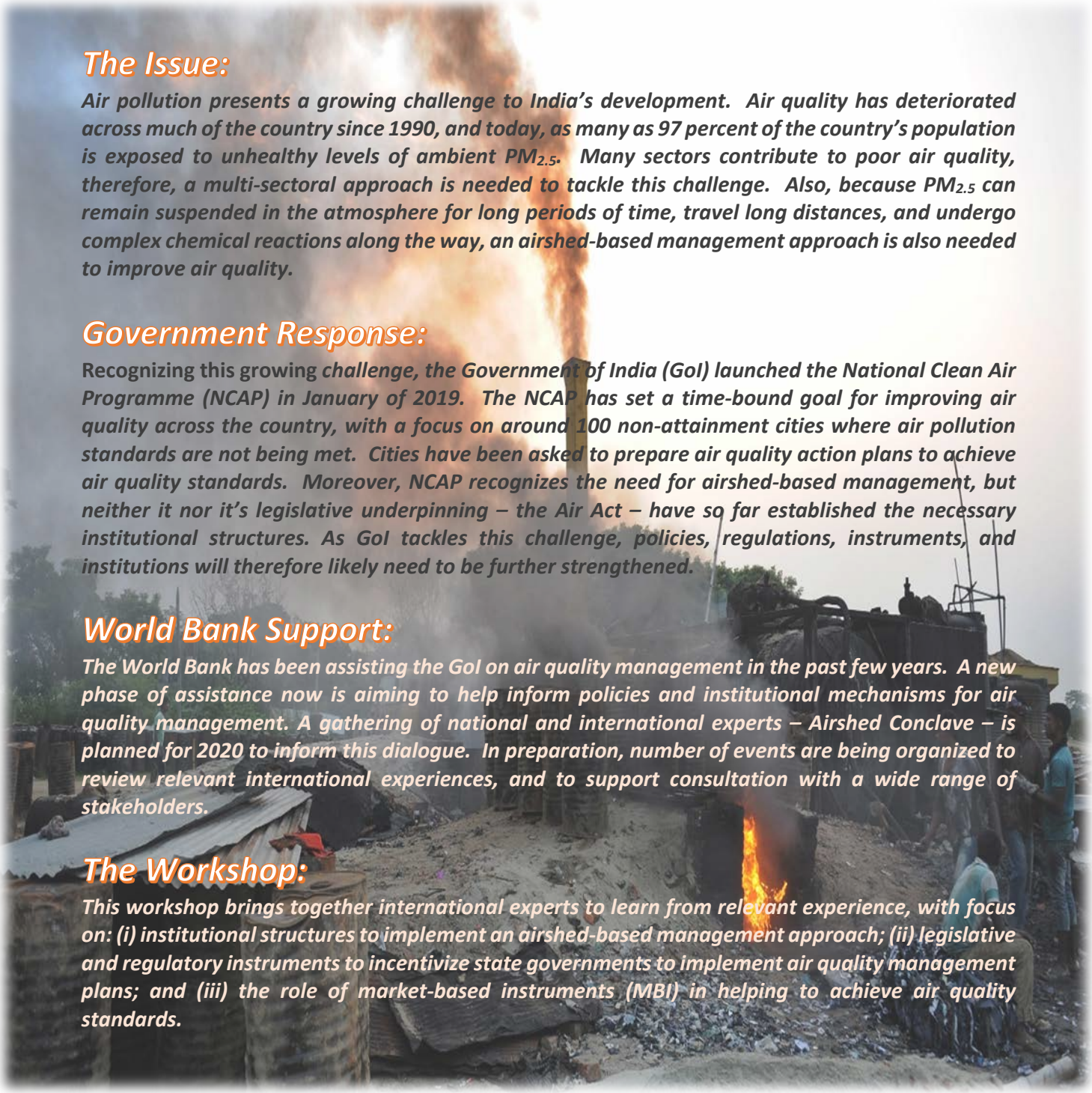
Air Quality Management in India: Learning from International Experiences

Monday, October 21, 2019

9:00am – 5:30pm, MC 10-850



The Issue:

Air pollution presents a growing challenge to India's development. Air quality has deteriorated across much of the country since 1990, and today, as many as 97 percent of the country's population is exposed to unhealthy levels of ambient $PM_{2.5}$. Many sectors contribute to poor air quality, therefore, a multi-sectoral approach is needed to tackle this challenge. Also, because $PM_{2.5}$ can remain suspended in the atmosphere for long periods of time, travel long distances, and undergo complex chemical reactions along the way, an airshed-based management approach is also needed to improve air quality.

Government Response:

Recognizing this growing *challenge, the Government of India (GoI) launched the National Clean Air Programme (NCAP) in January of 2019. The NCAP has set a time-bound goal for improving air quality across the country, with a focus on around 100 non-attainment cities where air pollution standards are not being met. Cities have been asked to prepare air quality action plans to achieve air quality standards. Moreover, NCAP recognizes the need for airshed-based management, but neither it nor it's legislative underpinning – the Air Act – have so far established the necessary institutional structures. As GoI tackles this challenge, policies, regulations, instruments, and institutions will therefore likely need to be further strengthened.*

World Bank Support:

The World Bank has been assisting the GoI on air quality management in the past few years. A new phase of assistance now is aiming to help inform policies and institutional mechanisms for air quality management. A gathering of national and international experts – Airshed Conclave – is planned for 2020 to inform this dialogue. In preparation, number of events are being organized to review relevant international experiences, and to support consultation with a wide range of stakeholders.

The Workshop:

This workshop brings together international experts to learn from relevant experience, with focus on: (i) institutional structures to implement an airshed-based management approach; (ii) legislative and regulatory instruments to incentivize state governments to implement air quality management plans; and (iii) the role of market-based instruments (MBI) in helping to achieve air quality standards.

Agenda:

8:30am	***BREAKFAST***	
9:00am	*Welcome and workshop objectives*	***Urvashi Narain*** *(Lead Economist, South Asia Region, WB)*
9:05am	*Opening remarks*	***John Roome*** *(Regional Director, Sustainable Development, South Asia Region, WB)* ***Karin Kemper*** *(Global Director, Environment, Natural Resources and Blue Economy, WB)*
9:15am	*Keynote Presentation (followed by Q&A)*	***Nidhi Khare*** *(Joint Secretary, NCAP, Ministry of Environment, Forests, and Climate Change, Government of India) – Webex connection from New Delhi*
9:45am – 10:45am	*Airshed-based Management: Lessons from across the world*	***Short presentations:*** ***Chai Fahe*** *(Deputy Director, National Joint Research Center on Air Pollution Causes and Control, China) –VC connection from Beijing* ***Alan Lloyd*** *(former Chairman, California Air Resources Board) – Webex connection from Austin* ***Marcelo Mena*** *(Advisor, Climate Change and Circular Economy, Office of the Managing Director of Operations, WB)* ***Till Spranger*** *(Senior Advisor, Regional Air Pollution Control, Federal Ministry for the Environment, Germany)*
10:45am– 11:30am		***Ajay Mathur*** *(Director General, TERI) to moderate discussion on lessons for India –VC connection from New Delhi*
11:30am	***Coffee / Tea Break***	
11:45am– 12:45pm	*Policies and regulations: global lessons in incentivizing action*	***Short presentations:*** ***Dale Evarts*** *(former Leader, Climate and International Group, Air Quality Office, US EPA)* ***Sergio Sanchez*** *(former Vice Minister of Environment, Mexico)* ***Markus Amann*** *(Program Director, Air Quality and Greenhouse Gases, IIASA)*
12:45pm– 1:30pm		***Genevieve Connors*** *(Practice Manager, Climate Change Strategy & Operations Unit, WB) to moderate discussion on lessons for India*
1:30pm	***LUNCH***	
2:15pm– 3:15pm	*Market-based Instruments: role in air quality management*	***Short presentations:*** ***Michael Greenstone*** *(Professor, University of Chicago)* ***Rohini Pande*** *(Professor, Yale University)* ***Alan Krupnick*** *(Senior Fellow, Resources for the Future)*
3:15pm– 4:00pm		***Karin Shepardson*** *(Lead Environmental Specialist, South Asia Region, WB) to moderate discussion on lessons for India*
4:00pm	***Coffee / Tea Break***	
4:15pm– 5:15pm	*NCAP and roadmap to Airshed Conclave*	***Urvashi Narain*** *(short presentation followed by discussion)*
5:15pm	*Wrap up and thanks*	*Closing remarks from* ***Magda Lovei*** *(Practice Manager, South Asia Region, World Bank)*

Speakers' Bios:

Nidhi Khare *is presently working as Joint Secretary, Ministry of Environment, Forest & Climate Change and is looking after the work relating to formulation of policy for Control of Pollution, Management of Hazardous substances, Cadre of Indian Forest Service officers*

Ms. Khare is a 1992 Batch Jharkhand Cadre officer of Indian Administrative Service (IAS). She has served in both States of Bihar and Jharkhand as District Magistrate of Madhubani, Jamshedpur and Dumka and as Municipal Commissioner of Patna. She served as Principal Secretary, Health, Family Welfare and Medical Education Department, Government of Jharkhand, Divisional Commissioner, Ranchi,Director, Disability Division, Ministry of Social Justice and Empowerment , Adviser, Planning Commission, Joint Secretary, Direct Benefits Transfer, Department of Expenditure, Ministry of Finance and Joint Secretary, Ministry of Home Affairs, Govt. of India. She is presently working as Joint Secretary, Ministry of Environment, Forest & Climate Change and is looking after the work relating to formulation of policy for Control of Pollution, Management of Hazardous substances, Cadre of Indian Forest Service officers

Chai Fahe *(Fahe Chai) is the former Vice President (2008-2018) of the leading Chinese research institution on environment – the China Research Academy of Environmental Sciences (CRAES). In his capacity at CRAES, he led the national advisory team on Air Quality Management (AQM) to the Chinese Government, including development of the AQM policies that lead to substantive progress in air quality in the expanded Jinjinji region in the North China Plain over the last 6 years as well as leading the advice on China's overall AQM policies. Prof. Chai Fahe has also led the adaptation of international AQM practices to Chinese conditions, including application of Air Quality Models and determination of Cost Effectiveness in China and is a main initiator of transforming China's AQM policies to be based on Science and Technology, which is now defined as China's official AQM policy from China's 14th Five Year Program (2021-25) and onwards.*

Following his retirement from CRAES in 2018, Prof. Chai has continued to guide China's largest AQM programs, now in the capacity as director of the Deputy Director, National Joint Research Center on Air Pollution Causes and Control, China. He continues to be a core advocate of, airshed management, and optimal technology application and cost effectiveness tools in Chinese AQM regions. He has worked as both Dean at CRAES' Institute of Atmospheric Physics and Chairman of its Center for Environmental Assessment prior to his assignment as vice president of CRAES.

Education: *Educated in Physics at Peking University*

Alan C. Lloyd *is currently a Senior Research Fellow at the Energy Institute, University of Texas at Austin. The focus of his research is the role of hydrogen in a sustainable society, fuel cells, electric drive vehicles, renewable energy and policies to promote zero emissions vehicles.*

Dr. Lloyd served as the President of the International Council on Clean Transportation from 2006 until 2013. He is one of the founding members of the ICCT. Dr. Lloyd served as the Secretary of the California Environmental Protection Agency, appointed by Governor Arnold Schwarzenegger in December 2004. Dr. Lloyd served as Chairman of the Air Resources Board, California Environmental Protection Agency, State of California, appointed by Governor Gray Davis in February 1999 and re-appointed by Governor Arnold Schwarzenegger in August 2004 before his appointment to Secretary.

Prior to joining CARB, Dr. Lloyd was the Executive Director of the Energy and Environmental Engineering Center for the Desert Research Institute at the University and Community College System of Nevada, Reno, and the chief scientist at the South Coast Air Quality Management District from 1988 to 1996.

Education: *B.S. in Chemistry and PhD in Gas Kinetics at the University College of Wales, Aberystwyth, U.K.*

Marcelo Mena Carrasco *is currently the Advisor, Climate Change and Circular Economy, Office of the Managing Director of Operations, The World Bank.*

Marcelo is a biochemical engineer, PhD environmental engineering at University of Iowa, Postdoctoral fellow at MIT Joint Program on the Science and Policy of Global Change. Former vice minister and minister of the environment, Chile. Led new air quality management plan for 14 cities including Santiago including an air quality forecasting system that contributed to reducing air quality episodes between 40 and 70%, with positive health outcomes. Designed and implemented carbon taxes for large industry and green taxes for new car sales. Along with ministers of energy, and transportation spearheaded current electromobility strategy for Chile. Received Climate and Clean Air Coalition Award in 2017, along with receiving awards from UNEP, and the National Geographic Society. Today he is an advisor on climate change to the office of the managing director of operations.

Education: *Postdoctoral Fellow, MIT Joint Policy on the Science and Policy of Global*

Till Spranger *is government director at the German Federal Ministry of the Environment, Nature Conservation and Nuclear Safety, division on air pollution control and ambient air quality. Besides national tasks, he represents Germany in the UN ECE Air Convention, is national focal point on air pollution for UN Environment, and negotiated the EU Directive on national emission reduction commitments for Germany. He was one of three nominated EU experts involved in the negotiations on the UNEA Resolution 3/8 on "preventing and reducing air pollution to improve air quality globally".*

He has worked in the framework of the UN ECE Air Convention for 25 years. Inter alia, he chaired the Task Force on Modeling and Mapping Critical Loads and Levels, served as the Convention´s vice-chair, and is now vice-chair of the Working Group on Strategies and Review, the Convention´s negotiating body. He was one of six members of the Convention´s Policy Review Group mandated by the Executive Body to draft policy conclusions from the 2016 Scientific Assessment Report and the Convention´s revised Long-term Strategy (2018). This Strategy includes policy recommendations regarding the nascent global/multi-regional governance structure on air pollution in reaction to UNEA resolution 3/8.

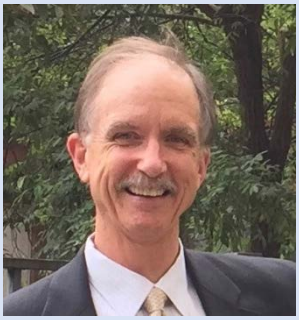
Till Spranger is a policymaker with an international focus and a strong science background, including on air pollutant emissions, transport, deposition, and effects; nitrogen management; and synergies of air pollution management inter alia with energy/climate and agriculture policies.

Education: *Ph.D. in ecosystem science from Kiel University (Germany) and a M.Sc. Environmental Science from Indiana University, Bloomington, IN (USA)*

Ajay Mathur *is Director General of TERI - The Energy & Resources Institute, and a member of the Prime Minister's Council on Climate Change.*

Mathur was Director General of the Bureau of Energy Efficiency in the Government of India from 2006 till February, 2016, and responsible for bringing energy efficiency into our homes, offices, and factories, through initiatives such as the star labelling programme for appliances, the Energy Conservation Building Code, and the Perform, Achieve and Trade programme for energy-intensive industries. Dr. Mathur was earlier with TERI from 1986 to 2000, and then headed the Climate Change Team of World Bank in Washington DC. He was President of Suzlon Energy Limited, also headed the interim Secretariat of the Green Climate Fund.

He has been a key Indian climate-change negotiator and was also the Indian spokesperson at the 2015 climate negotiations at Paris. He is a global leader on technological approaches to address climate change; recently, he joined the global group of industrial, financial and think-tank leaders to co-chair an Energy Transitions Commission which will suggest ways for companies and countries to move towards climate-friendly energy futures.



Dale Evarts *is a climate and air quality expert based in the U.S. After completing a Presidential Management Fellowship in 1988, he joined U.S. EPA's Office of Air Quality Planning and Standards (OAQPS).*

Evarts worked on a variety of programs, including the interface between air pollution and water quality, strategic planning for air quality programs, state-EPA relations, regional air quality program management, and international air quality. From 2006-2018, Dale led OAQPS's Climate, International, and Multimedia Group where he worked on the linkages between climate change and air quality, managed international air quality programs, and addressed the impacts of air pollution on water quality and ecosystems. For over two decades, Mr. Evarts led and was involved in U.S. EPA and international efforts to address transboundary air pollution and to build capacity to improve air quality and address climate pollution. These included the Minamata Convention on Mercury, the Climate and Clean Air Coalition, UNEP's Integrated Assessment on Black Carbon and Tropospheric Ozone, the Stockholm Convention on Persistent Organic Pollutants, as well as bilateral cooperation with China, Canada, Mexico, India, Ghana, Chile and South Africa. Since 2000, Mr. Evarts played a central role in a team of U.S. EPA experts working with China to understand and improve air quality and reduce climate pollutants.

Education: *Bachelor of Science and Masters of Public Affairs degrees from North Carolina State University*

Sergio Sanchez-Martínez *holds a track record of over 25 years of achievements on planning and implementation of comprehensive strategies on environmental management, pollution abatement and climate change mitigation which have had significant impacts at local, national and international scales.*

Recently, he served as México's Vice Minister for Environmental Protection being responsible for environmental management at a country scale, including atmosphere; waste and hazardous waste; forest and land; wildlife; coastal and maritime zone; environmental impact assessment and integrated environmental management systems.

Sanchez-Martinez was the Executive Director of the Clean Air Institute and worked all over Latin America on high impact, large scale interventions to improve air quality, mitigate climate change and address cross sectorial issues at different sectors. He worked with the World Bank in DC as head of the Executive Secretariat of the Clean Air Initiative for Latin American Cities (CAI-LAC). He was also instrumental in the creation (2006) of the Clean Air Institute. He was Director General of Air Quality Management within Mexico's Ministry of Environment. He implemented nationwide air quality strategies, as well as the Mandatory Pollutant Release and Transfer Registry. He served as Co-chair of the Mexico-US Air Policy Forum and represented Mexico at the Montreal Protocol. He worked as a consultant to the World Bank, PAHO, North American Commission for Environmental Cooperation and GTZ, and he was Mexico's coordinator of the Massachusetts Institute of Technology 's Program on Local, Regional and Global Air Pollution. In the 90's, he played a leading role for preparing and implementing the Mexico City's Comprehensive Air Quality Management plans that has resulted in substantial, permanent air pollution reductions. From 1994 to 1998, he served as Mexico City's Director General of Environmental Projects.

Education: *Environmental Engineer graduate, Universidad Autónoma Metropolitana, Mexico, Graduate of the LEAD Program for International Environment and Development, Colegio de México (1995-1998) -- for which he was awarded with a fellowship from the Rockefeller Foundation.*

Markus Amann *is Program Director of the Air Quality and Greenhouse Gases (AIR) Program and co-leader of IIASA's Greenhouse Gas Initiative. He also serves as the head of the Centre for Integrated Assessment Modelling (CIAM) of the European Monitoring and Evaluation Programme (EMEP) under the Convention on Long Range Transboundary Air Pollution (CLRTAP).*

Amman has been appointed as a member of the Clean Air Commission of the Austrian Academy of Sciences. He is a member of the Editorial Board of "Environmental Modelling and Software" and lead author for the Working Group III report of the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC).

Dr Amann was a member of the Environmental Assessment Group of EUROTRAC-II, member of the Management Committee of Topic Centre for Air and Climate Change of the European Environment Agency (EEA), member of the Scientific Oversight Committee of the APHENA "Air Pollution and Health, A European and North American Approach" project of the Health Effects Institute (HEI, Boston, USA), reviewer for the AFO2000 German Atmospheric Research program and reviewer for the United States Acid Deposition Research Program NAPAP. He first joined IIASA in 1984 – worked on the Energy Systems Program; IIASA's Acid Rain Project to model emissions and control costs for SO2 and NOX; led IIASA's Transboundary Air Pollution Program. Under Dr. Amman's leadership, the RAINS integrated assessment model for air pollution has been developed and implemented for Europe and Southeast Asia.

Education: *PhD in Economics from the University of Karlsruhe, Germany; Electrical Engineering, Technical University, Vienna School of Economics; BA/MA in Philosophy, Politics and Economics from Oxford University; and a BA in Economics from Delhi University.*

Michael Greenstone *is the Milton Friedman Distinguished Service Professor in Economics, the College, and the Harris School, as well as the Director of the Becker Friedman Institute, the interdisciplinary Energy Policy Institute at the University of Chicago, and the Tata Centre for Development at the University of Chicago.*

He previously served as the Chief Economist for President Obama's Council of Economic Advisers, where he co-led the development of the United States Government's social cost of carbon. Greenstone also directed The Hamilton Project, which studies policies to promote economic growth, and has since joined its Advisory Council. He is an elected member of the American Academy of Arts and Sciences, a fellow of the Econometric Society, and a former editor of the Journal of Political Economy. Before coming to the University of Chicago, Greenstone was the 3M Professor of Environmental Economics at MIT.

Greenstone's research, which has influenced policy globally, is largely focused on uncovering the benefits and costs of environmental quality and society's energy choices. His current work is particularly focused on testing innovative ways to increase energy access and improve the efficiency of environmental regulations globally. As a co-director of the Climate Impact Lab, he is producing empirically grounded estimates of the local and global impacts of climate change. He also created the Air Quality Life Index™ that provides a measure of the gain in life expectancy communities would experience if their particulates air pollution concentrations are brought into compliance with global or national standards.

Education: *PhD in economics from Princeton University; BA in economics with High Honors from Swarthmore College.*

Rohini Pande *is the Henry J. Heinz II Professor of Economics and Director of the Economic Growth Center, Yale University. She is a co-editor of American Economic Review: Insights.*

Pande's research is largely focused on how formal and informal institutions shape power relationships and patterns of economic and political advantage in society, particularly in developing countries. She is interested the role of public policy in providing the poor and disadvantaged political and economic power, and how notions of economic justice and human rights can help justify and enable such change. Her most recent work focuses on testing innovative ways to make the state more accountable to its citizens, such as strengthening women's economic and political opportunities, ensuring that environmental regulations reduce harmful emissions, and providing citizens effective means to voice their demand for state services.

In 2018, Pande received the Carolyn Bell Shaw Award from the American Economic Association for promoting the success of women in the economics profession. She is the co-chair of the Political Economy and Government Group at Jameel Poverty Action Lab (J-PAL), a Board member of Bureau of Research on Economic Development (BREAD) and a former co-editor of The Review of Economics and Statistics. Before coming to Yale, Pande was the Rafik Harriri Professor of International Political Economy at Harvard Kennedy School, where she co-founded Evidence for Policy Design.

Education: *PhD in economics from London School of Economics; BA/MA in Philosophy, Politics and Economics from Oxford University; and a BA in Economics from Delhi University.*

Alan Krupnick *is a Senior Fellow at Resources for the Future. His research focuses on analyzing environmental and energy issues, in particular the benefits, costs and design of pollution and energy policies, both in the United States and abroad. He leads RFF's research on the risks, regulation and economics associated with shale gas development and has developed a portfolio of research on issues surrounding this newly plentiful fuel.*

Krupnick also served as senior economist on the President's Council of Economic Advisers, advising the Clinton administration on environmental and natural resource policy issues. In 2011 he was elected President of the Association of Environmental and Resource Economists and earlier that year was named an AERE Fellow. He has served on the Editorial Boards of a number of journals. He co-chaired a federal advisory committee counseling the U.S. Environmental Protection Agency on the implementation of new ozone and particulate standards. He is a regular member of expert committees from the National Academy of Sciences, the USEPA and various Canadian government and non-governmental institutions. Krupnick also consults with state governments, federal agencies, private corporations, the Canadian government, the European Union, the Asian Development Bank, the World Health Organization, and the World Bank.

Education: *PhD in Economics, University of Maryland, 1980; BS in Finance, the Pennsylvania State University, 1969.*