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ICAS India Clean Air Summit

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# INDIA CLEAN AIR SUMMIT (ICAS) 2025

## Towards Clean Air for All: Modelling the Solutions to Pollution

Date: 20–22 August 2025

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**Dr Jai Asundi**
Executive Director, CSTEP

When we first conceived the India Clean Air Summit (ICAS), little did we realise that it would take a life of its own and become the go-to event for air quality in India. We are now in the 7th year of ICAS, and I am delighted to hear that the theme is 'Towards Clean Air for All: Modelling the Solutions to Pollution'.

I take this opportunity to express my gratitude to those who have participated in and supported ICAS over the last 6 years. Your participation in the discussions at ICAS has immensely contributed to the work we are doing, helping us identify gaps and develop comprehensive solutions that reflect the changing world. The need for urgency, a sense of purpose, and collaboration when tackling the wicked challenges we are facing today—climate change and rising air pollution—remains the same!

As we progress towards a Viksit Bharat, it is essential that we consider the health and productivity of our people. Ensuring that citizens are able to live a better quality of life would not be possible without clean air. Clean air is often a co-benefit of mitigating some of the factors contributing to climate change. The urgency I have mentioned above would require us to look at practical opportunities to reduce air pollution. The theme and discussions we chose for ICAS 2025 reflect this in our pursuit of clean air.

Clean air benefits us all. Unfortunately, the steps to be taken are fraught with uncertainty. Air quality models offer us guidance in this uncertain world. This guidance must be local and practical. The ability to bring together the data, understand the science behind air flows, and examine the costs associated with implementation is where the models converge. This year's summit brings stakeholders together to discuss the nuances of these issues. A number of scheduled workshops will help build capacity around modelling in our ecosystem, although that is just the beginning.

Investing in clean air right now will mean a future with a healthy and productive population who are themselves working towards a better quality of life for all. I urge you all to actively participate, engage in dialogue, and seek out opportunities for collaboration during this summit. This is the essence of CSTEP's work, too—where science, technology, and policy come together to find solutions for us to build a secure, sustainable, and inclusive society for all. Let us further our resolve to pursue a greener, healthier, and more prosperous India!

**Dr Indu K Murthy**
Sector Head, Air Quality, CSTEP

As we convene for the seventh edition of the India Clean Air Summit (ICAS), I am both proud and hopeful. Proud of the significant progress we have made as a community in tackling one of the toughest public health and environmental challenges—air pollution. I am hopeful because the path forward is becoming clearer: it involves science, collaboration, and a strong commitment to the people who are most affected.

At CSTEP, our Air Quality work is grounded in science and shaped by the needs of policymakers, practitioners, and citizens alike. Since the formation of the Centre for Air Pollution Studies in 2018—now the Air Quality sector—we have focused on generating robust evidence; developing tools for informed decision-making; and building partnerships that bridge disciplines, institutions, and sectors. Over the years, we have grown not just in expertise but in the depth of our engagement. We believe that scientific research must be actionable, accessible, and inclusive. That is precisely what ICAS stands for.

The theme for ICAS 2025, 'Towards Clean Air for All: Modelling the Solutions to Pollution', is both timely and necessary. While we have made measurable progress through initiatives like the National Clean Air Programme (NCAP), there remains an urgent need to transition from generic measures to targeted evidence-led strategies. These strategies must address not only the obvious and visible sources of emissions but also take into account regional air movement patterns, meteorological dynamics, land use, and the layered human impacts of pollution.

Air quality models offer a powerful lens to view this complexity and intervene meaningfully. When grounded in high-quality data and calibrated to local realities, these models can guide action across scales—from neighbourhood-level interventions to regional clean air planning. But to fully harness this potential, we need more than just technical tools. We need a strong foundation of data; enhanced capacity among stakeholders; public trust in the science; and multi-level collaboration across government, academia, civil society, and industry.

ICAS 2025 provides a platform to strengthen all four. Over the next three days, we will engage with some of the brightest minds and boldest practitioners in the field—from scientists to students and regulators to innovators. The summit is designed not just to showcase technical advancements in air quality modelling but to reflect on how these can be translated into sustainable solutions that impact people's lives positively. This summit is not just about modelling pollution; it is about modelling solutions, partnerships, and a shared vision for clean air.

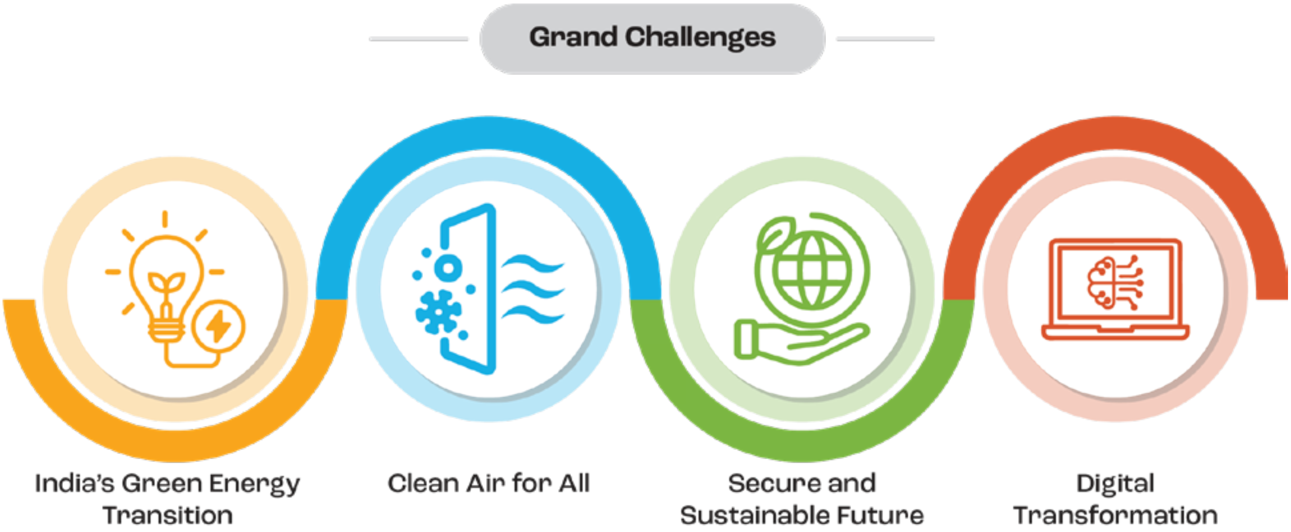
In a world where environmental challenges are increasingly interconnected and urgent, ICAS is a reminder that sustained progress requires shared commitment and that real change happens when knowledge is turned into action.

I thank each of you for being part of this journey. Your voice, your expertise, and your commitment are vital to achieving our collective goal—clean air for all. Let us use this summit to learn, collaborate, and renew our resolve to make that vision a reality.

# CENTER FOR STUDY OF SCIENCE, TECHNOLOGY & POLICY

## About CSTEP

The Center for Study of Science, Technology and Policy (CSTEP) is one of India's leading think tanks, with a mission to enrich policymaking with innovative approaches using science and technology for a sustainable, secure, and inclusive society. Our work is in the areas of climate, environment, sustainability, energy, artificial intelligence for social impact, and new materials. Our research leverages innovative technology-based ideas to solve developmental challenges. Our vision is to be the foremost institution for policy innovation and analysis in India.




## Policy Engagements

- Member, Low-Carbon Technologies Committee formed by NITI Aayog (with a focus on policy solutions for enabling a Green Hydrogen economy in India)
- Member, India Climate and Energy Modelling Forum convened by NITI Aayog for developing India's long-term strategies
- Ministry of Environment, Forest and Climate Change (MoEFCC)
- NITI Aayog
- Ministry of New and Renewable Energy (MNRE)
- Governments of Karnataka, Andhra Pradesh, Bihar, West Bengal and Madhya Pradesh
- Review Panel in the Clean Energy Ministerial working groups
- Member of Science and Engineering Research Board, DST
- Institute of Repute under the National Clean Air Programme for Non-attainment Cities in Karnataka

# Air Quality Sector at CSTEP

Since the establishment of the Centre for Air Pollution Studies (CAPS) at CSTEP in 2018, our work in the realm of air pollution control has been driving change across the country. In July 2023, CAPS was expanded into the new 'Air Quality' sector that now works on three specialised areas: Air Quality Policy and Outreach, Air Quality Observations, and Air Quality Modelling.

The Air Quality sector at CSTEP is one of the few entities in India that has adopted an integrated approach to developing policies that address air pollution. CSTEP is also recognised as an Institute of Repute under the National Clean Air Programme (NCAP) for non-attainment cities in Karnataka. We are currently collaborating with the State Pollution Control Boards in Karnataka, Punjab, and West Bengal, as well as other government bodies.

Over the years, CSTEP has developed high-resolution emission inventories for over 80 non-attainment and million-plus cities, which helped us identify targeted air pollution reduction measures. Our research uses air quality observations, state-of-the-art chemical transport models, and reduced-complexity models (RCMs). These inform policy scenarios, refined by techno-economic assessment and stakeholder consultations.

We use a combination of reference-grade instruments and low-cost sensors to monitor atmospheric concentrations of $PM_{2.5}$, $PM_{10}$, $NO_2$, $SO_2$, $O_3$, and CO and meteorological observations. A dense network of lower-cost multipollutant sensors can be used to quantify spatio-temporal patterns and identify hyperlocal hotspots in urban air pollution, and we have deployed such a network across Bengaluru. However, sensor data quality can be a concern. Hence, we have established the India Sensor Evaluation and Training (Indi-SET) facility at our Bengaluru office, with plans to add more such centres across India. For continuous chemical characterisation of aerosols, we use an aerosol chemical speciation monitor (ACSM) to measure non-refractory aerosol composition (organics, nitrate, sulphate, chloride, and ammonium), an aethalometer for monitoring black carbon aerosols and a multi-metal monitor (Xact) for measuring metals.

A combination of the above instruments and receptor modelling is used for near-real-time source apportionment of fine particulate matter over Bengaluru. To better understand the contribution of different regions and sources of pollution, state-of-the-art chemical transport models (CTMs) such as WRF-CAMx and WRF-Chem are used. These models, along with RCMs, such as the intervention model for air pollution (InMAP) and Rapid Estimation of Air Concentrations for Health (REACH), are used to estimate air quality and health impacts of any mitigation measure. Both CTMs and RCMs are validated using ground- and space-based atmospheric measurements. By harmonising diverse models and observations, we aim to provide insights for formulating effective state and regional air pollution control strategies.

To bridge the gap in the policy landscape and strengthen India's air quality management, the Air Quality Policy and Outreach group provides evidence-based policy inputs through rigorous scientific research, techno-economic assessments, Monitoring, Evaluation, and Learning (MEL) frameworks, and collaboration with key stakeholders. We lead capacity-building efforts through workshops, training modules, and direct engagement with government stakeholders, equipping them with the tools and knowledge to address air pollution proactively and effectively.

Our work cuts across sectors such as transport, residential, domestic, agriculture, diesel generator sets, and industry. We have also collaborated with organisations, including The Advocacy Team, for political economy analysis of black carbon. We make our tools freely available to research institutions and government bodies across India to strengthen the country's air quality ecosystem.

The India Clean Air Summit (ICAS), CSTEP's flagship event spearheaded by the Air Quality sector, stimulates purposeful dialogue and collaborative action. Entering its seventh year, ICAS is recognised today as India's premier event on air pollution. It brings together scientists, community-led organisations, policymakers, and influencers to leverage the latest scientific research and technology to improve policies and actions for reducing air pollution.


Over the past decade, India has taken major steps to improve air quality. These include providing financial support, expanding air quality monitoring networks, and introducing mandatory city-specific action plans under the National Clean Air Programme (NCAP). However, a key opportunity remains untapped—the integrated use of air quality modelling to design more effective, region-specific solutions at the national, state, and local levels.

As a part of our collective pursuit of the grand challenge 'Clean Air for All', the Center for Study of Science, Technology and Policy (CSTEP) is pleased to announce the seventh edition of its flagship event—India Clean Air Summit (ICAS) 2025. With the theme 'Towards Clean Air for All: Modelling the Solutions to Pollution', ICAS 2025 will be held on 20–22 August 2025.

This edition will focus on how air quality modelling and monitoring can guide effective, science-based solutions to tackle air pollution. The summit will bring together a diverse group of stakeholders, including representatives from government bodies, research institutions, think tanks and policy experts, citizen groups, implementation partners, and funding agencies. Through a mix of training sessions, research presentations, and expert discussions, ICAS 2025 will explore how air quality models and measurements can be adapted for the Indian context to support informed policymaking, reduce harmful pollution exposure, improve public health, and ensure a better quality of life.

Air quality models can help us understand where pollutants come from, how they behave in the atmosphere, and what actions might be most effective in reducing them. These models can also estimate how much pollution comes from outside a city or region and help define air pollution control areas, also referred to as 'airsheds'. However, despite the value provided by air quality modelling, India has not extensively invested in the development and testing of these models tailored to local conditions. Likewise, the availability of high-quality data needed to run and test these models remains limited.

To raise awareness about the importance of air quality modelling, CSTEP recently hosted a workshop covering the basics, recent advances, and real-world policy applications of air quality models. At ICAS 2025, we aim to expand this conversation to a broader audience by discussing key questions, including the following:

- Why are air quality models critical for effective air quality management?
- How can we combine models and real-world data to create science-based, accessible tools?
- Should our air quality policies also address secondary pollutants and short-lived climate pollutants (SLCPs) over the medium and long term?

- How can we reduce personal exposures and improve ambient air quality with climate co-benefits?
- What should be our sectoral emission targets for NCAP 2.0?
- How can we ensure that models offer consistent and trustworthy results for policymaking?
- What kind of training and capacity building can help widen the reach of air quality modelling and related tools?

These questions and the ensuing discussion will highlight the urgent need for air quality modelling-based solutions and a more integrated approach to improving air quality across India. ICAS 2025 will include two parallel training sessions on 20 August, aimed at PhD students and early-to-mid-career professionals from think tanks, academic institutions, and government agencies. These sessions will cover the following areas: An introduction to and hands-on training in a simplified (reduced-complexity) air quality model, best practices for air quality monitoring, data analysis, and visualisation. The goal is to help participants generate and use high-fidelity air quality datasets. Such data are essential for testing models and evaluating policy impacts. In doing so, we hope to equip the next generation of researchers with the tools they need for effective air quality management and policy planning.

# Poster Presentations

1. **Estimation of Size Fractionated Lung Deposition Dose from Low-Cost Sensor Measured Particulate Matter in Rural Homes of Southern India**

   – S G Karthiga Devi, Sri Ramachandra University of Higher Education and Research

2. **Evaluating CNN-LSTM and GNN-GRU Hybrid Models for Enhanced Air Quality Prediction and Dynamic Forecasting**

   – Prince Vats, Indian Institute of Technology Gandhinagar

3. **ML Model Evaluation for AQI Prediction in Gangetic Plain Using Air Quality and Meteorological Features**

   – Akhand Pratap Singh, Indian Institute of Technology (Indian School of Mines) Dhanbad

4. **Development of Land Use Regression Models for Urban Residential Outdoor $NO_2$ Locations in Mumbai, India**

   – Prince Vijay, Indian Institute of Technology, Bombay

5. **Impact of Emission Reduction Policies in Mitigating Road Transport-Induced Air Pollution and GHG Emissions in a Non-Attainment City in India**

   – Manuj Sharma, Indian Institute of Technology Tirupati

6. **Understanding the Changes in Future Air Quality and Its Drivers in India**

   – Mukul Kumar, Indian Institute of Technology Delhi

7. **Satellite-based ambient formaldehyde exposure estimates over India**

   – Deeksha Gautam, Indian Institute of Technology Delhi

8. **Examining Indoor and Outdoor $PM_{2.5}$ Exposure and Their Toxicity in the Schools of Urban Mysuru, Karnatak**

   – Shambhavi Mishra, Indian Institute of Technology Bombay

9. **From Emission to Intervention: A Comprehensive Study on Stone Carving Dust Exposure**

   – Shubham Sharma, Malaviya National Institute of Technology Jaipur

10. **Association Between Exposure to Multiple Air Pollutants and Anaemia Among Women of Reproductive Age in India**

    – Khushboo, Indian Institute of Technology Delhi

11. **Effect of Urban Form on $PM_{2.5}$ Concentration for Metropolitan Cities: Kolkata and Chennai**

    – Himank Sen, Delhi Technological University

12. **Evaluating Collocation Performance of Low-Cost Sensors in a Semi-Urban Air Quality Environment**

    – Khushboo Sharma, International Centre for Integrated Mountain Development, Nepal

13. **Assessing the Influence of Meteorological Variables on $PM_{2.5}$ Concentrations Under Sparse Observation Regimes: Application of Nonparametric Statistical and Machine Learning Methods**

    – Kumar Gaurav Mishra, Indian Institute of Technology (Indian School of Mines) Dhanbad

14. **Analyzing PM Distribution and Calibrating Low-Cost Sensors for Accurate Measurements in Indoor, Laboratory, and Outdoor Settings**

    – Rubal Dhiman, Indian Institute of Technology Goa

15. **Ozone and PM2.5 Chemical Regimes Over Delhi: A Multi-Platform Observational Study Using Multiple Satellite and Ground-Based Network**

    – Vikrant Tomar, Aryabhatta Research Institute of Observational Sciences (ARIES)

16. **AirVanta: An IOT-Based Indoor Air Quality Monitoring System for Safer School Environments**

    – Ishan Mukherjee, ScholarLab Foundation

17. **Chemical Characterization and Source Apportionment of $PM_{2.5}$ over an Upwind Site of Delhi During Biomass Burning and Diwali Festival Perio**

    – Vasu Singh, Indian Institute of Technology Delhi

18. **Observational Insights into Biomass Burning Aerosols Using High-Resolution Time-of-Flight Aerosol Mass Spectrometry During an Extreme Pollution Event in Delhi**

    – Akash Sagar Vispute, Indian Institute of Tropical Meteorology, Pune

19. **Predicting Road-Specific Emissions of the Active Vehicular Fleet over the Tier-II City in India: Integrating deep learning and speed information**

    – Vishal Sengar, Indian Institute of Technology Tirupati

20. **Assessing Emissions from Crop Residue Burning: Comparing Global Fire Inventories with Bottom-up Burnt Area-Based Method**

    – Sneha Maria Ignatious, Council on Energy, Environment and Water, Delhi

21. **Making Air Quality Modelling Easier – Python Notebooks for CAMx Pre-processing**

    – Rishikesh P, Council on Energy, Environment and Water, Delhi

22. **Size-Dependent Optical and Chemical Properties of Water-Soluble Organic Aerosols: Insights from Indo-Gangetic Plain, India**

    – Garima, Physical Research Laboratory, Ahmedabad

# Studies Undertaken by the Air Quality Sector

## Emission inventory study on 76 cities in India

CSTEP, with the assistance from 11 other Institutes of Repute (IoRs), developed emission inventories for 76 non-attainment cities under the aegis of the National Knowledge Network (NKN) to examine various polluting sectors in the cities and their contributions to air pollution.

The study estimated the shares of four major pollutants (particulate matter [$PM_{10}$ and $PM_{2.5}$], sulphur dioxide [$SO_2$], and oxides of nitrogen [NOx]) in the following sectors: residential, commercial cooking, open burning, industries (including electricity generation), transportation (tailpipe and resuspension of dust), airports, and marine ports. The study quantified sectoral emission contributions for the base year 2019–20 and projected the increase in emissions till 2030. The study also determined the emission reduction potential of selected control measures and their associated costs. Some of the key control measures evaluated were electrification of transportation, installation of diesel particulate filters in trucks, solid waste management, banning of open burning, and promotion of clean fuel usage in industries.

*A portal for visualising the findings of the study was launched at ICAS 2024. City-specific reports can be downloaded from the portal here.*

## State-level strategies for reducing air pollution in Punjab

The National Clean Air Programme (NCAP) focuses on city-level actions, which do not address transboundary, peri-urban, and rural sources of pollution. CSTEP, supported by the Clean Air Fund, is working closely with the Punjab State Pollution Control Board and line departments to establish state-level strategies that would cover urban and peri-urban areas and rural hamlets, thus truly ensuring clean air for all (not just for city dwellers). Several important sources are beyond city jurisdictions (e.g. stubble burning) and are under the state's purview (e.g. freight transport and industry).

One unique approach to our work involves the assessment of the impact of state-level strategies using regional air quality modelling techniques vis-à-vis city-level actions. We have published a policy brief on the ex-situ mechanisms for managing stubble and are now working towards a report on managing transport emissions. CSTEP has also conducted extensive capacity-building exercises with various departments in Amritsar, Mandi Gobindgarh, Khanna, and Jalandhar.

*Click here to read our report 'Stubble management: Harnessing ex-situ options and market mechanisms'.*

# Projects Under Evidence Generation for the National Clean Air Programme (NCAP)

## Heavy duty, high impact: Mitigating heavy commercial vehicle emissions in India

The study quantifies state-level emissions due to HCVs using registration data and some national ground surveys. We identify 'super emitters': older and ill-maintained freight that pollute up to 11 times more than regular vehicles. We offer mitigation measures with the highest pollution reduction potential for the horizon year 2035. This study gives a mitigation pathway based on air quality modelling, current policies, and associated costs.

## Switch on, smoke off: Reducing emissions from diesel generator sets

The study quantifies district-level emissions from DG sets and investigates viable alternatives and mitigation costs. Known for hyperlocal pollution, DG sets are often overlooked in the larger discourse on emission sources. We estimated that older DG sets pollute way more and are rampant. We are calling these "super emitters". Further, we provide alternatives to DG sets across different use cases. This includes sue of solar power and battery storage, gas-based generator sets and using DG Sets that conform to CPCB IV+ guidelines. The report also offers a comprehensive cost for each of these alternatives along with the current policy ecosystem.

## The case for action on black carbon

The report points to the gap between the growing evidence on black carbon's regional climate impacts and its absence from global climate strategies. Black carbon, a pollutant emitted from the incomplete combustion of fossil fuels, biomass, and waste, sits uniquely at the centre of climate and health crises. Black carbon significantly speeds up the melting of snow and ice in the Arctic, Himalayas, and Andes; disrupts monsoon patterns in West Africa and India; and worsens the effects of dangerous heatwaves. Black carbon is strongly correlated with increased blood pressure levels, a high-risk factor for cardiovascular disease. Exposure to black carbon during pregnancy has been linked to multiple adverse birth outcomes, including low birth weight. Case studies compiled from across the globe demonstrate cost-effective and practical solutions to reducing black carbon emissions immediately. These include transitioning to cleaner technologies in the Arctic and Africa, introducing the 'zigzag' technology for firing brick kilns in Asia, and controlling wildfires through community engagement in forest management.

**Read More:** https://www.cleanairfund.org/resource/black-carbon/

## Tackling black carbon: How to unlock fast climate and clean air benefits (in collaboration with the Clean Air Fund and The Advocacy Group)

Black carbon is a climate and air pollutant that, per tonne, is more potent than carbon dioxide. Although it remains in the atmosphere for only one to two weeks, it has severe impacts on human health, economies, air quality, and accelerates ice melting in the Arctic and the broader cryosphere. The report provides evidence of a unique opportunity available for global leaders to secure a 'quick win' in tackling the climate crisis by adopting a comprehensive approach to black carbon emission reduction. It includes a blueprint on how to remove six barriers relating to politics, finance, regulation, the role of industry, and gaps in awareness and advocacy that have converged to block progress on black carbon emission reduction in recent years. In the India case study, led by CSTEP, we focus on accelerating a clean energy transition in the Himalayas via clean cooking and financing cleaner brick kilns in the Indo-Gangetic Plain. Cutting black carbon emissions alongside other super pollutants is the only known way to achieve an early and significant victory in tackling the climate crisis in the short term, while improving air quality and delivering health and economic benefits.

**Read More:** https://www.cleanairfund.org/resource/tackling-black-carbon-report/

## Emission inventory and pollution reduction strategies for Bengaluru

CSTEP developed an emission inventory for the airshed area (60 km × 60 km) of Bengaluru. The emission load for various polluting sectors was estimated using the Central Pollution Control Board (CPCB) and United States Environmental Protection Agency (USEPA) methodology. The study estimated particulate matter ($PM_{10}$ and $PM_{2.5}$), oxides of nitrogen (NOx), and sulphur dioxide ($SO_2$) emissions for 2019.

**Read More:** https://cstep.in/publications-details.php?id=1985

## Identification of polluting sources for Bengaluru: Source apportionment study

CSTEP, under the aegis of Karnataka State Pollution Control Board (KSPCB), conducted a source apportionment of PM concentrations in Bengaluru. The study had three major components: (i) Sampling of $PM_{2.5}$ and $PM_{10}$ through a fine particulate sampler and respirable dust sampler, respectively; the study quantified the sources of $PM_{2.5}$ and $PM_{10}$ at 13 sites monitored by KSPCB in Bengaluru. (ii) Quantification of the chemical species through various analytical instruments. (iii) Source apportionment of $PM_{2.5}$ and $PM_{10}$ through receptor modelling using the chemical mass balance model. The quantified chemical data were then used as an input for running the receptor model to derive the sector-wise contribution to pollution.

**Read More:** https://cstep.in/publications-details.php?id=1988

## Satellite-based mapping and the quantification of $PM_{2.5}$ in India

The daily mean $PM_{2.5}$ was estimated, and spatial maps (1-km spatial resolution) were generated using moderate resolution imaging spectroradiometer (MODIS) AOD for 2019 across select Indian regions. The study regions included the urban, peri-urban, and rural regions of Delhi-National Capital Region, Kanpur, and Bengaluru. An advanced statistical model was trained using open-access data sets (satellite, regulatory ground-based $PM_{2.5}$, and reanalysis meteorology) to estimate the daily mean $PM_{2.5}$. Annual and seasonal maps of $PM_{2.5}$ were generated, and a hotspot analysis was performed to identify the spatial clusters of high $PM_{2.5}$ grids within the study regions. Spatial gradients of $PM_{2.5}$ were studied to understand the rural, peri-urban, and urban contrast in pollution levels.

**Read More:** https://cstep.in/publications-details.php?id=2004

## Best practices for deploying and maintaining a low-cost $PM_{2.5}$ sensor network

The affordability, portability, and availability of low-cost sensors (LCSs) make air quality data accessible to the general public. The best practices suggested in this study are expected to help stakeholders set up and maintain LCS networks efficiently. The points put forth are based on our experience in establishing a city-wide PurpleAir LCS network in Bengaluru and maintaining it for 2 years.

**Read More:** https://cstep.in/publications-details.php?id=2161

## Mapping air pollution in Bengaluru using low-cost sensors and mobile monitoring data

A hybrid approach that combines non-conventional, less-expensive, short-term stationary, and mobile deployments may be a cost-effective solution. In the city of Bengaluru, India, we adopted such a hybrid measurement approach to generate high-spatial-resolution air pollution maps. The primary policy recommendations from the work are as follows: (1) regulatory monitors need to be installed in non-urban areas, (2) supplementary monitoring using LCSs needs to be pursued in select regions in addition to the regulatory monitoring in urban areas, and (3) a mitigation plan is needed to reduce traffic-related emissions in western Bengaluru.

**Read More:** https://cstep.in/publications-details.php?id=2321

## Mobile-monitoring campaign for air pollution studies in Bengaluru

This report summarises the outputs of an 11-month-long mobile-monitoring project, with the goal of producing a high-resolution pollution map of select parts of Bengaluru. The study investigated the feasibility of mobile-monitoring studies in middle-income countries, which often have poor road conditions, high background pollution levels, and heterogeneous sources of pollution.

**Read More:** https://cstep.in/publications-details.php?id=1296

## Comprehensive clean air action plan for the city of Patna

The Patna Clean Air Action Plan was prepared to identify source-specific control measures. A techno-economic assessment was performed on the control measures, and an emission inventory was developed. The study estimated that the emission level will increase by 42% in 2030 without any interventions. The study estimated that under high-, medium-, and low-emission reduction scenarios, the $PM_{2.5}$ emission level can be reduced by 69%, 48%, and 30%, respectively, with reference to the BAU scenario.

**Read More:** https://cstep.in/publications-details.php?id=861

## Comprehensive clean air action plan for Gaya

The Gaya Clean Air Action Plan was prepared to identify source-specific control measures. A techno-economic assessment was performed on the control measures, and an emission inventory was developed to estimate the total emission load from various polluting sources in the city. The study estimated that the total $PM_{2.5}$ emission load in 2018 was around 10,000 tonnes/year and is estimated to reach around 16,000 tonnes/year by 2030 under the BAU scenario. Emissions from the transportation sector were found to be the highest.

**Read More:** https://cstep.in/publications-details.php?id=1278

## Comprehensive clean air action plan for Muzaffarpur

A clean air action plan was prepared for Muzaffarpur, under which an emission inventory was developed. Source-specific control measures were identified, and a techno-economic analysis of the control measures was performed. The study estimated that under high-, medium-, and low-emission reduction scenarios, the PM2.5 emission level can be reduced by 37%, 28%, and 19%, respectively, with reference to the BAU scenario in 2030. Under the high-emission reduction scenario, the city could save at least 800 lives by 2030.

**Read More:** https://cstep.in/publications-details.php?id=1279

## Clean air action plan for Ramgarh

The Ramgarh Clean Air Action Plan aimed to help mitigate the impacts of air pollution in several cities in Jharkhand. The government identified multiple cities, including Ramgarh, to generate evidence on air pollution. In this context, CSTEP prepared this clean air action plan to identify major polluting sources and prioritise measures to control air pollution. Further, the pollution landscape in the city was examined, and data were collected through multiple interactions with policymakers.

**Read More:** https://cstep.in/publications-details.php?id=2353

## Air pollution emission inventory for six cities in Jharkhand

The study aimed to better understand the air pollution scenario in non-attainment cities in Jharkhand and develop emission inventories for six cities, namely, Sahibganj, Dumka, Pakur, Chaibasa, Hazaribagh, and Ramgarh. Reduction in emissions in the study cities requires holistic approaches. Heavy commercial vehicles plying in the cities significantly contribute to transport emissions (owing to the presence of major roads within the cities and freight movement due to industries). New roads bypassing the city area need to be constructed to reduce the sectoral share of transportation. End-to-end pavement to reduce road dust and installation of dust suppression systems in the industries for fugitive dust control are needed. Further, industries should be encouraged to use cleaner fuels, along with mandatory compliance (with third-party auditing), to significantly reduce emissions in these cities.

**Read More:** https://cstep.in/publications-details.php?id=2354

# Sponsors

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The DURAG GROUP is one of the worldwide market leaders for intelligent solutions in the fields of emission and ambient air measurement technology, combustion technology, multi-gas analysis, tunnel sensors, indoor air monitoring, and environmental and process data management. Their range of services includes instruments for the monitoring and data acquisition of pollutant emissions in accordance with legal requirements, the ignition and control of flames, and visualisation and online temperature analysis of thermal processes. They rely on a dedicated team and decades of experience. Their business activities are guided by the motto 'Technology for a clean and safe environment'.

## Tesscorn AeroFluid, Inc.

They offer aerosol instrumentation for applications ranging from atmospheric and climate studies to engine emissions and inhalation toxicology. They have built a network of suppliers that are leaders in their fields, all providing unique technologies for a broad spectrum of applications. Their aerosol instrumentation includes various instruments to measure the chemical and physical properties of primary and secondary aerosol particles.

# Meet the Air Quality Team

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