Guest Editorial

A step towards consensus-based support for air quality management

India’s rapid urbanisation, industrialisation, and population growth in the last few decades have brought about severe air pollution problems which pose a significant threat to human health, agricultural productivity, and the economy of the country. More than 75 percent of Indian cities violate the nationally prescribed standards of air quality[1]. Air pollution in the world alone causes 4.2 million premature deaths and out of which 1.67 million are attributable to India, which is 17.8 percent of the total deaths observed in the country[2]. In addition, more than 30 percent of wheat is estimated to be lost in India on account of high ground-level ozone pollution[3].

Over the years, air quality has become one of the major areas of work for the UN Environment Programme (UNEP) and during the third session of the UN Environment Assembly (UNEA), the resolution 3/8 on Preventing Air Pollution was adopted by Member States. “UNEP facilitates multilateral action and partnership and provides technical support and guidance to Member States so they can respond better to the pollution crisis”.

Tackling air pollution can bring significant benefits to economies, human health, and the climate. In 2019, India announced the National Clean Air Programme (NCAP) to tackle air pollution with a targeted approach to reduce particulate matter pollution by 20-30% by 2024. Along with national-level actions, NCAP identified 132 non-attainment cities for which city-specific action plans are being formulated and implemented.

On 13 December 2021, the Air Quality Action Forum was launched by UNEP, the UNEP convened Climate and Clean Air Coalition and Paytm Foundation to help mitigate the impacts of air pollution in India as well as to support the Government’s objectives outlined in the NCAP. “The scale, complexity, and urgency of the problem necessitate a strong, coherent, and coordinated response from all concerned stakeholders in order to address the air pollution issues in India”.

As part of the Forum’s activities, on 7-17 June 2022, stakeholder consultations were convened between the corporate sector, expert institutions (including NGOs CSOs, Academia), international development agencies, international philanthropic organizations, national philanthropic organizations, and UN bodies in New Delhi along with CERCA, IIT Delhi leading one of the stakeholder groups- the Expert Institutions. These consultations were held primarily to identify stakeholder 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.

Atul Bagai
Head of UNEP India Office
Indian & International Cities- June 2022

Delhi has the highest pollution levels

The graph above shows the daily average PM$_{2.5}$ for the month of June 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
June 2021 Vs June 2022

June 2022 recorded poor air quality as the meteorological conditions like high temperature, lack of rainfall impacted the dispersion of pollutants. Further, relatively higher wind speed led to greater dust resuspension. 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 increased slightly by 8.02 µg/m$^3$ on an average in June 2022 as compared to June 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.
On June 30th, 2022, Nita Soans delivered a talk on "The Role of Air Quality Management in Low Carbon Healthy Buildings." She spoke about how our buildings account for nearly 40% of global GHG (greenhouse gas) emissions each year. To combat climate change and decarbonize, there is an urgent need to address this issue and change how we operate our buildings. It was also emphasised that buildings can be both healthy and energy-efficient, low-carbon, and eventually carbon-zero. Nita Soans discussed how air quality monitoring can help buildings be healthier while also lowering their carbon footprint.

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

Watch the complete Expert Talk Series Here.
All the feedback and suggestions from these important stakeholder meetings are being compiled into a detailed and comprehensive need assessment report for understanding the challenges, gaps, needs, and synergistic solutions to further the work of AQM under the AQAF. This report will be brought out at the Forum Convention, which is tentatively scheduled to take place on 7th September 2022.

**Extreme weather impacts of climate change: an attribution perspective**

*Ben Clarke, Friederike Otto, Rupert Stuart-Smith and Luke Harrington*

- This study reviews current knowledge of the influences of climate change on five different extreme weather hazards (extreme temperatures, heavy rainfall, drought, wildfire, tropical cyclones), the impacts of recent extreme weather events of each type, and thus the degree to which various impacts are attributable to climate change.
- This study also provides a starting point for more systematic documenting of the costs (monetary and non-monetary) of human-caused climate change today and the losses and damages caused. In order to build on this, there are some areas in which scientific developments will add great value.
- A lack of data on past impacts of extreme events is a major barrier to mitigating future damages, simply because there is no direct evidence upon which to base the necessary measures.
- Second, improve the coverage of attribution for more regions around the world, for a more diverse range of hazards, and with a focus on event definitions that are most pertinent to the impacts upon people. Attribution studies on individual events are currently lacking for a number of regions and hazards.
- The third and final area for future work involves a broader consideration of risk, rather than simply hazards and impacts.
Estimation of background concentration of ambient pollutants for Delhi NCT region

Rahul Chaurasia, Manju Mohan

- This study estimated the background concentration of ambient pollutants for Delhi NCT using meteorological filtering and statistical techniques.
- The monthly and seasonal variability in the background concentration values has been studied and quantified.
- Background concentration values showed seasonal and monthly variation. Winter has the highest values, followed by summer and autumn, while the monsoon season has the lowest. Local Meteorological conditions and long-range transport can explain this variability in background concentration.
- The estimated background concentration value has been validated with previous studies and values obtained during Lockdown.

Improvements in SO2 pollution in India: role of technology and environmental regulations

Jayanarayanan Kuttippurath, Vikas Kumar Patel, Mansi Pathak & Ajay Singh

- The study presents the temporal changes in SO2 concentrations over India in the past four decades (1980–2020).
- It used the reanalysis data- MERRA-2, CAMS to supplement the ground-based measurements CPCB as the latter are station specific and sparse. To simulate particulates, SO2, and sulphate, Goddard Global Ozone Chemistry Aerosol Radiation and Transport (GOCART) model is used.
- The analysis shows that the Central and East India, and Indo-Gangetic Plain (IGP) are the hotspots of SO2, as these regions house a cluster of thermal power plants, petroleum refineries, steel manufacturing units, and cement industries.
- Thermal power plants (51%), and manufacturing and construction industries (29%) are the main sources of anthropogenic SO2 in India. Its concentration over India is higher in winter (December–February) and lower in pre-monsoon (March–May) seasons.
- The temporal analyses reveal that SO2 concentrations in India increased between 1980 and 2010 due to high coal burning and lack of novel technology to contain the emissions during the period. However, SO2 shows a decreasing trend in recent decades (2010–2020) because of the environmental regulations and implementation of effective control technologies such as the flue gas desulphurisation (FGD) and scrubber.

Air quality panel bans use of coal in Delhi-NCR from January 2023

To reduce greenhouse gas emissions in the Delhi NCR, the Commission for Air Quality Management directed state governments to phase out the use of coal as a fuel source by December 31, 2022, and instead switch to cleaner fuels such as natural gas and biomass. This will not only save 1.7 million tonnes of coal per year, but will also reduce pollutants such as particulate matter (PM), nitrogen oxide (NOx), CO2, and CO. Thermal power plants in the NCR, on the other hand, are permitted to use low-sulfur coal. The restrictions/ban on the use of coal will take effect on October 1 (for regions where PNG infrastructure and supply are already available) and January 1, 2023, respectively (for other regions where the PNG supply is still not available). Coal use as a fuel will be prohibited throughout the NCR beginning January 1, 2023.

PM launches global initiative 'Lifestyle for the Environment - LiFE Movement'

On World Environment Day, Prime Minister Shri Narendra Modi launched a global initiative called the 'Lifestyle for the Environment - LiFE Movement.' The launch will kick off the 'LIFE Global Call for Papers,' which will solicit ideas and suggestions from academics, universities, and research institutions, among others, in order to influence and persuade individuals, communities, and organisations around the world to live an environmentally conscious lifestyle. LIFE's vision is to live a lifestyle that is in tune with our planet and does not harm it. Those who lead such a life are referred to as "Pro-Planet People." Mission LiFE borrows from the past, operates in the present, and looks to the future. Reduce, reuse, and recycle are concepts that we live by.
Delhi air pollution shortens life by 10 years, report says

According to data from the University of Chicago's Energy Policy Institute's recent Air Quality Life Index report, air pollution reduces life expectancy by nearly ten years in the National Capital Territory of Delhi. Achieving and maintaining particulate pollution reduction targets set by the National Clean Air Programme (NCAP) could lead to "remarkable health improvements." According to the report, India is the world's second most polluted country, with Bangladesh being the world's most polluted country. More than 63 percent of India's population lives in areas where the national air quality standard of 40 g/m3 is exceeded.

Cement carbon dioxide emissions quietly double in 20 years

In the last 20 years, the heat-trapping carbon dioxide emissions from cement production—a less-discussed but significant source of carbon pollution—have doubled, according to new statistics from around the world. According to research from Norway's CICERO Center for International Climate Research and the Global Carbon Project, the world's emissions of carbon dioxide from producing cement for use in construction, roads, and other infrastructure reached nearly 2.9 billion tonnes (2.6 billion metric tonnes) in 2021, or more than 7% of all carbon emissions. In 2002, twenty years ago, around 1.4 billion tonnes (1.2 billion metric tonnes) of carbon dioxide were emitted by cement.

Climate change a factor in 'unprecedented' South Asia floods

Climate change, according to scientists, is a factor behind the erratic and early rains that triggered unprecedented floods in Bangladesh and northeastern India, killing scores and making millions' lives miserable. Annual flooding is not uncommon in the region, it usually occurs later in the year, when monsoon rains are in full swing. The area was hit with torrential rains as early as March this year. The extent to which climate change played a role in the floods may take much longer to determine, but scientists say it has made the monsoon — a seasonal change in weather usually associated with heavy rains — more variable over the past decades. Until now, floods in northeastern Bangladesh were uncommon, while Assam state, famous for its tea cultivation, dealt with floods later in the year during the usual monsoon season. The sheer volume of early rain this year that lashed the region in just a few weeks makes the current floods "unprecedented," according to the National Weather Service.

Study finds natural sources of air pollution exceed air quality guidelines in many regions

Over 90% of the world's population is currently exposed to average yearly amounts that are higher than the advised level, according to a study published in the journal Environmental Science and Technology Letters. Even in the absence of all anthropogenic emissions, more than 50% of the world's population would still be exposed to PM2.5 concentrations that are higher than the new air quality standards. Millions of early deaths occur each year due to particle exposure throughout the world. In a recent study, scientists from MIT's Department of Civil and Environmental Engineering investigated whether the revised 5 m3 air quality guideline could be achieved in various parts of the world especially if human-caused emissions are drastically reduced by exploring the impact of a specific source, their model simulations employed a variety of anthropogenic sources that could be turned on and off.
