INDIA CLEAN AIR SUMMIT 2022

Looking at Air Pollution Through the Climate Lens

23–26 August 2022 | Radisson Blu Atria, Bengaluru

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INDIA CLEAN AIR SUMMIT (ICAS) - 2022

#ICAS2022

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FOREWORD

ವಿಜಯ್ ಮೋಹನ್ ರಾಜ್. ವಿ ಐ.ಎಫ್.ಎಸ್.,
ಸರ್ಕಾರದ ಪ್ರಧಾನ ಕಾರ್ಯದರ್ಶಿ
(ಜೀವಿಪರಿಸ್ಥಿತಿ ಮತ್ತು ಪರಿಸರ)
ಅರಣ್ಯ, ಜೀವಿಪರಿಸ್ಥಿತಿ ಮತ್ತು ಪರಿಸರ ಇಲಾಖೆ

Vijay Mohan Raj. V, IFS.,
Principal Secretary to Government
(Ecology and Environment)
Forest, Ecology and Environment Department

16/08/2022

Air pollution and climate change are two interrelated environmental challenges impacting the ecology. National Clean Air Programme (NCAP) launched by MoEFCC in 2019, is trying to address the challenge of air pollution and improve the quality of air in 132 Non-Attainment (NA) Cities in India. Ambient air pollution is a major health concern globally.
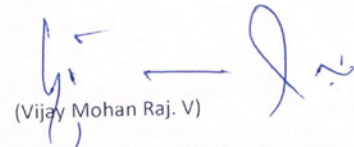
Karnataka has four NA cities and Bengaluru is one amongst them. The major challenge for bad air quality in these four NA cities is transportation, road dust, waste management and insufficient infrastructure development. Bengaluru is way ahead of the curve by conducting studies such as Emission Inventory (EI) and Source Apportionment (SA) which helped to understand the sources and various pollutants.

The Centre for Study of Science, Technology & Policy (CSTEP) is a not-for-profit policy-research organisation with a mission to enrich policymaking with innovative approaches, using science and technology for a sustainable, secure, and inclusive society. CSTEP's inter-disciplinary research encompasses diverse fields such as energy, urban development, climate, and air pollution.

The Centre for Air Pollution Studies (CAPS) at CSTEP has signed a MoU with Karnataka State Pollution Control Board (KSPCB), Bruhat Bengaluru Mahanagara Palike (BBMP) and the Government of Karnataka (GoK) to help towards the implementation of the control measures, build capacity of the various state departments and create awareness for air pollution challenges under the NCAP.

India Clean Air Summit (ICAS) is a step towards achieving better air quality by focussing on air-pollution issues and strategies towards clean air for all. ICAS will serve as a platform by bringing various experts from India and across the globe to showcase & deliberate on the best practices.

I wish ICAS a great success.

(Vijay Mohan Raj. V)

ಕೊಠಡಿ ಸಂಖ್ಯೆ: 709, 7ನೇ ಮಹಡಿ, 4ನೇ ಹಂತ, ಡಾ॥ ಬಿ.ಆರ್. ಅಂಬೇಡ್ಕರ್ ವೀಧಿ, ಬಹುಮಹಡಿಗಳ ಕಟ್ಟಡ, ಬೆಂಗಳೂರು – 560 001
ದೂರವಾಣಿ: 080–2225 4377 / 2203 2445
Room No. 709, 7th Floor, 4th Stage Dr. B.R. Ambedkar Veedhi, Multistoreyed Building, Bengaluru - 560 001
Tel: 2225 4377 / 2203 2445 E-mail: secyenv-fee@karnataka.gov.in

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CIN: U80302KA2005NPL036676

Dr Jai Asundi
Executive Director, CSTEP

Welcome to the 4th edition of the India Clean Air Summit!

We hope the discussions and sessions are revealing and are able to inform your work. We hope you make connections with other participants that will last a lifetime and above all make this part of your learning journey. For our sponsors and partners, a heartfelt gratitude for your support and we hope this year's Summit meets your expectations.

We face a significant challenge with regards to air pollution in our settlements. At the same time, the effects of climate change are upon us, impacting us every day. These multiple crises, fall in the category of 'wicked' problems. Hence, this calls for all of us to work together with a sense of purpose, agency, and urgency to find practical, implementable, and scalable solutions to address these challenges.

It is thus appropriate that the organising and technical committee of the India Clean Air Summit 2022 decided to choose the theme of 'Looking at Air Pollution through the Climate Lens', to discuss and examine the research and policy questions on issues where there are commonalities. We hope that the discussions at ICAS 2022 will reveal pertinent insights to direct our action.

This year, we are also happy to collaborate with the UC Davis Air Quality Research Center to bring to India its first Air Sensors International Conference (ASIC-India). The conference couldn't come at a better time. Sensors are becoming a game-changer in air pollution monitoring and management by empowering citizens and community groups. However, it is important that we understand the science behind them and are able to understand their limitations. At ASIC, participants will attend training sessions and will be among the first cohort of practitioners contributing to building a common vision for the application of sensor technology in monitoring air pollution.

We have tried to make this Summit more participative by inviting students to present their research/work on solutions to tackle air pollution, while at least 15 tech developers will present their technology solutions. The summit is divided into panel discussions that bring different perspectives and concerns to the fore; as well as deep dives, where a single issue is studied from multiple angles in the hope of finding comprehensive and holistic solutions.

The India Clean Air Summit is CSTEP's flagship event. We would like to use this opportunity to highlight our ongoing research to practitioners, communities, policymakers while also being advocates for solutions that are practical. 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.

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ABOUT
CSTEP

CENTER FOR STUDY OF SCIENCE, TECHNOLOGY & POLICY

About CSTEP

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, and AI for social good. Our research leverages innovative technology-based ideas to solve developmental challenges.

Climate, Environment & Sustainability

Energy & Power

AI & Digital Platforms

Strategic Studies

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, and Madhya Pradesh
- Review Panel in the Clean Energy Ministerial
- Member of Science and Engineering Research Board, DST

Centre for Air Pollution Studies

Very few institutions in India combine scientific knowledge and techno-economic assessment of interventions for policy. CAPS uses an integrated approach to address this gap and provide high quality policy advise to improve air quality in India.

Vision

To provide scientific, high-quality policy advice for improving air quality in India and the South Asian region.

Aim

1. Develop a scientific knowledge base for solving policy issues related to air pollution.
2. Share knowledge and best practices with citizen groups to mitigate air pollution.
3. Build cooperation and partnerships among researchers and practitioners on the issue of air pollution.
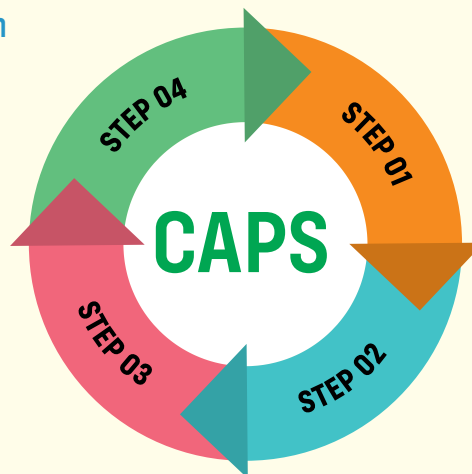
Approach

CAPS uses the following four approaches for conducting air pollution studies:

Capacity Building & Outreach
1. Scientific studies
2. Methodology and models
3. Communicating science

Measurement & Monitoring
1. Mobile & static measurements
2. Sensor network
3. Satellite measurements

STEP 04 • STEP 01 • STEP 02 • STEP 03 • CAPS

Policy Analyses
1. Techno-economic assessment
2. Health impact studies
3. Policy analysis

Modelling & Analysis
1. Model development
2. Computational set-up
3. Storage facilities

Highlights

- CSTEP is a member of Air Pollution Measurement Consortium (APMU) of Technical Air Resource Unit (TARU) created by the Department of Science & Technology (DST)
- CSTEP is a member of Air Quality Action Forum (AQAF) initiative of the United Nations Environment Programme (UNEP) with support from Paytm Foundation
- CSTEP has been recognised as an Institute of Repute (IOR) by the Central Pollution Control Board (CPCB) under the National Clean Air Programme (NCAP)

INDIA
Clean Air Summit
(ICAS-2022)

INDIA CLEAN AIR SUMMIT (ICAS) - 2022

Looking at Air Pollution Through the Climate Lens

23–26 August 2022 | Radisson Blu Atria, Bengaluru

The Center for Study of Science, Technology and Policy (CSTEP) is organising its annual flagship event 'India Clean Air Summit (ICAS) 2022', one of the largest events on air pollution in India. This event is being organised in collaboration with the Air Sensors International Conference (ASIC), UC Davis.

Concept Note

The India Clean Air Summit (ICAS)—CSTEP's flagship event on air pollution—has been instrumental in shaping the narrative and driving action on air quality in India. Organised by the Centre for Air Pollution Studies (CAPS) at CSTEP, the event embraces an integrative and holistic approach to improving India's air quality. Since 2019, ICAS has brought people across disciplines—scientists, policymakers, academicians, and civil society—together to facilitate meaningful discussions on challenges grounded in reality and solutions based on scientific evidence while leveraging the power of technology. Discussions at ICAS range across topics such as health, the socio-economic impacts of air pollution, innovative monitoring approaches, and reducing pollution. Further, these discussions pave the way to bridge gaps in policies.

The 4th edition of ICAS promises to be bigger and better than ever. This year, we have a hybrid four-day conference. Also joining ICAS this year is the UC Davis Air Quality Research Center (AQRC), with a mission to facilitate research on scientific, engineering, health, social, and economic aspects of gaseous and particulate atmospheric pollutants.

They would be bringing the Air Sensors International Conference (ASIC) to India for the first time. Over the last 6 years, ASIC has brought together stakeholders from academia, government, communities, and commercial interests to advance air pollution sensors, improve the data quality from sensors, expand the list of pollutants measured, and foster community involvement in monitoring air quality. ASIC aims to develop understanding and consensus between various stakeholders on the use of small, affordable air quality sensors.

At ICAS 2022, we will bring to the table two of the most pressing global issues of our time— climate change and air pollution. We will address the critical linkages between these and explore how working on these in tandem can help synergise policy decisions and make them comprehensive and more effective. Considering the urgency of the climate crisis and the health toll due to air pollution, we feel that this is the need of the hour. ICAS 2022, with ASIC, will examine these issues at research, policy, and engagement levels.

ICAS 2022 has something for everybody, and is, in fact, aimed at all practitioners working or interested in the areas of climate change and air pollution. Apart from engaging sessions for policymakers, scientists, and researchers, we have a Student Poster Competition, where 15 students from around the world will be selected to present innovative research ideas on the conference topics. Product developers are also invited to an exhibition, where 15 latest game changing technologies to curb air pollution will be displayed for demo. On the final day of ICAS 2022, ASIC will provide in-depth technical training to interested attendees.

AGENDA

DAY 1: 23 August 2022		
The Right to Life: Citizens at the Centre of Science and Policy		
Session 1	18:30–21:00	Inaugural address - Climate Change, Air Pollution, and Society Linkages
DAY 2: 24 August 2022		
Two Sides of the Same Coin: The Link Between Air Pollution and Climate Change		
	10:00–11:00	Welcome address and introduction
Session 1	11:00–12:00	Energy Fix –The Role of Low-Emission Technologies in Addressing Air Pollution & Climate Change
Session 2	12:15–13:00	Solutions for Pollution (poster presentation by students)
Session 3	14:00–15:00	Seeing Is Believing – Addressing the Time Lag of Climate Change Impact to Enable Policies That Work
Session 4	15:15–16:15	The Number Game – Putting a Number on Our Losses
Session 5	16:15–17:15	Introducing Sponsors
	17:15–17:30	Summary of the day and conclusion
DAY 3: 25 August 2022		
Tracking Clean Air Policies: Where Are We in the War Against Pollution?		
	10:00–10:30	Welcome note and keynote address
Session 1	10:30–11:45	Policy Manoeuvres–Way forward for NCAP
Session 2	12:00–13:00	Student poster competition (Final round)
Session 3	14:00–15:10	Better Data for Better Policies – Standardising Measurement Practices
Session 4	15:25–16:30	Policy Integration – Leveraging Co-benefits of Policies Addressing Air Pollution and Climate
Session 5	16:30–17:15	Introducing Sponsors
	17:15–17:30	Summary of the day and conclusion

DAY 4: 26 August 2022 Air Sensor International Conference – India Chapter		
Opening panel	09:50–10:45	Where We Are and Where We're Going with Small Low-Cost Air Quality Sensors
Session 1A	11:15–12:15 (Parallel)	Data Modelling and Analytics
Session 1B		Choosing and Evaluating a Sensor
Session 2A	12:15–13:15 (Parallel)	Data Assimilation, Sharing, and Visualisation
Session 2B		Network Design and Operations
Session 3	14:05–14:50	Performance Targets and Sensor Calibration
	14:50–15:50	Lightning Talks
Session 4	15:50–16:50	Real-World Sensor Applications: Illustrating Practical applications of Low Cost Sensors
Closing panel	16:50–17:50	How to Use Sensor Data to Drive Action

The Right to Life: Citizens at the Centre of Science and Policy

Smt T Sumathy (a) Thamizhachi Thangapandian
Poet and MP, Lok Sabha, Tamil Nadu

Shri K Sudhakar
Minister of Health and Family Welfare and Medical Education, Government of Karnataka

Mr Ricky Kej
Grammy-winning Music Composer & Environmentalist

Mr Vikram Gulati
Country Head & Sr VP (Corporate Affairs & Governance), Toyota Kirloskar Motor

Dr Jai Asundi
Executive Director, CSTEP

Dr Pratima Singh
Research Scientist, CSTEP

Ms Sandra Hall
Conference and Outreach Manager, UC Davis

Two Sides of the Same Coin: The Link Between Air Pollution and Climate Change

Opening Address:

Dr Jai Asundi
Executive Director, CSTEP

Dr Pratima Singh
Research Scientist and Lead, Centre for Air Pollution Studies, CSTEP

Guest Address:

Dr Shanth A Thimmaiah
Chairman, Karnataka State Pollution Control Board (KSPCB)

Shri Jawaid Akhtar (IAS)
Additional Chief Secretary, Forest, Ecology and Environment, Government of Karnataka

Shri Vijay Mohan Raj (IFS)
Principal Secretary, Forest, Ecology and Environment, Government of Karnataka

Energy Fix – The Role of Low Emission Technologies in Addressing Air Pollution & Climate Change

What are the sustainable approaches for adopting clean fuel technology for a holistic reduction in emissions in developing countries?

Session Chair: **Panelists:**

Ms Vinuta Gopal
Founder & CEO, ASAR

Mr Ajai Sirohi
Chief Development Officer,
Toray Industries India Pvt Ltd

Ms Ulka Kelkar
Director – Climate, WRI India

Dr K V George
Sr Principal Scientist & Head,
Air Pollution Control Division,
CSIR-NEERI

Dr Parth Sarathi Mahapatra
Technical Advisor, GIZ

Solutions for Pollution (student poster presentation)

12:15 – 13:00

Evaluation of students' posters and shortlisting five finalists

Judges:

Dr Pratima Singh
Research Scientist and Lead,
Centre for Air Pollution Studies, CSTEP

Dr Sreekanth Vakacherla
Sr Research Scientist, CSTEP

Dr Vijay Kanawade
Assistant Professor,
University of Hyderabad

Seeing Is Believing – Addressing the Time Lag of Climate Change Impact to Enable Policies That Work

Assessing the effects of air pollution on regional climate, livelihood, and survival

Session Chair: **Panelists:**

Ms Gunjan Jain
Lead, Communications
for Air Quality and Climate
Impacts, Climate Trends

Mr Chandra Bhushan
CEO, iFOREST

Dr Stijn Janssen
Program Manager, VITO

Dr Vijay Kanawade
Assistant Professor,
University of Hyderabad

Mr Polash Mukerjee
Lead, Air Quality and Climate
Resilience, NRDC India Programme

The Number Game – Putting a Number on Our Losses

Exploring the economic impact of air pollution on the society, environment, and occupational health

Session Chair: **Panelists:**

Prof Ravindra Khaiwal
Professor, Department of
Community Medicine & School
of Public Health, PGIMER

Dr Ramachandran Thiruvengadam
Assistant Professor, Department of Biochemistry,
Pondicherry Institute of Medical Sciences

Dr Basha Khan
Director-Lung Transplant,
Narayana Healthcare, Bengaluru

Dr Harshal Salve
Additional Professor, AIIMS

Dr Rahul Patil
Cardiologist, Sri Jayadeva Institute of
Cardiovascular Sciences and Research

Introducing our sponsors   16:15 – 17:15
Concluding Remarks   17:15 – 17:30

DAY 3: 25th August   10:00 – 10:30

Tracing our Steps for Cleaner Air Policies
Keynote address

Shri Srinivasulu, IFS
Member Secretary, KSPCB

Shri Tushar Giri Nath (IAS)
Chief Commissioner, BBMP

Ms Devaja Shah
Program Manager, Google

Panel Discussion   10:30 – 11:45

Policy Manoeuvres – Way forward for NCAP

Understanding ground-level challenges faced by NCAP, identifying interventions required for achieving NCAP targets, and highlighting the way forward

Session Chair: **Panelists:**

Dr Shirish Sinha
Director, Climate, CIFF, India

Prof Sachchida Nand Tripathi
Sr Professor, Department of Civil Engineering,
IIT Kanpur

Mr Jostein Nygard
Sr Environmental Specialist,
World Bank

Ms Puja Tewary
Environment Program,
Bloomberg Philanthropies

Shri Ashish Tiwari (IFS)
Secretary, Department ofEnvironment,
Forest & Climate Change,
Government of Uttar Pradesh

Mr Soumitri Das
Project Management Specialist (Environment)
and Team Lead (Pollution and Health Impacts), USAID

Session 2: Student poster competition (Final round)

12:00 – 13:00

Judges:

Dr Pratima Singh
Research Scientist and Lead,
Centre for Air Pollution Studies, CSTEP

Dr Sreekanth Vakacherla
Sr Research Scientist, CSTEP

Dr Vijay Kanawade
Assistant Professor,
University of Hyderabad

Deep Dive

14:00 – 15:10

Better Data for Better Policies – Standardising Measurement Practices

Framing a uniform measurement protocol using hybrid sensors, satellite data, mobile monitoring, etc., for informed policy decisions

Session Chair:

Speakers:

Dr Pratima Singh
Research Scientist and Lead,
Centre for Air Pollution Studies, CSTEP

Prof Sagnik Dey
Institute Chair Professor,
Centre for Atmospheric Sciences, IIT Delhi

Prof Neeraj Rastogi
Professor,
Physical Research Laboratory (PRL)

Dr Ashok Ghosh
Chairman, BSPCB

Shri Ashish Tiwari (IFS)
Secretary, Department of Environment,
Forest & Climate Change,
Government of Uttar Pradesh

Ms Akshara Kaginalkar
Senior Director (Sc G) at Centre for
Development of Advanced Computing (C-DAC)

15:25 – 16:30

Policy Integration – Leveraging Co-benefits of Policies Addressing Air Pollution and Climate

Discussing counter-intuitive policy decisions on climate and air pollution, identifying the correlation between air pollution and climate change policies, and determining sustainable approaches

Session Chair: **Panelists:**

Ms Divya Narayanan
Campaigns Director, Jhatkaa

Dr O P Agarwal
CEO, WRI India

Ms Prarthana Borah
Director-India, CDP

Dr Bhargav Krishna
Fellow, CPR

Ms Anumita Roy Chowdhury
Executive Director. CSE

- -

Session 5: Introducing our sponsors
Sponsors speak (continued from Day 2)   16:30 – 17:15
Concluding remarks   17:15 – 17:30
Speaker:

Dr Pratima Singh
Research Scientist and Lead,
Centre for Air Pollution Studies, CSTEP

AIR SENSORS INTERNATIONAL CONFERENCE
International Connection Hub

DAY 4: 26 August 2022   09:50 – 10:45

AIR SENSORS INTERNATIONAL CONFERENCE

Where we are and where we're going with small low-cost air quality sensors

Moderated by: **Panelists:**

Dr Pratima Singh
Research Scientist and Lead,
Centre for Air Pollution Studies, CSTEP

Dr Zoe Chafe
Technical Lead, Air Quality,
C40 Cities

Mr Vasu Kilaru
Scientist, US EPA

Mrs Bhavreen Kandhari
Co-Founder, Warrior Moms

- -

DAY 4: 26 August 2022   11:15 – 12:15

Session 1A: Data Modeling & Analytics

Where we are and where we're going with small low-cost air quality sensors

Moderated by: **Panelists:**

Dr Saumya Singh
Environmental Scientist,
UC Berkeley

Dr Priyanka deSouza
Assistant Professor,
University of Colorado, Denver

Mr Sean Khan
Program Manager, UNEP

Mr Zeel Patel
Researcher,
IIT Gandhinagar

Session 1B: Choosing & Evaluating a Sensor

Moderated by:

Panelists:

Mr Karthik Ganesan
Fellow and Director - Research
Coordination, CEEW

Dr Sreekanth Vakacherla
Senior Research Scientist, CSTEP

Ms Meenakshi Kushwaha
Co-founder, ILK Labs

Mr Vasudev Malyan
Researcher, IIT, Bombay

Session 2A: Data Assimilation, Sharing, & Visualization

12:15 – 13:15

Moderated by:

Panelists:

Ms Tanushree Ganguly
Program Lead, CEEW

Mr Vasu Kilaru
Scientist, US EPA

Mr Ayyan Karmakar
Co-Chief Marketing Officer, Oizom

Ms Swagata Dey
Technical Advisor & Researcher,
Environmental Defense Fund

Session 2B: Network Design & Operations

Moderated by:

Panelists:

Ms Devaja Shah
Program Manager, Google

Prof Sachchida Nand Tripathi
Sr Professor, Department of Civil Engineering,
IIT Kanpur
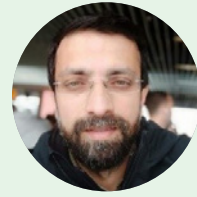
Mr Ronak Sutaria
Founder & CEO,
Respirer Living Sciences Pvt. Ltd.

Dr Saumya Singh
UC Berkeley

Session 3: Performance Targets & Sensor Calibration

14:05 – 14:50

Moderated by:

Panelists:

Ms Namita Gupta
Founder, Airveda

Dr R Subramanian
Senior Scientist, QEERI

Mr Adeel Khan
Research Analyst,
Council on Energy Environment and
Water (CEEW)

Lightning Talks

Speakers:

Dr. Afifa Aslam
Department of Environmental Sciences,
University of Jhang, Pakistan

Mr Sairam Dhandapani
Council on Energy,
Environment and Water

Dr Suverna Trivedi
University of California Berkeley,
NIT Rourkela India

Mr Mohsinkhan Pathan
SVNIT, Surat

Mrs Akanksha Priyadarshini
Phoenix Robotix Pvt. Ltd.

Mr Karm Patel
IISc Bangalore

- -

Poster Review & Lightning Talk Discussion Break

15:20 – 15:50

- -

15:50 – 16:50

Session 4: Real-World Sensor Applications: Illustrating Practical Applications of Low Cost Sensors

Moderated by: **Panelists:**

Dr Pratima Singh
Research Scientist and Lead,
Centre for Air Pollution Studies, CSTEP

Dr Naveen Puttaswamy
SRU, Chennai

Dr Damodar Bachani
Deputy Project Director, John Snow
India Private Limited, New Delhi

Ms Everlyn Gayle Tamayo
Air Quality Specialist, Clean Air Asia

Closing Panel: How to Use Sensor Data to Drive Action

16:50 – 17:50

Moderated by:

Panelists:

Dr Vignesh Prabhu
Senior Associate, CSTEP

Mr Avijit Michael
Executive Director, Jhatkaa

Mr Chetan Bhattacharji
Senior Managing Editor, NDTV.

Dr Sarita Ahlawat
Head of Living Science Group, IIT Delhi

Ms Farah Kazi
Strategic and Technical Communications
Consultant, Respirer Living Sciences

STUDENT
Posters

Title: Assessment of Ambient Air Pollutants, and Climatic Variables on Vegetative Indices Over The Last Decade in the Six Major Cities of Uttarakhand

Researcher

Hema Bhatt, *Central University of Rajasthan, Ajmer*

Title: Exploring Linkages Between Land Use Change, Peri-Urban Air Pollution and Environmental Policy- A Remote Sensing Enabled Data Analytics Driven Approach

Researcher

Ravi Bhushan, *BITS Pilani, Hyderabad*

Title: Machine Learning Based Calibration of PM2.5 Using Low-Cost Sensors via Incorporation 2 of Environmental Parameter

Researchers

Rajat Hedaoo & Gaurav Sarode, *CSIR-National Environmental Engineering Research Institute (CSIR-NEERI)*

Title: Demographic and Socio-Economic Disparities in PM2.5 Exposure in India: A Regional/State Level Analysis

Researcher

Debajit Sarkar, *Indian Institute of Technology Delhi, India*

Title: Evolution of Urban Vehicular Emissions Reduction Policies in India

Researcher

Neha Bhadauria, *Amity University, Noida*

Title: Health Benefits of Meeting Clean Air Targets in India: A Cross Sectional Study

Researcher

Ekta Chaudhary, *Centre for Atmospheric Sciences, Indian Institute of Technology, Delhi*

Title: Investigation of On-Road Size-Segregated Particulate Matter Exposure Concentration and Age-Specific Lobar Deposition in Human Airway

Researchers

Sneha M & Ramsundram N, *Department of Civil Engineering, Kumaraguru College of Technology*

Title: Simulating Impact of Traffic Air-Pollution Using Agent Based Modeling

Researcher

Vagmi Patel, *CEPT University*

Title: Application of A High-Resolution Emission Inventory Management System to Assess Linkages in Air Pollution and Climate Change over India

Researchers

Ganesh Gupta & Kushal Tibrewal, *Indian Institute of Technology, Bombay*

Title: Aerosol Simulations of General Circulation Models of CMIP6 for Air Pollution Studies in a Changing Climate

Researcher

Bharath J, *SRM Institute of Science and Technology, Kattankulathur*

Title: Connection of Black Carbon Air Pollution to The Rainfall over Chennai

Researcher

Arunima V. S, *SRM Institute of Science and Technology, Kattankulathur*

Title: Nexus of Air Pollution, Public Health, and SDGs for Indian Metropolitan Cities

Researcher

Priti K, *Academy of Scientific & Innovative Research (AcSIR)*

Title: Use of Low-Cost Sensor Network for Predicting Micro-Satellite Imagery Based PM2.5 via Machine Learning Models

Researcher

Vaishali Jain, *IIT Kanpur*

Title: Paddy Residue Burning: Linking Air Quality from Field to Space over Punjab & Haryana for Robust Mitigation Strategies

Researchers

Sanjeev Bhardwaj & Sahil Kumar, *Department of Environment Studies, Panjab University*

Title: Future of Clean Air in Perspective for Achieving Sustainable Development Goals

Researchers

Akshi Goyal & Nitasha Vig, *Department of Environment Studies, Panjab University*

CAPSStudies

Emission Inventory and Pollution Reduction Strategies for Bengaluru

CSTEP developed an emission inventory (EI) for the air-shed area (an area of 60km × 60km) of Bengaluru. Emission load for various polluting sectors was estimated based on the Central Pollution Control Board (CPCB) and United States Environmental Protection Agency (USEPA) methodology. The EI study estimated particulate matter (PM10 and PM2.5), oxides of nitrogen (NOx), and sulphur dioxide (SO2) emissions for 2019.
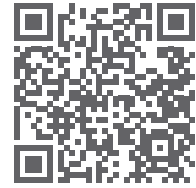
Identification of Polluting Sources for Bengaluru – Source Apportionment Study

CSTEP, under the aegis of KSPCB, conducted a source apportionment of particulate matter concentrations for Bengaluru. The study had three major components: (i) Sampling of PM2.5 and PM10 through fine particulate sampler and respirable dust sampler, respectively. The study quantified the sources of PM2.5 and PM10 at the 13 sites monitored by KSPCB in Bengaluru. (ii) Quantification of the chemical species through various analytical instruments. (iii) Source apportionment of PM2.5 and PM10 through receptor modelling using the chemical mass balance model. The quantified chemical data was then used as an input for running the receptor model to derive the sector-wise contribution to pollution.

Satellite-Based Mapping and the Quantification of PM2.5 in India

Daily mean PM2.5 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, periurban, and rural regions of Delhi-National Capital Region (NCR), Kanpur, and Bengaluru. An advanced statistical model was trained using open-access data sets (satellite, regulatory ground-based PM2.5, reanalysis meteorology) to estimate the daily mean PM2.5. Annual and seasonal maps of PM2.5 were generated, and a hotspot analysis was performed to identify spatial clusters of high PM2.5 grids within the study regions. Spatial gradients in PM2.5 were studied to understand the rural, peri-urban, and urban contrast in pollution levels.

Best Practices for Deploying and Maintaining a Low-Cost PM2.5 Sensor Network

The affordability, portability, and availability of 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.

Mobile-Monitoring Campaign for Air-Pollution Studies in Bengaluru

This report summarises the outputs of an 11-month-long mobile-monitoring project with a goal to produce 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 (making such measurement campaigns challenging), high background pollution levels, and heterogeneous sources of pollution.

Comprehensive Clean Air Action Plan for the City of Patna

The Patna Clean Air Action Plan was prepared to identify source-specific control measures (CMs), and a techno-economic assessment (TEA) on the CMs was performed. An emission inventory was also 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 PM2.5 emission level can be reduced by 69%, 48%, and 30% respectively with reference to the BAU scenario.

Comprehensive Clean Air Action Plan for Gaya

The Gaya Clean Air Action Plan was prepared to identify source-specific control measures (CMs), and a techno-economic assessment (TEA) on the CMs was performed. An emission inventory was developed to estimate the total emission load from various polluting sources of the city. The study estimated that the total PM2.5 emission load for 2018 is around 10,000 tonnes/year and is estimated to reach around 16,000 tonnes/year in 2030, under the business-as-usual (BAU) scenario. Emissions from the transportation sector were found to be the highest.

Comprehensive Clean Air Action Plan for Muzaffarpur

A clean air action plan was prepared, under which an emission inventory was developed for Muzaffarpur. The Muzaffarpur Clean Air Action Plan (MCAAP) identified source-specific Control Measures (CMs) and performed a Techno-Economic Assessment (TEA) of the CMs. 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 for 2030. Under the high emission-reduction scenario, the city would save at least 800 lives by 2030.

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How Google is Mapping for Sustainability in collaboration with local partners

Sustainability is at the core of everything we do at Google. Be it running operations on carbon free energy or helping consumers make informed choices about their purchases, we believe in applying technology to help solve environmental challenges at scale. Over the last few years we've come up with tools like Environmental Insights Explorer, that make transport emissions and Air Quality data (street level) available to city authorities for better decision making. Cities across the world have used the data to develop climate action plans and propose urban policy changes to reduce air pollution.

In India, we've supported local partners like Aurassure and CSTEP to build Air Quality maps from the ground, helping them set up low cost sensor networks in Bangalore and Bhubaneswar and providing the technology to store, process and build Air Quality prediction models. Ultimately, our goal is to be able to support policymakers in data-driven decision making, so we can collectively work towards a sustainable, healthy future. To learn more about Google's for good efforts, visit g.co/earth/outreach. For collaborations, email geoforgood-india@google.com

Oizom® is an environmental IoT company offering data-driven environmental solutions for better decision-making. With sensor-based hardware, Oizom's monitors various environmental parameters like air quality, noise, odour, radiation, weather conditions, etc. The data analytics platform derives many actionable insights for authorities, communities, and industries. At present, Oizom's monitors are present across 50 countries monitoring the air quality that affects 23 million people. Oizom® strives to play an essential role in a sustainable future through smart environmental solutions and data science.

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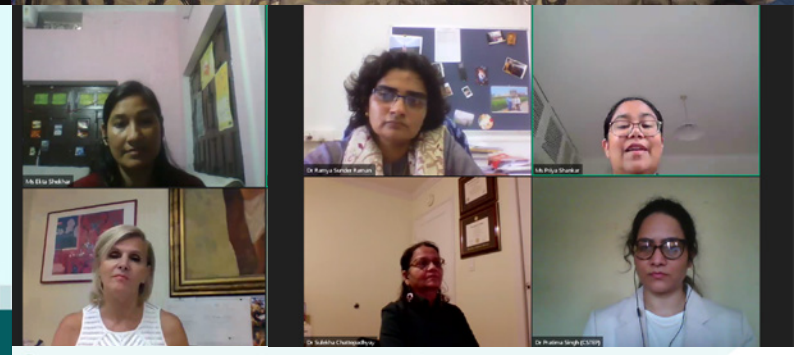AT A GLIMPSE
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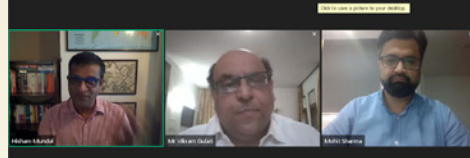### Discussion
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स्वच्छ हवा नागरिकों का मौलिक अधिकार, हर हाल में कम करना होगा प्रदूषण : सुरेश प्रभु

नई दिल्ली/पटना/संवाददाता। स्वच्छ हवा और पानी हर नागरिक का अधिकार है। लेकिन स्थिति बद से बदतर होती जा रही है। हमें वायु की खराब गुणवत्ता के मूल कारणों पर बात करनी होगी। ये कहना है पूर्व रेलमंत्री और सांसद सुरेश प्रभु का। वह सेंटर फॉर स्टडी ऑफ साइंस, टेक्नोलॉजी एंड पॉलिसी (सीएसटीईपी) में सेंटर फॉर एयर पॉल्यूशन स्टडीज (सीएपीएस) की ओर से आयोजित भारत स्वच्छ वायु शिखर सम्मेलन (आईसीएएस 2021) में बोल रहे थे। उन्होंने कहा कि, ऊर्जा के इस्तेमाल के तरीकों को बदल कर, परिवहन के तरीकों में बदलाव करके, औद्योगिक प्रदूषण को कम करके, बेहतर प्रबंधन के माध्यम से इस पर काबू पाया जा सकता है। समाधान उपलब्ध हैं, परिवर्तन संभव है, लेकिन केवल समर्पित और समन्वित प्रयासों से ही हम वायु प्रदूषण के मूल कारण को समझ सकते हैं और नागरिकों को स्वच्छ वायु प्रदान कर सकते हैं।

हमारा ध्यान वायु प्रदूषण के कारण स्वास्थ्य पर पड़ने वाले प्रभावों को दूर करने पर है। आईसीएएस के माध्यम से हम मजबूत नीतियों को तैयार करने के लिए वायु प्रदूषण पर महत्वपूर्ण मुद्दों पर चर्चा करने की उम्मीद करते हैं। वहीं दिल्ली रिसर्च इम्प्लीमेंटेशन एंड इनोवेशन की सीईओ शिल्पा मिश्रा ने कहा कि, नीति निर्माताओं के सामने वायु प्रदूषण के कारण हो रहे मौसमी बदलाव पर ध्यान देने और उसके समाधान निकालने की चुनौती है। वर्तमान नीतियों में केवल आर्थिक गतिविधि को फायदा, प्रदूषण निवेश को पर्यावरण और जलवायु कार्यक्रम, ब्लूमबर्ग की भारत निदेशक प्रिया शंकर ने कहा कि, हमारे पास बहुत सारी अच्छी नीतियां हैं। लेकिन सही प्रकार की नीतियों के साथ आने के लिए सटीक डेटा प्राप्त करने के लिए हमें कड़े नियामक तंत्र और कम लागत वाले तरीकों को लागू करने की आवश्यकता है। रिसर्च स्कॉलर डॉ ग्रेगर कीसेवेटर का कहना था कि, भारत में वर्तमान नीतियां केवल आर्थिक विकास की भरपाई करेंगी, वायु प्रदूषण के कारणों को कम नहीं करेंगी। वायु प्रदूषण के

हवा में सांस ले रहे हैं। हमें इस पर और जागरूकता की जरूरत है। एप्पेंडई के अध्यक्ष डॉ डेनियल एस ग्रीनबाम ने कहा कि हमें न केवल वायु प्रदूषण, बल्कि इसके स्वास्थ्य प्रभावों के संदर्भ में सबसे अधिक प्रभाव चले वाले स्रोतों की पहचान करने की आवश्यकता है। द जॉर्ज इंस्टीट्यूट फॉर ग्लोबल हेल्थ इंडिया के कार्यकारी निदेशक प्रो विवेकानंद झा ने कहा कि लगभग 6% वैश्विक मौतें बाहरी वायु प्रदूषण के कारण होती हैं। भारत 8-10% की सीमा में है, और बढ़ रहा है। डर यह है कि एक बार महामारी की स्थिति में सुधार होने पर, लोग अपने पुराने तरीकों पर वापस जा सकते हैं, क्योंकि आर्थिक गतिविधि इतना धीरे है, लोग वापस पटरी पर आने के लिए बेचैन हैं। जब तक हम लोगों को बेहतर विकल्प नहीं देते, तब तक चीजें बेहतर होने से वे अपने पुराने तरीकों पर वापस चले जाएंगे।नोवोडेटा कंपनी के सीनियर वाइस प्रेसिडेंट विक्रम गुलाटी ने कहा कि हमें जल्द से जल्द जीवाश्म ईंधन से हटने की जरूरत है। आज हम जो सड़कों पर निर्णय ले रहे हैं, वही तक करेगा कि अब से 15 साल क्या होगा। इसलिए हमें इस पर ध्यान देने की जरूरत है।


स्वच्छ हवा नागरिकों का मौलिक अधिकार हर हाल में कम करना होगा प्रदूषणः प्रभु

हमें वायु की खराब गुणवत्ता के मूल कारणों पर बात करनी होगी

नई दिल्ली, 27 अगस्त (नवोदय टाइम्स)। स्वच्छ हवा और पानी हर नागरिक का अधिकार है, लेकिन स्थिति बद से बदतर होती जा रही है। हमें वायु की खराब गुणवत्ता के मूल कारणों पर बात करनी होगी। समाधान उपलब्ध हैं, परिवर्तन संभव है, लेकिन केवल समर्पित प्रयासों से वायु प्रदूषण के मूल कारण को समझ सकते हैं और नागरिकों को स्वच्छ वायु प्रदान कर

सकते हैं। पूर्व रेलमंत्री और सांसद सुरेश प्रभु ने सेंटर फॉर स्टडी ऑफ साइंस, टेक्नोलॉजी एंड पॉलिसी (सीएसटीईपी) की ओर से आयोजित भारत स्वच्छ वायु शिखर सम्मेलन (आईसीएएस 2021) में यह कहते हुए, ऊर्जा, परिवहन के तरीकों में बदलाव, औद्योगिक प्रदूषण को कम कर, बेहतर प्रबंधन के माध्यम से वायु प्रदूषण पर काबू पाए जाने पर जोर दिया।

उन्होंने कहा कि स्वच्छ वायु जनता का मौलिक अधिकार है इसलिए हर

हाल में प्रदूषण कम करना होगा। इस अवसर पर विज्ञान, प्रौद्योगिकी और नीति अध्ययन केंद्र (सीएसटीईपी) के कार्यकारी निदेशक डॉ. जय असुंडी ने कहा कि हमारा ध्यान वायु प्रदूषण के कारण स्वास्थ्य पर पड़ने वाले प्रभावों को दूर करने पर है। आईसीएएस के माध्यम से हम मजबूत नीतियों को तैयार करने में मदद करने के लिए वायु प्रदूषण पर महत्वपूर्ण मुद्दों पर चर्चा करने की उम्मीद करते हैं।
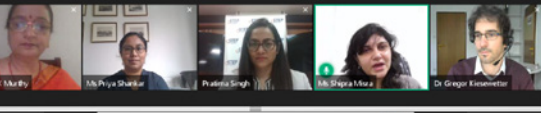
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