

Progress, Challenges, and Opportunities for Sustainability Science: A Workshop

Committee

William C. Clark

Co-Chair

WILLIAM C. CLARK (NAS) is the Harvey Brooks Professor of International Science, Public Policy and Human Development at Harvard University's John F. Kennedy School of Government. Trained as an ecologist, his research focuses on sustainability science: understanding the interactions of nature and society with a view toward advancing the goals of sustainable development. He is particularly interested in how institutional arrangements affect the linkage between knowledge and action in the sustainability arena. At Harvard University, he serves as Area Chair for the program in International and Global Affairs and co-directs the Sustainability Science Program. He is co-author of *Sustainability Science: Toward a synthesis* (ARER, 2020), *Pursuing sustainability: A guide to the science and practice* (Princeton, 2016), *Adaptive environmental assessment and management* (Wiley, 1978), and *Redesigning rural development* (Hopkins, 1982); editor of the *Carbon dioxide review* (Oxford, 1982); coeditor of *Sustainable development of the biosphere* (Cambridge, 1986), *The earth transformed by human action* (Cambridge, 1990), *Learning to manage global environmental risks* (MIT, 2001), *Global Environmental Assessments* (MIT, 2006) and *The global health system: Institutions in a time of transition* (Harvard, 2010); and co-chair of the U.S. National Research Council's study *Our Common Journey: A Transition Toward Sustainability* (National Academies Press, 1999). He serves on the editorial board of the *Proceedings of the National Academy of Science*. Dr. Clark is a member of the National Academy of Sciences and a Fellow of the American Association for the Advancement of Science. He is a recipient of the MacArthur Prize, the Humboldt Prize, the Kennedy School's Carballo Award for excellence in teaching, and the Harvard College Phi Beta Kappa Prize for Excellence in Teaching. Dr. Clark received his Ph.D. in Ecology from University of British Columbia and his B.S. from Yale University.

Pamela A. Matson

Co-Chair

PAMELA MATSON (NAS) is the Richard and Rhoda Goldman Professor of Environmental Studies, Director of the Change Leadership for Sustainability, and Senior Fellow at the Woods Institute for the Environment at Stanford University. Dr. Matson served as dean of Stanford University's School of Earth, Energy and Environmental Sciences from 2002-2017, building interdisciplinary departments and educational programs focused on resources, environment and sustainability, as well as co-leading university-wide interdisciplinary initiatives. Her research addresses a range of environment and sustainability issues, including sustainability of agricultural systems, vulnerability and resilience of particular people and places to climate change, and characteristics of science that can contribute to sustainability transitions at scale. Dr. Matson serves as chair of the board of the World Wildlife Fund-US and as a board member of the World Wildlife Fund-International and several university advisory boards. She is a past President of the Ecological Society of America. Her recent publications (among around 200) include *Seeds of Sustainability: Lessons from the Birthplace of the Green Revolution in Agriculture* (2012) and *Pursuing Sustainability: A Guide to the Science and Practice* (2016). Dr. Matson is an elected member of the National Academy of Science and the American Academy of Arts and Sciences, and is an American Association for the Advancement of Science Fellow. She received a MacArthur Foundation Award, contributed to the award of the Nobel Prize to the Intergovernmental Panel on Climate Change, among other awards and recognitions, and is an Einstein Fellow of the Chinese Academy of Sciences. Dr. Matson holds a Bachelor of Science degree with double majors in Biology and Literature from the University of Wisconsin (Eau Claire), a Master degree in Environmental Science and Policy from Indiana University's School of Public and Environmental Affairs, a Doctorate in Forest Ecology from Oregon State University, and honorary doctorates from Princeton, McGill and Arizona State Universities.

Arun Agrawal

Member

ARUN AGRAWAL (NAS) is a Samuel Trask Dana Professor at the School of Natural Resources and Environment at the University of Michigan. His research and teaching emphasize the politics of international development, institutional change, and environmental conservation. He has written critically on indigenous knowledge, community-based conservation, common property, population and resources, and environmental identities. Dr. Agrawal is the coordinator for the International Forestry Resources and Institutions network and is currently carrying out research in central and east Africa as well as in South Asia. Since 2013, Dr. Agrawal has served as the editor-in-chief of *World Development*, and his recent work has appeared in *Science*, *Proceedings of the National Academy of Sciences of the United States of America*, *Conservation Biology*, and *Development and Change*, among other journals. Preceding his work at the University of Michigan, Dr. Agrawal held teaching and research positions at Yale University; University of Florida; McGill University; University of California, Berkeley; and Harvard University, among others. Dr. Agrawal received his Ph.D. in political science (1992) from Duke University.

Partha Sarathi Dasgupta

Member

PARTHA SARATHI DASGUPTA (NAS) is the Frank Ramsey Professor Emeritus of Economics at the University of Cambridge, United Kingdom; Fellow of St John's College, Cambridge, and Visiting Professor at the New College of the Humanities, London. Dr. Dasgupta made seminal contributions to many fields in economics. He gave an ethical voice to economics through his espousal of social well-being and the effects of economic policies on the poor. Dr. Dasgupta's analyses are widely used to forge optimal policies for extracting exhaustible resources, and also underlie economic development planning. He also brought new ideas to the understanding of optimal population growth, and how competition fosters technological innovation. His memberships include: fellow of the British Academy and the Royal Society; member of the Pontifical Academy of Social Sciences and the American Philosophical Society and Royal Swedish Academy of Science; honorary fellow of the London School of Economics and Trinity College, Cambridge; honorary member of the American Academy of Arts and Sciences; and international member of the U.S. National Academy of Sciences. His honours include: Volvo Environment Prize (2002), John Kenneth Galbraith Prize of the American Agricultural Economics Association (2007), Zayed International Prize for the Environment (2011), Blue Planet Prize (2015), and Tyler Prize (2016). Dr. Dasgupta obtained a Ph.D. in Economics at Cambridge. He was made Knight Bachelor in 2002, and was awarded an Honorary Doctorate by, among other universities, University of Bologna in 2012 and Harvard University in 2013.

Ruth S. DeFries

Member

RUTH DEFRIES (NAS) is a professor of ecology and sustainable development at Columbia University in New York. She uses images from satellites and field surveys to examine how the world's demands for food and other resources are changing land use throughout the tropics. Her research quantifies how these land use changes affect climate, biodiversity and other ecosystem services, as well as human development. She has also developed innovative education programs in sustainable development. Dr. DeFries was elected as a member of the U.S. National Academy of Sciences, received a MacArthur "genius" award, and is the recipient of many other honors for her scientific research. In addition to over 100 scientific papers, she is committed to communicating the nuances and complexities of sustainable development to popular audiences through her books *The Big Ratchet: How Humanity Thrives in the Face of Natural Crisis* and *What Would Nature Do?: A Guide for Our Complex World*. Dr. DeFries is committed to linking science with policy, for example through her involvement with the Environmental Defense Fund, Science for Nature and People, World Wildlife Fund, and reconciling conservation and development in central India. Dr. DeFries received her Ph.D. from the Department of Geography and Environmental Engineering at Johns Hopkins University. She currently serves on the NAS council.

Carl Folke

Member

CARL FOLKE (NAS) is Professor and Director of the Beijer Institute of Ecological Economics of the Royal Swedish Academy of Sciences, and founder and Chair of the Board of the Stockholm Resilience Centre at Stockholm University. Dr. Folke is a systems thinker in integrative science for sustainability, recognized for his research on social-ecological systems and resilience thinking. Since the mid-1980s he has broken new ground in understanding the dynamic interplay of humans and nature, of economy and ecology, from management and stewardship of ecosystem services in the seas and on the land to global sustainability. Dr. Folke has contributed in fostering a new generation of sustainability science researchers internationally and in Sweden, built internationally leading research centres and institutes, and worked with scholars across the natural and social sciences and the humanities. He is genuinely engaged in the arts-science interface. Dr. Folke has produced some three-hundred publications and is recognized as highly cited researcher. He has received the Gunnerus Award in Sustainability Science (2017), the International Geographical Union's Planet and Humanity Medal (2016), the Sustainability Science Award of the Ecological Society of America (2004), and the Pew Scholar Award in Conservation and the Environment (1995). He is member of the Royal Swedish Academy of Sciences (2002) and the U.S. National Academy of Sciences (2017). Dr. Folke received his Ph.D. in Ecological Economics/Natural Resource Management from Stockholm University and became full professor of natural resource management at Stockholm University in 1996.

Robert O. Keohane

Member

ROBERT KEOHANE (NAS) is Professor of International Affairs at Princeton University. He is the author of *After Hegemony: Cooperation and Discord in the World Political Economy* (1984) and *Power and Governance in a Partially Globalized World* (2002). He is co-author (with Joseph S. Nye, Jr.) of *Power and Interdependence* (third edition 2001), and (with Gary King and Sidney Verba) of *Designing Social Inquiry* (1994). He has served as the editor of the journal *International Organization* and as president of the International Studies Association and the American Political Science Association. Dr. Keohane won the Grawemeyer Award for Ideas Improving World Order, 1989, and the Johan Skytte Prize in Political Science, 2005. He is a member of the American Academy of Arts and Sciences, the American Philosophical Society, and the National Academy of Sciences. He has received honorary degrees from the University of Aarhus, Denmark, and Science Po in Paris, and is the Harold Lasswell Fellow (2007-08) of the American Academy of Political and Social Science. His recent work has involved political analyses of 'post-Kyoto' climate change architecture. Dr. Keohane earned his B.A. from Shimer College in 1961 and a Ph.D. from Harvard University in 1966.

Diana M. Liverman

Member

DIANA LIVERMAN (NAS) is a Regents Professor and the Director of the School of Geography and Development at the University of Arizona. Dr. Liverman's current research focuses on the connections between climate and development, especially the synergies and trade offs between the responses to climate change, poverty alleviation and sustainable development goals. This builds on her long-term interests in understanding how people become vulnerable to climatic changes, especially in agricultural and food systems, and how climate adaptation, including climate services, can help them cope. She has also studied aspects of environmental governance, including the effectiveness of carbon offsets and the impacts of trade agreements on the U.S.-Mexico border. She uses multiple methods in her research including computer modeling, interviews, social surveys and data analysis. Dr. Liverman was a lead author for the Intergovernmental Panel on Climate Change Special Report on 1.5°C and is part of interdisciplinary teams that have published on planetary boundaries and pathways to a sustainable future. She was awarded the Founders Gold Medal of the Royal Geographical Society and the Association of American Geographers Distinguished Service Honors and Presidential Achievement Award for her contributions and leadership in understanding the human dimensions of global change. Dr. Liverman holds a B.A. from University College London, a M.Sc from the University of Toronto, and a Ph.D. from University of California, Los Angeles. She was elected to the NAS in 2020.

Stephen Polasky

Member

STEPHEN POLASKY (NAS) is the Regents Professor and Fesler-Lampert Professor of Ecological and Environmental Economics at the University of Minnesota, St. Paul. His research focuses on issues at the intersection of ecology and economics and includes the impacts of land use and land management on the provision and value of ecosystem services and natural capital, biodiversity conservation, sustainability, environmental regulation, renewable energy, and common property resources. Dr. Polasky is a member of the National Academy of Sciences, and he is also a fellow of the American Academy of Arts and Sciences, the American Association for the Advancement of Science, and the Association of Environmental and Resource Economists. He has a B.A. degree from Williams College and a Ph.D. degree in Economics from the University of Michigan.