

**7th International Forum on Sustainable Future in Asia /
7th NIES International Forum**

Research for Societal Transformation with Future Earth

**Date January 20-21, 2022
Venue Online (Zoom)**

Organizer

National Institute for Environmental Studies

Special Co-organizers

**Research Institute for Humanity and Nature
Nagasaki University**

Co-organizers

**Institute for Future Initiatives, The University of Tokyo
Regional Resource Centre for Asia and the Pacific, Asian Institute of Technology**

Supporter

Future Earth Global Secretariat Hub Japan



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Organizers

Organizer

National Institute for Environmental Studies (NIES – Japan)

The National Institute for Environmental Studies (NIES), established in 1974, is Japan's leading institute for comprehensive research in environmental science and technology. Experts in diverse fields ranging from pure sciences, engineering, agriculture sciences, medical sciences, pharmaceutical sciences, and fishery sciences, to law and economics, cooperate to pioneer new methodologies and foster pioneering research that will facilitate improvements in environmental circumstances.

Special Co-organizers

Research Institute for Humanity and Nature (RIHN – Japan)

The Research Institute for Humanity and Nature is a national research institute established by the Government of Japan in 2001. As a member of the National Institutes for the Humanities, RIHN research starts from the premise that environmental problems are rooted in human culture and societal values. RIHN's goal is to seek concepts, theories and mechanisms that enhance human quality of life in direct relation to environmental conditions and ecological processes. RIHN research therefore involves a normative dimension, as it asks what the relationship between humanity and nature ought to be. To this end, RIHN solicits, funds, and hosts integrative research projects investigating environmental change problems in specific settings. Research projects are undertaken by interdisciplinary teams at RIHN, working together with partner institutions and communities in Japan and abroad.

Nagasaki University (NU – Japan)

On November 12, 1857, Dutch army surgeon Pompe van Meerdervoort initiated medical lectures in the Dutch language to government doctor Ryojyun Matsumoto and 11 other persons. This is the origin of today's School of Medicine as well as Nagasaki University.

Located in a region that geographically faces the Asian Continent across the East China Sea, Nagasaki University possesses the history and memory of Dejima and is invested with a unique mission by the atomic bombing. To honor the special history and carry forward its mission, Nagasaki University seeks to develop new values and human resources with outstanding personal qualities capable of contributing to the sustainable development of a rapidly changing modern world and local community, on the basis of its unique features and tradition that have been nurtured for many years.

Co-organizers

Institute for Future Initiatives, The University of Tokyo (IFI – Japan)

Institute for Future Initiatives (IFI) was established in April 2019 to organically integrate the Policy Alternatives Research Institute (PARI) and UTIAS Integrated Research System for Sustainability Science (IR3S). It constitutes one of the core organizations that support the Future Society Initiative (FSI) of the University of Tokyo, which aims to accelerate university-wide efforts to promote and achieve the Sustainable Development Goals (SDGs). To create a sustainable future society, IFI makes policy and social recommendations on future society issues and pursues research in collaboration with society toward those ends. It also serves as an international network hub integrating university knowledge related to future society and as a platform for collaborative creation between industry, government, academia, and citizens to provide research-based alternatives for creating our future society and to help develop the human resources necessary to achieve it.

Regional Resource Centre for Asia and the Pacific, Asian Institute of Technology (AIT RRC.AP – Thailand)

The Regional Resource Centre for Asia and the Pacific (RRC.AP) is an Institute-wide center of the Asian Institute of Technology (AIT) that aims to assist countries to advance their environment and sustainable development goals through the provision of capacity-building, knowledge sharing, policy advice, and research in three thematic areas: Climate Change, Air and Atmosphere, and Waste Management.

Supporter

Future Earth Global Secretariat Hub Japan

Future Earth is a global network of scientists, researchers, and innovators, with a mission to advance research in support of transformations to global sustainability. Future Earth initiates and supports international collaboration across natural, social, and human sciences and between researchers and stakeholders to identify and generate the integrated knowledge needed for transformation towards societies that provide good and fair lives for all within a stable and resilient Earth system. Future Earth promotes transdisciplinary research and systems thinking approaches throughout its work to inform and guide decision making processes in the society.

The Future Earth Japan Hub is supported by National Institute for Environmental Studies (NIES), Research Institute for Humanity and Nature (RIHN), Nagasaki University, The University of Tokyo Institute for Future Initiatives (IFI), Science Council of Japan (SCJ) and other supporting organizations, and functions as a part of global secretariat of Future Earth.

Background

The Sixth Assessment Report from the United Nations Intergovernmental Panel on Climate Change (IPCC) indicates that the world is standing at an important crossroads. Will we continue business as usual and face a world where we can no longer live? Or will we make the necessary societal transformations for a sustainable planet? The National Institute for Environmental Studies (NIES) of Japan is developing research to understand global and regional environmental change and has developed scientific evidence that feeds into societal decision-making processes to improve the state of the environment. In this context, and annually for the past six years, NIES has held the International Forum on Sustainable Future in Asia (NIES International Forum) with the purpose of facilitating international collaboration with those that share the same goal.

In part to achieve this goal, NIES is contributing to Future Earth, an international research program to accelerate transformations for global sustainability. Future Earth supports transdisciplinary processes with stakeholders. Researchers at NIES have been co-designing critical components to enable such societal transformations to take place.

The main theme of the 7th NIES International Forum reflects Future Earth's principles: Research for Societal Transformation. NIES is very pleased to invite the Research Institute for Humanity and Nature and Nagasaki University as Special Co-Organizers. Both institutions are also supporting Future Earth and conducting research internationally and in Japan. Furthermore, NIES is grateful to its Co-organizers, the Institute for Future Initiatives, The University of Tokyo (IFI, UTokyo - Japan), and the Regional Resource Centre for Asia and the Pacific, Asian Institute of Technology (AIT RRC.AP - Thailand). Moreover, the Future Earth Global Secretariat Hub Japan supports the Forum.

We hope that researchers from around the world and from various disciplines and career stages with an interest in sustainability science will join the Forum to exchange their views and knowledge and contribute to society.

Session Overview

Expert Session 1: Valuing Environment

The Earth systems are unprecedentedly threatened by human activities, which in turn adversely affects human health and wellbeing. To maintain “healthy planet”, it is necessary to appropriately reflect available information and knowledge in policy making and in promoting social/behavioral transition. This knowledge-to-action process, for instance, in deciding the priority among the issues to be focused or in choosing methods to solve the issue, is the key for the maintenance of healthy planet and involves scientific (natural, social, and humanities) and non-scientific communities. Apparently, “value” plays crucial role in such a process. Each stakeholder has its own scale to measure the value of the issues at stake. To reach consensus, stakeholders (either individuals or agencies) have to understand what kind of scale each of them is using.

In practice, the processes may range from one which is scientific in nature to one which is rather associated with practical consideration such as policy or social institutions. In this session, we will discuss various kind of valuing process associated with environment-relevant actions basing on case studies as well as studies using model(s). For example, counter measures for climate change sometimes conflict with other risk issues. The process may also differ depending on the region/country (or context in a broader sense). Also, development of the locality and preserving local environment can generate either trade-off situation or win-win situation, which may or may not be foreseeable by stakeholders. To solve some locally relevant issues, solution may or may not satisfy the people simply because it relied on indigenous knowledge/conventional custom or not. Through these examples, we will discuss possible factors for success or failure of the process associated with environment-relevant decisions.

Expert Session 2: Net zero GHG emissions by 2050 in a complex world with stakeholders

The 2015 Paris Agreement, a legally binding international treaty on climate change to limit global warming to well below 2, preferably to 1.5 degrees Celsius, compared to pre-industrial levels, calls for action to reduce GHG emissions. In response, ambitious national governments have set goals of net zero GHG emissions by 2050; however, the pathways for zero GHG emissions are yet to be developed. Japan and many others are now looking at ways to make this shift in policies a reality. To make well informed and inclusive decisions, there is a need to work across sectors and boundaries, to achieve consensus for major policies and to decide what steps to take.

Researchers monitor, design, and analyze different scenarios to predict future changes in Green House Gas emissions; however, most often, the views of stakeholders, such as the views from key emitters or the general population, are not yet incorporated in these models. To successfully achieve the goals of net zero GHG emissions by 2050, co-design efforts are necessary to incorporate stakeholder needs and views, and to develop actionable clear steps across sectors. In this session, we will present an overview of the latest scientific achievements with a lens on Asia and discuss how co-design processes combined with state-of-the-art science can help develop transformations in society that are equitable and inclusive for all.

Expert Session 3: Systemic Risks

The Anthropocene is the age of systemic risk. Researchers have not only identified that human interference with the environment has brought us close to planetary boundaries in several domains, but also suggest that upsetting the balance in one domain will trigger cascading effects across others and upset the entire planetary system. As human systems increasingly cover the globe, systemic risks also emerge in the social realm, as, for example, demonstrated by the widespread disruption of global supply chains during the early phase of the COVID-19 pandemic. How can society manage such risks in a comprehensive way?

In this session we will explore issues of systemic risk along three dimensions in order to root the discussion in specific phenomena, but at the same time to identify common, underlying drivers. The three dimensions are: disaster risk reduction, ecosystem health and pandemic risk and financial risk.

In the recent past, we have experienced increasingly frequent and severe disruptions along these dimensions but we have not yet been able to effectively manage and reduce future risks. This suggests that we need to delve more deeply into fundamental underlying drivers and examine the entire economic development model. How can we catalyze the kinds of fundamental transformations that are needed. What kind of narratives can be deployed to facilitate a sustainable future in Asia?

Program – Day 1 Open Symposium

January 20, 2022

MC: **Dr. Giles Bruno Sioen** NIES/ Future Earth Global Secretariat Hub Japan
Dr. Ria Adoracion Lambino RIHN/ Future Earth Global Secretariat Hub Japan

13:30-13:50 Welcome Addresses

Dr. Masahide Kimoto

President, National Institute for Environmental Studies, Japan

Prof. Shigeru Kohno

President, Nagasaki University, Japan

Prof. Juichi Yamagiwa

Director - General, Research Institute for Humanity and Nature, Japan

Prof. Kensuke Fukushi

Vice Director, Institute for Future Initiatives, The University of Tokyo, Japan

Dr. Naoya Tsukamoto

Director, Regional Resource Centre for Asia and the Pacific, Asian Institute of Technology, Thailand

13:50-14:00 Introduction from Moderator

Dr. Fumiko Kasuga

Global Hub Director - Japan, Future Earth / Senior fellow, National Institute for Environmental Studies, Japan

14:00-15:00 Keynote Speeches

Dr. Michiru Nishida

Professor, Research Center for Nuclear Weapons Abolition, Nagasaki University, Japan

Dr. Leena Srivastava

Deputy Director General for Science, International Institute for Applied Systems Analysis (IIASA), Austria

Prof. Ilan Chabay

Head of Strategic Research Initiatives and Programmes, Institute for Advanced Sustainability Studies Potsdam (IASS), Germany

15:15-16:30 Flash talks from young researchers

Theme: Mutual understanding with the society and science

Facilitator:

Prof. Kazuhiko Moji

Dean, School of Global Humanities and Social Sciences, Nagasaki University, Japan

Speakers:

Dr. Charissa Ferrera

Marine Science Institute, University of the Philippines, Philippines

Dr. Asmawati Muhamad

Academy of Islamic Studies, University of Malaya, Malaysia

Dr. Suvdantsetseg Balt

Administration and Planning Department, Mongolian Academy of Sciences, Mongolia

Ms. Novelia Triana

Graduate School of Fisheries and Environmental Science, Nagasaki University, Japan

Ms. Huynh Thi Mai Lam

Graduate Programme of Sustainability Science and Global Leadership Initiative, The University of Tokyo, Japan

Ms. Desy Ekawati

Graduate School of Natural Resources and Environmental Management Study Program, IPB University, Indonesia

Dr. Tan Duc Nguyen

Department of Science and Technology, Graduate School of Engineering, Nagasaki University, Japan

Dr. Shinichiro Asayama

Environmental Policy Section, Social Systems Division, National Institute for Environmental Studies, Japan

Mr. Hiroki Hashizume

School of Tropical Medicine and Global Health, Nagasaki University, Japan

Dr. Bonjun Koo

Research Department, Research Institute for Humanity and Nature, Japan

Mr. Obey Gotore

Department of Advanced Engineering, Graduate School of Engineering, Nagasaki University, Japan

16:30-17:15 Panel Discussion

Theme: Society & Science

Facilitator:

Dr. Seita Emori

Deputy Director, Earth System Division, National Institute for Environmental Studies, Japan

Panelists:

Dr. Michiru Nishida

Professor, Research Center for Nuclear Weapons Abolition, Nagasaki University, Japan

Dr. Leena Srivastava

Deputy Director General for Science, International Institute for Applied Systems Analysis (IIASA), Austria

Prof. Akimasa Sumi

Professor Emeritus / Project Professor, Institute for Future Initiatives, The University of Tokyo, Japan

Prof. Shobhakar Dhakal

Vice President for Academic Affairs, Asian Institute of Technology, Thailand

Dr. Yasuko Kameyama

Director, Social Systems Division, National Institute for Environmental Studies, Japan

17:20-17:25 Summary of the Day 1

Dr. Fumiko Kasuga

Global Hub Director - Japan, Future Earth / Senior fellow, National Institute for Environmental Studies, Japan

17:25-17:30 Closing Remarks of Open Symposium

Prof. Takeshi Nagayasu

Trustee, Nagasaki University, Japan

Program – Day 2 Expert Sessions

January 21, 2022

MC: **Dr. Giles Bruno Sioen** NIES/ Future Earth Global Secretariat Hub Japan
Dr. Ria Adoracion Lambino RIHN/ Future Earth Global Secretariat Hub Japan

13:30-13:35 Welcome Greetings

Prof. Hein Mallee

Deputy Director General, Research Institute for Humanity and Nature, Japan

13:35-14:50 Expert Session 1: Valuing Environment

Session Organizer:

Prof. Chieko Kondou

Professor, School of Engineering, Mechanical Engineering Program, Nagasaki University, Japan

Chairperson:

Dr. Chris Fook Sheng Ng

Associate Professor, Department of Global Health Policy, Graduate School of Medicine, The University of Tokyo, Japan

Rapporteur:

Prof. Chieko Kondou

Professor, School of Engineering, Mechanical Engineering Program, Nagasaki University, Japan

Presentations:

Prof. Arif Satria

Rector, IPB University, Indonesia

Prof. Takahiro Ota

Associate Professor, Faculty of Environmental Science, Nagasaki University, Japan

Dr. Kiyoshi Takahashi

Deputy Director, Social System Division, National Institute for Environmental Studies, Japan

Prof. Alan Dangour

Wellcome Trust, London, United Kingdom

15:00-16:15 Expert Session 2: Net zero GHG emissions by 2050 in a complex world with stakeholders

Session Organizer:

Dr. Hiroshi Tanimoto

Head, Global Atmospheric Chemistry Section, Earth System Division, National Institute for Environmental Studies, Japan

Dr. Giles Bruno Sioen

Science Officer, Future Earth / Research Associate, National Institute for Environmental Studies, Japan

Chairperson:

Dr. Yasuko Kameyama

Director, Social Systems Division, National Institute for Environmental Studies, Japan

Rapporteur:

Dr. Giles Bruno Sioen

Science Officer, Future Earth / Research Associate, National Institute for Environmental Studies, Japan

Presentations:

Dr. Jiang Kejun

Senior Researcher, Energy Research Institute, Chinese Academy of Macro-Economic Research, China

Dr. Tatsuya Hanaoka

Head, Global Sustainability Integrated Assessment Section, Social Systems Division, National Institute for Environmental Studies, Japan

Prof. Dr. Rizaldi Boer

Executive Director, Centre for Climate Risk and Opportunity Management, IPB University, Indonesia

Dr. Tomoko Shirai

Head, Global Carbon Project Tsukuba office, National Institute for Environmental Studies, Japan

16:25-17:40 Expert Session 3: Systemic Risks

Session Organizer:

Prof. Hein Mallee

Deputy Director General, Research Institute for Humanity and Nature, Japan

Chairpersons:

Prof. Hein Mallee

Deputy Director General, Research Institute for Humanity and Nature, Japan

Rapporteur:

Dr. Ria Adoracion Lambino

Specially Appointed Associate Professor, Research Institute for Humanity and Nature, Japan

Presentations:

Dr. Takehito Yoshida

Associate Professor, Research Department, Research Institute for Humanity and Nature, Japan / Department of General Systems, The University of Tokyo, Japan

Dr. Chadia Wannous

Steering Committee Member, Health KAN, Future Earth, Sweden

Mr. Junya Tani

Senior Researcher, Center for Global Commons, Institute for Future Initiatives, The University of Tokyo, Japan

Prof. Maurie Cohen

Professor, Department of Humanities and Social Sciences, New Jersey Institute of Technology, United States of America

17:40-17:55 Summary of the Forum From Joint Planning Committee

Prof. Chiho Watanebe

Professor/ Executive Advisor to the President (Planetary Health), School of Tropical Medicine and Global Health, Nagasaki University, Japan

17:55-18:00 Closing Address

Dr. Yuichi Moriguchi

Vice President, National Institute for Environmental Studies, Japan

MC

Dr. Giles B. Sioen

Science Officer at Future Earth and Research Associate at the National Institute for Environmental Studies, Japan



Dr. Giles B. Sioen Co-Leads the Research and Innovation team at Future Earth, which consists of 27 Science Officers corresponding to 27 Global Research Networks. In addition, he coordinates the Future Earth Urban and Health Knowledge-Action Networks, conducts research, and supports a range of domestic projects and activities. His research focuses on the development of a transdisciplinary system-based guideline to reduce the impact of climate change and other disasters on cities and health. Before joining Future Earth, he worked as a project researcher at the Graduate School of Frontier Sciences of the University of Tokyo in collaboration with Massachusetts Institute of Technology - System Design and Management Program. Dr. Sioen holds a Ph.D. in Sustainability Science from the University of Tokyo, a Master's degree in Urban Planning and Design from KU Leuven (Luca-Arts, campus Ghent), and a Bachelor's degree in Garden and Landscape Architecture from University College Ghent.

Dr. Ria Adoracion Lambino

Specially Appointed Associate Professor, Research Institute for Humanity and Nature, Japan



Ria Lambino is based at the Research Institute for Humanity & Nature (RIHN) in Kyoto as Specially Appointed Associate Professor. She received her PhD and Masters from Kyoto University Graduate School of Global Environmental Studies. She has a degree in Applied Physics but has spent most of her professional career as a practitioner and researcher focusing on environmental conservation and sustainability, with significant experience in the Philippines and in Japan. Prior to joining Future Earth, she worked for WWF Philippines as Vice President for Sustainable Production and Market Engagement and had been involved in transdisciplinary research on watershed governance at RIHN. Her research interests include environmental policy and governance, protected areas & management, renewable energy, water issues, sustainable agriculture & fisheries and sustainable consumption and production.

Day 1 Open Symposium

Welcome Addresses

Dr. Masahide Kimoto

President, National Institute for Environmental Studies, Japan



Dr. Masahide Kimoto received Ph.D. in atmospheric sciences from University of California, Los Angeles in 1989. His main fields of study are climate dynamics, predictability, and human impacts on the climate system. He is president of National Institute for Environmental Studies and professor emeritus of the University of Tokyo. He was a member of Joint Scientific Committee of World Climate Research Programme (WCRP), a review editor of IPCC AR6 (Working Group I) and a lead author of IPCC AR5.

Prof. Shigeru Kohno, M.D., Ph.D.

President, Nagasaki University



Prof. Shigeru Kohno is the President of Nagasaki University since Oct. 2017. He holds a medical degree and a Ph.D. and taught as a professor in the infectious and molecular pathogenesis department. His former students are now leading researches on infectious diseases, respiratory medicine, and mycology at many institutions. He has received many distinctions, including the Futaki Award, the Japanese Society for Medical Mycology Award, the ISC Meritorious Membership Award, and the Kiyoshi Shiga-Sahachiro Hata Award. He served as Dean of the graduate school of medicine and as Director of Nagasaki University Hospital from 2009 to 2015. Then he chaired the board of Nagasaki University as Vice president and Trustee since 2014. President Kohno declared that Nagasaki University contributes to “Planetary Health” through research and educational activities and demonstrates leadership in this university-wide action.

Prof. Juichi Yamagiwa
Director - General, Research Institute for Humanity and Nature, Japan



Juichi Yamagiwa is the Director-General of Research Institute for Humanity and Nature. He is a world-renowned researcher and expert in the study of primatology and human evolution. He was awarded Doctor of Science from Kyoto University in 1987. After holding positions at the Karisoke Research Center, Japan Monkey Center, and Primate Research Institute Kyoto University, he has been Professor of Graduate School of Science at Kyoto University since 2002. He was Dean of Graduate School and Faculty of Science from 2011 to 2013 and has been the 26th President of Kyoto University from 2014 to 2020. Dr. Yamagiwa has also served as President of International Primatological Society from 2008 to 2012, and as the Editor in Chief of *Primates*, a quarterly peer-reviewed scientific journal of primatology published by Springer Science+Business Media from 2010 to 2014. In Japan, he served as the president of the Japan Association of National Universities, the president of Science Council of Japan, and is now the member of Environmental Policy Committee of Ministry of Environment.

Dr. Yamagiwa's passion for fieldwork research frequently made him travel to Africa, such as Rwanda, Republic of the Congo, and Gabonese Republic, where he discovered an abundance of new findings related to gorillas, through his unique viewpoint of evolution.

Prof. Kensuke Fukushi
Vice Director, Institute for Future Initiatives, The University of Tokyo, Japan



Kensuke Fukushi is Professor and Vice Director of the Institute for Future Initiatives (formerly Integrated Research System for Sustainability Science, IR3S), The University of Tokyo (UTokyo). He is also an Academic Programme Officer at the United Nations University Institute for the Advanced Study of Sustainability.

His research interests include environmental engineering, risk assessment, climate change effect, water resource, biological technology, membrane technology. His research projects cover the integrated climate assessment – risks, uncertainties and society, establishment of research platform for developing models to predict future health risks posed by changes in climate, land use and population, development of international network for sustainability science and on health risk assessment in urban area.

Dr. Naoya Tsukamoto
Director, AIT Regional Resource Centre for Asia and the Pacific, Thailand



Dr. Naoya Tsukamoto obtained Ph.D. of Sustainability Science from Hosei University, Master of Environmental Science from Johns Hopkins University, in 2005 and a Bachelor of Physics from University of Tokyo, 1985. He started his professional career at the Ministry of the Environment of Japan in 1985. During 2005-2008, he served as the Head of Japanese Delegation to the IPCC/AR4. During 2014-2016, he worked for the Institute for Global Environmental Strategies (IGES) as Secretary-General/Principal Researcher. During 2016-2018, he serves as Project Director under the United Nations University, Institute for the Advanced Study of Sustainability (UNU-IAS). He is current responsibility is Director of Regional Resource Centre for Asia and the Pacific (RRC.AP) in Asian Institute of Technology (AIT), Bangkok, Thailand.

Introduction from Moderator

Dr. Fumiko Kasuga

Global Hub Director - Japan, Future Earth, and Senior Fellow, National Institute for Environmental Studies, Japan



After graduated from and received Ph.D. from The University of Tokyo, Dr. Fumiko Kasuga has been working on food safety risk assessment and epidemiology of foodborne diseases, as a government researcher in the Ministry of Health, Labour and Welfare (MHLW) of Japan. Formerly, she was a Director at the National Institute of Health Sciences. Internationally she worked with WHO and FAO as a technical advisor. When she served as Vice-President of Science Council of Japan in charge of international activities (2011-2014), she helped inviting a part of the Future Earth global Secretariat to Japan. At Future Earth, she facilitates research collaboration across the disciplines and promotes co-design of sustainability science with stakeholders. She is also Visiting Professor, Institute for Future Initiatives (IFI), The University of Tokyo.

Keynote Speech 1

Need for Reframing Nuclear Weapons as an Environmental Issue to Realize the Regional and Global Sustainability

Michiru NISHIDA¹

¹ Research Center for Nuclear Weapons Abolition, Nagasaki University, Nagasaki, Japan
michiru.nishida@nagasaki-u.ac.jp

Abstract - The biggest environmental problem facing humanity today is generally recognized to be climate change. However, many people do not realize that there is another critical issue that should rival climate change. It is the issue of nuclear weapons. The fear of nuclear weapons has been fading from people's memories since the end of the Cold War 30 years ago. However, the risk of nuclear weapons use is increasing without general recognition. The consequences of any use are catastrophic in today's increasingly complex international society. Particularly in Asia, where the distribution of power balance has shifted dramatically over the past decade and where there is no shortage of sparks of conflict, the risk of the use of nuclear weapons is higher than in any other region of the world. The impact would not be limited to Asia but would be global. The fact that the issue of nuclear weapons has been looked at primarily from the perspective of international politics and security may have contributed to the lack of public awareness. For the sake of regional and global sustainability, it is important to reframe the issue of nuclear weapons as an environmental issue. By having environmental experts address the issue of nuclear weapons as an environmental issue, for example by conducting environmental impact assessments of the manufacturing process and the use of nuclear weapons, the response of society to the issue of nuclear weapons can be more optimized and impactful.

Keywords: nuclear, environment, climate change, sustainability, public awareness, international politics and security

Dr. Michiru Nishida

Professor, Research Center for Nuclear Weapons Abolition, Nagasaki University, Japan



Michiru Nishida is a Professor at Research Center for Nuclear Weapons Abolition, Nagasaki University. He has long worked on arms control, disarmament and non-proliferation issues in the Government of Japan as Special Advisor for Arms Control, Disarmament and Non-Proliferation Affairs, including postings to the Embassy of Japan to the United States in Washington D.C., the Arms Control and Disarmament Division, the Delegation of Japan to the Conference on Disarmament, and the Non-Proliferation, Science and Nuclear Energy Division. Professor Nishida holds an MA in International Policy Studies with a certificate on non-proliferation from the Middlebury Institute of International Studies at Monterey and a Ph.D. (Law) from Hitotsubashi University.

Keynote Speech 2

Valuing Our Environment: Driving Decisions Today for A Sustainable Tomorrow

Leena SRIVASTAVA¹

¹ International Institute for Applied Systems Analysis, Laxenburg, Austria
srivastava@iiasa.ac.at

Abstract - The world today is faced with multiple, converging challenges. Our ability to meet climate goals and the sustainable development goals are, at the same time, inter-twined but effect different geographies and populations differently. A key research focus, that needs to be internalized and communicated effectively to all decision makers - including society at large, is the impact that the choices that we effect today will have on their future well-being. The body of research on monetary costs and benefits is fairly well established, and we are getting better at valuing the non-monetary costs and benefits of climate impacts and (in)action as well. However, this macro-analysis now needs to translate into implications on well-being at a local, or indeed individual, level. It is only then that we are likely to nudge entire systems into accelerating their transitions to more sustainable pathways. At the same time, the Agenda 2030 commitments that most countries have signed on to enjoin us to 'leave no one behind'. It is all the more imperative, therefore, that the choices we encourage do adequately value the non-monetary costs and benefits and explicitly take into account the equity implications of such choices.

Keywords: Agenda 2030, Climate goals, Non-monetary costs, Sustainable development goals, Well-being

Dr. Leena Srivastava

Deputy Director General for Science, International Institute for Applied Systems Analysis, Austria



Leena Srivastava is the Deputy Director General for Science of the International Institute for Applied Systems Analysis (IIASA), Austria. Prior to this, she was the Vice Chancellor of the TERI School of Advanced Studies, New Delhi – an interdisciplinary higher education institution, focused on sustainable development – since 2012. She has over three decades of research experience in the areas of energy, environment and climate change policies at The Energy and Resources Institute (TERI), including nearly nine years as its Executive Director. She has a Masters in Economics from the University of Hyderabad and a PhD in Energy Economics from the Indian Institute of Science in Bangalore, India.

Keynote Speech 3

Looking Over The Horizon: Systemic Risks, Social-Environmental Change, And Global Crises

Ilan CHABAY^{1,2}

¹ Institute for Advanced Sustainability Studies, Potsdam, Germany

²Arizona State University, USA

Ilan.chabay@iass-potsdam.de

Abstract - We are unfortunately still in a global crisis precipitated in late 2019 with the COVID-19 disease caused by the SARS-COV2 virus. We also see local, regional, and global impacts of past events, including the 2011 Tohoku earthquake, tsunami, and failure of the Daiichi Nuclear power plant. These events have had massive negative impacts on the local to global scale over multiple years with enormous cost to the well-being of millions of people and many billions of dollars. The critical challenge we face is learning from these past and current experiences, while simultaneously looking for systemic risks that may be out of sight just over the horizon. Could the risks coming upon us quickly overwhelm our capacities in planning, training, resources, and governance, thereby resulting in a major crisis? To avoid or mitigate and prepare for a crisis, we need forms of foresight for complex socio-environmental systems. The integrated human-environmental system contains multiple interdependent feedback loops distributed across spatial and temporal scales in which non-linear effects and tipping points result in fundamental uncertainty and indeterminate causality. The governance of systemic risk in a democratic context therefore involves not only knowledge of relevant technology, but equally it needs knowledge of cultural and contextual norms and values for inclusive decision making. This can be facilitated by awareness of and understanding of the narratives of future visions and social identities that arise from and influence community members. I will discuss new approaches to identifying and characterizing narratives of sustainability in traditional and digital media in US, European, and Japanese contexts. I will outline plans for a new open research hub formed with international partner institutions for catalyzing innovative thinking, research, and practice in understanding social factors shaping responses to sustainable futures and developing new approaches to modelling social dynamics for sustainability using narrative data.

Keywords: systemic risk, socio-environmental systems, foresight processes, crises, transboundary governance, cultural perceptions, narratives, sustainable futures

Prof. Ilan Chabay

Head of the Strategic Research Initiatives and Programmes, Institute for Advanced Sustainability Studies Potsdam, Germany



Ilan Chabay is Head of Strategic Science Initiatives and Scientific Project Leader of the KLASICA (Knowledge, Learning, and Societal Change Alliance) at the Institute for Advanced Sustainability Studies (IASS) in Potsdam Germany and Adjunct Professor in the School of Sustainability, Arizona State University. After his first ten-year career of innovative research in laser physics and chemistry, he became associate director of The Exploratorium Science Museum (San Francisco), then for 18 years founder and president of a Silicon Valley company that designed and produced interactive exhibitions for 230 museums around the world, including Disney, the Smithsonian, and NASA. In 2006 he began his current third career in sociology and sustainability science, focusing on understanding the narratives of vision and identity in communities and how they influence collective behavior change toward sustainable futures. In addition to research and 80+ publications in both natural and social sciences, he continues designing games to inspire people to reach for a more sustainable future.

Flash talks from young researchers

Facilitator

Prof. Kazuhiko Moji

Dean, School of Global Humanities and Social Sciences, Nagasaki University, Japan



Kazuhiko Moji is a human ecology specialist, having been the leader of the Ecohealth Project between 2007 and 2013 at RIHN, Kyoto, Japan. His team had carried out research mainly in Laos, Vietnam, Yunnan-China, and Bangladesh. He received his MA (1978) and Ph.D. (1987) in Health Sciences at the University of Tokyo. He was Research Associate at the Department of Human Ecology at the University of Tokyo, Associate Professor in the Department of Public Health, and Professor at the Research Centre for Tropical Infectious Diseases, Nagasaki University Institute of Tropical Medicine before joining RIHN. He also studied at Harvard School of Public Health and Cambridge University Department of Biological Anthropology. He joined Nagasaki University again in 2013, served as Dean of School of International Health Development, and launched the new graduate school of Tropical Medicine and Global Health. He is currently a Dean of School of Global Humanities and Social Sciences, Nagasaki University.

Flash talk

Co-designing Solutions to Recover from Cultural Eutrophication

Charissa FERRERA¹

¹ University of the Philippines Marine Science Institute, Quezon City, Philippines
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Abstract - Coastal problems such as cultural eutrophication due to mariculture require a transdisciplinary cultural approach in finding solutions to alleviate their negative effects on water quality, fisheries, and the economy. For more than two decades now, extensive farming of milkfish in pens and cages, and intensive and unregulated fish feeding practices have deteriorated the water and sediment quality in Bolinao, Philippines. Increased organic matter and nutrient concentrations in the water column have been the precursor for harmful algal bloom events cascading to hypoxia and fish kills. Despite the advances in monitoring environmental conditions and increase in the database of multidisciplinary efforts, translating this information to materials that will foster awareness, instill accountability, and encourage positive action has been lacking. Thus, five solutions that can be co-designed with stakeholders are being proposed to help address these gaps: 1) Cultural education through science communication products such as socio-environmental report cards, and creation of different science communication tools for different stakeholders; 2) Incorporation of human inputs into environmental models that will encourage recovery from eutrophication and ocean acidification; 3) Transdisciplinary research that includes livelihood through bioremediation technologies and incentivization; 4) Adaptive governance that takes into consideration site-specific science-based policies, and 5) Sustained engagement efforts with stakeholders in a defined timeline considering the socio-cultural and political context. To help achieve sustainable fisheries and resilient ecosystems and communities, efforts to engage communities in science communication activities should also be sustained. Scientists represent a small percentage of stakeholders and there is a bigger percentage of local communities that need to be encouraged to participate early on that will ensure behavioral change towards recovery from cultural eutrophication.

Keywords: cultural eutrophication, socio-environmental report cards, engagement, sustainability

Dr. Charissa Ferrera

Assistant Professor, University of the Philippines Marine Science Institute, Philippines



Dr. Charissa Ferrera is an Assistant Professor at the University of the Philippines Marine Science Institute (UP MSI). She obtained her PhD in Mechanical and Environmental Informatics at the Tokyo Institute of Technology, Japan, and Master of Science in Marine Science and Bachelor of Science in Chemistry degrees at the University of the Philippines. She started as a researcher on “red tide” or harmful algal blooms in 2005 and since then has been involved in multi-disciplinary research projects on chemical oceanography, marine biogeochemistry, eutrophication, ocean acidification, coral reefs, and blue carbon ecosystems. Recently, she is also engaged in trans-disciplinary research efforts through the development of science communication tools such as socio-environmental report cards. Dr. Ferrera is a recipient of various fellowship grants and scholarships and was awarded the L’Oréal-UNESCO For Women in Science Philippines National Fellow in 2018 and included in the Asian Scientist 100 list in 2019.

Flash talk

Insights on Religious Motivations for Environmental Advocacy at Universiti Malaya through the Green Mosque Living Lab Programme

Dr. Asmawati Muhamad

Senior Lecturer, Applied Science with Islamic Studies Programme, Academy of Islamic Studies, Universiti Malaya, Malaysia



Dr. Asmawati Muhamad received her PhD in Qur'an and Sunnah Studies from the International Islamic University Malaysia (IIUM) in 2014. She has developed her research interest in Islam and Sustainability Science while writing her PhD thesis entitled Abatement and Control of Environmental Degradation: The Qur'anic Paradigm. Since 2016, she has started to lead the Green Mosque Project at Academy of Islamic Studies, Universiti Malaya (UM) under the purview of UM Community & Sustainability Centre (UMCares). She is very much passionate to streamline the Green Mosque initiatives and religious community advocacy in interfaith dialogue on Islam and Sustainability. She is the founder and advisor to the student's volunteers club in UM, known as Ijarah Eco-Friends (IEF) that advocate eco-mosque community engagement programmes in Kuala Lumpur with the motto of 'Be Green, Be Exemplary.'

<https://umexpert.um.edu.my/asmawatimuhamad>

Flash talk

Science-Policy Pathways in Mongolia Through Interdisciplinary and Transdisciplinary approach

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Abstract - The National Committee for Future Earth Mongolia and Mongolian Academy of sciences (MAS) are initiated to support the Future Earth activities at national level by fostering the interdisciplinary and transdisciplinary projects through effective linking scientific outcomes with policy mechanisms including practical communities' participation, convening researchers from diverse disciplines who engage with societal actors (e.g. civil society, governments, private sector) in processes of adaptive learning to design, implement, and evaluate pathways to sustainability. Science policy linkage is requiring important formal infrastructure and active linking networks based on needs. In this point we are try to build up official working environment or formal structure unit at the MAS to link science to the policy making in Mongolia which manages or translate the outputs or results of scientific research to the policy-making level.

The National committee for Future Earth Mongolia and MAS are proposed to develop interdisciplinary and transdisciplinary research proposals to the National science foundation organization that may support the real projects including multi-stakeholders to work together on major societal challenges and problem solving through science-policy-business pathways.

Keywords: SDG's, inter and transdisciplinary approach, translate science to the policy.

Dr. Suvdantsetseg Balt

Administration and Planning Department, Mongolian Academy of Sciences, Mongolia



She is head of administration and planning department of Mongolian Academy of Sciences (MAS) and Secretariat of future Earth national committee for Mongolia. She obtained her PhD in Environmental governance science at Keio university, Japan (2012).

Her research mainly focuses on environmental policy studies especially in rangeland degradation related to nomadic pastoralism, Climate change adaptations and its impacts to the herding communities' livelihood in Mongolia and Inner Mongolia, China. Her main research expertise includes application of space and geospatial technologies in assessment of pastoral social ecological vulnerability, climate change impacts assessment, planning and its adaptation strategy, and sustainable development policy analysis. Currently she is managing leadership to contribute scientific outputs to the national policy making and implementations of international policies as such SDG's at Mongolian Academy of science.

Flash talk

Elucidation of Corporate Demand For Carbon Offset Credits for Carbon Dioxide Absorption by Forest Management: Taking Nagasaki Prefecture As an Example

Sunhee Suk¹, Takahiro Ota², Novelia Triana³

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Abstract - Japanese Government and 514 local governments have announced their commitment to net zero carbon emissions by 2050 (Saraff 2021). The movement toward the realization of society is accelerating. As a company, in order to reduce greenhouse gases, it may consider the optimal combination from multiple options such as reduction by energy saving in-house, introduction / expansion of clean energy, trading activities in the credit market, etc. based on cost effectiveness. Besides, promoting greenhouse gas reduction more efficiently and effectively for the industry, which accounts for a large part of emissions, may take into account for various economic mechanisms and policies based on market mechanisms have been introduced. In Japan has credit a credit certification system called J-credit, and credit is bought and sold in a voluntary manner. which is relatively cost-effective.

On the other hand, the economic benefits can be obtained by forest owners from the sale of carbon dioxide absorption credits through forest management which further to support sustainable forestry management and at the same time maintain ecosystem services from diverse forests. In the current situation where it is difficult to obtain sufficient income from forestry management, it is necessary to secure a new source of income and maintain the forest environment. This credit can be potential

Existing research has revealed that the degree of implementation of carbon management such as credit transactions by companies is strongly influenced by the price of credits and the degree of understanding of carbon management within the company (Suk 2018). However, regarding the demand of companies for absorption credits by forest management, it needs to figure out the demand of companies for various attributes of absorption credits by forest management before the credit market is active.

Keywords: Demand, Carbon offset credit, forest management

Ms. Novelia Triana

Graduate School of Fisheries and Environmental Science, Nagasaki University, Japan



I obtained Bachelor Degree of Forestry (2017) from University of Palangkaraya, Indonesia. Also I graduated my Master Degree in International master program of collaboration with Göttingen University and Dresden University at Vietnam National University of Forestry which focus on economic conservation research. Currently I am PhD student in Graduate School of Fisheries and Environmental Science, Nagasaki University. My research field and interests include environmental economics, valuation environmental service and climate change.

Flash talk

Incorporation Of Human Wellbeing In Urban Blue Spaces Planning As A Gateway For Urban Sustainability

Lam HUYNH¹ and Kensuke FUKUSHI²

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Abstract - Studies have explored the positive human wellbeing outcomes accruing from the use of and access to urban green/blue spaces through the provision of cultural ecosystem services (CES). CES contribute to human wellbeing through complex mechanisms, including improved physical activities, enhanced social relationships, attachment to the place, cultural fulfilment, and personal learning. Many local and national governments are increasingly identifying that investment in green/blue spaces can be a gateway for urban sustainability and a cost-effective measure to improve the wellbeing of urban residents, especially concerning physical and mental health. However, there are still many major gaps in our understanding of the complex mechanisms mediating CES and human wellbeing outcomes in urban context and how to effectively incorporate the concept of wellbeing in urban green/blue infrastructure management. Using a rapidly transforming urban coastal ecosystem due to tourism in Da Nang city in Vietnam, we explore (a) the different mechanisms in which CES from urban blue spaces contribute to human wellbeing and (b) how this information can be used for promoting urban sustainability. This is achieved through a combination of individual interviews and focus group discussions with residents and other stakeholders. The findings from the case study in Vietnam can have broader applicability to similar fast-paced urbanised cities in Asia and allow the exploration of potential causalities in the field of urban resources management.

Ms Huynh Thi Mai Lam

Master candidate, Graduate Programme of Sustainability Science and Global Leadership Initiative, the University of Tokyo, Japan



Lam Huynh is currently a Master student in Sustainability Science and Global Leadership Initiative at the University of Tokyo. She obtained her bachelor's degree in Sustainability and Environmental Management from the University of Leeds, the UK. She previously served as a public officer in the People's Committee in Vietnam from 2016 to 2019, specialising in urban planning and smart city development. She currently works on assessing the impacts of ecosystem services on human wellbeing. She also engages with research on mapping adaptation initiatives and assessing social vulnerability to climate change. Her research interests are evaluation of ecosystem services, human wellbeing assessment, urban planning and sustainability, and vulnerability and adaptation to climate change.

Flash talk

The Enablers and Barriers for Community -based Bamboo Industry Development in Ngada Regency, East Nusa Tenggara, Indonesia

Ms. Desy Ekawati

Student, Graduate School of Natural Resources and Environmental Management Study Program, IPB University, Indonesia



A doctoral student of the third year in the Graduate School of Natural Resources and Environmental Management Study Program, IPB University, Bogor, Indonesia. She completed her master's degree from the Graduate School of Earth and Environmental Science, Kagoshima University, Japan, and she graduated from the Faculty of Forestry, IPB University. She is a forester and serves as government officials under the Ministry of Environment and Forestry (MOEF) with 20 years of experience in the field and management works.

She started working on bamboo development in 2011 and became projects coordinator under the international cooperation of MOEF with the International Tropical Timber Organization (ITTO) in the year 2014-2017. She was continued as project coordinator for "community bamboo agroforestry" collaboration with ICRAF (the World Agroforestry Center) and ACIAR (Australian Center for International Agroforestry Research) in the year 2018-202. She was also co-founder of 1000 Bamboo Villages Movement in Indonesia in 2015.

Flash talk

Frequentist and Bayesian Approaches To Environmental Assessment

Tan Duc NGUYEN¹, Tomoaki ITAYAMA²

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Abstract - Environmental science includes many subfields and related fields, from ecology to mathematics and statistics. One of those fields, environmental assessment is important for appraising the environmental quality under increasing pollution pressures. Accurate environmental assessments are commonly performed by comparing a target in risks to that in good conditions. So far, the Frequentist statistics, such as t-test, ANOVA, and any other tests relative to the p value, have been applied widely for comparative aims, even though the misuse of those tests and their p values have also received many criticisms. Bayesian statistics, the most classical statistic, is being presently reconsidered as an alternative for the Frequentist approaches. Further, the computer era allows the Bayesian models can be run without limitations on computational complexity. To display the difference between Frequentist and Bayesian approaches in statistical comparison, we present the most underlying example relative to a two-sample t-test, which has been used widely in the environmental assessment field. Moreover, the advantages and disadvantages of the two approaches are also given. We find the Bayesian statistic can better interpret the comparative result than another approach and it may improve the accuracy of this result by synthesizing previous information elsewhere. The Bayesian statistic is thought to prevail over the Frequentist statistic in the 21st century in relation to the statistical models in most fields. Thus, gradual transformations in statistics used for the environmental assessment are required to adapt to today's increasing pollution.

Keywords: Bayesian statistic, environmental assessment, environmental pollution, Frequentist statistic

Dr. Tan Duc Nguyen

Researcher, Department of Science and Technology, Graduate School of Engineering,
Nagasaki University, Japan



Dr. Tan Duc NGUYEN

Researcher, Department of Science and Technology, Graduate School of Engineering, Nagasaki University, Japan

Flash talk

Two layers of ‘co-production’ in the science-policy interface

Dr Shinichiro Asayama

Senior Researcher, National Institute for Environmental Studies, Japan



Shinichiro Asayama is a Senior Researcher at Social Systems Division, National Institute for Environmental Studies, Japan. As an environmental social scientist, he studies the role of narratives and imaginaries in the societal debate around climate change. He is interested in understanding how people construct climate change as a narrative for social change (or non-change). His research is broadly focused on the politics of scientific knowledge and technological imaginaries in the science-policy interface of climate change. In particular, through interpretive and critical social science approaches, he studies the role of discourses, framings and narratives in shaping the public debates around the IPCC, carbon capture technologies and climate geoengineering.

Flash talk

Novel Strategic Approach to Investigate Mosquito Fauna Using Environmental DNA

Hiroki HASHIZUME^{1,2}, Tomonori HOSHI^{1,2}

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Abstract - Mosquito-borne diseases, including malaria and dengue fever, are one of the most important challenges for public health in resource-limited settings. Often, habitat expansions of these vector mosquitoes are caused by human activities and global climate changes, which eventually increases the chances of humans and animals becoming infected. Therefore, understanding mosquito-borne disease dynamics in relation to both human activities and natural environments is fundamental for disease control and prevention. However, classic surveillance methods for mosquitoes using dippers and pipets require numerous efforts in the field. More importantly, professional skills are needed to identify mosquitoes and incrimination of mosquito vectors. Medical entomologists are always eager to make this process fast and effective to deploy necessary measures (insecticide spraying and bed nets) in a timely fashion. For this aim, we focus on an application of environmental DNA (eDNA) for mosquito surveillance. The eDNA is a relatively novel approach that helps disclose whole animal species in collected water or soil samples. Currently, we successfully created an essential apparatus for filtering eDNA using a 3D printer, which enables us to reduce the fieldwork burden for eDNA samplings. Moreover, a method to preserve eDNA in good condition for a long-term at room temperature was developed to improve experimental efficiency. In this session, these progresses will be discussed and also one of the current ongoing works or eDNA metabarcoding using next-generation sequencing technology will be presented. We believe that our research progresses can contribute to eDNA research to accelerated in remote areas where sufficient laboratory facilities are lacking.

Keywords: Mosquito, Environmental DNA, Infectious disease, 3D printing, Next-generation sequencing

Mr. Hiroki Hashizume

PhD candidate, School of Tropical Medicine and Global Health, Nagasaki University, Japan



Hiroki Hashizume earned his Master of Science from Kobe University in Japan. He is currently in the third year of the School of Tropical Medicine and Global Health Ph.D. programme. He also belongs to the department of Eco-epidemiology, Institute of Tropical Medicine, Nagasaki University in Japan as a project researcher. His research interest lies in the area of infectious disease ecology in the field. Using molecular techniques or environmental DNA methods (a.k.a. eDNA), he attempts to develop novel survey methods and reveal dynamic changes in infectious disease distributions. By using eDNA methods, he is conducting three research topics across the world: mosquito ecology studies in Nagasaki, Japan, mycetoma (chronic fungal skin disease) in Sudan, and schistosomiasis (parasitic disease by blood flukes) in Lao PDR.

Flash talk

Engineering Development Of Corn Cob Derived Biochar For Fluoroquinolones-FQs Removal In Least Developed Countries

Obey GOTORE¹, Bao Trong DANG¹, Rameshprabu RAMARAJ², Yuwalee UNPAPROM³, Niwooti WHANGCHAI⁴, Thanh Bui XUAN^{5,6}, Hideaki MASEDA⁷, Tomoaki ITAYAMA^{1*}

¹ Nagasaki University, Nagasaki City, Japan

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Abstract - Biochar-inspired (BC) tertiary removal system is beneficial in preventing antibiotic residue discharged from hospital wastewater treatment. Taking advantage of a simple kiln controlled at around 600°C, we succeeded in carbonizing corn cobs to biochar with a surface area of 306 m²/g. The iodine adsorption fits the Langmuir model with the maximum adsorption of 2.42 mg/g and 2.04 mg/g for MB. The kinetic parameter of MB and Iodine was 0.59 hr⁻¹ and 0.13 hr⁻¹ respectively. Using ciprofloxacin (CIP), ofloxacin (OFL), and delafloxacin (DEL), we demonstrated the performance of the corn cob biochar for the sorption removal. The pseudo-second-order rate of DEL was lower than CIP and OFL. The maximum sorption capacity (Q_{max}) of 93.9 μg/g for DEL, 399.6 μg/g for CIP and 306.0 μg/g for OFL were estimated using the Langmuir model. The parameter KL relating to binding strength for DEL is 8 times larger than CIP and OFL. The Q_{max} could be mainly determined by the pore size distribution of the biochar and the dimensions of fluoroquinolones (FQs) considering hydration. Furthermore, we discussed that these results might relate to the number of halogen atoms and functional groups in the fluoroquinolones. Conversely, as for molecular size, it can be concluded as well that I < CIP < DEL as maximum capacity measurement precisely and apparently unveiled. By using the simple kiln, we succeeded in obtaining a corncob biochar with a large surface area. The results show that BC can bring an economic benefit to rural areas of developing countries for access to clean and safe water supply to achieve Sustainable Development Goal number 6.

Keywords: biochar, delafloxacin, fluoroquinolones, sorption, isotherm, kinetics.

Mr. Obey Gotore Student, Nagasaki University, Japan



OBEY GOTORE is currently a PhD student at Nagasaki University, Graduate School of Engineering undertaking Environmental Water Science program, majoring in adsorption materials for organic and inorganic removal from the water environment. His research interest mainly focuses of new, modernized, and low-cost biomass technologies in water and wastewater treatment for sustainable development and reuse in developing countries. Additionally, his research interest is extended to mass biomass production, nature-based methods (constructed wetlands), water and sanitation and irrigation engineering development. Had been a lecturer for more than five year at Harare Polytechnic, Zimbabwe before pursuing a master's degree with Nagasaki University in 2017. He has published one peer-reviewed paper in *Bioresources* journal in 2021. The researcher also joined international conferences including the 2nd Maejo-Engineo International Conference on Renewable Energy (MEICRE 2018-Thailand) and International Conference on Chemical, Biological and Environmental Engineering (Conference-FORA, Zimbabwe, 2021).

Flash talk

Transdisciplinary (TD) Research to Cope with Environmental Problems

Bonjun KOO¹

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Abstract - Environmental challenges are complex and interconnected with other social and economic issues. Thus, conventional environmental risk management approaches are often not sufficient to address the complexity of societal, environmental, and economic systems and their interactions. To cope with these environmental problems, the importance of integrated approaches is being emphasized in academia. Moreover, it is increasingly acknowledged that transdisciplinary (TD) approaches, or co-creation between scientists and societal partners, are useful in research projects on environmental problems for which science alone cannot provide a definite solution. In this respect, transdisciplinary research is attracting attention as a new research approach in sustainability science. Implementation of TD requires new research methodologies, that go beyond existing academic approaches, to integrate expertise of science and technology with the knowledge and experience of the field. In this talk, we review the significance and concept of transdisciplinary research and its tools and methods to effectively promote collaborative and environmental problem-solving.

Keywords: environmental problems, transdisciplinary approach, transdisciplinary research, co-creation, sustainability science

Dr. Bonjun Koo

Researcher, Research Institute for Humanity and Nature, Japan



Bonjun Koo is currently working as a researcher at the Research Institute for Humanity and Nature in Kyoto, Japan. He received his master's and doctoral degrees in Urban Management from Kyoto University. Previously, he worked for Global Green Growth Institute (GGGI) as Program Officer for green growth planning and implementation in Mongolia. He is interested in promoting participatory methods, including the use of narrative theory in understanding social dynamics in Mongolia and Japan.

Panel Discussion

Facilitator

Dr. Seita EMORI

Deputy Director, Earth System Division, National Institute for Environmental Studies, Japan



Seita Emori joined National Institute for Environmental Studies (NIES), Japan as Researcher in 1997 after completing his doctorate in the University of Tokyo. In 2018, he was appointed as a Deputy Director for Center for Global Environmental Research, which was renamed as Earth System Division in 2021. He has been working concurrently as the Head of Social Dialogue and Co-production Office since 2016. He is a lead author for the Intergovernmental Panel on Climate Change (IPCC) 5th and 6th Assessment Reports (AR5, AR6).

Research interest:

Global climate model development

Climate change projection with a focus on precipitation and its extremes

Linking climate modelling with impact assessment

Global climate risk assessment and management

Panelists

Dr. Michiru Nishida

Professor, Research Center for Nuclear Weapons Abolition, Nagasaki University, Japan



Michiru Nishida is a Professor at Research Center for Nuclear Weapons Abolition, Nagasaki University. He has long worked on arms control, disarmament and non-proliferation issues in the Government of Japan as Special Advisor for Arms Control, Disarmament and Non-Proliferation Affairs, including postings to the Embassy of Japan to the United States in Washington D.C., the Arms Control and Disarmament Division, the Delegation of Japan to the Conference on Disarmament, and the Non-Proliferation, Science and Nuclear Energy Division. Professor Nishida holds an MA in International Policy Studies with a certificate on non-proliferation from the Middlebury Institute of International Studies at Monterey and a Ph.D. (Law) from Hitotsubashi University.

Dr. Leena Srivastava

Deputy Director General for Science, International Institute for Applied Systems Analysis, Austria



Leena Srivastava is the Deputy Director General for Science of the International Institute for Applied Systems Analysis (IIASA), Austria. Prior to this, she was the Vice Chancellor of the TERI School of Advanced Studies, New Delhi – an interdisciplinary higher education institution, focused on sustainable development – since 2012. She has over three decades of research experience in the areas of energy, environment and climate change policies at The Energy and Resources Institute (TERI), including nearly nine years as its Executive Director.

She has a Masters in Economics from the University of Hyderabad and a PhD in Energy Economics from the Indian Institute of Science in Bangalore, India.

Prof. Akimasa Sumi

Professor Emeritus, The University of Tokyo, Japan

Project Professor, The University of Tokyo Institute for Future Initiatives, Japan



He was born in 1948 at Gifu City. He entered the University of Tokyo in 1967 and graduated from the department of Physics in 1971. After a two-year master course, he joined the Japan Meteorological Agency. He got a D.Sc from UT in 1985 and moved to UT as an associate professor in the department of geophysics. In the University, he was engaged in many research fields, such as ENSO related research, and model development projects. He established CCSR (Center for Climate System Research) in 1991 and also engaged in Sustainability Science Project in 2001. He retired in 2013 and now is a Professor Emeritus. He is a former President of the National Institute of Environmental Studies (NIES).

Prof. Shobhakar Dhakal

Vice President, Asian Institute of Technology, Thailand



Professor Shobhakar Dhakal is a professor and Vice President (Academic Affairs) of Asian Institute of Technology (AIT) in Thailand. He is also a Coordinating Lead Author (CLA) of IPCC's Sixth Assessment Report (Mitigation) and a member of Scientific Steering Committee of Global Carbon Project. He was CLA of IPCC's Fifth Assessment Report (Mitigation), and also co-led Second Assessment Report of on Climate Change in Cities of the Urban Climate Change Research Network. In the past, he served as Dean of School of Environment Resources and Development of AIT, Executive Director of Global Carbon Project in Japan, Research Scholar of International Institute for Applied Systems Analysis in Austria, and Senior Policy Researcher of Institute for Global Environmental Strategies in Japan. Prof. Dhakal received his Ph.D. from the University of Tokyo.

Dr. Yasuko Kameyama

Director, Social Systems Division, National Institute for Environmental Studies, Japan



Dr. Yasuko Kameyama is Director of Social Systems Division, National Institute for Environmental Studies in Japan. Her background is international relations, and her main research topic has been on climate change regime building, and on sustainable development. She is appointed to various committees and councils related to environmental policies at national and prefectural levels, including those under Tokyo Metropolitan Government. One of her recent publications is Climate Change Policy in Japan: From the 1980s to 2015, from Routledge (2017).

Summary of the Day 1

Dr. Fumiko Kasuga

Global Hub Director - Japan, Future Earth, and Senior Fellow, National Institute for Environmental Studies, Japan



After graduated from and received Ph.D. from The University of Tokyo, Dr. Fumiko Kasuga has been working on food safety risk assessment and epidemiology of foodborne diseases, as a government researcher in the Ministry of Health, Labour and Welfare (MHLW) of Japan. Formerly, she was a Director at the National Institute of Health Sciences. Internationally she worked with WHO and FAO as a technical advisor. When she served as Vice-President of Science Council of Japan in charge of international activities (2011-2014), she helped inviting a part of the Future Earth global Secretariat to Japan. At Future Earth, she facilitates research collaboration across the disciplines and promotes co-design of sustainability science with stakeholders. She is also Visiting Professor, Institute for Future Initiatives (IFI), The University of Tokyo.

Closing Remarks of Open Symposium

Prof. Takeshi Nagayasu, M.D., Ph.D.

Trustee, Nagasaki University



Prof. Nagayasu is a Trustee of Nagasaki University. He received his medical degree and Ph.D. from the Nagasaki University School of Medicine in 1987 and 1996. He started his career as a thoracic surgeon in the Department of Surgical Oncology while teaching in the Graduate School of Biomedical Sciences Nagasaki University. His research interests include lung cancer surgery and molecular oncology, bronchoplasty and tracheoplasty, lung transplantation, regeneration of trachea and lung, and development of medical devices. Currently, he leads Medical-Engineering Hybrid Professional Training Center as the Director. In addition, he has served as Director of the Nagasaki University Hospital for 2009- 2017 and Dean of School of Medicine for 2017-2019. Since 2019, as the current trustee, he has been dedicated to promoting research activities, social cooperation, and strategic planning at Nagasaki University.

Day 2 Expert Sessions

Welcome Greetings

Prof. Hein Mallee

Deputy Director-General, Research Institute for Humanity and Nature, Japan



Hein Mallee is a social scientist based at the Research Institute for Humanity and Nature in Kyoto, Japan. He has worked as a researcher, funder, and practitioner in China, Southeast Asia and Japan for the past 25 years. His work is usually interdisciplinary/ intersectional and evolves around themes such as poverty alleviation, rural development, natural resource management, and emerging infectious diseases. He is the Director of the Regional Center for Future Earth in Asia.

Expert Session 1: Valuing Environment

Session Organizer / Rapporteur

Prof. Chieko Kondou

Professor, School of Engineering, Mechanical Engineering Program, Nagasaki University, Japan

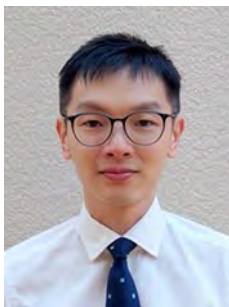


Prof. Kondou is a professor at Nagasaki University. She was an engineer at Hitachi Appliances, Inc. from 2002 to 2009. In this period, she received her Ph.D. from Kyushu University. She then worked as a visiting scholar at the University of Illinois Urbana-Champaign for 2009-2010, where she studied the heat transfer of natural refrigerants near the critical point. She had appointed an assistant professor at Kyushu University in 2011, where she studied heat transfer and energy performance analysis for low-global warming potential refrigerants. She joined Nagasaki University in 2015. She teaches thermodynamics and heat transfer while conducting research projects on the measurement and prediction of the physical properties of new refrigerants.

Chairperson

Dr. Chris Fook Sheng NG

Associate Professor, Graduate School of Medicine, The University of Tokyo, Japan



Chris Fook Sheng Ng obtained his Bachelor of Science from the University of Nebraska-Lincoln, Master of Applied Statistics from the University of Malaya, and PhD in Health Science from the University of Tokyo. His research interest is in the field of environmental epidemiology, where he studies the effects of air pollutants, meteorological factors and global environmental changes on human health. Currently he is collaborating internationally to investigate the health effects of exposure to desert dust.

Expert Session 1

Valuing Environment: Developing Countries Perspective And Intergeneration Issues In Indonesia

Arif SATRIA¹

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Abstract - Understanding the complexity of human nature interactions requires transdisciplinary approaches in order to produce suitable strategic solution. As we know that environmental value as both a system and a pillar of sustainability can be perceived differently by diverse stakeholders. In particular, Indonesia as a developing country with a very significant proportion of productive ages in its demographic structure and cultural differences faces great challenges on how to close the gap in the understanding of environmental values including the inter-generation issues. Based on sustainability sciences, IPB and its network strive for addressing the gap through co-creation of knowledge including modern and traditional that is generated based on a transdisciplinary approach that moves beyond just blending disciplines. This paper will present selected approaches addressing the above-mentioned issues that links concepts, knowledge and perspectives through a real-world context in Indonesia.

Keywords: sustainability, environmental value, knowledge, strategic solution

Dr. Arif Satria
Rector, IPB University, Indonesia



Prof. Arif Satria is the Rector of IPB University (a.k.a. Bogor Agricultural University). He previously served as Dean of the IPB Faculty of Human Ecology (2010–2017) and as a lecturer in the Department of Social Economics for Fisheries. He served as Chairman of the Indonesian Rectors' Forum 2020 - 2021. In 2012, he also served as an adviser to Indonesia's Minister of Marine and Fisheries. Since 2002, Prof. Arif Satria has been actively involved in the development of marine and fisheries policies, including the development of the Blue Economic Concept and a number of Government and Ministerial Regulations. He visited the University of British Columbia in Canada as a visiting fellow. He earned a bachelor's degree in socioeconomics from IPB University's Faculty of Agriculture and a master's degree in rural sociology from the same institution. He earned a PhD in Marine Policy from Kagoshima University in Japan

Expert Session 1

Payments for Ecosystem Services in the context of free-living animal farming: A case of swallow nests and peat swamp forests in Indonesia

Takahiro OTA¹

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Abstract - Swallow nests are traditional medicinal or supplement food in China and it attracts many people in south east Asian countries now. Production or harvest of Swallow nests is rapidly increasing in Indonesia. Indonesian nests have high prestige due to beautiful and cheap. White-nest Swiftlet (*Aerodramus fuciphagus*) makes its nest by its saliva in large cave originally. Nowadays, large concrete building, called swallow building, is built for its breeding place. Like honey production using honey bee, this farming of free-living animal is dependent on surrounding natural environment, i.e. enough flying-insects for its food material. In this presentation, I suggest financial payment system for providing swallow nests from peat swamp forest by beneficiaries, who are building owners. This payment can support forest manager or local people fighting against forest fire, resulting in sustainable production of swallow nests. I focus on two existing systems, which can be prototype of payment system. One is taxation and the other is local cooperation system. An awareness survey asking potential view of these payment systems can reveal feasibility of this payment system and further requirement for implementation. I would like to discuss future direction of theorizing harmonization between free-living animal farming and environment conservation.

Keywords: forest conservation, PES, forest fire, taxation, community business

Dr. Takahiro Ota

Associate Professor, Faculty of Environmental Science, Nagasaki University, Japan



2015- Current position

2013-2014 Assistant professor, College of Policy Science, Ritsumeikan University

2010-2012 Doctor course, Civil engineering, Nagoya University (Dr. of Engineering)

Expert Session 1

Expanding Scope of Integrated Assessment Models for Climate Policy Analyses

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Abstract - For global scale analyses of climate policies, quite a few Integrated Assessment Models (IAMs) have been developed and employed since early 1990s. While most global IAMs are classified into one of the two model categories, benefit-cost IAM (BC-IAM) and detailed process IAM (DP-IAM), a common feature of them is that each model contains a module for evaluating GHGs emission and mitigation cost. On the other hand, in general, DP-IAMs, that are equipped with sectoral climate impact modules with finer spatial resolution, tend to describe climate impacts more elaborately than BC-IAMs, that is usually equipped with simplified climate impact cost functions. For supporting policymaking processes better, research teams in the world have been making efforts to improve comprehensiveness and level of detail of climate impact modules in DP-IAMs, although consideration of inter-relationships among different impact sectors, impacts of extreme weather events, and consequences of large-scale discontinuity of the earth system are still limited. With the improved description of climate impacts, for example, we can specify climate impacts to be focused for each region better than before. Recently, attention to inter-relationships between climate policies and sustainability development policies has been increasing and the existing IAMs are also expected to enhance their functions for evaluating the inter-relationships. Under the collaboration with universities and research institutes in Japan as well as in other countries in Asia, NIES has been developing an IAM called the Asia-Pacific Integrated Model (AIM) and is making efforts to improve it for sufficing the expanding policy needs mentioned above. In the forum session, the speaker will introduce recent updates of AIM for global analyses of climate impacts and implications of climate policies on global sustainability.

Keywords: Integrated Assessment Model, climate impact analyse, inequality, global sustainability, climate policy

Dr. Kiyoshi Takahashi

Deputy Director, Social Systems Division, National Institute for Environmental Studies, Japan



Kiyoshi Takahashi earned a B.S. in the Department of Sanitary and Environmental Engineering and a Ph.D. in Engineering from Kyoto University. He started to work for NIES in 1996 and has been engaged in the development of the Asia-Pacific Integrated Model (AIM) since then. He is in charge of the development of global impact analyses modules in AIM. Regarding the experiences in international collaborative activities, he was a lead author for IPCC-AR4-WG2 (Chapter 17: Assessment of adaptation practices, options, constraints and capacity), IPCC-SREX (Chapter 4: Changes in impacts of climate extremes: human systems and ecosystems) and IPCC-AR5-WG2 (Chapter 19: Emergent risks and key vulnerabilities). He is also a committee member of for ICONICS (International Committee on New Integrated Climate change assessment Scenarios). His current research focuses on the integrated analyses of climate policies for simultaneous realization of the Paris Agreement and the SDGs.

Website: <https://www.nies.go.jp/researchers-e/100053.html>

Publications: <https://www.researchgate.net/profile/Kiyoshi-Takahashi-3>

Expert Session 1

The Food System And Climate Change: Valuing Public Health and the Planet

Alan DANGOUR^{1,2}

¹ Wellcome Trust, London, UK

² Formerly London School of Hygiene & Tropical Medicine, London, UK

Abstract - The impact of current and projected climate change on the food system has the potential to be profound and wide-reaching. Environmental changes are projected to significantly affect global crop yields, livelihoods, nutrition and health outcomes as well as social cohesion and stability. While the poorest people in the poorest countries will be most affected, it is clear that the impacts of climate change on food systems will be felt globally. United Nations and agricultural research organisations regularly provide reassuring updates on progress towards delivering sustainable and healthy diets for all, but these statements can frequently seem divorced from much of the on-the-ground reality. Using evidence and new analyses from selected case studies, this presentation will focus on the interactions between the environment, food systems and health identifying significant areas of concern and areas of hopeful progress. This presentation will make the case that both public health and the planet must be valued to respond to the largely predictable future impacts of climate and environmental change.

Keywords: Public health; food systems; climate change; environmental change

Prof. Alan Dangour

Professor, Food and Nutrition for Global Health, London School of Hygiene and Tropical Medicine, United Kingdom



Alan is Professor of Food and Nutrition for Global Health and Director of the Centre on Climate Change and Planetary Health at the London School of Hygiene & Tropical Medicine.

Alan's research focusses on the connections between the environment, food systems and health. Alan runs a large portfolio of interdisciplinary and intersectoral research with an international focus that he has developed with an exciting team of researchers with expertise in epidemiological and mathematical modelling, soil and agricultural science, environmental assessment, climate science, nutrition and health.

From 17th January 2022, Alan is Director of Climate and Health at the Wellcome Trust.

Expert Session 2: Net zero GHG emissions by 2050 in a complex world with stakeholders

Session Organizer

Dr. Hiroshi Tanimoto

Head, Global Atmospheric Chemistry Section, Earth System Division, National Institute for Environmental Studies, Japan



Hiroshi Tanimoto is the Head of Global Atmospheric Chemistry Section at National Institute for Environmental Studies (NIES) in Tsukuba, Japan. He received his PhD in Chemistry from The University of Tokyo in 2001. Dr. Tanimoto has been working in the field of atmospheric composition in Asia and Oceania regions. His group develop techniques for measuring and modeling trace gases and aerosols of atmospheric importance, make laboratory experiments to reveal the formation and reaction mechanisms, observe spatial and temporal variations using ground-based, ship, aircraft, and satellite platforms, and simulate emissions, transport, transformation, and deposition processes. He currently serves as the co-chair of IGAC-MANGO and CEOS AC-VC, and previously served as the co-chair of the IGAC project.

Session Organizer/Rapporteur

Dr. Giles B. Sioen

Science Officer at Future Earth and Research Associate at the National Institute for Environmental Studies, Japan



Dr. Giles B. Sioen Co-Leads the Research and Innovation team at Future Earth, which consists of 27 Science Officers corresponding to 27 Global Research Networks. In addition, he coordinates the Future Earth Urban and Health Knowledge-Action Networks, conducts research, and supports a range of domestic projects and activities. His research focuses on the development of a transdisciplinary system-based guideline to reduce the impact of climate change and other disasters on cities and health. Before joining Future Earth, he worked as a project researcher at the Graduate School of Frontier Sciences of the University of Tokyo in collaboration with Massachusetts Institute of Technology - System Design and Management Program. Dr. Sioen holds a Ph.D. in Sustainability Science from the University of Tokyo, a Master's degree in Urban Planning and Design from KU Leuven (Luca-Arts, campus Ghent), and a Bachelor's degree in Garden and Landscape Architecture from University College Ghent.

Chairperson

Dr. Yasuko Kameyama

Director, Social Systems Division, National Institute for Environmental Studies, Japan



Dr. Yasuko Kameyama is Director of Social Systems Division, National Institute for Environmental Studies in Japan. Her background is international relations, and her main research topic has been on climate change regime building, and on sustainable development. She is appointed to various committees and councils related to environmental policies at national and prefectural levels, including those under Tokyo Metropolitan Government. One of her recent publications is *Climate Change Policy in Japan: From the 1980s to 2015*, from Routledge (2017).

Expert Session 2

China's Energy and Economy Transition towards to the Carbon Neutrality Target

Dr. Jiang Kejun

Senior Researcher, Energy Research Institute, Chinese Academy of Macro-Economic Research, China



Kejun Jiang's research focus is energy, climate change mitigation and air pollution prevention policy assessment by using IPAC modeling, to support national five year plans, and long-term planning. He began his research in ERI from 1990, and led the development of Integrated Policy Assessment Model for China(IPAC). IPAC modeling team is now a leading research team on China's 2050 energy transition studies by providing benchmark research results. He also was LA and CLA for IPCC reports, and authors of WEOs, Emission Gap reports by now.

Expert Session 2

Exploring Global Carbon-Neutrality and Cobenefit-Tradeoff Effects on non-CO2 Emissions Projections

Tatsuya HANAOKA¹

¹ National Institute for Environmental Studies, Tsukuba, Japan
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Abstract - In the 26th UN Climate Change Conference (UNFCCC) of the Parties (COP26) in 2021, the international target “to pursue efforts to limit the temperature increase to 1.5 degree Celsius above pre-industrial levels by the end of this century” (so-called “1.5°C target”) was adopted among UNFCCC parties. The Carbon-Neutrality is the essential direction to achieve the 1.5 C target. This study explored the global carbon-neutral pathways by considering the difference in decarbonization measures and those timings among developed and developing countries, and evaluated the effects of cobenefits and tradeoffs in reducing emissions of Short-Lived Climate Forcers (SLCFs), air pollutants and mercury (Hg) due to decarbonization measures for achieving the carbon-neutral target. The AIM/Enduse[Global] model, a multi-regional and sectoral bottom-up type optimization model, was used to analyze global and regional emissions and mitigation potentials of CO₂, SLCFs, air pollutants, and Hg. The results showed that even if CO₂ emission pathways are similar toward the carbon-neutral target, SLCFs and air pollutants emissions pathways and mitigation potentials vary widely depending on different combinations of key mitigation measures. It is expected to reduce a certain amount of SLCFs and Hg emissions as cobenefit effects due to decarbonization measures. However, there are particular limitations of cobenefit effects. For example, the cobenefit effects in reducing Hg emissions will reach the ceiling at about 60% compared to the reference scenario in the OECD developed countries, even if CO₂ emissions reach the nearly 100% reduction by 2050. For another example, bioenergy with carbon capture and storage (BECCS) is one of the essential measures for achieving carbon neutrality. However, if BECCS is drastically introduced and operated inefficiently without attaching devices to remove black carbon (BC) and Hg emissions, BECCS may become a factor to trigger tradeoff effects in increasing BC and Hg emissions.

Keywords: Carbon Neutrality, Cobenefit and Tradeoff, Long-Lived Greenhouse Gases, Short-Lived Climate Forcers, Air Pollutants, Mercury, Paris Agreement, Minamata Convention

Dr. Tatsuya Hanaoka

Head, Global Sustainability Integrated Assessment Section, Social System Division,
National Institute for Environmental Studies, Japan



Dr. Tatsuya Hanaoka is the head of the global sustainability integrated assessment section in the social system division at NIES. He is one of members of the AIM (Asia-Pacific Integrated Model) team and has been in charge of developing the bottom-up type model, named the AIM/Enduse model, from the global to national level, especially focusing on Asia regions. His key research interests are 1) multi-regional and multi-sectoral bottom-up modeling, 2) emissions scenarios on GHGs (Greenhouse Gases), SLCFs (Short-Lived Climate Forces), air pollutants, ODSs (Ozone Depleting Substances) and heavy metal, etc., 3) co-benefits and trade-off analyses on emissions mitigations and those impacts due to different combinations of mitigation measures, and 4) impacts of behavior changes on service demand projections and sustainable development.

Expert Session 2

Decarbonizing Indonesian FOLU toward Net Zero Emission

Rizaldi Boer¹, Lukytawati Anggraeni¹, Annuri Rosita¹, and Gito Sugih Immanuel¹

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Abstract - Indonesia has submitted its long-term strategy to reach net zero emission by mid of this century. Role of forest and land use (FOLU) sector is key in the LTS. In the LTS vision, Indonesia is pursuing to deep decarbonize FOLU sector, changing the emission status of the sector from the biggest emission contributor to net sink by 2030. Several key policies to make such transformation have been issued. Among others, key policies for transformation include the forest and peatland moratorium and sustainable land use management, social forestry, multi permit scheme for forest concessions, mandatory certification for sustainable forest management and oil palm plantation, sustainable jurisdiction and carbon pricing policy.

Keywords: Long-term strategy, net sink, FOLU, carbon pricing

Prof. Dr. Rizaldi Boer

Executive Director, Centre for Climate Risk and Opportunity Management, IPB University, Indonesia



Rizaldi Boer is a Professor at the IPB University, Indonesia and currently Executive Director of Centre for Climate Risk and Opportunity Management in Southeast Asia and Pacific of IPB University. He received doctoral degree from University of Sydney, Australia in 1994. He has been working on climate change mitigation and adaptation, particularly on agriculture, forest and other land uses since 1998. He involved in many international scientific teams, national research missions and several scientific projects of the United Nations and high-level global players. He had been appointed as Chairperson of the RA-V Region Agricultural Meteorology Working Group (2002-2009) for WMO and member of the Task Force Bureau for the IPCC Greenhouse Gas Inventory (2008-2015), and now serves as Chairman of the Expert Board of the Indonesian Agriculture Meteorology Society, as well as Member of the Advisory Board for the Asian Greenhouse Gas Inventory Working Group (WGIA), and the Asian Low Carbon Research Network (LoCaRNet).

Expert Session 2

Global Carbon Budget: Implications of the latest observations and simulations of the global Carbon Cycle

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Abstract - The Global Carbon Project (GCP) is established in 2001 and joined Future Earth as one of the global research projects since 2015. It is also a research partner of the World Climate Research Programme and has international offices in Canberra, Australia (hosted by CSIRO) and Tsukuba, Japan (hosted by NIES). Its mandate is to promote collaboration among international researchers to develop a complete picture of the global greenhouse gases cycle and its interaction with human activities and the Earth system. The implementation strategy of the GCP is organized around three science themes, namely patterns and variability, processes and interactions, and carbon management. Its key contributions include global budgets for three dominant greenhouse gases — carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O) — and complementary efforts in urban, regional, cumulative, negative emissions and in quantifying the impacts of the pandemic containment measures and CO₂ emission. Its most recent publication, the Global Carbon Budget 2021, is the 16th edition of the annual update of the budget and was presented at the United Nations Framework Convention on Climate Change (UNFCCC) climate summit COP26 in Glasgow. Other key contributions of the group are the Global Carbon Atlas and the emission interactive. In this presentation, we will present the key findings of the latest budget, which include: Global fossil CO₂ emissions in 2021 are set to rebound close to their pre-COVID levels after an unprecedented drop in 2020 and the emissions of the major emitters, such as India and China appear to return to pre-COVID trends. The implications of the findings and the need for immediate action and global coherence in the world's response to climate change will also be discussed.

Keywords: Greenhouse gases, emission, budget, international collaboration

Dr. Tomoko Shirai

Head, Global Carbon Project Tsukuba office, National Institute for Environmental Studies, Japan



Tomoko Shirai finished her PhD in the department of chemistry, Graduate school of science at the University of Tokyo. Thereafter, she worked as an engineer at the Earth Observation Research Center of National Space Development Agency of Japan (currently JAXA). Since February 2002 she joined the Roland/Blake laboratory of the chemistry department at University of California, Irvine as an associate research specialist. She joined National Institute for Environmental Studies in 2004. Her main research interest has been environmental impact of atmospheric trace gases, especially greenhouse gases (CO₂, CH₄, N₂O,...), halocarbons and nonmethane hydrocarbons (NMHCs). She also fosters open science as the head of Office for Global Environmental Data Integration and Analytics. She is appointed head of GCP (Global Carbon Project) Tsukuba office since April 2021.

Expert Session 3: Systemic Risks

Session Organizer/Chairperson

Prof. Hein Mallee

Deputy Director-General, Research Institute for Humanity and Nature, Japan



Hein Mallee is a social scientist based at the Research Institute for Humanity and Nature in Kyoto, Japan. He has worked as a researcher, funder, and practitioner in China, Southeast Asia and Japan for the past 25 years. His work is usually interdisciplinary/ intersectional and evolves around themes such as poverty alleviation, rural development, natural resource management, and emerging infectious diseases. He is the Director of the Regional Center for Future Earth in Asia.

Rapporteur

Dr. Ria Adoracion Lambino

Specially Appointed Associate Professor, Research Institute for Humanity and Nature, Japan



Ria Lambino is based at the Research Institute for Humanity & Nature (RIHN) in Kyoto as Specially Appointed Associate Professor. She received her PhD and Masters from Kyoto University Graduate School of Global Environmental Studies. She has a degree in Applied Physics but has spent most of her professional career as a practitioner and researcher focusing on environmental conservation and sustainability, with significant experience in the Philippines and in Japan. Prior to joining Future Earth, she worked for WWF Philippines as Vice President for Sustainable Production and Market Engagement and had been involved in transdisciplinary research on watershed governance at RIHN. Her research interests include environmental policy and governance, protected areas & management, renewable energy, water issues, sustainable agriculture & fisheries and sustainable consumption and production.

Expert Session 3

Disaster Risks, Associated Systemic Risks, and Ecosystem-based Solutions

Takehito YOSHIDA^{1,2}

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Abstract - Climate change has been increasingly causing disasters such as riverine and coastal floods in lowlands and landslides and mudflows in mountainous areas in Japan and other countries. Extreme weather is certainly one aspect of the causes, but urbanization and economic development are the other aspect causing devastating impacts on human systems, inducing the systemic risks associated with disasters. At the same time, countermeasures against disasters sometimes create tradeoffs between disaster risk reduction and functions of natural and human systems. As an example, large-scale dams and dykes have been criticized because of their negative impacts on river and coastal ecosystems and livelihoods closely related to their ecosystem services. Thus, countermeasures against disasters can also lead to systemic risks. Solutions for reducing disaster risks without inducing systemic risks in natural and human systems contribute to the sustainability of human society, and ecosystem-based approaches can be one of the such sustainable solutions. Ecosystem-based disaster risk reduction (Eco-DRR) takes advantage of the multi-functionality of ecosystems and biodiversity, including their capacity to mitigate disasters while providing multiple ecosystem services. For example, in the Mikatagoko Lakes area in Fukui, Japan, traditional land use helps to reduce inundation damage of houses and, at the same time, conserve biodiversity and ecosystem services including local food culture. In the Hira mountains area in Shiga, Japan, landslides and mudflows descending steep slopes are averted by traditional infrastructures such as stone walls made of locally produced materials and forests harboring diverse organisms. High-quality stone materials delivered by landslides support the local industry and local culture associated with the stones. Coping with disasters in the era of climate change is a big challenge in the present and future human society, but achieving it without inducing systemic risks is a bigger challenge. My talk stresses that ecosystem-based approaches have a pivotal role as one of their sustainable solutions.

Keywords: disasters, climate change, ecosystem-based approaches, ecosystem services, traditional knowledge, local culture

Dr. Takehito Yoshida

Associate Professor, Research Institute for Humanity and Nature & Department of General Systems Studies, University of Tokyo (jointly affiliated), Japan



Takehito Yoshida is an ecologist and limnologist who studies diversity and complexity of organisms and ecosystems from the viewpoints of adaptation and system dynamics, and explores human-nature interactions and sustainability in local communities in Japan. Trained in Kyoto University (PhD) and Cornell University (postdoc), he was a member of the faculty at the University of Tokyo at Komaba before assuming joint appointments at RIHN and the University of Tokyo. At RIHN, he is leading a transdisciplinary research project entitled “Research and Social Implementation of Ecosystem-based Disaster Risk Reduction as Climate Change Adaptation in Shrinking Societies”.

Expert Session 3

Pandemic Risks-Drivers of Disease Emergence and Spread

Chadia WANNOUS¹

¹ Steering Committee member, Future Earth Health Knowledge Action Network
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Abstract - The underlying causes of pandemics are the same global environmental changes that cause biodiversity loss: land use and climate change, agricultural expansion, and the wildlife trade. Rampant deforestation, uncontrolled expansion of agriculture, intensive farming, mining, and infrastructure development, as well as the exploitation of wild species have created a ‘perfect storm’ for the spillover of diseases from wildlife to people. This often occurs in areas where communities live that are most vulnerable to infectious diseases. This is in addition to two important factors of disease spread: unregulated trade in wild animals and explosive growth of global air travel(<https://ipbes.net/covid19stimulus>). Socioeconomic changes affect human health and well-being. These are the processes that frame and shape the relationships between people and their environment, with subsequent impacts on global health, include how societies function and organize themselves, use land and natural resources, and manage health, water, and sanitation calling for bigger societal transformations to address these risks. The research on economic transition and relation to pandemics highlights the value of research that recognizes and prioritizes the interdependencies between economic growth and global risks, as failing to mainstream the relationship between economy and nature and health in decision-making can lead to severe economic stress over shorter and longer time periods. It also emphasises concerns for equity and equality within and across countries that are overshadowing economic transitions (WHO 2014). This needs massive transformation in the energy, transport, and urbanizations sectors. As Climate change further complicates the urbanization and other challenges, we need urgently to combat climate change. A critical call for all countries to identify, implement, and institutionalize enabling conditions for green and blue technologies that minimize greenhouse gas emissions and air pollution for a sustainable future for all.

Dr. Chadia Wannous

Steering Committee Member, Health Knowledge-Action Network, Future Earth, Sweden



Dr. Wannous is a public health professional with over twenty years of experience in health emergencies preparedness and response and risk reduction and strengthen the resilience of communities and systems. Dr. Wannous coordinated the implementation of the health components of the Sendai Framework for Disaster Risk Reduction and led the Science and Technology Partnership and Advisory Group at the UN Office for Disaster Risk Reduction (2015-2017). She was the Senior Policy Advisor to the UN Special Envoy on Ebola response in West Africa (2014-2015) and to the UN System Influenza Coordination (2011-2015). She is the coordinator of the Toward a Safer World (TASW) Network- for Pandemic Preparedness’ since 2011. She is member of the Steering Committee of the Future Earth Knowledge Action Network on Health, and the Scientific Committee of EcoHealth Alliance One Health project. Dr. Wannous is also member of the IPBES Expert Group on biodiversity and pandemics report.

Expert Session 3

Global Environmental Crisis and Financial Risks

Junya TANI

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Abstract - The settlement and credit creation function of the finance (the banking system) is the premise of all economic activities and its dysfunction is fatal to our entire economy. “The systemic risk” in the finance refers to the risk related to this financial function where part or whole of the financial system will be destabilized by the chained dysfunctions caused by the failure of certain financial institutions, markets, or settlement systems. Recently, the Lehman shock in 2008 was a prime example. Besides the function mentioned above, the finance (the capital market) has other functions of linking savings (fund surplus) and investments (funding needs) and redistributing economic risks through transactions of financial instruments (stocks, bonds, loans, etc.), thereby making the economy more efficient and growing. In there, while investment risks can usually be mitigated through diversified investment, such factors as large-scale conflicts/wars, environmental crises, political situation, interest rate fluctuation, or economic crises lead to instability of the entire market that cannot be avoided by diversified investment. This is referred to as “the systematic risk”. Today, the globally linked financial markets can instantly reflect various risk events and destabilize the entire global economy to undermine the welfare of humanity. In this context, the global environmental crisis to cause various socio-economic disruptions globally such as natural disasters, pandemics, food and water shortages, and regional conflicts can be obviously the most serious global systemic as well as systematic risk leading to a spiral of the socio-economic disturbances. Therefore, mitigating the global environmental crisis is a prerequisite for the sustainability of the financial and socio-economic systems of the world. On the other hand, the finance has a great power to change and develop the society and economy by redistributing economic resources and controlling the activities of various economic entities. If the overall financial market makes the most of such powers, it can encourage the socio-economic system transformation on a global scale toward sustainability. Among the preconditions for the finance to demonstrate its powers for sustainability, are pricing global environmental loads in the goods market, issuers’ information disclosure regarding the global environment issues, changing financial principles such as fiduciary responsibility, and an efficient market system to accurately reflect these factors in the price of financial instruments and the capital cost for economic entities. In this way, the global environmental crisis and the financial market/system have an extremely close relationship, and in order to overcome the crisis, it is necessary to look into this relationship and make the most of the functions of finance.

Keywords: functions of the finance, systemic risk, systematic risk, capital market, financial instruments, globally linked financial markets, socio-economic system transformation

Mr. Junya Tani

Senior Researcher, Center for Global Commons, The University of Tokyo / Senior Advisor, Japan Hub, Future Earth



Junya Tani has a background for many years in the finance business working for some global financial institutions (Bank of Tokyo (currently MUFG), Citigroup, UBS, Credit Suisse, and DBS). After retired from the business, he has been engaged in various social activities related such areas as welfare for mentally and intellectually disabled persons, education, local community revitalization, and global environmental crisis.

In the field of global environmental crisis, he started his activities in 2018 by translating “Big World Small Planet” by Johan Rockström and Mattias Klum together with Dr. Naoko Ishii and Institution for Global Environmental Strategies (IGES). Currently, he is engaged in Japan Hub of Future Earth as Senior Advisor and Center for Global Commons of University of Tokyo as COO/Senior Researcher.

Expert Session 3

Is Degrowth a Useful Strategy for Reducing Systemic Risk in the Anthropocene?

Maurie COHEN¹

¹ New Jersey Institute of Technology, Newark, New Jersey, USA

Abstract - Efforts to engage with the challenges of sustainability over the past several decades have given rise to ongoing debate between proponents of “weak” and “strong” sustainability. The most recent manifestation of this divide takes the form of efforts, on one hand, to encourage “green growth” and to seek pragmatic initiatives to decouple economic growth from resource utilization and environmental degradation through improvements in technological efficiency. On the other hand, attention has turned to more expansive strategies that strive to achieve systemic transformation based on various conceptions of sufficiency and to realign societal objectives with biospheric constraints. A partial list of these ambitious frameworks includes degrowth, “doughnut economics,” foundational economy, post-growth, post-capitalism, care economy, well-being economics, consumption corridors, and 1.5°C lifestyles. This presentation provides a brief historical overview of the weak vs. strong distinction and offers an explanation as to why we are currently witnessing a proliferation of interest in these insurgent and assertive propositions. Specific attention focuses on the potential risks and benefits of degrowth during the Anthropocene both as an explicit set of policy interventions and an underlying process of social change in affluent countries of the global North. Consideration is also devoted to how the longer-term implications of the COVID-19 pandemic, especially in terms of work practices, lifestyle commitments, household routines, and consumer culture may already be accelerating emergent trends away from long-standing growth-impelled political priorities.

Keywords: degrowth, economic contraction, economic deceleration, Anthropocene

Prof. Maurie Cohen

Professor, Department of Humanities and Social Sciences, New Jersey Institute of Technology, United States of America



Dr. Maurie Cohen is Chair of the Department of Humanities and Social Sciences and Professor of Sustainability Studies at the New Jersey Institute of Technology. He is additionally the founding and current Editor of the journal *Sustainability: Science, Practice, and Policy* which was established in 2005 (and is currently published by Taylor & Francis) and a member of the Management Team member of the Future Earth Knowledge-Action Network on Systems of Sustainable Consumption and Production. His books include *Sustainability* (Polity Press), *The Future of Consumer Society: Prospects for Sustainability in the New Economy* (Oxford University Press), and *Social Change and the Coming of Post-consumer Society* (Routledge). Cohen received his PhD. in regional science from the University of Pennsylvania in 1993.

Summary of the Forum

Prof. Chiho Watanabe

Professor/ Executive Advisor to the President (Planetary Health), School of Tropical Medicine and Global Health, Nagasaki University, Japan



Prof. Chiho Watanabe has been in the current position since April 2021. He completed his Ph.D. (health science) at the University of Tokyo, Japan in 1991. He was a Professor of the University of Tokyo from 2005 to 2017, then President of the National Institute for Environmental Studies from 2017 to 2021. Having a background in toxicology and nutrition, he has conducted many experimental and field studies on toxicant-nutrient-life style interactions and their health impacts in Asian populations. He has also been engaged in several inter-disciplinary projects/initiatives associated with the issue of sustainability and health. He serves as president of the Japanese Society of Health and Human Ecology, Society of Environmental Science Japan, former vice-president of the Society of Human Ecology (international), Steering Committee member for Health KAN, Future Earth.

Closing Address

Dr. Yuichi Moriguchi

Vice President, National Institute for Environmental Studies, Japan



He joined National Institute for Environmental Studies (NIES) in 1982, engaged in wide range of environmental research at NIES until 2011. After appointed to the Director of the Research Center for Material Cycles and Waste Management of NIES for 2005-2011, he moved to the University of Tokyo as of April 2011. He is vice president of NIES since April 2019, retired from the University of Tokyo as of March 2021 after the cross-appointment for two years.

In his early career, he had also worked for the Environment Agency of Japan and for the OECD Environment Directorate in Paris. He contributed to the UNEP International Resource Panel for 2007-2016 as one of the inaugural members. He was awarded the 2013 Society Prize of International Society for Industrial Ecology. He was the previous president of The Institute of Life Cycle Assessment, Japan. His research field covers Industrial Ecology, post-disaster environmental management, etc.

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