros worldwide, Delhi has shown the highest concentration of PM$_{2.5}$ followed by Dhaka and Kolkata. Delhi and Kolkata, within India, rank among the topmost polluted cities worldwide.

Delhi PM$_{2.5}$ (24 hr. daily average) Trend
July 2021 Vs July 2022

July 2022 recorded better air quality as meteorological conditions like surplus rainfall, and a dip in the maximum temperature impacted the dispersion of pollutants. Further, this was responsible for making it the cleanest July for the city since 2015. 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$_{2.5}$ has decreased slightly by 3.05 µg/m$^3$ on average in July 2022 as compared to July 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.
To register for this August 2022 Talk Series, [Click here](#).

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**Expert Talk delivered by Prof Nomesh Bolia on 29th July, 2022**

On July 29th, 2022, **Prof Nomesh Bolia** delivered a talk on "Blue Skies & the Japan Experience." He spoke about how air pollution is an intractable problem but at the same time, it is also known how several cities around the world like London, Tokyo, Seoul, and Beijing, have faced exactly this, arguably worse situations, and have addressed them quite well, with quite successful air pollution reduction programs. This talk was focused on his Japanese experience based on the visit and associated research. He discussed how the learnings from the study could culminate in recommendations for the context of Delhi and India, including adaptation and adoption of the relevant international best practices.

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As part of the initial work under the Air Quality Action Forum (AQAF), which was targeted towards a detailed understanding of the existing gaps and challenges for various stakeholders working in the domain of air quality management (AQM), six need-assessment consultations were successfully completed with over 80+ organizations. These consultations were held with each of the six stakeholder pillars as part of the AQAF—starting with Indian Expert Institutions (Non-Government), Indian Expert Institutions (Government), UN Agencies and Developmental Partners, National Philanthropic Organizations and Corporates, International NGOs and Philanthropic Organizations, and finally concluding with International Development Agencies and Embassies. Following the 6 intensive and informative consultations, UNEP &amp; CCAC jointly organized a targeted meeting with the senior officials of over 20+ State Pollution Control Boards (SPCBs) and Pollution Control Committees (PCCs) on 24th June 2022. This meeting was held with the objectives to understand the views and perspectives of the pollution control boards (PCBs) on various air pollution-related issues and challenges being faced by the PCBs of each state and union territory, and understanding the immediate priority areas of work and actions that can be potential solutions to many of these issues. This consultation proved very vital from the point of view of understanding the current status of the environmental regulatory agencies in terms of their manpower availability, administrative and scientific infrastructure, the status of human and financial capacities, implementation bottlenecks, and many other pertinent aspects—all of which were highlighted by the representative of respective PCBs in attendance.

After the completion of all the need assessment consultations with the above stakeholder groups, and with an understanding of the broader synthesis of the issues and challenges, the focus was turned towards finding suitable solutions to the issues and challenges. To this end, on July 18th 2022, the AQAF team hosted the very first AQAF Quarterly Meeting for the 1st quarter of 2022 that was aimed at exploring solutions for reducing air pollution. For this meeting, four core domains were identified for discussion—namely science, policy, technology, and capacity building. Four parallel sessions were held, with each having participants who discussed action-oriented solutions for addressing the gaps in air quality management under each of the four domains. Some other relevant topics that were discussed during the
Quarter Meeting were the co-creation of a repository of solutions, criteria to create an actionable work plan for the coming months of AQAF, and discussions on the framework of the Solutions Centre which is to be established under the AQAF to provide focused, time bound and actionable solutions for supporting the government.

The First Quarterly Meeting also saw an overwhelming participation from over 80+ organisations that came together to make this event a documentable success. All the valuable suggestions & inputs gathered from all four groups have been recorded in detail and are being synthesised in the form of a comprehensive report. The launch of this crucial report is being planned to take place towards the end of the third quarter of 2022.

First Quarterly Meeting held on 18th July 2022 at IIT Delhi

CERCA Expert Opinion and Research Outcomes

Air pollution and child development in India
Anca Balietti, Souvik Datta, Stefanija Veljanoska

- This research studied the impact of air pollution on child growth in India.
- They relied on wind direction to capture quasi-random variation in three main criteria air pollutants.
- It was shown that an increase in the average concentration of fine particulate matter by one standard deviation was accountable for almost 5 and 2.4 percentage points of stunting and severe stunting rates, respectively.
- Even ozone and carbon monoxide impact weight-related outcomes.
- Stunting has critical long-term health and economic consequences; through its impact on stunting, pollution exacerbates the height premium in earnings, with girls being more adversely affected than boys in India.

Read More

Diurnal Variations in the Air Pollutants Concentration over Haryana, India, and Understanding their Emission Sources
Sahil Mor, Santosh Bhukal, Narsi Ram Bishnoi & Khaiwal Ravindra

- This study focuses on studying the diurnal variation of air pollutants for the first time covering Haryana, India, and identifying the sources responsible for air pollutants emissions during the different seasons of the year.
- Based on ecology and cropping patterns, the study area was divided into three zones.
- In all seasons, the diurnal peak concentrations of particulate matter (PM2.5 and PM10) were found highest in Zone 2 as compared to Zone 1 and Zone 3, which can be due to the high polluting districts located in Zone 2 including Hisar where thermal power plants, stainless steel producing industry and pulp and paper industry are located along with district Faridabad which is known as the industrial capital of Haryana.
The lowest average hourly concentration of PM10 and PM2.5 was found in late afternoon hours in winter, pre-monsoon and post-monsoon season in all three zones due to a decrease in traffic volumes which lead to low emission rates along with increase in the mixing height which cause favorable dispersion conditions.

The lowest hourly mean concentration of CO, NOx and NH3 in all zones was found during the afternoon hours in all seasons. The study also focuses on understanding the day and time patterns and the maxima and minima of pollutant concentrations in different zones of Haryana.

Health impacts of PM2.5 originating from residential wood combustion in four nordic cities

Hans Orru, Henrik Olstrup, Jaakko Kukkonen, Susana López-Aparicio, David Segersson, Camilla Geels, Tanel Tamm, Kari Riikonen, Androniki Maragkidou, Torben Sigsgaard, Jørgen Brandt, Henrik Grythe & Bertil Forsberg

- The current study aimed to calculate the related health effects in four studied city areas in Sweden, Finland, Norway, and Denmark.
- Health impact assessment (HIA) was employed as the methodology to quantify the health burden.
- Firstly, the RWC induced annual average PM2.5 concentrations from local sources were estimated with air pollution dispersion modelling. Secondly, the baseline mortality rates were retrieved from the national health registers. Thirdly, the concentration-response function from a previous epidemiological study was applied. For the health impact calculations, the WHO-developed tool AirQ + was used.
- All four Nordic city areas have a substantial amount of domestic heating, and RWC is one of the most significant sources of PM2.5.
- This implicates a substantial predicted impact on public health in terms of premature mortality. Thus, several public health measures are needed to reduce the RWC emissions.

New air pollution combat plan being firmed up in Delhi

A policy prepared by the Commission for Air Quality Management (CAQM) to curb air pollution in the National Capital Region (NCR) has recommended revisions to the GRAP. Suggested revisions to the GRAP, which was notified in 2017, including taking action based on the air quality index (AQI) and not the existing system of response that kicks in based on particulate matter concentrations. Strengthening the air quality monitoring network is also part of the policy. The previous plan did not have any specific restrictions on light motor vehicles, apart from enforcement of Pollution Under Control (PUC) norms, and odd-even for private vehicles. Other sectors that have been addressed in the policy include industrial emissions. In the transport sector, the Ministry of Road Transport and Highways is to formulate norms for monitoring on-road vehicles with

Climate Change Adding Layer Of Vulnerability To Fragile Himalayas: Experts

According to a 2020 study by the Wadia Institute of Himalayan Geology, an autonomous institute under the Ministry of Science and Technology, black carbon concentrations near the Gangotri glacier rise by 400 times in summer due to forest fires and the burning of agricultural waste, which can trigger glacial melt because of the light-absorbing nature of black carbon. The fragility of the mountains has increased due to ill-thought human interventions – dams, hydropower projects, highways, mining, deforestation, buildings, unregulated tourism, and pilgrimage. The Himalayas are inherently vulnerable to heavy rains, flash floods, landslides, etc, as these are new mountains that are still growing and are seismically very active.
Bad news for renewable sector — study says climate change will hit solar & wind energy in India

A study conducted by researchers from the Indian Institute of Tropical Meteorology, Pune, published in the journal ‘Current Science’, suggests changing climate patterns over the next 50 years are likely to reduce the generation of solar power in India and affect the major wind power plants in certain regions. The study titled Analysis of future wind and solar potential over India using climate models, suggests that the renewable energy sector should work on improving the efficiency of solar farms given that radiation is likely to dip by 10 to 15 watts per square meter (sqm) across all seasons.

Climate Change poses the greatest threat to Antarctica

According to the latest State of the Environment report, Climate change poses the greatest threat to Antarctic and Southern Ocean ecosystems. They assessed the current status and trends of a range of physical (ice, ocean, atmosphere) and biological characteristics of the region, based largely on Australian Antarctic research. They also assessed the human footprint in the Australian Antarctic Territory and the success of management bodies and frameworks in protecting this part of the region. The report found that, like elsewhere in Australia, climate change is a key driver of change in Antarctica, the sub-Antarctic, and the Southern Ocean. Pollution, tourism, commercial fishing, and an expanding human presence, also affect the Antarctic region.

Climate change: Alaska experiencing wildfires it’s never seen before

Alaska is burning this year in ways rarely or ever seen, the frequency of these big seasons has doubled from what it was in the second half of the 20th century. Recent rains have helped but longer-term forecasts are showing a pattern similar to 2004 when July rains gave way to high-pressure systems, hot days, low humidity, and lightning strikes that fueled Alaska’s worst fire year. Heat waves and droughts, which are exacerbated by a warming climate, are making wildfires more frequent, destructive, and harder to fight in many places. This month, wildfires have torn through Portugal, Spain, France, England and Germany, which have seen record-high temperatures.

Human activity increases likelihood of more extreme heatwaves

July 19 was the hottest day ever recorded in the United Kingdom, with temperatures surpassing 40 degrees Celsius (about 104 degrees Fahrenheit). The findings, published on July 22 in Advances in Atmospheric Sciences, may also explain the current heatwave in the U.K. The researchers studied internal variabilities such as atmospheric circulation patterns along with external forces such as anthropogenic greenhouse gases. The research team found that greenhouse gases are the primary reason for increased temperatures in the past and will likely continue to be the main cause of hotter temperatures in the future. The researchers’ simulations showed that extreme heatwave events will increase by more than 30 percentage points in the coming years. Of this increase, almost two-thirds will be caused by greenhouse gases, according to their results.
CONTACT US

Email: cerca@iitd.ac.in, cerca.iitd@gmail.com
Phone (Office): +91 (11) 2659 7361
Address: MS 207/ C 20, Indian Institute of Technology (IIT) Delhi, Hauz Khas, New Delhi 110016, INDIA

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