



Democratizing air pollution models in India: current opportunities and challenges

21-22 June, 2023 | Bengaluru, India

Background

In India alone, air pollution was responsible for about 1.7 million deaths. Air pollution annually costs India about \$36.8 billion or 1.36% of GDP, incurring not only health costs but economic damages as well. To reduce air pollution, in 2019 the Government of India launched the National Clean Air Action Programme (NCAP), a nationwide set of timebound action plans targeting cities that fail to meet Indian national ambient air quality standards.

Along with air pollution measurements and public policy, air quality models form the backbone of an effective air quality management system needed to realize the NCAP. Air quality models estimate ambient levels of pollution from various sources to fill in gaps when and where air pollution measurements do not exist. Air pollution models also allow analysis and quantification of “what if” scenarios.

Over the last decade, the number and quality of air quality modeling analyses for India have increased. These analyses have quantified major national, regional, and urban sources of air pollution along with possible control strategies. Likewise, they have identified associated scientific uncertainties in model inputs and outputs. Moreover, these analyses have highlighted the limitations in technical capacity, computational resources, and input data that make widespread adoption of air quality models difficult.

In recent years newer, more cost-effective technological advances in air pollution models, called reduced-complexity air quality models (RCM), have emerged to manage air quality. RCMs use simplified representations of atmospheric science to estimate the impact that pollution control policies will have on air quality and associated social costs. Consequently, RCMs provide alternatives, opening complex scientific models to a wider audience of citizens, policymakers, industries, and civil society at large. While by themselves less resource-intensive, these models have their limitations and uncertainties. Until now, RCM use has largely been limited to scientists and researchers. It is unclear how this technology could be used to address the interests of diverse stakeholders who are not academics, especially in low- and middle-income countries.

This one-day workshop of technical and policy experts will take stock and assess the state of air quality modeling in India. A particular emphasis of the gathering will be to understand from stakeholders how these models are used, associated challenges, and whether newer generation of RCMs currently under development can provide alternatives to conventional methods. A working paper taking stock of RCMs for use in low and middle-income countries will also be presented for discussion.

High Level Questions

- What is the current state of technical and institutional capacity to model air quality in India?
 - What types of models (mechanistic, empirical, semi-empirical, etc) are currently used?
 - Which groups or individuals have this capacity?
- How do air quality models fit into current air quality management in India?
 - What role will they play to realize the NCAP?
- What are the air quality modeling needs of non-academic stakeholders, eg. civil society, industry?
- What is the current state of RCM development in India?
 - What are their current strengths and weaknesses?
 - What learnings from global RCMs can apply to India-specific RCMs?
 - Can current RCM development incorporate diverse needs of stakeholders?
- What role, if any, could RCMs play when managing air quality in resource-constrained settings?

Aims and Outcomes

- Stock take of current air quality modeling in India, with methods, constraints, and capacity
- Recommendations on how models fit into air quality management and the NCAP framework
- Recommendations identifying the role of reduced-complexity air quality models in managing air quality
- Further engagement between RCM developers and potential RCM-users to inform model development.

21 June, 2023

7:30 PM | Informal welcome dinner

22 June, 2023

10:00 AM	Introductions and scene setting. Why this meeting?
	Welcoming Remarks
15 mins	<ul style="list-style-type: none">• Pratima Singh, CSTEP• Shayak Sengupta, ORF America• Santosh Harish, Open Philanthropy
35 mins	Introductions by participants
	The current state of air quality modeling in India
	<ul style="list-style-type: none">• What is the current state of technical and institutional capacity to model air quality in India?<ul style="list-style-type: none">○ What types of models (mechanistic, empirical, semi-empirical, etc) are currently used?○ Which groups or individuals have this capacity?
11:00 AM	
	<u>Moderator:</u> Pratima Singh, CSTEP
30 mins	Landscape of air quality modeling in India: history, developments, and ways forward
	<ul style="list-style-type: none">• Sarath Guttikunda, UrbanEmissions
25 mins	Semi-structured discussion
	Models and air quality management in India
	<ul style="list-style-type: none">• How do air quality models fit into current air quality management in India?<ul style="list-style-type: none">○ What role will they play to realize the NCAP?
12:00 PM	
	<u>Moderator:</u> Bhargav Krishna, Centre for Policy Research
15 mins	Air quality management in India: a regulator's perspective
	<ul style="list-style-type: none">• CPCB/SPCB representative (invited)
15 mins	Decision support systems and Commission for Air Quality Management
	<ul style="list-style-type: none">• Sachin Ghude, IITM
15 mins	Applying GAINS in the Indo-Gangetic Plain for air quality management
	<ul style="list-style-type: none">• Pallavi Joshi, IIT Delhi
25 mins	Semi-structured discussion
1:15 PM	Lunch

	<p>Perspectives from non-academic stakeholders</p> <ul style="list-style-type: none"> • What are the air quality modeling needs of non-academic stakeholders, e.g. civil society, intergovernmental organizations, and industry? <p><u>Moderator:</u> Aparna Roy, ORF</p>
2:15 PM	
15 mins	<p>Connecting the dots: air quality models, data, and technologies for translating science to services</p> <ul style="list-style-type: none"> • Akshara Kaginalkar, Centre for Development of Advanced Computing
15 mins	<p>Regional air quality models for decision support for different stakeholders and across political boundaries</p> <ul style="list-style-type: none"> • Arshini Saikia, International Centre for Integrated Mountain Development
25 mins	Semi-structured discussion
	<p>Reduced-complexity models (RCM) and ways forward</p> <ul style="list-style-type: none"> • What is the current state of RCM development in India? <ul style="list-style-type: none"> ○ What are their current strengths and weaknesses? ○ What learnings from global RCMs can apply to India-specific RCMs? ○ Can current RCM development incorporate diverse needs of stakeholders? • What role, if any, could RCMs when managing air quality in resource-constrained settings? <p><u>Moderator:</u> Shayak Sengupta, ORF America</p>
3:15 PM	
15 mins	<p>Introduction to RCMs and discussion paper “Reduced-complexity air quality models and their relevance for low- and middle-income countries”</p> <ul style="list-style-type: none"> • Shayak Sengupta, ORF America
15 mins	<p>EASIUR-India: An RCM derived from chemical transport modeling</p> <ul style="list-style-type: none"> • Peter Adams, Carnegie Mellon University
15 mins	<p>PAVITRA</p> <ul style="list-style-type: none"> • Srinidhi Balasubramanian, IIT Bombay
15 mins	<p>Global InMAP</p> <ul style="list-style-type: none"> • Sumil Thakrar, University of Minnesota Twin Cities
40 mins	Semi-structured discussion
	<p>Wrap Up/Concluding Remarks</p> <ul style="list-style-type: none"> • Pratima Singh, CSTEP • Shayak Sengupta, ORF America
5:00 PM	