Centre of Excellence for Research on Clean Air
(Academic Think Tank and Research Centre at IIT Delhi)

Annual Report 2019

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Centre of Excellence for Research on Clean Air
Indian Institute of Technology Delhi
New Delhi-110 016
INDIA

www.cerca.iitd.ac.in

T: +91 (11) 26591707

E: cerca@iitd.ac.in
Wish you all Happy New Year 2020, often a time for new dreams and goals as well as renewed energy for New Year resolution to get things done. Let’s come together and make a resolution to keep air clean this and coming years ahead.

We at CERCA started our journey with a vision to restore Blue Skies and improving Air Quality in Delhi/NCR. On 16th Feb, 2018, we inaugurated our CoE to take one step forward towards clean air initiatives. Since then, we have been steadily moving ahead on this interesting path! This Annual report puts a light on our journey of 2019; how much have we walked since 2018?

We would like to thank Prof. V Ramgopal Rao, Director IITD, Prof B R Mehta, Dean (IRD), Mr. Arun Duggal, Founder CERCA, Prof. Sagnik Dey, Prof. Mukesh Khare, Prof. Nomesh Bolia, Advisory Council Members, Donors, Officials of MoEFCC, CPCB, TERI, NEERI and CERCA Team along with many others who have extended tremendous support to our Centre.

Ever since we have been on a path to get things done, CERCA is structuring into a more productive and dynamic framework. We hope this New Year brings us more wonderful opportunities and responsibilities towards clear air in our country.

Best wishes from team CERCA!!
Message from our Founder

Air Pollution has affected major Indian cities like never before due to infrastructure development, industrialization and rapid population growth. As per World Health Organization, India is home to 14 of the world’s 20 most polluted cities. As a step towards mitigating the ever-rising problem of air pollution on a national scale, the National Clean Air Programme (NCAP) was launched by MoEFCC in January 2019.

The Centre of Excellence for research on clean Air (CERCA) was established at IIT Delhi in 2018 to help scholars devise solutions to fight air pollution and promote scientific research in this important field. Our vision is to contribute to restoring Blue Skies and improving Air Quality in Delhi/NCR and other cities in India through scientific research and as a Think Tank. The scientific research being carried out at CERCA is used to help formulate policy recommendations in the area of clean air. CERCA is a platform for bringing together scientific practitioners at IIT Delhi and policymakers to facilitate an inter-disciplinary and holistic understanding on clean air issues based on rigorous scientific research and evidence.

CERCA delivered very good performance during the year as we made steady progress in terms of the number of projects undertaken on clean air issues including feedback to government stakeholders, conducting series of air quality workshops/conferences/round tables, sensitizing various stakeholders like state Pollution Control Boards including industry and scientific community, public awareness through a weekly newsletter, acquiring reference grade air quality monitoring systems, instituting CERCA chair at IIT Delhi and engaging with eminent faculties researchers both within IIT Delhi and outside. We are extremely happy to share with you our Annual Report for Calendar year 2019.

Arun Duggal
Founder
Centre of Excellence for Research on Clean Air (CERCA)
IIT Delhi
Centre of Excellence for Research on Clean Air

CERCA is a Centre of excellence hosted at an institute known for its high-quality research and education, IIT Delhi is nurturing us with best practices from entire ecosystem present in India since Feb 2018. We, at CERCA have always been very keen to get maximum out of these practices. This Annual Report presents an account of the activities carried out in 2019 starting with our vision, mission and values along with projects, events, collaborations, coverage and fund Raising.

Vision

CERCA vision is to contribute to restoring Blue Skies and improving Air Quality in Delhi/ NCR and other cities in India through scientific research and as a Think Tank.

Mission

- To identify initiatives and policies in India and internationally which have been effective for sustained ambient air quality improvement.
- Provide scientific information and objective feedback on effectiveness of various clean air programmes to Government policy makers.
- Assist in setting Goals and Pathways for achieving satisfactory ambient air quality in Delhi/NCR and other cities in India.
- Develop practical and effective solutions for short, medium and long term for improvement in ambient air quality.
- To support multidisciplinary and multi institution research projects for improving ambient air quality and Indoor air quality.
- Provide objective feedback on effectiveness of various air pollution improvement programs and to help enhance public understanding and participation promoting Clean Air initiatives.
- Exchange learnings and share knowledge with other countries facing air pollution problems.
- Collaborate with Industry on Clean Air and emission reduction equipment initiatives and Indoor Air quality improvement programs.

Values

- Scientific Integrity and quest to enhance knowledge.
- Collaborative, constructive and solutions-oriented approach.
Projects

CERCA supports multidisciplinary and multi-institution research projects for improving ambient and indoor air quality along with other projects to explore new domains of air quality improvements strategies. At present, below projects are being undertaken with CERCA.

Monitoring Air Pollution impacting Delhi NCR using a Hybrid Approach:

- A detailed report is prepared where top 500 villages in Punjab and top 500 in Haryana are identified. The report was distributed amongst the policymakers (Mr. K S Pannu, Secretary, Agriculture, Punjab Govt, Niti Ayog and Mr. Siddhu) to facilitate them prioritizing action at village level.

- Two policy papers published on the requirements of a robust and hybrid monitoring system in India for successful implementation of NCAP. In the first work (Martin et al., 2019), authors estimated that global mean population distance to the nearest reference grade PM$_{2.5}$ monitors is 220 km. In the second work, it is found that India has 1 reference grade monitor for every 6.8 million population, well below than that of China (1.2 monitors/million), the USA (3.4 monitors/million) and Japan (0.5 monitors/million). To address these gaps between India and comparator countries will require 1600-4000 monitors at an estimated capital cost of US$106-270 million and annual operating cost of US$212-540 million.

Assessment and prediction of the air-quality using dynamically downscaled high-resolution data from numerical models:

- WRF-Chem model used for an assessment of the stubble burning impacts on the PM2.5 concentrations over Delhi. Control and sensitivity experiments were conducted during the two episodes of stubble burning in Punjab and Haryana. The selected periods were 20-25 October 2018 and 1-5 November 2017.

- During both periods numerical experiments carried out by (I) including fire emissions from MODIS satellite and (II) excluding fire emissions and keeping all other emissions same. Outputs from both the experiments compared to see the difference in PM2.5 concentrations.

- Model results showed different impacts of the stubble burning on the air-quality (PM2.5) at different locations in Delhi-NCR. While, the north, northwest, east Delhi regions were largely impacted, whereas the south and southwestern Delhi regions found to have lower impacts during these two episodes of stubble burning.

- PM2.5 concentrations simulated by WRF-Chem model are also compared with the CPCB monitoring site data at Anand Vihar and R K Puram locations. The comparison shows good agreement when the model included effects of stubble burning.
Select Study of Air Pollution Reduction Programs around the World: Governance and Implementation Issues:

- **Stakeholders engagement**: Met with officials of Chinese embassy in India and requested for scheduling a meeting with Chinese stakeholders, Contacted Fudan University, Shanghai, and conversation is moving in the right direction, Visited Exicom Tele-Systems Limited- a company leading in EV Li-ion batteries manufacturing and charging infrastructure development. **Key findings**: They developed a battery swapping and charging system, and a battery management system.

- About to submit a working paper on “Governance and Policy Framework for Air Pollution Control Strategies” and submitted a paper on “Air Pollution: Impact & Interventions”

- **More on China Experience**: Studied the report “Gaining a Rapid Win against Air Pollution: How India Can Make Use of China’s Experience”. **Recommendations and our findings**: a target-oriented approach, active legal and regulatory framework, buy in from the top (for strict enforcement) due to political will, strong coordination, and clear responsibility (public interviews, special inspections, local govt first responsibility, incentives)

- Studied EV plans: Indian government’s plan (key highlights - EV adoption is slow due to lack of charging infrastructure and large time taken by battery charging, therefore, need for policy to facilitate development of adequate, fast charging infrastructure and incentives, like experience in China, Japan, Nordic countries.

- Initiated research on reverse logistics of used EV.

- Final Report with findings of best practices by June 2020.

Public Awareness generation on Indoor Air Quality for Priority Buildings in Delhi, NCR:

- Main aim of this project is to generate mass awareness on indoor air quality in public places (schools, colleges, hospitals, shopping malls, metro and residential complexes) of Delhi NCR for in urban India.

- **Objectives**: To access the knowledge, attitude and perception of public towards indoor air pollution and its exposure in urban microenvironments namely schools, colleges, hospitals, shopping malls, metro trains and residential complexes.

- To collect qualitative data on perception of general public through a questionnaire survey and formulate a report on the same.
Pilot deployment of Particular Matter (PM) sensors in Delhi buses:

- Use vehicle fleets that travel across the city and instrument them with sensors. This will scale up the spatial coverage of the sensors. Delhi Integrated Multi-Modal Transit System (DIMTS) has kindly agreed to help us with their bus fleet (letter of support below). Encouraging conversations are also happening with Ola cabs.
- In addition to measuring Particulate Matter (PM), the vehicle mounted instruments should have other sensors, computation and communication facilities -- so that policy questions become more tractable. Proposed instrument should have - PM sensor (low cost, but accurately calibrated against more expensive E-BAM sensors)
- GPS (to know location of the vehicle when the data is collected. The GPS information can also be used to query Google Maps and Google Satellite APIs to know whether a location is residential vs. industrial vs. agricultural vs. commercial and the green cover of the region from satellite images)
- Temperature and humidity sensors (to correct the PM measurement which depends on temperature and humidity and see effect of these weather factors on PM)
- Accelerometer, gyroscope and magnetometer sensors (to check vehicle speed and vibration and appropriately filter the PM measurements collected at high speed or vibrations to reduce errors)
- Camera (to take pictures of road traffic in front of the vehicle carrying the instrument, count and classify vehicle type in traffic to see correlation between traffic and PM)
- Processor/Microcontroller (to sample the sensors at fixed periodicity, apply corrections as needed and process the data as much as possible locally)
- 4G Router like JIO (to communicate the sensed and processed information to a backend server, where data from all buses will be aggregated for high level analyses)
- Local storage (the 4G communication might be intermittent as buses travel across the city. To prevent data loss, information should be reliably stored in a local SD card)
- Appropriate power supply interface (continuous sampling, processing and 4G communication will need around 10 watts of power. So, battery-based operation will not be practical, and batteries also will need recharge. Thus, power supply from the vehicle will be necessary).
- Work done so far; Design and build the necessary instrument, as off-the-shelf instruments from Atmos and Airveda had some shortcomings and test runs in our own car, taking power from the car.
Events/Programs

CERCA Office Inauguration:

Inauguration ceremony took place on 9th May at MS 207/C20 Main Building IIT Delhi for a new CERCA office premises. The office was officially inaugurated by Dean R&D Prof. B R Mehta and Mr. Arun Duggal. CERCA associated Faculty, PhD students, and staff were also present on this occasion.

Tsinghua University Summer School Program:

As a first step towards collaboration between CERCA and School of Environment, Tsinghua University, 5 undergrad students from IITD has been selected with full scholarship for “2019 TSINGHUA INTERNATIONAL SUMMER SCHOOL ENVIRONMENT-Energy and Global Changes” beginning from 28th July - 10th August 2019 at Tsinghua university, China.

Four undergrad students from different departments of IITD have successfully completed “2019 TSINGHUA INTERNATIONAL SUMMER SCHOOL ENVIRONMENT-Energy and Global Changes” with full scholarship from 28th July - 10th August 2019 at Tsinghua university, China.

During their two weeks stay at Tsinghua, they got to learn about various environmental issues in China and what is being done by Chinese government to resolve these issues. Apart from that, the program made them aware about the urgent need of innovative solutions to various environmental problems being currently faced. During the summer school, they had academic lectures of Professors from Tsinghua University, Michigan University, Imperial College London who had been experts and most renowned in their work. Each one of them covered different aspects of environment such as soil contamination, climate action, wastewater management etc. To add a practical experience to the visit, they have visited the Huaifang Recycling water treatment plant, Asia's biggest water recycling center. They have also visited the World Horticulture Exposition where various kinds of horticulture and their variations across the countries could be observed over hundreds of acres.

Knowledge Exchange Session (Tutorial) by Dr Jack Broadbent:

A Knowledge Exchange Session was organized on 15th April 2019 in collaboration with US Embassy. Dr. Jack Broadbent was invited to deliver lecture on Best practices on air Quality management in San Francisco Bay Area USA. He talked about overall approach to protect and improve public health, air Quality and Global climate. He gave an overview of air
monitoring, regulations, control measures, innovative strategies they have adopted for ambient air monitoring in bay area.

**Workshop on Blue Sky Initiatives for Delhi:**

Centre of Excellence for Research on Clean Air (CERCA) at IIT Delhi organized a workshop on "Blue Sky Initiatives for Delhi" on 15th April 2019 in collaboration with the Embassy of Japan. This workshop aims to bring stakeholders from the government, academia and private sector together to learn and explore pollution reduction strategies from across the world. In this edition, CERCA focused on Japan, and the Blue-Sky Initiatives proposed by the Japanese Embassy in India. The Japan International Cooperation Agency (JICA), Clean Air Asia, CII (India), and an IIT Delhi startup, along with CERCA itself, were represented in the workshop held.

**Roundtable on Air Quality, Ambassador Marcia Bernicat visit to CERCA/IIT Delhi:**

CERCA, IIT Delhi hosted a roundtable on Air Quality at the institute. Ambassador Marcia Bernicat, who is currently Principal Deputy Assistant Secretary in the Bureau of Oceans, and International Environmental and Scientific Affairs at the U.S. Department of State, was part of the roundtable. Along with Ambassador Bernicat, Prof. V Ramgopal Rao, Director, IIT Delhi; Prof BR Mehta, Dean, IRD; Mr. Arun Duggal, and Prof Mukesh Khare, participated in the Roundtable which was held on May 9, 2019. Addressing the roundtable, Ambassador Marcia Bernicat focused on the need of data gathering, raising awareness and role of democracy and law to resolve the issues related to air quality.

**Air Quality Workshop “The Path to Clean Air – Reducing Fine PM Concentrations”:**

Centre of Excellence for Research on Clean Air (CERCA), IIT Delhi in association with the Embassy of the United States of America, New Delhi has organized a Workshop on Air Quality “The Path to Clean Air – Reducing Fine Particulate Matter (PM) Concentrations” at IIT Delhi on 25th June’2019. A unique feature of the workshop was sharing of the US Success story in tackling air pollution by US Science Envoy Dr. James Schauer, Professor of civil and environmental engineering at the University of Wisconsin-Madison who has extensive experience in source apportionment and whose work focuses on developing a quantitative understanding of the origin of air pollution.
Conference on Stubble Burning: “Findings, Ground Issues and Policy Perspectives”:

Centre of Excellence for Research on Clean Air (CERCA), IIT Delhi has organized a Conference on Stubble Burning at IIT Delhi on 20th September’2019. The objective of this conference was to confer and help the Government in policymaking and to prioritize actions by providing scientific evidence. This conference provided an opportunity to listen to speakers from across a wide spectrum consisting of leading scientific researchers from IIT Delhi, government policy makers, independent policy think tanks, Leading NGOs working on the ground in the area of stubble burning, Economists, Health practitioners and industry focused on stubble reuse technology.

The conference covered various topics ranging from Central Government policy and resource prioritization, Association between Stubble burning and cardiovascular health in Northern India, Alternatives to crop residue burning in India, Stubble Burning - Ground issues, gaps and Remedies, Crop residue management-Environmental implications of technological choices, Tracking of stubble burning from Space for prioritizing mitigation strategies, Use of WRF-Chem model to study the effects of stubble burning on PM 2.5 concentrations in Delhi, Zuri : AI-enabled platform to monitor and regulate farm fires in India, Paddy straw: A Problem to solve or an opportunity to tap, a startup’s perspective at IIT Delhi.

Visit of H.E. Mr Shin Bongkil, Ambassador, Embassy of the Republic of Korea in India:

Ambassador H.E. Mr Shin Bongkil of the Republic of Korea visited IIT Delhi on 7th November for a roundtable meeting on Air Quality hosted by Centre of Excellence for Research on Clean Air (CERCA).

Ambassador H.E Mr Shin Bongkil highlighted the issue of severe air pollution situation in Delhi and explained the Korean experience of grappling with air pollution and significant progress made by the Korean government in dealing with air pollution with the help of concentrated extraordinary efforts particularly in policy making, passing of legislations and leveraging of powers.

The ambassador was highly appreciative of the Indian government initiatives on Electric Vehicles and hoped that with the deployment of Electric vehicles, vehicular air pollution would be greatly reduced. He also emphasized on the need for a coordinated and cooperative approach by state and central government for combating air pollution in India.
Collaboration Meetings

IPS Foundation:

A meeting was held on 13th March 2019 at CERCA, IIT Delhi to discuss agricultural crop burning issue and its impact on air quality. Mr. Arun Duggal introduced Mr. Ritesh Bhatia, CEO of IPS foundation, an NGO, which has been working in 150 villages in Punjab to educate farmers on an alternative to crop burning. He informed about his foundation and their initiatives at village level to track the effect on environment. They have started an awareness campaign called “Change Buddy” program in 5 districts in which 155 villages were covered in the 1st year of operation. So far, they have interacted with 3000 farmers to sensitize them about alternate technologies and available govt. subsidies. CERCA will collaborate with IPS to focus on action plan for crop burning issue for proposing long term policy change, Implementation strategies by state govt., analysis at village level, Analysis of health impacts on children, In-situ management of residue, Correlation of satellite data and manual data.

Make My Trip:

A meeting was held on 9th April 2019 with Mr. Deep Kalra Founder of MMT to discuss possible areas of collaboration with MMT for the improvement of air quality in Delhi NCR region. The Possible areas where CERCA & MMT can collaborate are Setting up of Long-term goals and a concrete policy and strategy implementation plans for Govt., Pushing air quality issues to EPCA, Mass Awareness programs, Air quality outlook, Major measures to establish a model for Delhi-NCR

Prof. Alan Hedge conferred as a CERCA Honorary Research Fellow:

A meeting was held on 26th April 2019 at IIT with Prof. Alan Hedge from Cornell University to discuss on potential areas of future collaborations between CERCA and Cornell University for the improvement of air quality in Delhi NCR region. Alan Hedge is a Professor in the Department of Design and Environmental Analysis, Cornell University. The key discussions of the meeting were on need of Testing and Calibration and servicing of air quality measurement instruments to ensure accuracy and reliable air quality diagnosis, integrated sampling, PM1 particles, use of satellite data for PM level measurements, need for substantial research in indoor air quality management area.

Research recommendations on Stubble Burning issue:

The meetings with McKinsey and IPS were held on 26th April and 28th May 2019 at IIT to discuss draft presentation on stubble burning for the Ministry of Environment forest and climate change. Key points discussed
were learnings of IPS ground data and Prof. Sagnik Dey’s Satellite data analysis on stubble burning (District level data), focus on Delhi NCR, future recommendations, Air flow monitoring, Government initiatives including funding information, Addressing and prioritizing top most districts, Quantification of effect of stubble burning, Channelization and appropriate targeting of funds, Funds allocation in highest pollution contributing villages.

** Exxon Mobil:**

A meeting was held on 29th April 2019 with Ms. Federica Berra, Director, Global Natural Gas strategy, ExxonMobil Gas & Power Marketing Company and her team at IIT to discuss scope for undertaking joint research between CERCA and ExxonMobil. Mr. Dibyajyoti Bhuyan informed that program scope for undertaking collaboration with Indian partners is still in the design stage and is likely to be finalized in a couple of months. However, opportunities exist for collaboration for specific research projects to be approved by ExxonMobil on a case to case basis for which CERCA could approach ExxonMobil for funds. It was decided that ExxonMobil and CERCA would again meet at a mutually convenient date to discuss potential collaboration opportunities going forward.

** DLF Foundation:**

A meeting with DLF foundation was held on 15th May to discuss specific projects that DLF F and CERCA could jointly sponsor which includes To develop a Clean Air plan for Gurgaon, Communication Outreach to school children and college students in Delhi Gurgaon through documentary films (to be made) and distribute it for viewing in school classrooms and online, To develop a short-term educational program (3 to 5 days) on Clean Construction Project Management for construction industry’s executive, engineers and supervisors. CERCA could also partner with DLF to develop plans for improvement of indoor air quality in DLF malls, office buildings, residential buildings, etc. A meeting was held on 23rd August 2019 with DLF Team to discuss collaboration for Clean Air Forum started by DLF.

**Principal Accountant General (Audit) Delhi:**

A meeting was held on 11th September 2019 with Mr. LAC Singh, Pr. Accountant General and Mr. Saurabh Singh, Deputy Accountant General to discuss on Air Pollution in Delhi regarding an ongoing Performance Audit for the Report of C&AG of India. During 2019-2020, they are considering a Performance Audit of “Steps/Initiatives being taken regarding mitigation of Air Pollution with special emphasis on Vehicular Pollution”. In this regard, CERCA was requested to provide inputs, suggestions, recommendations, etc. on the subject.
Audit Advisory Board:

In another meeting on 24th September, Prof. Sagnik Dey was invited to be a part of the Audit Advisory Board, which is primarily responsible for the audit of all the departments/PSUs under the Government of National Capital Territory of Delhi. The Audit Advisory Board comprises of external members with expertise in their domain areas such as education, health, industries etc. and provides suggestions on matters relating to Audit including coverage, scope and prioritization of audits together with suggestions regarding audit approached and techniques within the framework of the Constitution and statuary mandate of the C&AG of India.

Embassy of the People's Republic of China:

A meeting was held on 10th July 2019 with Delegation from Chinese embassy to discuss possible areas of collaboration for the improvement of air quality in India, signing of an MoU between IIT Delhi and Tshingua University for joint research projects and exchange of students, starting an MTech program on EVs at IIT. A follow up on issues discussed in last meeting visit was carried out at Embassy of China on 5th September by CERCA team.

NITI Aayog:

A meeting was held on 4th September 2019 with Mr. Jitendra Kumar NITI Aayog, to discuss Carbon Footprint project with IIT Delhi and MoU between NITI Aayog and School of Public policy

J & K State Pollution Control Board:

A meeting was held on 10th October 2019 at Srinagar with the Chairman of Jammu and Kashmir state pollution control board for capacity building, Training and awareness for the improvement of air quality in the state.

MAX hospital group:

A meeting was held on 14th August 2019 with Mr. Anil Vinayak to discuss possible areas of joint project for the improvement of Indoor air quality in Hospitals.

Air pollution Action group:

A meeting was held on 23rd August with Team of APAG started by Central Square Foundation to work for the improvement of air quality in Delhi NCR region specifically to develop a scientific ranking criteria for cities in the area of clean air.
Central Pollution Control Board:

A meeting was held on 19th August 2019 with Dr. Prasant Gargava, Member Secretary CPCB to discuss the proposal of Annual City Clean Awards proposed by CERCA. This Award would be conferred on cities every year under the ambit of National Clean Air Program (NCAP) to periodically recognize and honor best city administration for their significant contribution and outstanding initiatives in the area of ambient air quality improvement.

Collaboration meeting with different agencies:

A meeting was held on 23rd October 2019 at IIT with representatives from DLF Foundation, Mckinsey, Air Pollution Action Group, Kaiterra and Renew Power to discuss their ongoing efforts in the field of air quality improvement and sharing of activity plan so that areas of common interest for collaboration could be identified.

Prof. Pratim Biswas from Washington University in St. Louis:

A meeting was held on 12th December 2019 with Prof. Pratim Biswas from Washington University in St. Louis, to discuss joint projects, training programs and setting up of air quality sensor calibration lab at IIT Delhi.

Beta Attenuation Monitoring (BAM) Installation at IIT Delhi

Recently a regulatory grade air quality measuring equipment for continuous/real time monitoring of ambient air quality has been installed at IIT Campus. This will enable further research on air quality as well as provide a reference grade facility for calibrating other air quality monitoring equipment.
Media Coverage

IIT-D study finds another peak-pollution season in city

Mohammad/reuters

New Delhi: If pollution levels over our health concerns, you simply breathe yourself for another peak pollution season. A study conducted by IIT-Delhi’s Centre for Excellence in Research on Clean Air (CERA) has revealed that there were two peak pollution episodes in Delhi—one after Diwali and another between December 30 and January 5. The report suggests an increase in the number of times everyone risks their health to the respiratory system due to air pollution.

The study, conducted for the Delhi National Capital Region (NCR), the researchers at IIT Delhi monitored PM2.5 levels during the dry season (October-February) by analysing 12 years’ worth of data. High-resolution (1 km) satellite data were used.

"Mainly, PM2.5 concentrations remain more than 300μg/m³, which is five times the Indian 24-hour national standard, for several weeks around these two peak pollution episodes," said IIT-Delhi associate professor Neelesh Bagh.

He explained that the first peak started with a transport of PM2.5 from upstream areas affected by open biomass burning, coupled with anticyclonic airflow conditions, while the second is attributed to enhanced local emissions and perhaps secondary aerosol formation under favourable meteorological conditions.

"Our study indicates two peaks of pollution episodes in Delhi NCR. Climatologically, the first peak occurs in the week of October 28-November 4. We attribute this peak to transport of PM2.5 from open biomass burning sites under such atmospheric conditions. The second peak is slightly lower than the first peak and occurs from December 30 to January 5. We associate this peak with a combination of enhanced local emissions and transportable pollution," the report said.

Bagh said that because of this second pollution phase, "it is necessary that governments implement control and pollution measures like odd/even during November 15-January 5 onwards.

IIT-D predicted pollution spike a month ago

Uniformly, severely polluted

Layer of cloud and smoke play foul

How bad is indoor air? IIT Delhi to study 10 public spaces

Photo credit: hindustantimes.com

New Delhi: With the threat of pollution in our daily lives, we need to pay attention to indoor air quality as well. IIT Delhi has announced plans to study ten public spaces to understand the levels of pollution inside these areas.

The study, which is part of the university’s ongoing research on clean air, will focus on ten public spaces across different locations in the city. These spaces include parks, schools, hospitals, shopping malls, and more.

The research team will use advanced monitoring technologies to measure PM2.5 levels and other pollutants inside these spaces. The data collected will help in understanding the impact of pollution on indoor environments and identify areas that require immediate attention.

"Indoor air quality is a growing concern in urban areas, and our study aims to provide valuable insights into the levels of pollution in different public spaces," said Professor Neelesh Bagh.

The results of the study will be used to develop strategies to improve indoor air quality and reduce the health impacts of pollution.
IIT Delhi alumnus Mr Arun Duggal donates Rs 5 Cr to establish the Centre of Excellence for Research on Clean Air (CERCA)

CERCA, ITD organises workshop on Air Quality: The Path to Clean Air – Reducing Fine PM Concentrations

Round-table conference hosted at IIT-Delhi on air quality

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Discussions include role of democracy, law to resolve issues

The Centre of Excellence for Research on Clean Air (CERCA), IIT-Delhi, hosted a round-table conference on air quality at the institute on the need of data gathering, raising awareness and role of democracy and law to resolve the issues related to air quality.

The conference came up with suggestions on setting goals and pathways for achieving satisfactory ambient air quality in Delhi/NCR and other cities in India.

IIT Director I K Misra said many researchers at IIT-Delhi were working on the subject of air quality and CERCA provided them a platform to connect with the government for the implementation of research output for developing and refining government's air pollution abatement plans and policy decisions.
IIT, MoEF experts help SC find ways to curb air pollution

The petitioners had represented various authorities that it is not insured with the legal argument on various methods to curb rising air pollution. IIT and experts' especial than the Indian Institute of Technology (IIT) and Ministry of Environment, Forest and Climate Change (MoEF), should be present to submit it on the basis and suggest immediate results.

The additional solicitor general retired, appearing for the court, informed the court that the 150 units of private vehicles were reprieved and that the first step is to begin providing information on current air quality. The court held that the concerned officials should suggest the process of expediting 40 minutes. This decision left the authorities struggling to get the expediting expert to the court.

'Delhi's Air Pollution: Yearly Bound Problem, Needs Reduction in Annual Pollution Levels'

New Delhi: Delhi declared a health emergency on November 3, 2019, due to severe air pollution.

On November 3, levels of PM 2.5 – polluting particles 30 times finer than one human hair, that can enter the bloodstream and sicken or kill people – in Delhi's air were recorded at a 24-hour average of 645 micrograms per cubic metre (µg/m³), which is 24 times higher than the World Health Organization (WHO) prescribed safe levels of 25 µg/m³ (24-hour average) and nine times higher than the Indian standard of 60 µg/m³ (24-hour average).

The Delhi government launched the 'odd-even' scheme on November 4, 2019, to reduce vehicular pollution and even-numbered private cars were allowed to run on alternate days. Will this scheme reduce pollution? No, says Sukhpal Dey, who studied this exercise when it was implemented for the first time in January 2016.

Transportation is the largest source of air pollution in Delhi, contributing 18-29% to the city's emissions, according to an April 2018 analysis by the Council on Energy, Environment and Water (CEEW), a Delhi-based think-tank. But without including two-wheelers, which make up the largest chunk of transport emissions, the odd-even scheme may not succeed, Dey said.

Road dust is the second largest source of air pollution in Delhi (18-39%), followed by industries (10-34%). Power plants, which are going to miss their second extended deadline for curbing air pollution in December 2018, having missed the first in December 2017—contribute about 3-11% of Delhi's pollution. The fifth largest source is construction (8%).