NATIONAL ACADEMIES Sciences Engineering Medicine

China-U.S. Scientific Engagement on Sustainability: A Workshop Series
Workshop III: Food Systems and Sustainability

November 21-22, 2024
All times are Central European Time

In Person
Budapest, Hungary

Virtual
The public is invited to register to join virtually.

AGENDA

Workshop Objectives:

- Promote scientific coordination, cooperation, and collaboration between China and the United States on food systems and sustainability;
- Examine the state of food systems and sustainability research and practices and identify priority areas for scientific collaboration on specific sustainability challenges; and
- Discuss opportunities for advancing policy actions to promote food systems and sustainability in China and the United States, including a solution-focused approach.

Thursday, November 21, 2024

9:00 am **Welcome from the National Academy of Sciences**
Marcia McNutt (NAS), U.S. National Academy of Sciences

9:05 am **Welcome from the Chinese Academy of Sciences**
Jianguo Hou (CAS), Chinese Academy of Sciences

9:10 am **Introductions and Goals of the Workshop Series**
Karen Seto (NAS), Yale University, U.S. Committee Chair
Yongguan Zhu (CAS), Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences, China Committee Chair

9:20 am **Framing Remarks: The State of Food Systems and Sustainability**

- **Jennifer Chow**, Senior Director, Climate-Resilient Food Systems, Environmental Defense Fund
- **Weicai Yang (CAS)**, Chief Scientist, Yazhouwan National Laboratory

10:05 am **Q&A and Discussion**
All Participants

10:30 am BREAK

10:50 am **Panel I: Food Systems, Climate Change, and Biodiversity**

Moderators:

- **Jianguo "Jack" Liu**, Michigan State University
- **Yi Yang**, Chongqing University

Panelists:

- **Roger Beachy (NAS)**, Professor Emeritus of Biology, Washington University in St. Louis
- **Le Kang (NAS/CAS)**, Distinguished Professor, Beijing Institutes of Life Science, Chinese Academy of Sciences
- **Chunwu Zhu**, Professor of Global Climate Change and Food Security, Institute of Soil Science, Chinese Academy of Sciences
- **Heidi Gibson**, Manager of Global Sustainability Series, Smithsonian Science Education Center

12:00 pm **Q&A and Discussion**
All Participants

12:30 pm LUNCH

1:30 pm **Panel II: Food Systems, Water, and Health**

Moderators:

- **Judith Wasserheit (NAM)**, University of Washington
- **Yue Qin**, Peking University

Panelists:

- **Daniel Raiten**, Senior Nutrition Scientist, Office of Nutrition Research, National Institutes of Health
- **Jessica Fanzo (NAS)**, Professor of Climate and Director of the Food for Humanity Initiative, Columbia University
- **Xiaoyuan Yan**, Professor, Institute of Soil Science, Chinese Academy of Sciences
- **Junguo Liu**, Professor and President, North China University of Water Resources and Electric Power

2:40 pm **Q&A and Discussion**
All Participants

3:10 pm BREAK

3:30 pm **Summary Discussion: Future Needs and Opportunities**
Karen Seto (NAS) and **Yongguan Zhu (CAS)** with All Participants

4:00 pm **Adjourn**

Friday, November 22, 2024

9:00 am **Welcome and Re-Cap from Previous Day**
Karen Seto (NAS), Yale University, U.S. Committee Chair
Yongguan Zhu (CAS), Chinese Academy of Sciences, China Committee Chair

9:10 am **Panel III: Food Systems, Urban Transformation, and Food Loss and Waste**

Moderators:
- **Karen Seto (NAS)**, Yale University
- **Weiqiang Chen**, Institute of Urban Environment, Chinese Academy of Sciences

Panelists:
- **Prabhu Pingali (NAS)**, Professor, Charles H. Dyson School of Applied Economics and Management, Cornell University
- **Thomas Reardon**, University Distinguished Professor, Michigan State University
- **Shenghui Cui**, Professor of Urban Environmental Planning and Management, Institute of Urban Environment, Chinese Academy of Sciences
- **Baojing Gu**, Professor of Sustainability, Zhejiang University

10:20 am **Q&A and Discussion**
All Participants

10:50 am BREAK

11:10 am **Panel IV: Food Systems, Behavioral Science, and Technological Innovation**

Moderators:
- **Nebojsa Nakicenovic**, International Institute for Applied Systems Analysis
- **Beibei Liu**, Nanjing University

Panelists:
- **David Zilberman (NAS)**, Robinson Chair, Agricultural and Resource Economics Department, University of California, Berkeley
- **Haiyan Chu**, Professor, Institute of Soil Science, Chinese Academy of Sciences
- **Ranveer Chandra**, Chief Technology Officer, Agri-Food and General Manager, M365 Copilot, Microsoft Corporation
- **Yuhong Cao**, Scientist and Principal Investigator, National Center for Nanoscience and Technology

12:20 pm **Q&A and Discussion**
All Participants

12:50 pm LUNCH

1:45 pm **A Path Forward: Future Needs and Opportunities**
Karen Seto (NAS) and **Yongguan Zhu (CAS)** with All Participants

2:30 pm **Summary Remarks**
Karen Seto (NAS), Yale University, U.S. Committee Chair
Yongguan Zhu (CAS), Chinese Academy of Sciences, China Committee Chair

2:45 pm **Workshop Conclusion**

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Workshop III: Food Systems and Sustainability

Biographies of Speakers and Moderators

Welcome from the National Academy of Sciences

MARCIA MCNUTT (NAS) is a geophysicist and the 22nd president of the National Academy of Sciences. From 2013 to 2016, she was the Editor-in-Chief of Science journals. Dr. McNutt was the Director of the U.S. Geological Survey (USGS) from 2009 to 2013, during which time USGS responded to a number of major disasters, including the Deepwater Horizon oil spill. For her work to help contain that spill, Dr. McNutt was awarded the U.S. Coast Guard's Meritorious Service Medal. She is a Fellow of the American Geophysical Union (AGU), the Geological Society of America, the American Association for the Advancement of Science, and the International Association of Geodesy. Dr. McNutt is a member of the U.S. National Academy of Engineering, the American Philosophical Society, and the American Academy of Arts & Sciences and a Foreign Member of the United Kingdom Royal Society, the Russian Academy of Sciences, and the Chinese Academy of Sciences. In 1998, Dr. McNutt was awarded AGU's Macelwane Medal for research accomplishments by a young scientist. She received the Maurice Ewing Medal in 2007 for her contributions to deep-sea exploration. Dr. McNutt received a B.A. in physics from Colorado College and a Ph.D. in Earth sciences from the Scripps Institution of Oceanography.

Welcome from the Chinese Academy of Sciences

JIANGUO HOU (CAS) is President and Executive President of the Presidium of Academic Divisions of the Chinese Academy of Sciences (CAS). A prominent physical chemist and nanomaterial expert, Dr. Hou has made significant contributions in synthesis and characterization of nanomaterial and nanostructures, physical and chemical properties of single molecules and their assemblies, and scanning tunnel microscopy. He studied physics at the University of Science and Technology of China (USTC) from 1978, completing his Bachelor degree in 1983 and then received his M.Sc. and Ph.D. degrees in 1986 and 1989, respectively. From 2008 to 2015, Dr. Hou held the position as President of USTC until he became Vice Minister of the Ministry of Science and Technology of China (MOST). Afterwards, he worked successively in Guangxi Zhuang Autonomous Region and General Administration of Quality Supervision, Inspection and Quarantine from 2016 to 2017. In 2018 He was appointed as Vice President (full ministerial level) of CAS. He was elected CAS Member in 2003 and Fellow of the World Academy of Sciences for the advancement of science in developing countries (TWAS) in 2004. He is also Fellow of the Royal Society of Chemistry of United Kingdom. Dr. Hou holds a series of awards and honors, among which the most prestigious are the National Natural Science Award (second-class) of China, the Holeung Ho Lee Advancement Prize, the TAN KAH KEE Science Award (Chemistry), and the Distinguished Award of CAS.

Introductions and Goals of the Workshop Series

KAREN SETO (NAS) (U.S. Committee Chair) is the Frederick C. Hixon Professor of Geography and Urbanization Science at Yale University. An urban and land change scientist, she is one of the world's leading experts on contemporary urbanization and global change. She uses satellite remote sensing, field interviews, and modeling methods to understand how urbanization will affect the planet, including land

change, food systems, biodiversity, and climate change. She has pioneered methods to reconstruct urban land use with satellite imagery and has developed novel methods to forecast urban expansion. She has conducted urbanization research in China for twenty years and in India for more than ten. She has extensive fieldwork experience in Asia, especially China and India, where she has conducted research for over 20 and 10 years, respectively. Dr. Seto has served on numerous national and international scientific bodies. She was a coordinating lead author for the 2022 IPCC 6th Assessment Report and the 2014 IPCC 5th Assessment Report. She is a former co-editor-in-chief of the journal, *Global Environmental Change*. From 2000 to 2008, she was faculty at Stanford, where she held joint appointments in the Woods Institute for the Environment and the School of Earth Sciences. She has received many awards for her scientific contributions, including the Outstanding Contributions to Remote Sensing Research Award from the American Association of Geographers. Dr. Seto is an elected member of the U.S. National Academy of Sciences, the Connecticut Academy of Science and Engineering, the American Academy of Arts and Sciences, and the American Association for the Advancement of Science. She received a Ph.D. in Geography from Boston University.

YONGGUAN (YONG-GUAN) ZHU (CAS) (China Committee Chair), Academician of the Chinese Academy of Sciences (CAS), Fellow of *TWAS* (The World Academy of Sciences), Fellow of International Science Council (*ISC*), professor of environmental science and health, is the Director General of the Research Center for Eco-environmental Sciences, CAS. He has been working on environmental health and wellbeing related to pollution, soil biodiversity and microbial ecology. He obtained his PhD from Imperial College, London in 1998. He was a scientific committee member for ISC program on Human Health and Wellbeing in Changing Urban Environment, and is a member of the Committee of Science Planning of ISC. He served for nine years as a member of Standing Advisory Group for Nuclear Application, International Atomic Energy Agency (2004-2012). He has received many merit awards, including TWAS Award for Agricultural Science 2013, National Natural Science Award 2009 & 2023, International Union of Soil Science *von Liebig* Award 2022. He publishes widely in international journals with an *H*-index of 126 (Web of Science), and has been selected as a Web of Science *Highly Cited Researcher* (2016-2024).

Framing Remarks: The State of Food Systems and Sustainability

JENNIFER CHOW is the senior director for climate-resilient food systems at the Environmental Defense Fund (EDF), where she brings nearly two decades of experience in the global food security, public health and international development field. She is focused on improving the environmental and economic sustainability of global food systems, both by shifting global processes and working in partnership with marginalized communities in developing countries. Immediately prior to EDF, she was the director for global engagement and strategy in the United States Agency for International Development (USAID)'s Bureau for Resilience and Food Security, where she helped construct public-private-civil society partnerships for food security and nutrition policies and investments, with a focus on Africa. She negotiated global UN policy documents, led U.S. government interagency processes, helped create USAID's first multi-sectoral nutrition strategy, and worked with the global development community to address the longer-term social and economic impacts of the COVID19 pandemic. Ms. Chow teaches Food Security and Development at the Sanford School of Public Policy. She earned an MPH in Global Health Policy from the George Washington University and a bachelor's degree in political science and environmental studies from the University of California, San Diego.

WEICAI YANG (CAS) is a professor and chief scientist at Yazhouwan National Laboratory. He obtained his Ph.D. in 1994 from Wageningen University, the Netherlands. From 1994–2000, he did postdoctoral research in Wageningen University; Cold Spring Harbor Laboratory, USA; and the Institute of Molecular Agrobiology, Singapore. In 2000, he joined the Temasek Life Sciences Laboratory in Singapore as senior

scientist. Since 2003, Dr. Yang has been a principal investigator at IGDB-CAS. His research focuses on molecular mechanisms governing plant development and molecular mechanisms of nitrogen-fixing rhizobium symbioses. Dr. Yang has obtained a series of outstanding achievements in the field of plant development and has published nearly 100 papers in top international journals, including *Nature* and *Science*. He is an academic leader in the field of plant developmental biology in China and has important international academic influence. Dr. Yang received many academic awards and honors.

Panel I: Food Systems, Climate Change, and Biodiversity

JIANGUO "JACK" LIU (U.S. Committee Member and Moderator) holds the Rachel Carson Chair in Sustainability, is University Distinguished Professor at Michigan State University and serves as director of the Center for Systems Integration and Sustainability. A human-environment scientist and sustainability scholar, Dr. Liu takes a holistic approach to addressing complex human-environmental challenges through systems integration, such as the integration of ecology with social sciences, policy and advanced technologies. He is particularly keen to connect seemingly unconnected issues, for example, telecoupling (human-nature interactions over distances). Dr. Liu has served on numerous international and national panels and committees, and editorial boards of international journals such as *Science*. He has also chaired or served on a number of committees of the National Academies of Sciences, Engineering, and Medicine. Dr. Liu was a coordinating lead author of the report on global assessment of biodiversity and ecosystem services, which was adopted by 132 countries in 2019 and used for developing new conservation policies and practices. He has received many awards and honors, such as the World Sustainability Award, Gunnerus Award in Sustainability Science, and Guggenheim Fellowship. He is a member of the American Philosophical Society, American Academy of Arts and Sciences, and Royal Norwegian Society of Sciences and Letters.

YI YANG (Moderator) is a professor in the Department of Environmental and Ecological Engineering at Chongqing University. He received his B.S. from Sichuan University in China and Ph.D. from the University of California at Santa Barbara, and did postdoctoral work at the University of Minnesota and Dartmouth College. Dr. Yang was trained in Industrial Ecology with a focus on life cycle assessment and input-output modeling. His current research spans a wide range of areas including climate change mitigation and adaptation, environmental assessment of emerging technologies, and sustainable agri-food systems. He is particularly interested in understanding the challenges of climate change to agri-food systems and how we can induce dietary change at scale toward better health and environmental outcomes. He is currently an associate editor for the *International Journal of Life Cycle Assessment* and *Biofuel Research Journal*, and serves on the editorial or advisory board of *Cell Reports Sustainability, Nexus, Carbon Footprints*, and *Environmental Research: Food Systems*.

ROGER BEACHY (NAS) is Professor Emeritus of Biology at Washington University in St. Louis and a member of the National Science Board (2014-2026). He previously served as director of the National Institute of Food and Agriculture (NIFA) at the U.S. Department of Agriculture (USDA). Dr. Beachy is the founding President of the Donald Danforth Plant Science Center and recognized for his work in molecular virology, gene expression, and biotechnology, in particular for development of transgenic plants that are resistant to virus infection. Dr. Beachy is a Member of the U.S. National Academy of Sciences and was an elected Councilor for the National Academy of Sciences. Dr. Beachy is a fellow at the American Association for the Advancement of Science, the American Academy of Microbiology, and the Academy of Science of St. Louis, and is Foreign Associate in Academies of Science in India and in South Korea. Dr. Beachy chairs the Council of Scientific Advisors of the International Center for Genetic Engineering and Biotechnology (ICGEB) in Trieste (Italy), Delhi (India), and Cape Town (South Africa). Dr. Beachy has received numerous honors for his research, including the Wolf Prize in Agriculture in

2001, the Dennis Robert Hoagland Award from the American Society of Plant Biologists, and the William D. Phillips Technology Advancement Award from the St. Louis County Economic Council.

LE KANG (CAS/NAS) is a CAS distinguished professor in Institute of Zoology, Chinese Academy of Sciences (CAS) and focuses on the research on ecological genomics and adaptation of insects. He served as president of Beijing Institutes of Life Sciences (CAS), Institute of Zoology and Hebei University. He reveals the molecular mechanisms for phenotypic plasticity and adaptation of locusts at both genetic and epigenetic levels using interdisciplinary methods. His achievement has provided the scientific outlooks on locust biology, and crucial cues to develop novel control strategies against the swarming insects. Dr. Kang was elected member of Chinese Academy of Sciences (CAS) and foreign member of the U.S. National Academy of Sciences (NAS) and EMBO etc. Dr. Kang is the Vice-Chairman of IUBS and council member of International Congress of Entomology.

CHUNWU ZHU is a professor of global climate change and food security at the Chinese Academy of Sciences. His research focuses on investigating soil-plant responses and adaptations in wet/paddy fields under the background of future climate change using FACE and global assessment models. With extensive research experience in multiple elevated CO2 platform laboratories, such as the world's first wetland CO2 enrichment platform at the Smithsonian Environmental Research Center (in collaboration with Patrick Megonigal) and the rice FACE experimental platform at Tsukuba of Japan (in collaboration with Toshihiro Hasegawa and Kazuhiko Kobayashi). Since 2023, he launched one new T-FACE (whole ecosystem warming and elevated CO2) in Nanjing of China, to support to more than 30 top research groups study for global change. He has (co-) authored over 80 peer-reviewed international papers (including Nature Geoscience, Nature Food, Science Advances), and he serves as associate editor or editorial board member for various international journals such as *Global Change Biology*, *Frontiers in Plant Science*, and *Soil Ecology Letters*.

HEIDI GIBSON is the Manager of the Global Sustainability Series in the Curriculum, Digital Media, and Communications Division of the Smithsonian Science Education Center (SSEC). Ms. Gibson joined SSEC in 2020 to support the development of the Smithsonian Science for Global Goals community research guides. This followed her prior work as an SSEC Research Fellow helping to develop the structure of the guides and aligning it to ideas from socio-scientific, place-based, participatory action, civic, and global learning research. Ms. Gibson is passionate about engaging young people to realize their own power to transform the world. She published a book, *From Ideas to Action: Transforming Learning to Inspire Action on Critical Global Issues* and has co-authored articles exploring the supports and educational shifts needed to help young people become a more central part of global sustainability efforts. Ms. Gibson has a MA in International Education and has held roles researching and directing global education programs. Diverse perspectives and experiences are exemplified by Ms. Gibson's background which includes serving as a US Foreign Service Officer in China and Fiji, teaching experiential civics to middle and high school students in Washington, DC and Hawaii, and conducting lab research in Berlin and Baltimore while completing her Bachelor's degree in Biology.

Panel II: Food Systems, Water, and Health

JUDITH N. WASSERHEIT (NAM) (U.S. Committee Member and Moderator) is Professor of Global Health, Medicine and Epidemiology, and Co-Director of the Alliance for Pandemic Preparedness at the University of Washington. Dr. Wasserheit has worked extensively at the interface of sexually transmitted infections (STI) and HIV clinical-epidemiological research, programs and policy in the U.S. and globally. Research to evaluate approaches that improve both environmental sustainability and human health, and pandemic disease preparedness are more recent areas of focus. Previously, she was the Founding Chief of the U.S. National Institutes of Health's STD Research Branch; Director of the U.S.

Centers for Disease Control and Prevention's STD/HIV Prevention Program, Director of the HIV Vaccine Trials Network, and Chair of the University of Washington Department of Global Health. She was the founding Board Chair of the Consortium of Universities for Global Health and assisted in the development of the Chinese Consortium of Universities for Global Health. She has worked in Bangladesh, Colombia, Egypt, Indonesia, Kenya, Thailand and Zambia. Her development of the concept of epidemiological synergy between HIV infection and other sexually transmitted infections has had a major influence on HIV prevention policy and programs worldwide. Dr. Wasserheit has broad experience working with agencies, governments, and colleagues on STD and HIV research, policy and programmatic issues. She is a member of National Academy of Medicine, the American Epidemiological Society, the Johns Hopkins Society of Scholars, and was a London School of Hygiene & Tropical Medicine's Heath Clark Endowed Lecturer. Dr. Wasserheit earned her M.D. from Harvard University, her M.P.H. from Johns Hopkins University, and her B.A. from Princeton University.

YUE QIN (Moderator) is a tenure-track associate professor at the College of Environmental Sciences and Engineering at Peking University, and the director for the MAIRS-FE IPO (Monsoon Asia Integrated Research for Sustainability-Future Earth, International Project Office). Before that, she worked as a tenure-track assistant professor at the Department of Geography and Sustainability Institute at the Ohio State University. She holds a Ph.D. degree in Science, Technology, and Environmental Policy from Princeton University. Her research uncovers the interactions between the earth system and human society to inform sustainable food, energy and water management under climate change. Dr. QIN's work has been published in a series of high-profile outlets, including Nature Climate Change, Nature Geoscience, Nature Sustainability, Nature Water, and PNAS. She also served as the associate editor and topic editor for a series of impactful journals: such as Earth's Future, ESSD, Climatic Change, and et al. Over the years, Dr. Yue QIN has received prestigious honors and awards such as Neil A. McConnell Fellowship in International Affairs for Promising Scholars at Princeton University, the Chinese American Oceanic and Atmospheric Association (COAA) Early Career Award, and the 2024 AGU Global Environmental Change Early Career Award, among others.

DANIEL RAITEN is a Senior Nutrition Scientist in the Office of Nutrition Research (ONR) at the National Institutes of Health (NIH). Dr. Raiten supports NIH nutrition research programs focused on human nutrition research, global nutrition, and the intersection of nutrition, climate change, and health. As part of the Global Nutrition Coordination Plan 2021-2026, he co-chairs two Technical Working Groups, the Ecology of Parent, Infant, and Child (EPIC) nutrition and Climate/environmental change, Health, Agriculture and Nutrition; a Global Ecology (CHANGE). Prior to joining ONR, Dr. Raiten served as the Program Director for Nutrition at the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD) from 2009-2023 where he was responsible for the portfolio of grants and related activities to support and advance the maternal and child health nutrition agenda in the United States and globally. His career has focused on the interface between research and translation to support evidence informed practice, programs, and policies in food safety and nutrition. He first joined NICHD in November 1999 where he began his service in the Office of Global Health. Dr. Raiten has a B.A. in history and political science, a B.S. and M.S. in animal science and agriculture and a Ph.D. in Human Nutrition from Penn State University. He also completed a postdoctoral fellowship at the Yale Child Study Center.

JESSICA FANZO (NAS) is a Professor of Climate and the Director of the Food for Humanity Action Collaborative at Columbia University's Climate School in New York City. Before coming to Columbia in 2023, Dr. Fanzo was the Bloomberg Distinguished Professor of Global Food Policy and Ethics at Johns Hopkins University. She has also held positions at the Food and Agriculture Organization of the United Nations (UN), the UN World Food Programme, Bioversity International, the Earth Institute, the Millennium Development Goal Centre at the World Agroforestry Center in Kenya, and the Doris Duke Charitable Foundation. She has participated in various collective endeavors, including the Food Systems

Economic Commission, the Global Panel of Agriculture and Food Systems for Nutrition Foresight 2.0 report, the Lancet Commission on Anaemia, and the EAT-Lancet Commissions 1 and now 2. She was also the Co-Chair of the Global Nutrition Report and Team Leader for the UN High-Level Panel of Experts on Food Systems and Nutrition. She currently leads the development of the Food Systems Dashboard and the Food Systems Countdown to 2030 Initiative. Dr. Fanzo received a Ph.D. in nutrition from the University of Arizona and Stephen I. Morse postdoctoral fellowship in Immunology in the Department of Molecular Medicine at Columbia University's College of Physicians and Surgeons. Dr. Fanzo became an elected member of the U.S. National Academy of Sciences in 2024 and was the first laureate of the Carasso Foundation's Sustainable Diets Prize in 2012 for her research on sustainable diets.

XIAOYUAN YAN is a Professor at Institute of Soil Science, Chinese Academy of Sciences and University of Chinese Academy of Sciences, Nanjing. Currently he is serving as the Executive Vice President and Secretary-General of Soil Science Society of China, the First Vice Chairman of Soil Properties and Processes Division of International Union of Soil Sciences. His research fields include carbon and nitrogen biogeochemistry, with special focus on mitigation of greenhouse gas emission and non-point source pollution. He has published more than 240 peer reviewed journal papers and 2 books.

JUNGUO LIU is a professor and the president of the North China University of Water Resources and Electric Power. His research involves several areas including hydrology and water resources, global environmental change, and ecological restoration. He has led pioneering work on advancing water resources assessment in coupled human-natural systems and on stepwise ecological restoration. His articles appear in numerous journals including Science, Nature, and Proceedings of the National Academy of Sciences of the United States of America. He is/was an editor-in-chief of *Physics and Chemistry of the Earth*, and the editor, associate editor or board member of 12 scientific journals. He founded China's inaugural provincial-level society devoted to ecological restoration and was subsequently elected as the inaugural and subsequent President (currently holding the position of Honorary President) of the Society for Ecological Rehabilitation of Beijing. He serves as the Vice President of the Chinese National Commission for the International Association of Hydrological Sciences, and the Chair of the Union of Societies for Ecological Restoration and Environmental Protection in Beijing. Liu is a Lead Author of the Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report. He is a Highly Cited Researcher by Clarivate, and Elsevier Highly Cited Chinese Researchers. He has received the IAHS-UNESCO-WMO International Hydrology Prize - Volker Medal, the World Academy of Sciences (TWAS) Award, the Paul A. Witherspoon Lecture Award of the American Geophysical Union, the Communication Award of the International Society for Ecological Restoration, and numerous other prestigious awards. He is widely recognized for his contributions to the field and has been elected as a member of the Swiss Academy of Engineering Science, Academia Europaea (The Academy of Europe), World Academy of Arts and Sciences, and appointed as a Fellow of the American Association for the Advancement of Science, the Royal Meteorological Society, and the Royal Geographical Society of UK.

Panel III: Food Systems, Urban Transformation, and Food Loss and Waste

KAREN SETO (NAS) (U.S. Committee Chair and Moderator) is the Frederick C. Hixon Professor of Geography and Urbanization Science at Yale University. An urban and land change scientist, she is one of the world's leading experts on contemporary urbanization and global change. She uses satellite remote sensing, field interviews, and modeling methods to understand how urbanization will affect the planet, including land change, food systems, biodiversity, and climate change. She has pioneered methods to reconstruct urban land use with satellite imagery and has developed novel methods to forecast urban expansion. She has conducted urbanization research in China for twenty years and in India for more than ten. She has extensive fieldwork experience in Asia, especially China and India, where she has conducted research for over 20 and 10 years, respectively. Dr. Seto has served on numerous national and

international scientific bodies. She was a coordinating lead author for the 2022 IPCC 6th Assessment Report and the 2014 IPCC 5th Assessment Report. She is a former co-editor-in-chief of the journal, *Global Environmental Change*. From 2000 to 2008, she was faculty at Stanford, where she held joint appointments in the Woods Institute for the Environment and the School of Earth Sciences. She has received many awards for her scientific contributions, including the Outstanding Contributions to Remote Sensing Research Award from the American Association of Geographers. Dr. Seto is an elected member of the U.S. National Academy of Sciences, the Connecticut Academy of Science and Engineering, the American Academy of Arts and Sciences, and the American Association for the Advancement of Science. She received a Ph.D. in Geography from Boston University.

WEIQIANG CHEN (Moderator) is a professor of Resources and Urban Sustainability at the Institute of Urban Environment, Chinese Academy of Sciences (CAS). He graduated from the School of Environment at Tsinghua University (Bachelor, 2004; Ph.D., 2010), Beijing, and worked at the Yale Center for Industrial Ecology during 2010-2015. His research focuses on (1) industrial ecology, (2) urban metabolism and sustainability, and (3) anthropogenic cycles and sustainable management of materials, especially metals, plastics, and chemicals. His studies have been published in *PNAS*, *Nature Climate Change*, *Nature Geoscience, Nature Communications*, *Environmental science and Technology*, and other first-level journals. He organized the first International Conference on Urban Sustainability Science in Xiamen, 2023.

PRABHU PINGALI (NAS) is a professor at the Charles H. Dyson School of Applied Economics and Management at Cornell University, with a joint appointment in the Division of Nutritional Sciences and Department of Global Development. Dr. Pingali is the founding director of the Tata-Cornell Institute for Agriculture and Nutrition. Prior to joining Cornell, he was the deputy director of the Agricultural Development Division of the Bill and Melinda Gates Foundation, from 2008 to May 2013. He was director of the UN Food and Agriculture Organization's Agriculture and Development Economics Division from 2002-2007. In addition, Dr. Pingali worked with the CGIAR for 15 years from 1987-2002, first with IRRI in the Philippines and then with CIMMYT in Mexico. Dr. Pingali is a fellow in the American Association for the Advancement of Science, a member of the U.S. National Academy of Sciences, and an AAEA Fellow. He has over four decades of experience working with some of the leading international agricultural development organizations as a research economist, development practitioner and senior manager. Dr. Pingali has written 13 books and over 120 refereed journal articles and book chapters on food policy.

THOMAS REARDON is a University Distinguished Professor at Michigan State University and Non-Resident Senior Research Fellow of International Food Policy Research Institute (IFPRI). Dr. Reardon is Fellow of the Agricultural & Applied Economics Association (AAEA), and Honorary Life Member (equivalent of Fellow) of the International Association of Agricultural Economists (IAAE). Dr. Reardon has been at MSU since 1992; IFPRI Research Fellow 1986-1991 and Non-Resident Senior Research Fellow since 2022; Rockefeller Foundation Post-Doc with IFPRI in Burkina Faso 1984-1986; and Ph.D. from UC Berkeley in 1984. Dr. Reardon spent 3 academic years at Renmin University in Beijing as 1000 Talents Scholar and 4 academic years at IFPRI in New Delhi in a joint MSU/IFPRI project on Asian food system transformation. Dr. Reardon studies the transformation of food value chains and rural nonfarm/food system employment: the "supermarket revolution," and the "Quiet Revolution in the Hidden Middle" (the diffusion of micro, small, and medium enterprises (MSMEs) in the midstream of value chains), and their impacts on food industry business strategies, and on farms, consumers, and employment in Africa, Asia, and Latin America. Dr. Reardon resided 21 years in those three regions. Dr. Reardon is in Who's Who in Economics; was featured on the front page of the New York Times; was the first agrifood economist invitee to the World Economic Forum in Davos; has 50,000 citations (in top 5 in agricultural economics) and H index of 102 in Google Scholar; and ranks in the top 1.7% of the 69,000 economists followed globally by IDEAS/REPEC.

SHENGHUI CUI received his Ph.D. in Environmental Science and Technology in 2003 and worked in the Institute of Urban Environment, Chinese Academy of Sciences in 2006. Now he is a professor of urban environmental planning and management and the Director of Xiamen City Key Laboratory of Urban Metabolism. His research interests are urban food system, urban greenspace and health, and urban resilience. His main international collaborated research projects in the past five years are as follows: Novel Organic recovery using Mobile ADvanced technology (NOMAD)(MOST-Horizon 2020), Multi-functional urban Green space planning based on transdisciplinary learning (CAS-NWO), Comparative risk assessment of flood disaster and adaption policy in Jiulong River and Chao Phraya Watershed (NSFC-NRCT Joint Project); Sustainable, Innovative, Resilient, and Interconnected Urban food System (NSFC-JPI_UE Joint Project). He has published more than 120 paper in peer-reviewed journals including *Proceedings of the National Academy of Sciences of the United States of America (PNAS)*, *Nature Food*, *Nature City*, *Environment International*, *Environmental Science & Technology*, etc.

BAOJING GU is a professor of sustainability at Zhejiang University, China. He received his training as an ecologist, specializing in biogeochemical nitrogen cycling analysis and economics, at Zhejiang University, the University of Alberta, and McGill University. Currently, he serves as the Executive Editor-in-Chief of Earth Critical Zone, Editor of The Innovation, and Associate Editor of Earth's Future. He is also the deputy director of the East Asia Center of the International Nitrogen Initiative (INI). In his role, he co-leads cost and benefit analyses of global nitrogen use under the International Nitrogen Management System (INMS) framework, enhancing our understanding of human-nitrogen cycle interactions. Professor Gu leads several research projects on Sustainable Development Goals (SDGs) and climate change, including the National Key R&D Program, the China-Austria Government Cooperation Project, the National Distinguished Youth Fund Project, and the NSFC-UNEP International Cooperation Key Project. He has published over 130 papers in peer-reviewed journals, with notable contributions in *Science* (1), *Nature* (3), *PNAS* (2), *Nature Sustainability* (3), *Nature Food* (11), *Nature Communications* (2), *Nature Climate Change* (1) and *The Innovation* (2). In 2023, he was recognized as the international champion of the Frontiers Planet Prize. His research interests center on the global nitrogen and carbon cycles and their interactions with global change and sustainable development, encompassing urbanization, rural development, policy regulations, and cost-benefit analysis. His significant contributions lie in large-scale biogeochemical nitrogen cycles and their response to natural and socioeconomic factors.

Panel IV: Food Systems, Behavioral Science, and Technological Innovation

NEBOJSA NAKICENOVIC (Moderator) is Honorary and Distinguished Emeritus Scholar of the International Institute for Applies Systems Analyses where he was the Deputy and Acting Director General. He is Deputy Chair of the Group of Chief Scientific Advisors to the European Commission and was tenured Professor of Energy Economics at Vienna Technology University. Among other positions, Dr. Nakicenovic is the Executive Director of The World In 2050 (www.TWI2050.org); has been a member of the Earth League; Earth Commission of the Global Commons Alliance; Multi-stakeholder Technical Group of Advisor on Sustainable Development Goal 7; Scientific Advisory Boards of the Potsdam Institute from Climate Impact Research; Fondazione Eni Enrico Mattei; Japanese Institute of Environmental Studies; German Aerospace Center; Renewable Energy Policy Network for the 21st Century; OMV Advisory Group on Sustainability; and Climate Change Centre Austria. He has also been a Technology and Innovation Advisor to the Government of Montenegro. He serves on many Editorial Boards of peer-reviewed journals, including *Technological Forecasting and Social Change*; *Climate Policy, Energy Policy, Institution of Civil Engineers*; *Current Opinion in Environmental Sustainability*; *Energy Sector Management*; *Ecosystem Health and Sustainability*; *Scientific World Journal*; *Environmental Innovation and Societal Transitions*; and the *Energy Strategy Reviews*. Dr. Nakicenovic's research interests include the long-term patterns of technological change, economic development and response to climate change and, in particular, the evolution of energy, mobility, digital technologies. Dr.

Nakicenovic holds bachelors and master's degrees in economics and computer science from Princeton University and the University of Vienna, where he also completed his Ph.D. He also holds Honoris Causa Ph.D. degree in engineering from the Russian Academy of Sciences.

BEIBEI LIU (Moderator) is currently a Professor of Environmental Planning and Management at the School of the Environment, Nanjing University, where she teaches and conducts research in the fields of Environmental Policy Analysis and Environmental System Analysis. She is also an Adjunct Professor at the Johns Hopkins-Nanjing Center. Dr. Liu's research focuses on environmental sustainability and climate resilience of agricultural, food and industrial systems, as well as developing cost-effective and robust strategies to adapt to an uncertain climate with less environmental impact. She has published over 60 articles in high-quality peer-reviewed journals, including Nature Food, Nature Water, Environmental Science & Technology, Environmental Research Letters. Dr. Liu has served as the principal investigator for over 20 national, provincial, and international projects, sponsored by organizations such as the National Science Foundation of China, Newton Foundation, Erasmus Mundus Program, and Academic Consortium (AC) 21. She also works as an expert for the United Nations Environment Programme (UNEP) and the Global Green Growth Institute (GGGI), where she advises on green development and climate change adaptation.

DAVID ZILBERMAN (NAS) holds the Robinson Chair in the Agricultural and Resource Economics Department at University of California, Berkeley. He received the 2019 Wolf Prize in Agriculture and was elected a U.S. National Academy of Science 2019 member. Dr. Zilberman served as the 2018-19 President of the Agricultural & Applied Economics Association (AAEA). He is a fellow of AAEA, AERE, and EAERE, among others, and has published in professional and popular outlets. He has over 400 referenced journal articles ranging from Science to ARE-Update and has edited 30 books. In addition, he has served as a Consultant to the U.S. Environmental Protection Agency, USDA, the World Bank, FAO, MARS, BP, and others. He co-founded the Beahrs Environmental Leadership Program and is the academic director of the Berkeley MDP program. Dr. Zilberman's research analyzes water, innovation, supply chain, agriculture, energy, and the environment. He has researched the economics and political economy of agricultural biotechnology and the potential of the bioeconomy. In addition, he has been working on water policy programs and the economic impacts of the COVID-19 pandemic. Dr. Zilberman received his B. A. in Economics, Statistics from Tel Aviv University, Israel and his Ph.D. in Agricultural and Resource Economics from University of California at Berkeley.

HAIYAN CHU received his Ph.D. degree in 2000 from the Institute of Soil Science, Chinese Academy of Sciences (CAS). Since then, he has worked at the Japan International Research Center for Agricultural Sciences as a visiting scientist (2001 to 2004), the National Institute for Agro-Environmental Sciences in Japan as a postdoc (2007 to 2010), and Queen's University, Canada, as a research associate (2007 to 2010). Since 2010, he has been a professor at the Institute of Soil Science, CAS. He is also a professor in the University of Chinese Academy of Science since 2018. His research interests include soil biodiversity, microbial ecology, and metagenomics. Currently, he is mainly working on soil microbial communities, functions and applications in agricultural ecosystems, and microbial distribution and prediction in the wetlands of Tibetean Plateau. He has published more than 190 papers in international journals with 19,000 citations. He serves as an editorial board member for 6 international journals, including Microbiome and iMeta, and is a co-editor in chief of Soil Ecology Letters. He has been named a 'highly cited researcher' (Clarivate) since 2019.

RANVEER CHANDRA is the General Manager in M365 Copilot and the Chief Technology Officer of Agri-Food at Microsoft. Previously, Dr. Chandra has held various leadership roles, including the Managing Director for Research for Industry, Chief Scientist of Microsoft Azure Global, and Head of Networking Research at Microsoft Research, Redmond. His research has shipped in multiple Microsoft products, including XBOX, Azure, and Windows. He is the inventor of Microsoft FarmBeats—Big Data,

AI, Cloud & Edge for Agriculture, which is a Microsoft product, and is being used by multiple agri-food companies. FarmBeats was featured by Bill Gates on GatesNotes, and he has been invited to present to the Secretary of Agriculture, and on TV White Spaces to the FCC Chairman. Dr. Chandra has published more than 100 papers and holds over 125 patents granted by the USPTO. He is an IEEE Fellow and ACM Fellow, and has won several awards, including the MIT Technology Review's Top Innovators Under 35 and was recognized by the Newsweek magazine as America's 50 most Disruptive Innovators (2021). Dr. Chandra has an undergraduate degree from IIT Kharagpur, India and a Ph.D. in Computer Science from Cornell University.

YUHONG CAO is a scientist and principal investigator at the National Center of Nanoscience and Technology, Beijing, China. She earned her B.S. in Chemistry from Linfield College in Oregon, USA, and her Ph.D. in Materials Science and Engineering from Stanford University, California. Under the mentorship of Professor Nicholas Melosh, her doctoral research focused on developing a nondestructive nanostraw system for longitudinal living cell sampling. Following her Ph.D., Dr. Cao pursued postdoctoral training in T cell engineering by applying CRISPR-Cas technology. She worked with Professor Peidong Yang, in partnership with Professor Jennifer Doudna at the University of California, Berkeley. She then returned to Stanford University for a second postdoctoral fellowship with Professor Steven Chu, focusing on in vivo single-molecule tracking. At the National Center of Nanoscience and Technology, Dr. Cao leads a research group specializing in Nanomaterials and Plant Cell Surface Interfaces. Her work aims to develop universal intracellular delivery systems for natural plants to accelerate plant breeding. By exploring nanomaterials to facilitate effective gene editing using CRISPR technology, her lab addresses the critical need for efficient delivery systems in plants. This research has the potential to significantly shorten plant breeding cycles, enabling ultra-fast breeding and advancing agricultural innovation.