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Message from the Director-General

The Research Institute for Humanity and Nature (RIHN) was established in April 2001 to conduct integrated research in the field of global environmental studies. In 2004, RIHN became one of the original members of the National Institutes for the Humanities (NIHU), as an Inter-University Research Institute Corporation.

Environmental degradation can be understood as an imbalance in interactions between human beings and natural systems. Our mission is therefore to conduct solution-oriented research aimed at exploring how interactions between humanity and nature ought to be. RIHN conducts interdisciplinary research spanning the natural sciences, humanities, and social sciences, and transdisciplinary research, collaborating with various stakeholders in society.

Fiscal year 2018 marks the second year of our Phase III Medium-Term Plan. Under the three Research Programs, and one Core Program, we conducted more than eight full research projects. The RIHN Center was promoting to organically integrate and support the Research Programs/Projects, including both domestic and international collaboration. As part of RIHN's international activities, RIHN is hosting the Asian Regional Centre for Future Earth, which is expected to promote the overall research and capacity buildings of Future Earth in Asia. Under the initiative of Director General (with the Council for Research Strategy), the Public Relations Unit and the Institutional Research (IR) Unit functioned actively. The International Publication Unit (IPU) was also established in FY2018. With the new structure in place, we are pursuing our mission even more vigorously through enhanced collaboration within our institute, across our diverse research community, and with society in general.

This annual report describes the updated outcome of these activities of RIHN for the FY2018. I do hope this report will help you to understand the overall activity within the FY2018.

With best regards,

YASUNARI Tetsuzo
Director-General
Research Institute for Humanity and Nature

Research Activities

●**Full Research**

[Research Program 1: Societal Transformation under Environmental Change]

Program Director: SUGIHARA Kaoru **p. 5**

Project Name: Societal Adaptation to Climate Change: Integrating Palaeoclimatological Data with Historical and Archaeological Evidences
Project leader: NAKATSUKA Takeshi **p. 11**

Project Name: Toward the Regeneration of Tropical Peatland Societies: Building International Research Network on Paludiculture and Sustainable Peatland Management
Project leader: MIZUNO Kosuke **p. 26**

Project Name: Research and Social Implementation of Ecosystem-based Disaster Risk Reduction as Climate Change Adaptation in Shrinking Societies
Project leader: YOSHIDA Takehito **p. 34**

[Research Program 2: Fair use and management of diverse resources]

Program Director: NAKASHIZUKA Toru **p. 46**

Project Name: Biodiversity-driven Nutrient Cycling and Human Well-being in Social-ecological Systems
Project leader: OKUDA Noboru **p. 49**

[Research Program 3: Designing Lifeworlds of Sustainability and Wellbeing]

Program Director: SAIJO Tatsuyoshi **p. 55**

Project Name: Lifeworlds of Sustainable Food Consumption and Production: Agrifood Systems in Transition
Project leader: MCGREEVY, Steven Robert **p. 59**

Project Name: The Sanitation Value Chain: Designing Sanitation Systems as Eco-Community-Value System
Project leader: YAMAUCHI Taro **p. 69**

[Core Program]

Program Director: TANIGUCHI Makoto **p. 81**

Project Name: Proposal and Verification of the Validity of Isotope Environmental Traceability Methodology in Environmental Studies
Project leader: TAYASU Ichiro **p. 84**

Project Name: Information Asymmetry Reduction in Open Team Science for Socio-environmental Cases
Project leader: KONDO Yasuhisa **p. 89**

●Pre Research

Project Name: Co-creation of Sustainable Regional Innovation for Reducing Risk of High-impact Environmental Pollution
Project leader: SAKAKIBARA Masayuki **p. 95**

Project Name: Mapping the Environmental Impact Footprint of Cities, Companies, and Household
Project leader: KANEMOTO Keiichiro **p. 102**

●Individual Collaboration FS

1. Future Image of Living Sphere by Restructuring Sustainable Relation between Humans and Land
   OKABE Akiko (University of Tokyo)

●Institutional Collaboration FS

1. Fair and Equitable Benefit Sharing of Biological and Genetic Resources in the Era of Digital Information: Improving Livelihoods and Agrobiodiversity Conservation by Intellectual Property and Storylines
   KOHSAKA Ryo (Tohoku University)
2. Transformation and Reconstruction of Agri-Cultural Diversity in Southeast Asia
   MATSUDA Hirotaka (Tokyo University of Agriculture)
3. Developing Interactive Rural-Urban Systems to Improve Human Well-being: Migration for Humanity and Nature
   MORI Koichiro (Shiga University)
4. Study of Behavior Modification of Public People by Sharing Daily Activity and Air Quality Information toward Clean Air and Promoting Public Health
   HAYASHIDA Sachiko (Nara Women's University)

●Core FS

2. Co-design and stakeholder engagement according to geographical scales
   ONISHI Yuko (RIHN)

●Incubation Studies

1. Humanities for the Environment: Developing a Cultural Approach to Environmental Knowledge
   NILES Daniel (RIHN) **p. 104**
2. Assessing and enhancing the environmental sustainability from edible insects
   CÉSARD Nicolas (National Museum of Natural History, France) **p. 104**
3. Quantifying and Typing Landform Transformations in Low-lying Large Cities: Toward Landscape Evaluations in Anthropocene
   HARA Yuji (Wakayama University) **p. 105**
4. Sustainable Urban Design using Inclusive Wealth
   MANAGI Shunsuke (Kyushu University) **p. 105**
5. Study for energy transition policy and strategy towards RE100% Asian cities
   KOBASHI Takuro (Renewable Energy Institute) **p. 105**

Research Program1: Societal Transformation under Environmental Change

Program Director: SUGIHARA Kaoru

○ Research Subject and Objectives

Goal of the Program

This program aims at providing realistic perspectives and options to facilitate the transformation towards a society that can flexibly respond to environmental changes caused by human activities such as global warming and air pollution, as well as to natural disasters.

Mission Statement

To demonstrate the fundamental significance of global environmental sustainability for human society, we need to make the links between environmental change and natural disasters, and social issues such as livelihood, inequality, social security and conflict, intellectually explicit, and reinforce them in the real world. RIHN's Societal Transformation under Environmental Change research program contributes to this task.

The Program follows two lines of inquiry. The first conducts research on Asia's long-term paths of social and economic development in relation to climate change and environmental history. Such studies offer historical understandings of the human-nature interface, and evaluate each region's political and economic conditions and cultural and social potentialities in comparative perspective. For example, postwar development of the industrial complex along the Asia's Pacific coast was made possible by the combination of imported fossil fuels and utilization of rich local resources of land, water and biomass. Industrial development in the region produced both rapid economic growth and at times severe environmental pollution and degradation. It is important to recognize the causes and consequences of these historical processes in their own light, as well as for their significance to future societal change and policy deliberations.

The Program's second line of inquiry examines the kinds of motivations that affect people's livelihood, by working closely with various stakeholders in local society in Asia. Our project based in Sumatra's tropical peat swamp forest, for example, has identified four principal kinds of motivations - local livelihood; profit of local farmers and agricultural and industrial enterprises; local and centrally-based governance; and conservation measures implemented by governments, NGOs and international institutions -, and examines how they can best be coordinated to promote sustainability at the village level. Project research also helps implement policies at local, national and international levels. This ongoing project, which cooperates with local universities, companies and officials, has already contributed to the development of regional and national policies to control peatland fires, which became a significant environmental issue in Indonesia and beyond.

This program coordinates a variety of research projects along these lines in order to develop a perspective that helps direct research and social transformation in Asia.

○ Progress and Results in 2018

Nakatsuka project: FR5

The project is coming to the final stage, and I am pleased to comment that it is most likely to yield excellent results with summary English-language publications (see Project Report). The long-term temperature/ rainfall data have been created and tested against historical events to the 18th century, and plausible interpretations are being formulated.

Following the successful panel Professor Nakatsuka and I organized at the Annual Meeting of the Socio-economic History Society in Tokyo in May 2017, we organized a session at the World Economic History Congress, Boston, in July-August 2018, with additional speakers including specialists on China, Europe and modern Japan (from France, the U.K. and the U.S.), to discuss the impact of the Nakatsuka group data and its implications for comparative environmental history. Members of the project discussed the possibility of reinterpretation of Tokugawa and early Meiji societies in the light of climate and rainfall data, while discussants commented on its utility for comparative history, especially with China and Europe. Professor Bruce Campbell, in particular, presented a European comparative perspective, especially with reference to medieval Europe. I responded to his presentation by proposing the twin approach to global history, to argue that population-based global history, in which Asia features largely, is just as relevant as GDP-based global history in which the 'European miracle' narrative remains fundamental, for the understanding of the change in the relationships between human activities and the environment. It was clear that climate history has much to offer for advancing the methodology of global history.

Mizuno project: FR2

This project is concerned with the environmentally vulnerable societies in tropical peatland. It has the most ambitious interdisciplinary and transdisciplinary research design in this field, with fully developed academic and political contacts in Indonesia. It conducts broadly three lines of research; the socio-economic, political and historical analysis of the communities, corporations and governance structure; the climate change and peat development studies focusing on rainfall, water and material cycles; and international comparisons of the Indonesian cases. In collaboration with other projects funded by JICA, CIFOR and at Kyoto University, the project made a good progress, particularly on the first two lines of research this year (see Project Report). The arrival of Professor Yamanaka, a senior specialist of climate-rainfall research, energized the project, and a wider range of data, both chronological and geographical, were assembled and were then related to the interpretation of the field work. Other researchers employed at RIHN were active in both field research and networking activities (e.g. newsletters and the home page). An English-language volume is planned for publication.

Professor Mizuno retired as project leader in March 2019, and was replaced by Professor Kozan, current sub-leader. Professor Mizuno will continue his own research and offer advice to the project.

Yoshida project: FR 1

In addition to assembling an impressive range of leading researchers and identifying the three main sites of field work in various parts of Japan, this project decided the methodological focus around the interdisciplinary evaluation of ecosystem-based disaster risk reduction more clearly than a year ago. In its first year it began the work both at national level research, identifying data and hazard maps, and in local sites, collecting the stock of knowledge on local history, eco-system and policy efforts on disasters themselves. Some of the existing approaches at the local level (e.g. in Shiga prefecture) already has innovative methodologies on disaster reduction, combining interdisciplinary knowledge. In view of this kind of development, there may be a greater need to conduct the English-language literature review for a broader contextualization in the coming years.

I am impressed with the breadth of high-level information gathered from academia, local government officials and some firms (see Project Report). It is expected that the project will be in touch with international collaborative projects on a more regular basis next year.

Research directives

About a third of my time has been spent on integrating my own research into the context of Program Directorship and, through it, the RIHN mission. I had several publication commitments before moving to RIHN. First, I have been a project leader at the JSPS ‘Grant-in-Aid for Scientific Research on Innovative Areas’ (Shingakujutsu) at GRIPS, my previous affiliation in Tokyo. The project ended in March 2018, and the main research outcome is being published in four volumes from Springer. I wrote a chapter on the Asian development path in Volume 1, the summary volume, and co-edited Volume 2 on the multiple path to the emerging economy and state in Asia and Africa. Both volumes have just been published. In these works, I introduced the issue of the socio-economic and historical assessment of environmental conditions behind the rise and stagnation of current emerging economies in Asia and Africa. Second, I also wrote three more articles, to which I had previously committed; ‘Varieties of Industrialization: An Asian Regional Perspective’, in an edited volume Global Economic History (Bloomsbury), ‘South Asia in Global History’ as a chapter of a Japanese-language volume on South Asian History (Yamakawa Shuppansha), and ‘Changing Patterns of Sarawak Exports, 1870-2016’ (co-authored) in an edited volume on the Anthropogenic Tropical Forests (Springer). They are published or due by June 2019. In all of them my research focus has clearly moved towards resource history, including fossil fuels, biomass, water and the ‘resource nexus’, a local and regional space which combines these and other resources (for a description of the resource nexus, see below).

My presentations at the public domain followed the same line of thinking. They included a lecture at ‘New Approaches in Asia-Pacific Historical and Contemporary Studies’, Waseda University, Tokyo (sponsored by the Harvard-Yenching Institute and Waseda University’s Global Asia Research Center) in July, and a keynote lecture at the First Conference of the Japan Society for Afrasian Studies, Kansai University in October. I appeared in a NHK lecture series on Global Economic History (The Open University of Japan production) in June to July.

At the World Economic History Congress at Boston in July to August, I participated in four sessions and read two papers, as well as acting as organizer, chair and general discussant (including the climate history panel mentioned in Nakatsuka project description). My presentation at a global history panel, in which I described the regional shift in economic gravity in post-war Asia, especially from Japan to China after c.1980, and its implications for global environmental sustainability attracted responses, and developed into international academic exchange at individual levels.

My intellectual interactions with people at RIHN have made a further progress during AY 2018. With Professor Makoto Taniguchi I continued the discussion on the potential extension of the nexus idea into social science and history domain. With

Professors Hein Mallee and Daniel Niles, I worked on how to incorporate the humanities side of the discourse on the Anthropocene in the Asian context.

I describe below some of the ideas I have developed.

The great acceleration in Asia

The original statement of the 'great acceleration' by the International Geosphere-Biosphere Programme (IGBP) in 2015 was supported by historical statistics, consisting of a set of twelve indicators on 'socio-economic trends' and another set of twelve indicators on 'earth system trends'. Together, they suggest a rapid increase of human activities since the nineteenth century and their impact on the earth system, especially since 1960. A preliminary study I made suggests that roughly a half of the increase since 1960 (to 2000 in IGDP statistics but probably the trend continues to this day) came from Asia, in terms of the first four 'basic' socio-economic indicators of population, real GDP, urban population and primary energy supply, although it is noteworthy that some of them, especially the proportion of Asia in world primary energy supply in 1960 was very low as the extensive use of biomass energy during industrialization was common in monsoon Asia. The exercise also reveals that 'socio-economic trends' are largely regionally identifiable, while some of the 'earth system trends' indicators are more globally oriented in nature. It was these observations that led me to look at the historical evolution of the resource nexus in Asia since the 1960s.

The evolution of the resource nexus in Asia

The emergence of the seafront resource nexus occurred first in Japan during the post-war period. Rapid economic growth to c. 1970 was accompanied by national land development plans, driven by 'developmentalism', which penetrated into designing urban and industrial space. Because imports of fossil fuels and other raw materials were fundamental to industrial development, seafront industrial complexes were created around major urban centres along the Pacific coast. I made a preliminary investigation into the case of the Tokyo Bay, the largest seafront industrial complex in Asia (and in the world built largely in reclaimed land) at this point in time.

Tokyo agglomeration as a whole also became the first megacity in the world in the early 1960s. While labour-intensive industries enjoyed access to labour and urban demand, it was better for capital- and resource-intensive industries to be located near the seafront. Thus, industrial ports, directly connected to factories, were created for resource-intensive industries along the seafront, with improved civil engineering technologies. 'Developers' organized finance and public support, and invited companies to take part in the development of the complex. The seafront industries then developed linkages to less resource-intensive industries and commercial and residential areas across the city. Labour-intensive industries were fairly evenly scattered across the central wards of Tokyo under the lax zoning regime. Thus, the Tokyo agglomeration emerged as an integrated urban-industrial nexus with spatial specialization between capital- and resource-intensive industries and labour-intensive ones.

There was a correlation between major seafront industrial complexes and areas of land subsidence as a result of the excessive groundwater extraction. Availability of water was essential to industrial clusters, which includes heavy water users, as well as to urbanization. When their needs clashed and land subsidence emerged as a major threat, it became a 'social tipping point'. Air pollution, water pollution, health hazard and noise and vibration also became social tipping points, which had to be addressed by municipal and central governments. They needed to be recognized both scientifically and by the public.

After the 1970s, the driver of urban development shifted from economic needs to the more socially and environmentally acceptable goals, largely as a result of citizens' movement and the initiatives of municipal and central governments. The reclamation now related to diverse purposes (residential, airports, leisure and trade fair facilities, as well as a site for industrial waste disposal). This coincided with the broader signal change from developmentalism to civil minimum and sustainability. But land reclamation continued at a slower pace, representing the (at least in the short-to medium-term) irreversible human alteration of nature, in this case of coastal ecosystems and their services. Most natural coasts around Japanese cities disappeared.

Today, major reclaimed land (km2) is located in China (13,500+), Netherlands (7,000), South Korea (1,550) and US (1,000+), while figures were 153 for the Tokyo Bay and 781 for Japan total in 1945-1999. In 2012 China's State Council estimated that by 2020 the overall coastal reclamation demand would be greater than 5,880km2, close to a half of the total area reclaimed over the past fifty years, much of the needs coming from urban, infrastructural and industrial purposes. Land reclamation is said to have brought about a serious impact on China's coastal ecosystems and their services. The 'social tipping points', similar to those found in the urban-industrial complex in Tokyo agglomeration around 1970, are likely to be experienced in China today on a much larger scale.

World Social Science Forum

The Fourth World Social Science Forum (WSSF) took place at Fukuoka in September 2018. Its main theme was security (including environmental security) and equality. About 1,000 people participated from 80 countries. I acted as a member of the Forum Executive Committee representing the Science Council of Japan, as well as a member of the local organizing committee. RIHN was a member of the Consortium for the Forum, and was responsible for organizing more than nine sessions and some individual papers and poster presentations. In fact, it was the second largest presence after the Kyushu University, the host institution.

Since this was the first international conference after the merger between ISSC (International Social Science Council), which was the original host of WSSF, and ICSU, its larger natural science counterpart, the event became internationally more visible and interdisciplinary.

In addition to my role as organizers, I participated in several sessions, including the two Future Earth inspired ones for which I acted as a reporter (I am a member of JST Future Earth Committee), and the Belmont Forum session on the transformation to sustainability. I also acted as a discussant for a RIHN session on the Anthropocene in Asia, which provided a platform for the organization of the RIHN international symposium in December (see below).

Program seminars and international workshops

One way of interacting with the three projects to promote communication, especially with respect to methodology, is to organize research seminars. With the arrival of Yoshida project and Dr Naoki Masuhara as a senior researcher for Program 1, we started a seminar series on land use, national development plans, pollution and the resource nexus from early 2018.

Titles of presentations made in the first three seminars in rough translation, including those by several invited speakers, were: ‘Land tax system and environment in early modern Japan (Kamatani from Nakatsuka project)’, ‘Land holding and the peatland issue in Indonesia (Mizuno)’, ‘The East Asian development path and the peasant family economy (Sugihara)’, ‘Adapting to the blessing and curse of nature: Towards a new approach to land use (Yoshida)’, ‘On national land development plans (Sugihara)’, ‘A study of the national design for land use from the perspective of the interactions between societal needs and water flows (Nakamura)’, ‘The seafront industrial complex and the shift to the mono-functional use of the coast (Kobori)’, ‘Japan’s pollution policy during the period of high-speed growth (Ito)’, ‘Environmental problems and legal policy in Indonesia (Sakumoto)’, ‘The evolution of national development law in post-war Japan (Masuhara)’.

In January 2019 we held an English-language preparatory workshop ‘Urban Space and the Resource Nexus’, which included; ‘Labor-intensive industrialization in post-war Tokyo: Urban space as a factor of production (Benjamin Bansal)’, ‘From shrine to machine: An industrial history of Ota city, Tokyo, 1900-1960 (Kobori)’, ‘The seafront resource nexus around the Tokyo Bay: Social tipping points in circa 1970 (Sugihara)’, ‘Regional sustainability in Japan from the perspective on water-energy-food (WEF) nexus (Sanghyun Lee)’, ‘Japan’s medium-term development strategy and its impact on resource utilization (Masuhara)’, ‘Synergy of the multi-scale water-energy-food nexus (Taniguchi)’.

Based on the January workshop, we held a two-day international workshop on the great acceleration and the resource nexus from the 10th to the 11th of March. We invited a few people from abroad, to discuss the utility of the nexus and the resource nexus approaches for the understanding of Asia’s sustainability.

○Project Members

○ Naoki Masuhara (Research Institute for Humanity and Nature,Senior Researcher)

○ Future Themes

The International Publication Unit

In April 2018 the International Publication Unit (IPU) was established under RIHN’s Council for Research Strategy, and I was appointed as its head. The IPU is to promote the editorial work of Global Sustainability, a new journal from Cambridge University Press, in which, on the invitation of Dr Johan Rockström, editor-in-chief, Professor Yasunari and I were to prepare a collection ‘humanities and global sustainability’. The journal began publication toward the latter part of 2018, and we became involved in the editorial process. No papers have been published either on humanity-related topics or as a collection of humanities collection yet, but I expect that a progress will be made during the next academic year.

The IPU also made the RIHN series of ‘Global Environmental Studies’ from Springeras part of its work. The three series editors (Professors Kenichi Abe, Hein Mallee and Daniel Niles) and the two section editors of Global Sustainability constitute the IPU committee, with the support of the International Affairs Section of RIHN and Ms. Yumiko Iwasaki of Program 1.

The IPU also engaged in other aspects of the promotion of international publications, including the setting up of a stand with the display of RIHN publications at WSSF Fukuoka mentioned above, encouragement of independent submission of papers to international journals, including those outside the researcher's specialization, and publication of books other than the RIHN series.

RIHN international symposium in December 2018

In this context the success of this year's RIHN international symposium 'Humanities on the Ground: Confronting the Anthropocene in Asia' offered an excellent opportunity for the activities of the IPU. It was the first international conference, specifically addressing the theme of the intellectual context of the Anthropocene in Asia 'on the ground', that is, the local andregional human-nature interface on the spot. After the symposium the organizing committee and the IPU decided to offer opportunities for publication either as a collection for Global Sustainability or an edited volume or both to presenters, and asked Mr. Masahiro Terada, currently visiting associate professor, to help the editorial process.

●Achievements

○Books

【Chapters/Sections】

- Sugihara, K., 2018,11 "Varieties of Industrialization: An Asian Regional Perspective". in Giorgio Riello and Tirthankar Roy (ed.) Global Economic History. Bloomsbury Academic, London, pp.195-214.
- Kimura, M., Masuhara, N. and Baba, K. 2018,05 Making Social Networks Visible: Shared Awareness Among Stakeholders on Groundwater Resources. Endo, A. and Oh, T. (ed.) The Water-Energy-Food Nexus: Human-Environmental Security in the Asia-Pacific Ring of Fire. Global Environmental Studies. Springer, pp.273-286.
- Baba, K., Masuhara, N. and Kimura, M. 2018,05 Scenario-based Approach to Local Water-energy-food Nexus Issues with Experts and Stakeholders. Endo, A. and Oh, T. (ed.) The Water-Energy-Food Nexus: Human-Environmental Security in the Asia-Pacific Ring of Fire. Global Environmental Studies. Springer, pp.321-333.

○Papers

【Original Articles】

- Taniguchi, M., Masuhara, N. and Teramoto, S. 2018,10 Tradeoffs in the Water-energy- food Nexus in the Urbanizing Asia-Pacific Region. Journal Water International 43(6):892-903. DOI:10.1080/02508060.2018.1516104 (reviewed).

○Research Presentations

【Oral Presentation】

- Masuhara, N. "Changes of Local Resource Utilization after 1960: Japan's Medium-term Development Strategy and Its Impacts". International Workshop on Resource Nexus and Asia's Great Acceleration, 2019.03.10-2019.03.11, RIHN, Kyoto.
- Sugihara, K. "The Great Acceleration in Asia: The Resource Nexus and Social Tipping Points". International Workshop on Resource Nexus and Asia's Great Acceleration, 2019.03.10-2019.03.11, Research Institution for Humanity and Nature, Kyoto.
- Sugihara, K. "The Seafront Resource Nexus around the Tokyo Bay: Social Tipping Points in circa 1970". Fourth Research Seminar for Program 1 on 'Urban Space and Resource Nexus', 2019.01.18, RIHN, Kyoto.
- Sugihara, K. (Introduction and Chair) "Session 1 'Knowledge, Science and the Experience of Nature'. The 13th International Symposium 'Humanities on the Ground: Confronting the Anthropocene in Asia, 2018.12.13, RIHN, Kyoto.
- Sugihara, K. (Discussant) "Reciprocal Comparisons and the Asian Paths of Economic Development", Session on 'Asia in the Anthropocene (CS5-08)'. The Fourth World Social Science Forum, 2018.09.26, Fukuoka International Congress Center, Fukuoka.
- Sugihara, K. (Moderator of the Session and Presenter) "Monsoon Asia, Industrial-Urban-Regional Nexus and Environmental Sustainability: Reflections of Asia's Historical Experiences" Session on 'Transformation of Resource Base in Asia's Economic Development and Its Costs: Sustainability of Local, National and Regional Nexus (CS4-03)'. The Fourth World Social Science Forum, 2018.09.25, Fukuoka International Congress Center, Fukuoka.

・Sugihara, K., (Discussant) Comments on "Tropical Paths and Trade Integration" Session on 'Tropical Economies in the Making of the Modern World (310121) '. The 18th World Economic History Congress, 2018.07.31, Boston Marriott Cambridge and MIT Campus, Boston.

・Sugihara, K. "Intra-Asian Trade and Asia's Economic Development in the Long Nineteenth Century", Session on 'Building a Global History of Economic Divergence (310202)'. The 18th World Economic History Congress, 2018.07.31, Boston Marriott Cambridge and MIT Campus, Boston.

・Sugihara, K. "Local and Regional Payment Methods and the Growth of World Trade in the Long Nineteenth Century", Session on 'Multiple Payment Systems in Globalizing Economies (300212)'. The 18th World Economic History Congress, 2018.07.30, Boston Marriott Cambridge and MIT Campus, Boston.

【Poster Presentation】

・Masuhara, N., Lee, S. and Taniguchi, M. "Decision-making Gaps regarding Food-Energy-Water Nexus? A Case Study of the Kyoto City in Japan". 2018 AGU Fall Meeting, 2018.12.10-2018.12.14, Washington, DC, USA.

・Masuhara, N. "Citizens' Consciousness and Interest: A Study on Groundwater Issues in Saijo City, Japan". World Social Science Forum 2018, 2018.09.25-2018.09.28, Fukuoka.

・Masuhara, N. and Taniguchi, M. "Proposal and Analysis on Water Intensity in Asia". Nexus 2018: Water, Food, Energy and Climate, 2018.04.16-2018.04.18, Chapel Hill, North Carolina USA.

【Invited Lecture / Honorary Lecture / Panelist】

・Masuhara, N. (Invited Lecture)"Relationships between Geothermal Power Developments and Conflicts in Japan after the Great Eastern Japan Earthquake of 2011". Workshop on Energy and Environmental Research, 2019.03.25, University of Hawaii, Hawaii, USA.

・Sugihara, K. (Keynote address) "The Asian Path of Economic Development and Its Relevance to Sub-Saharan Africa". The First Conference of Japan Society for Afrasian Studies, 2018.10.06, Kansai University, Suita.

・Sugihara, K. (Moderator) Session on ' The Belmont Forum–NORFACE Transformations to Sustainability Programme: Re-structuring the Field of Sustainability Research for Sustainable and Secure Futures ('CS1-11)'. The Fourth World Social Science Forum, 2018.09.26, Fukuoka International Congress Center, Fukuoka.

・Sugihara, K. "(Co-organizer and co-chair) Session on Societal Response to Climate Variation: Institution, Market, and Social Change in Early Modern and Modern Japan (010214)". The 18th World Economic History Congress, 2018.08.01, Boston Marriott Cambridge and MIT Campus, Boston.

・Sugihara, K. (Invited Lecture) "Monsoon Asia, Intra-Asian trade and the Transformation of Resource Nexus". New Approaches in Asia-Pacific Historical and Contemporary Studies, 2018.07.02, Waseda University, Tokyo. (Sponsored by the Harvard-Yenching Institute and Waseda University's Global Asia Research Center.)

Stage: Full Research

Project Name: Societal Adaptation to Climate Change in Japan: Integrating Palaeoclimatological Data and Archaeological Evidence

Project Leader: NAKATSUKA Takeshi

Program 1: Societal Transformation under Environmental Change

○ Research Subject and Objectives

a) Problem, background and objectives

So far, many scholars of both paleoclimatology (e.g. Zhang et al., 2008) and history (e.g. Parker, 2013) have argued that human history has been influenced by climate. But, most of historians have not yet believed it and often criticized it as the climate determinism. This mismatch was mainly caused by inaccuracy of our understanding on past climate, but recent IPCC-relevant developments of high resolution paleoclimatology (e.g. PAGES consortium, 2013) has totally changed the situation. Because past variations in temperature and precipitation are now being reconstructed at annual or finer time resolutions during last several millennia using innovative new proxies of past climate such as tree ring isotope ratios (e.g. Li et al., 2011; Sano et al., 2012; Xu et al., 2013), we can investigate chronological relationship between climate variations and societal phenomena precisely and judge whether any kind of societal events were preceded by some significant climate events or not. Moreover, we can propose a new strategy of historical studies. By focusing on outstanding events and periods in past temperature or precipitation variations at first, we can ask contemporarily important questions about the resilience of human societies against climate changes. (I) What types of human societies can avoid crises owing to climate change? (II) How can human societies overcome negative influences of climate change at last? In this project, we seek answers to the questions by collaborative studies among many paleoclimatologists, historians and archaeologists on climate-society relationships in Japan during last 5,000 years. Although this strategy seems simple, it is not easy for individual researchers to combine up-to-date climatological and historical knowledge so that there have never been any similar research projects in the world. There are essential reasons why we selected Japan as the research field.(a) Japan is located at the north-eastern rim of East Asia Summer Monsoon(EASM), where rice paddy cultivation, main livelihood of Japanese people during last 3,000 years, has been frequently damaged by flood, drought or cold summer accompanied with EASM variations. (b) In Japan, we can find plenty of historical documents and archaeological remains to elucidate past climate-society relationships during last 1,000 and 5,000 years, respectively.

b) Methodology, structure and schedule

This project has three steps of research strategy. (1) Reconstructions of past climate variations as precise as possible for last several millennia in Japan and surrounding areas. (2) Comparisons between climate variations and societal phenomena with special foci on the outstanding events and periods in climate variations. (3) Analyses of cause-and-effect relationships from climate variations to societal phenomena, including the cases where no significant influence had been found in societies. While step 1, using tree rings, sediments, documentary records and soon, has preceded other steps in the project, step 2 has been studied simultaneously by referring the result of step 1 and quantifying the documentary and excavated evidences on societal properties. Based on the new findings in step 2, individual historians and archaeologists in the project are now analyzing the cause-and-effect relationship from climate variations to societal phenomena in their specialized regions and periods, such as early modern, medieval, ancient and pre-historical western and eastern Japan, respectively. During the step 2, we first categorize common climate-society relationships in Japanese long history as many as possible and then find exceptional cases that the typical climate variations did not result in the typical societal responses.

c) Expected results

Until FR4, huge amounts of high resolution paleoclimatological data, especially using tree-ring width, density and oxygen isotope ratio as the proxies of summer temperature and precipitation, have been already obtained successfully back to about 5,000 years ago together with new chronological evidences on prehistorical societal events by the tree-ring oxygen isotope ratios (Step 1) enough precisely to discuss climate-societal relationship in Japanese history (Step 2). Agrarian productivity, mainly shown as rice yields, often suffered from summer climate disasters such as coldness, drought and/or flood through short-term climate variations, but some cases of climate disasters did not influence societies significantly. On the other hand, influences of long-term climate variation scan be recognized by changes in distribution and number of archaeological human habitats in a region. As for the middle-term variations, common characteristics have been found where multi-decadal large variations in summer temperature and precipitation often resulted in the occurrence of serious famines and societal upheavals, respectively, possibly owing to the unexpected crop failures and uneven water disasters after decadal length of comfortable climate conditions.

We have been conducting numerous case studies on the climate-society relationship since 2800 BC (Jomon era) to 19th century AD (Early Modern period), including cases when large climate variations did not leave any significant influences in societies (Step 3), and now preparing many papers and books in Japanese and English, most of which will be published by the end of FR5.

d)Project organization and membership

The project consists of six research groups, one international outreach unit and the project office. All academic activities in the project have been divided into five traditional discipline-based groups (Paleoclimatological group, Climatological group, Prehistorical and Ancient group, Medieval group and Early Modern group) and one synthesis group (Categorization and Integration group), mainly consisting of project office members and core members (leader and sub-leader of each research group). To promote international publications of Japanese historical and archaeological studies, we are operating the international outreach unit continuously. The discipline based structure for most of research groups was designed to make numerous historians and archaeologists now outside the project understand results of this project smoothly and participate in the study on climate-history relationships for the full promotion of the research strategy after the end of this project. As the result, inter-disciplinary collaborations by individual members in the project still have rooms to be improved at present.

e) Contribution to the Program

Program 1 has two fundamental questions. (A) What type of society can adopt to environmental changes smoothly? (B) How can we transform present society to it? Our project can answer to the former question by extracting various lessons from historical societal responses against climate changes. By collaborating with other contemporary projects in Program 1, we can contribute to answer to the latter question too by comparing many cases of societal transformations, which occurred intermittently in Japanese history, with many contemporary cases in Asian countries and clarifying their essential similarities and differences.

Although our project is a truly inter-disciplinary (ID) project between natural science (paleoclimatology and climatology) and humanity (history and archaeology), itis not a trans-disciplinary (TD) project collaborating directly with various stakeholders outside of academic societies. The program in RIHN consists of various types of projects, each of which is located at its particular position between ID and TD, so that a project in a program may be ID-oriented while another project in the same program is TD-oriented. The most important purpose to launch the “program” system in RIHN is that a project oriented to ID or TD can and must collaborate with other projects with different background regarding to ID and TD to learn more deeply from each other. The ID-oriented project can provide the other projects of up-to-date academic progresses in the issues covered by the program, while the TD-oriented project can tell the other projects on-going problems for installation of practical methods to solve the problems dealt by the program. In this framework, we would like to contribute to the achievement of Program #1 goal from the viewpoint of ID-oriented project. During last one year, the inter-project collaboration has not been activated very much mainly due to the total number of FR projects in Program #1had become small (just 2) one year ago. However, we believe that we can develop the inter-project collaboration in Program #1 by participation of three FR projects in the coming one year.

○ Progress and Results in 2018

a) Project Progress during the FR period to date

Until FR4, we have obtained huge amounts of high resolution paleoclimatological data for last 5,000 years in and around Japan using many natural proxies and documentary records on past climates (Step1). So far, we have found many fundamental common linkages between climate variations and societal responses with their important exceptions by comparing those paleoclimatological data with various quantitative data on societal properties, such as agrarian production, human population, distribution of human habitats and occurrence of famines and conflicts, inferable from numerous palaeographic and archaeological archives (Step 2). Based on the newly obtained paleoclimatological data and the discovered past climate-society relationships, we are now conducting many case studies in Japanese history from Jomon era (~30thcentury BC) to Edo era (~19th century AD) on people’s adaptation to climate variations (Step 3). Here, some outstanding results will be presented for each research step.

<<Step 1>> Summer temperature is one of the most important climate parameters controlling agrarian productions because rice paddy cultivation in Japan has been suffering from summer coldness frequently and it resulted in many large famines in Japanese history. We have reconstructed summer temperature in annual time resolution during last millennium by tree-ring width and documentary records and in centurial time resolution for more than several millennia by sediment analyses. Because time-series on past summer temperature reconstructed by various proxies are coincided well with others, we can conclude that those reconstructions are reliable. Summer precipitation is the other most important climate parameter influencing agriculture and people’s lives because summer strong rainfall usually causes floods destroying farmlands and villages and on the other hand small rainfall often results in droughts decreasing crop yields. Until the end of last century, we had never obtained data on past

summer precipitation at annual time resolution in Japan for the period before 17th century AD, while we could reconstruct daily weather conditions only after 17thc AD using many diary records over Japan. However, we have created a new innovative method applicable to last several millennia to reconstruct past summer precipitation at annual time resolution using tree-ring oxygen isotope ratio (Nakatsuka et al., 2004). As the main research activity in Step 1, we have developed many time-series of tree-ring oxygen isotope ratios for last five millennia over Japan. The reconstructed variations of summer precipitation in central Japan for last 2,600 years by the tree-ring oxygen isotope ratio have been proven to be accurate and reliable by comparison with meteorological, historical and archaeological archives. In Japan, summer precipitation generally shows negative correlation with summer temperature, suggesting that we can infer past variations in summer temperature at least in centurial time scale using the tree-ring oxygen isotope time-series even for the period when we have not reconstructed past summer temperature by tree-ring width.

<<Step 2>> To clarify the influence of climate variations to past societies in Japan, we have been extracting various types of quantitative and semi-quantitative information about past societies from numerous palaeographic and archaeological archives. The temporal variation in rice yield in a region during Early Modern era can be inferred from annual records of “Tsubokari ” (grain yield per an unit area; Sato, 1987) and “Nokoridaka” (basis of land tax for a village; Kamatani et al., 2016), which varied coincidently to summer temperature and/or precipitation, indicating strong influences of climate variations to agrarian productions. Occurrence of large famines can be monitored by counting of the number of old documents per year describing the word “Ki” (starving) in digital databases of old literatures relevant to climate disasters during Medieval (10-17th centuries; Fujiki (ed.),2007) and Early Modern (17-19th centuries; Kimura et al. (eds.), 2015) periods. Number of famine records drastically increased when summer temperature suddenly decreased after decadal length of warmth in both Medieval and Early Modern periods, indicating difficulty for the people used to rich harvests for a long time to adopt the crop failure at once. By comparing the annual numbers of old documents containing the word “Akuto” (outlaws emerging in a manor) in CD-ROM of “Kamakura-Ibun vol.1-46” (Database of old documents in Kamakura era, 1185-1333 AD) (Takeuchi (ed.), 1971-91) with the summer precipitation, we could realize that multi-decadal large variations in summer precipitation and resultant occurrence of unexpected floods probably caused local conflicts frequently owing to the serious and uneven damages to farmlands among many manors. Interestingly, the multi-decadal components of variations in summer precipitation during last 2,600 years shows intermittent amplification at several hundred year intervals, exactly corresponding to the period of political regime shifts in Japan and China. Number of human habitats in the prehistorical period summarized from numerous excavation reports in Japan seemed to increase when amplification of multi-decadal climate variability increased, suggesting that emergence of many refugees due to water disasters and nation-wide people’s migration at those periods. The large scale coincidence between climate variations and human history must become a basis for many historical researches about climate-society relationship in the near future.

<Step 3>> We are now conducting so many case studies about cause-and-effect relationships from climate variations to societal responses during last 5,000 years over Japan as shown in Research Plan below that we cannot explain them in detail here. In principle, large climate variations had usually caused serious societal damages, but there are significant numbers of exceptions in some periods and regions. For example, multi-decadal large variations in temperature during late 13th and 14th centuries did not seem to cause many famines, while those in precipitation might have resulted in serious warfare at the same periods. An important lesson from historical climate-society relationship is that any kind of societies have their own resilience against climate variations to certain degrees resulting in various societal transformation during and after the periods of large climate variations, from which we can learn about adaptability of societies to environmental changes.

b) Progress since the last reporting

There are significant progresses in each of three research steps 1~3 during last one year.

In Step 1, we have nearly reached the final goal of past climate reconstructions necessary in the project during last one year (FR4). Until FR3, we could not separate the signal of long-term precipitation variations in time series of tree-ring oxygen isotope ratios from that of long-term biological effects. However, by integrating of oxygen and hydrogen isotope ratios in tree-ring cellulose, we have succeeded in reconstructing past variation of summer precipitation in central Japan during last 2,600 years for all frequency domains covering from annual to millennium time scales, that is now stimulating many case studies of climate-society relationships especially in prehistorical, ancient and medieval periods in Steps 2 and 3.

We have improved the accuracy of summer temperature reconstruction in Early Modern period by analyzing newly obtained tree-ring width and density dataset in mountainous areas of central Japan, elucidating mechanism of famine occurrence in Step 2. On

the other hand, we have extended the annual resolution of summer climate reconstruction to middle Jomon period (around 4,800 years ago). It provides us of a new evidence on middle Jomon societal change that the decline of human habitats did not occur due to drastic cooling event at 4.3-4.2k but corresponded to maximal warmth and dryness around 4.6k, suggesting the difference in climate adaptation between hunter-gathers (Jomon) and farmers (post-Jomon) societies to be discussed in Step 3.

In Step 2, we have accumulated many new quantitative data on past societies since last reporting, to be compared with past climate variations, such as agrarian production, land tax, human population, social conflict and human habitats inferred from early modern documents of tax invoices to villages, medieval palaeographic database compiled by local governments, excavation reports on prehistorical distribution of human habitats and so on.

In Step 3, we have discussed and fixed contents in final publications of the project during last one year. Planed publications consisted of six Japanese books, one English book, as shown in Research Plan, and many other individual papers submitted to journals, some of which have been already written and edited in project office.

c) Most notable outputs to date

Batten, B. and Brown,P. (eds) 2015 “Environment and Society in the Japanese Islands: From Prehistory to the Present”, Oregon State University Press, 291pp.

Cook, E. R., Krusic, P. J., Anchukaitis, K. J., Buckley, B. M., Nakatsuka, T., Sano, M.,PAGES Asia2k Members 2013 Tree-ring reconstructed summer temperature anomalies for temperate East Asia since 800 C.E. Climate Dynamics 41, 2957-2972doi: 10.1007/s00382-012-1611- x41.

Itoh, K. and Nakatsuka,T. 2017 Quantitative analyses of relationship between reconstructed past climate variations and numbers of old documents in “Kamakura era old documents CD-ROM”, Research on Kamakura Old Documents 40, 23-53. (in Japanese)

Kamatani, K, Sano, M, Nakatsuka, T. 2016 Payment of the land tax and the change of climate in the Early Modern ages. Journal of Japanese History 646, 36-56.(in Japanese)

Kawahata, H., Matsuoka,M., Togami, A. Harada, N., Murayama, M., Yokoyama Y., Miyairi, Y.,Matsuzaki, H., Tanaka, Y. 2017 Climatic change and its influence on human society in western Japan during the Holocene. Quaternary International 440, 102-117

Kurita, N., Nakatsuka, T., Ohnishi, K., Mitsutani, T.,Kumagai, T. 2016 Analysis of the interdecadal variability of summer precipitation in central Japan using a reconstructed 106 year long oxygen isotope record from tree ring cellulose. Journal of Geophysical Research-Atmosphere 121, 12,089–12,107.

Liu,Y. and others (incl. Nakatsuka, T.) 2017 Recent enhancement of central Pacific El Niño variability relative to last eight centuries. Nature Communications 8, Article No:15386,

Nakatsuka, T. 2015 New possibilities in archaeological research enabled by oxygen isotope dendrochronology, Archaeological Research 62,17-30. (in Japanese with English abstract)

Nakatsuka, T. 2016 Possibility of the new historical study by using the data of the high resolution paleoclimatology. Journal of Japanese History 646, 3-18. (in Japanese)

Nakatsuka, T. 2016 Directions in new historical disaster studies based on high resolution paleoclimate data. Bulletin of the National Museum of Japanese History 203, 9-26. (in Japanese with English abstract)

PAGES 2k consortium (incl. Kimura, K., Nakatsuka, T., Sano, M., Yasue, K.), 2013 Continental-scale temperature variability during the last two millennia. Nature Geoscience 6, 339-346.

Sato, D. 2016 “Recovery from giant disaster and collaboration – Construction of crop storage and development of salt pan by Maruyama Sasaki family”, Banzanbou, Sendai, 74pp. (in Japanese)

Tamura, N. 2016 Study on the Japanese medieval history and the reconstruction by the high resolution paleoclimatology. Journal of Japanese History 646, 19-35. (in Japanese)

Wakabayashi, K. 2016a The early agricultural settlements pattern in Japan with flood disaster. Bulletin of the National Museum of Japanese History 203, 27-46. (in Japanese with English abstract)

Watanabe,K. 2016 The formality of agreement on ‘the clearance’: the measures to recover from the typhoon surge in 1790’s Metropolis Edo. Historical Review (Rekishi Hyoron) 797, 55-73 (in Japanese).

d) Project organization and members

This project consists of six research groups and project office in RIHN, with a special unit for international outreach. Among six groups, five groups have their own group leaders and sub-leaders, while a group (Categorization and Integration group) is a virtualone where members are coming from other five groups and project office in RIHN to discuss issues covering the whole project. Among five groups, three groups (Early modern group, Medieval group and Prehistorical and Ancient group) consist of historians and archaeologists and the other two groups (Paleoclimatological group and Climatological group) consist of paleoclimatologists and climatologists.

The two members in International Outreach are historians originating from United States and studying Japanese history fora long time. They belong to Prehistorical and Ancient group and Early Modern group, respectively, but mainly contribute to preparation of the publication of project results in English by holding an annual meeting for the international publication of the project in August regularly, negotiating with editors of Cambridge University Press and other publishers and recruiting of many potential translators from the community of English native speakers with speciality on Japanese history.

Each research group holds research meetings about three times per year to enhance communication within the group and with the project office in RIHN. During last one year, each group has been focusing on discussion about publication of the Japanese synthesis book on the group research result as shown above. The communication between different groups is mainly mediated by project office in RIHN, but direct communication among groups are also encouraged such as direct communications between literature-based historians and diary-based ultra-high time-resolution paleoclimatologists in the meeting of Early Modern group and wooden artefact archaeologists and annually-resolved tree-ring dating of oxygen isotope dendrochronologists in the discussion of Prehistorical and Ancient Group and Medieval Group. In Each research group, all members belonging to the group have been conducting their own individual researches on some specific issues at some specific period and region by communicating with other members in the group and project office mainly for exchanging quantitative data on past climatic and societal conditions within and beyond the group.

We have created a special team of oxygen isotope dendroarchaeology, beyond the groups covering many dendrochronologists and isotope geochemists in the Paleoclimatological Group and archaeologists in the Prehistorical and Ancient Group and Medieval Group, to collect many important naturally and artificially buried woods and establish annually resolved tree-ring oxygen isotope chronologies precisely over many regions in Japan and many periods since middle Jomon era about 5,000 years ago to present. We have successfully reconstructed past variations in summer precipitation at annual time resolution and dated

many excavated wooden artefacts all over Japan since the Jomon era to present using the established tree-ring oxygen isotope chronologies, which have been already applied to date excavated archaeological woods in Korea and China, too. The special team has not only consisted of academic researchers in the projects but also collaborated with many experts of archaeological investigations belonging to local governments all over Japan. This "trans-disciplinary" collaboration has been realized by introducing of the innovative technology of oxygen isotope tree-ring dating to the trans-academic, governmental and private community on the buried cultural properties in Japan.

In general, this project structure is suitable for promotion of historical climate adaptation studies according to the philosophy of each discipline, but it is not very effective to enhance the inter-disciplinary communication especially for members of natural scientists because they do not have enough chance to discuss with many historians and archaeologists in the project on the application of paleoclimatological data for understanding the historical societal responses to climate variations. To compensate this insufficiency, we have the whole project meeting once a year, but it is also a big challenge to promote fruitful discussions among researchers of natural sciences and humanity beyond the large boundary of discipline in the meeting. It is partly because we have not created enough chances to enhance the inter-disciplinary communication within the project as seen in the project structure, but partly because the research philosophy itself is completely different between natural science and humanity, such that almost all research activities in literature-based Japanese history are individual ones and it is not necessary for potential contributors of any results on climate-history relationship in the project to agree conclusion of the individual researches because the individual papers do not usually have co-authorships. By introducing of many natural scientific data to the field of Japanese historians and archaeologists, the situation may change gradually in the future.

○Project Members

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○ YOSHIMURA, Kei	(Institute of Industrial Science, The University of Tokyo,Associate Professor,Evaluation of proxy isotope data using general circulation models with isotope dynamics)
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PANDUKA, Neluwala	(School of Engineering, The University of Tokyo,Graduate Student)

Prehistory/Ancient History Group

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Medieval History Group

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○ MIZUNO, Shoji	(School of Human Culture, The University of Shiga Prefecture,Professor,Analysis of social adaptation to hydroclimate variability during Kamakura and Muromachi periods)
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Early Modern History Group

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BROWN, Philip C.	(College of Arts & Sciences, Department of History, The Ohio State University,Professor,Analysis of landownership in Japan during early modern period)
ENDO, Takahiro	(Osaka Prefecture University,Associate Professor,Societal responses to climate change during the early modern period in central Japan)
KORIYAMA, Shiho	(Kasai City Board of Education,Part-time Researcher,Estimate of climate impacts in early modern feudal domains)

○ **Future Themes**

Because only one year is left for our project before the end of FR5 (March, 2019), we will concentrate ourselves to publish our research results as Japanese and English books shown below through intense individual and group studies in Step 2 and 3.

The Japanese synthesis books consist of six volumes. Contents of all books have been determined in detail, some of which have been already written and handled by editors (project office members and leader and sub-leader of each group) in the project. Chapters of each books are as follows. Volume 1 is to overview the whole six volumes (part 1) and to propose a new strategy for obtaining lessons about societies resilient to climate and environment changes from the history (part2). Volume 2 is to describe the up-to-date results of past climate reconstructions, their climatological implications and dating of archaeological properties. Volumes 3-6 are to show the latest results on many historical case studies on climate-society relationships during prehistorical and ancient (Vol.3), medieval (Vol. 4) and early modern (vol. 5 and 6) periods, respectively.

<Vol.1> Emergence of new climatological scope and new potential of Japanese history

Part 1. How do new paleoclimatological data change our understanding of Japanese history?

Chap. 1 Overview of climate variations behind Japanese history

Chap. 2 How does our understanding on prehistorical and ancient periods change or not change?

Chap. 3 How does our understanding on medieval period change or not change?

Chap. 4 How does our understanding on early modern period change or not change?

Part 2. Searching societies resilient to climate variations – New possibility in studies of history

Chap. 5 Reconstruction of historical rice growth potential under climate variations

Chap. 6 Comparison of social responses to climate across periods from prehistorical to early modern era

Chap. 7 Comparison of social responses to climate among regions – Cases of early modern era

Chap. 8 Categorizing of climate-society relationship beyond time and space.

<Vol. 2> Reconstruction of past climate variations and establishment of new chronological basis

Part 1. Development of high resolution paleoclimatological reconstruction

Chap. 1 Recent achievements of paleoclimatological reconstructions in Japan and world

Chap. 2 Precipitation -Tree ring oxygen isotope ratio

Chap. 3 Temperature - Tree ring width and density

Chap. 4 Precipitation and Temperature - Old diaries

Chap. 5 Water and Air temperature - Sediment

Chap. 6 Water temperature and Salinity - Coral ring

Chap. 7 Climate disaster - Old document

Part 2. Toward comprehensive understanding of climate history

Chap. 8 Integration of paleoclimatological data by statistical methods

Chap. 9 Integration of paleoclimaotlogical data by data assimilation general circulation model

Part 3. Establishment of new chronological basis

Chap. 10 Development and advancement of oxygen isotope ratio dendrochronology

Chap. 11 Spatio-temporal extension and application of tree-ring oxygen isotope chronologies

Chap. 12 Toward highly precise dating by radiocarbon analyses

<Vol. 3> Climate and society in prehistorical and ancient period in Japan

Part 1. General part

Chap. 1 Overview of climate variations in prehistorical and ancient period

Chap. 2 Recent development of chronology in prehistorical period

Chap. 3 Migration of rice paddy cultivation and climate variations

Part 2. Formation and alteration of ancient nation

Chap. 4 Relation between climate and local social structure during period of nation formation

Chap. 5 Population pattern and environment in Yayoi and Kofun period

Chap. 6 Royal authority and climate - General crisis in late 9th century

Part 3. Villages and landscape

Chap. 7 Variation in middle Jomon (4-5ka) village around the region in southwest Kanto region near Tokyo and its relation to climate

Chap. 8 Change in village and climate in central Japan around Nagoya during Yayoi-Kofun transition

Chap. 9 Development of villages with surrounding trench during middle Yayoi in Shiga prefecture area

Chap. 10 Geomorphology and human habitats in southwest Kanto region since late Yayoi related to climate variations

Part 4. Production and economy

Chap. 11 Rice paddy cultivation and precipitation change in Yayoi period

Chap. 12 Problems around “Koku” (crop) and climate variations in 6th and 7thcenturies

Chap. 13 Relationship between ancient coin circulation and climate variations

<Vol. 4> Climate variation and medieval societies in Japan

Part 1. Environment and landscape in medieval period

Chap. 1 Overview of climate variations in Medieval period

Chap. 2 History of villages and farmlands related to environmental changes

Part 2. Responses against disasters

Chap. 3 Medieval ceremonies to pray for rain and precipitation variations

Chap. 4 Formation of medieval societies caused by climate changes in 11th and 12th centuries

Part 3. Relation to manor system

Chap. 5 Influence of climate variations in 11thand 12th centuries to establishment of manor system

Chap. 6 Variation of agrarian production in a manor estate of western Japan during 14thand 15th centuries

Chap. 7 Disasters in a manor estate near Kyoto and climate variations

Part 4. Influence to distribution and economy

Chap. 8 Societal change in 14th century, especially urban economy, and adaptation to famines

Chap. 9 Land sales contracts in late medieval period near Osaka related to climate variations

<Vol. 5> Reconsidering of early modern Japan from climate variation

Part 1. Nation-wide characteristics

Chap. 1 Overview of climate variations in early modern period

Chap. 2 Early modern agrarian production inferred from land tax invoices and climate variation

Chap. 3 Population change and natural environment in early modern period

Chap. 4 Anti-famine crop stocks and climate variations

Part 2. Edo government and central market

Chap. 5 Central market in early modern Japan and climate variation

Chap. 6 Responses of Edo government and private sectors to complex disasters in early 19th century

Part 3. Technologies and societies

Chap. 7 “Kabuido” (cooperative groundwater utilization system) in a delta region near Nagoya

Chap. 8 Agricultural responses against cold climatedisaster

<Vol. 6> Overview of early modern Japanese archipelago - from south to north

Part 1. Warmth as the problem

Chap. 1 Climate disasters and social responses in 19th Ryukyu (Okinawa) island – Top-down reformation and change in societies

Chap. 2 Climate variations and local societies in early modern Tanegashima island (south of Kagoshima) –from 1800 to 1820 AD –

Chap. 3 Climate during early 19th century (Bunka period) and agricultural policy in Kaga feudal domain

Part 2. Coldness as the problem

Chap. 4 Disasters and famines during late 18th and early 19th centuries and societal responses in Hiroshima feudal domain

Chap. 5 Crop failure and famine during early 19th century in northern Kanto region (north of Tokyo) and responses by local society

Chap. 6 Climate variations and societal responses during early 19th century in Sendai feudal domain.

The English synthesis book is planned to be one volume, in which resilience of Japanese societies against large climate variations will be discussed for each period of outstanding historical regime shifts over Japanese history. Chapters of the book have been decided as below. Chapters 4 to 10 will be written by Japanese historians or archaeologists mainly in Japanese language and translated to English later by English-native experts on Japanese history, including members of international outreach unit in the project.

Tentative title: “Climate Change and Resilience in Japanese History” (editors: T. Nakatsuka (RIHN), P. C. Brown (The Ohio State University), B. L. Batten (J. F. Oberlin University))

Tentative title of chapters:

Introduction: Aims of this book (editors)

Chap. 1: Japanese history: an overview (editors)

Chap. 2: Climate change and its relationships to historical events and trends in Japan: Possibilities for a re-writing of history (editors)

Chap. 3: Theoretical perspectives: resilience (editors)

Chap. 4: Climate in the 10th–5th c. BCE and introduction of wet-rice agriculture (S. Fujio, National Museum of Japanese History)

Chap. 5: Climate in the 2nd c. and the Yayoi-Kofun transition (K. Wakabayashi, Dōshisha University)

Chap. 6: Climate in the 6th c. and the emergence of a centralized state (K. Imadu, Okayama University)

Chap. 7: Climate in the 10th–12th c. and the decline of a centralized state (N. Tamura, Beppu University)

Chap. 8: Climate in the 14th–16th c. and warrior society (T. Ito, Meijō University)

Chap. 9: Climate in the 17th c. and agricultural expansion during the Little Ice Age (K. Takeii, University of the Ryukyus)

Chap. 10: Climate in the 18th-19th c. and the development of a market economy (Y. Takatsuki, Kobe University)

Conclusion: Resilience in Japanese history (editors)

All of the writers and translators have been determined, and the book is planned to be published by Cambridge University Press through the reviewing process of CUP after the end of this project.

●Achievements

○Papers

【Original Articles】

- Uemura, R., M. Uemura, M. Sano, T. Nakatsuka 2018 A 180-year-long isotopic record of tree-ring cellulose on Okinawa Island, Japan. Geochemical Journal. (reviewed). in press
- Xu, C., N. Pumijumnong, T. Nakatsuka, M. Sano, 2018 Inter-annual and multi-decadal variability of monsoon season rainfall in central Thailand during the period of 1804-1999-inferred from tree ring oxygen isotopes. International Journal of Climatology. (reviewed). in press
- Li, Q., Y. Liu, T. Nakatsuka, K. Fang, H. Song, R. Liu, C. Sun, G. Li, K. Wang 2018,10 East Asian Summer Monsoon moisture sustains summer relative humidity in the southwestern Gobi Desert, China: evidence from δ18O of tree rings. Climate Dynamics :1.0-17.0. DOI:https://doi.org/10.1007/s00382-018-4515-6 (reviewed).
- Hisamochi, R., Watanabe, Y., Sano, M., Nakatsuka, T., Naoyuki Kurita, Miyuki Matsuo-Ueda, Hiroyuki Yamamoto, Suyako Tazuru, Junji Sugiyama 2018,12 Cellulose oxygen isotopic composition of teak (Tectona grandis) collected from Java Island: a tool for dendrochronological and dendroclimatological analysis. Dendrochronologia(52):80-86. DOI:https://doi.org/10.1016/j.dendro.2018.09.010
- Lucquin, A., Robson, H.K., Eley, Y., Shoda, S., Veltcheva, D., Gibbs, K., Heron, C.P., Isaksson, S., Nishida, Y., Taniguchi, Y., Nakajima, S., Kobayashi, K., Jordan, P., Simon Kanerk, S., and Craig, O.E. 2018,07 The impact of environmental change on the use of early pottery by East Asian hunter-gatherers. PNAS 115.0(31.0):7931.0-7936.0. DOI:10.1073/pnas.1803782115
- Wei, Z., X. Lee, Z. Liu, U. Seeboonruang, M. Koike, K. Yoshimura 2018,04 Influences of large-scale convection and moisture source on monthly precipitation isotope ratios observed in Thailand, Southeast Asia . Earth and Planetary Science Letters(488):181-192. DOI:doi:10.1016/j.epsl.2018.02.015, 2018 (reviewed).
- Hirano, J. Mikami,T. Zaiki,M. Nishina J. 2018 Analysis of precipitation data at Yokohama, Japan, from 1863 to 1869 observed by J.C. Hepburn. Journal of Geography(127.0):531.0-541.0. DOI:https://doi.org/10.1007/s00382-018-4212-5 (reviewed).

・Hakozaki, M., F. Miyake, T. Nakamura, K. Kimura, K. Masuda, M. Okuno 2018 Verification of the annual dating of the 10th century Baitoushan Volcano eruption based on AD 774–775 carbon-14 spike. Radiocarbon(60.0):261.0-268.0. DOI:https://doi.org/10.1017/RDC.2017.75. (reviewed).

・Caceres, M.L.L., S.Nakano, J.P.Ferrio, M.Hayashi, T. Nakatsuka.,M.Sano,Y.Yamanaka、Y.Nobori 2018 Evaluation of the effect of the 2011 Tsunami on coastal forests by means of multiple isotopic analyses of tree-rings. Isotopes in Environmental and Health Studies . (reviewed).

・Nakai, W., N. Okada, M. Sano, T. Nakatsuka 2018 Sample preparation of ring-less tropical trees for δ18O measurement in isotope dendrochronology. (reviewed).

・Nabeshima, E., T. Nakatsuka, A. Kagawa, T. Hiura, R. Funada 2018,06 Seasonal changes of δD and δ18O in tree-ring cellulose of Quercus crispula suggest a change in post-photosynthetic processes during earlywood growth. TROPICS (27.0). DOI:https://doi.org/10.1093/treephys/tpy068 (reviewed). in press

・Xu, C., Sano, N., Ashok Priyadarshan Dimri, Rengaswamy Ramesh, Takeshi Nakatsuka, Feng Shi, and Zhengtang Guo 2018,05 Decreasing Indian summer monsoon on the northern Indian sub-continent during the last 180 years: evidence from five tree-ring cellulose oxygen isotope chronologies. Climate of the Past (14):653-664. DOI:https://doi.org/10.5194/cp-14-653-2018

・Xu, C., J. Shi, Y. Zhao, T. Nakatsuka, M. Sano, S. Shi, Z. Guo 2018,04 Early summer precipitation in the lower Yangtze River basin for AD 1845–2011 based on tree-ring cellulose oxygen isotopes. Climate Dynamics,. DOI:https://doi.org/10.1007/s00382-018-4212-5 (reviewed).

○Research Presentations

【Oral Presentation】

・Nakatsuka, T New perspectives in historical studies provided by high resolution paleoclimate data. WEHC BOSTON　2018, 2018.08.01, Boston, USA.

・Shibamoto, M., Takatsuki, Y. Climate changes and market economy: the case of early modern Japan. WEHC BOSTON 2018, 2018.08.01, Boston, USA.

Stage: Full Research

Project Name: Toward the Regeneration of Tropical Peatland Societies: Building International Research Network on Paludiculture and Sustainable Peatland Management

Abbreviated Title: Tropical Peatland Societies

Project Leader: MIZUNO, Kosuke

Program 1: Societal Transformation under Environmental Change

Key Words: Peatland, Tropical peatland societies, Rehabilitation, Environmental vulnerability, Transformability

○ Research Subject and Objectives

a) Problem, background, and objectives

The degradation of tropical peat swamps in Southeast Asia has increasingly become problematic in the context of international environmental conservations. Due to their physical characteristics, tropical peat swamp forests have been difficult to utilize, and therefore, spared from development for a long time. However, drainage associated with plantation development of fast-growing trees and oil palm has led to a decrease in groundwater table levels and the drying of peat swamp forest.

This has resulted in an increase in CO2 emissions, by peat decomposition, and frequent fires (Hirano 2009, 2012, 2014). In Indonesia alone, an estimated 2.1 million hectares of forest – most of them peatlands – that were burned in 2015. The amount of CO2 emitted from the fires in 2015 exceeded annual CO2 emission from the consumption of fossil fuels in Japan of 2015 (Fig. 1). The resultant haze caused incalculable damage to the local economy and has impacted the health of not only the local people, but also those in Malaysia and Singapore (Fig.2). The prevention of peatland degradation and aridification has become a global environmental, economic, and political issue.

In Indonesia, the political and social situation around peatland has made the sustainable management of the peat environment a difficult task. Most peatland is classified as state forest, and state appropriation has created contestation, overlapping, and insecurity over forest tenure conditions (RRI 2008, RRI 2012, Sunderlin, Hatcher, and Liddle 2008, White and Martine 2002). Companies that were given concessions in peatland areas developed plantations, roads, and canals under weak state regulations, attracting people to move in. The complexity and vagueness of land possession has prevented the local villagers from managing peatland sustainably and continuously. As a result, the peat swamp has dried up, resulting in degradation, and in turn, widespread fires like a stage of catastrophe. .

How can society develop institutions to control and manage these fires and mitigate degradation? Our research project will conduct transdisciplinary research into the social-ecological systems in tropical peatlands to understand and address their vulnerabilities. Ultimately the project intends to elucidate the transformability of environmentally vulnerable societies.

b) Methodology, structure and schedule

The inquiries and issues of peatland societies and environment can be integrated under the cyclic three phenomena; that is, (1) History of Development, (2) Peat Environment and (3) Climate Change. We explore them along the two lines, i.e. studies on Vulnerability and ones on Transformability (Fig. 3). The studies on vulnerability mainly includes scientific approaches to each phenomenon such as (1) exploring the socio-economic history of the peatland changes from the peat swamp forest to degraded and dried peatland by the exploitation by the companies and the societies, and changes of socio ecological conditions of peatland, (2) monitoring greenhouse-gas emissions in various types of peatlands and clarifying the characteristics of peat environment, and material and biological cycle such as soil and plants changes according to the peatland degradation (3) Analyzing the relationship among the rainfall, peatland fire, haze and health damage.

On the other hand, studies on transformability involves landscape changes from the degraded and dried peatland to rewetted and revegetated peatland with improved livelihood and entitlement of local people with our deep commitments to local people's efforts to tackle the peatland restorations, such as (1) promoting participation in peatland restoration activities amongst villagers and suggesting effective policies to administrators, (2) creating the innovative ways of peatland restoration, both by soil science, biological science and by organizational and agrarian arranges for of the paludiculture (See Fig. 4 & 5) through social forestry, and (3) identifying the potential local hotpots of fire with a weather radar. By combing vulnerability and transformability approaches, we try to not just implement the restoration or rehabilitation of degraded and dried peatlands, but create new system and landscape of regenerated peatland society In terms of research schedule, see Fig. 6.

c) Expected results

Through our research activities based around peatland restoration, we will draw an integrated map of the peatland ecosystem with participatory mapping (as a result of the studies on vulnerability), and establish a socio-ecological model of regenerated peatland society (as ones on transformability) that can be applied to peatland restoration in other areas. In addition, by comparing the

situations of peatlands in various areas, we will explore the characteristics of peat environment and societies in the world, addressing the transformability of environmentally vulnerable societies.

d) Project organization and membership

The project is composed of three work groups.

1) The Community, Corporate and Governance Group mainly deals with the phenomenon of the History of Development. The Study will focus on historical activities of the companies and people on the peatland, livelihood strategies, land tenure, and resource use to identify factors that cause peat degradation. This group consists of economists, anthropologists, sociologists, political scientists, experts on company management, experts on administration/governance and archive historian.

2) The Material Cycling Group focuses on the phenomena of the Climate Change and Peat Environment. The group conducts intensive multi-disciplinary research, particularly on water and material cycles, for the integration of natural and social scientific mapping to better understand peatland ecosystems. The group also assesses influences and health hazards associated with haze. The group consists of hydrologists, meteorologists, botanists and pedologists.

3) The International Research Group compares the social and ecological situations of peatlands in the world, and integrates experiences on sustainable peatland management. The members include experts on international relations, political science, and experienced scientists who conduct research within peatland outside of Indonesia.

e) Contribution to the program

The deliberation of relationship and structure between the three phenomena enables us to discuss sustainable development of peatland societies. Namely, in integrating processes between studies on the rainfall pattern/change and fire history, and land tenure and land conflict history that have been motivated by the companies, local people and the governments, and the solutions studies we can follow the (2) examining the kinds of motivations that affect people's livelihood in the Program 1 statement. Also we focus on the resource intensive development in Indonesia, such as the intensification of timber plantation and oil palm planting on the peatland as the opposite side of export-oriented industrialization in East Asian countries as (1) showing the Asia' s paths of socio-economic development in relation to climate change and environmental history of Program I statement.

CONTRIBUTION TO THE PROGRAM

The deliberation of relationship and structure between the three themes, s i.e. the History of Development, Peat Environment and Climate Change enables us to discuss sustainable development of peatland societies. Namely, in integrating processes between studies on climate change, especially rainfall pattern/change, and the characteristics of peatland exploitation, we can identify the characteristics of the vulnerability and the process of the transformability. Vulnerable peat swamp forest could not be restored and degradation of peatland has led to the catastrophe, but now people aim to restore the peatland not as the original peat swamp forest but the vegetated rewetted peat land as social and political options at local societies/livelihoods in accordance of the peatland environment. This results in the suggestion to administrators of effective peatland restoration programs, in which people can positively participate (see also Fig, 3 and 4. Amendments to Research…). This transformability approach thus contributes to showing the Asia's paths of socio-economic development in relation to climate change and environmental history, and examining the kinds of motivations that affect people's livelihood in the Program 1 statement.

In addition, some research activities can respectively contribute to the aim of the Program 1. Some members in the Community, Corporate and Governance group and Material Cycling group began implementing social forestry program in the village of Tanjung Leban. This is following the new government policies, in which the government legitimize the community's ownership of the forests, which were designated as state forests, through the community practice of social forestry. It has been broadly conducted in other Asian countries that once the state government claimed the state ownership of the almost all lands, then the government gradually guarantees the people's land rights. Through the implementation and observation of social forestry program, we clarify a process of socio-political development of land right in the rapid transformation of peatland environment.

For some time, the Indonesian economy has relied on the export of primary commodities such as logs, wooden products, sugar, tea, rubber, petroleum, natural gas, and palm oil. Further extraction of primary commodities often sacrifices the environment, and in many cases, has not given rise to further industrialization. The prevalence of oil palm planting, for example, contributes to deforestation, and the degradation of peatland, whilst also leading to decreased industrialization. The development of the palm oil processing industry has not been proportional to the increase in Crude Palm Oil (CPO) extraction. This type of resource intensive development or primary commodity export intensive development pattern in Indonesia is the opposite side of the Export-oriented industrialization in East Asian countries such as Japan, South Korea, Taiwan and China.

○ Progress and Results in 2018

PROJECT PROGRESS DURING THE FR PERIOD TO DATE

This year, we have tried to integrate our studies among the History of Development, Peat Environment and Climate Change groups with the ideas of the vulnerability and transformability. Vulnerability is the degree to which a system, or part of a system, may react adversely during the occurrence of a hazardous event (Prong 2014), on the other hand transformability is the capacity to create a fundamentally new system when ecological, economic, or social (including political) conditions make the existing system untenable. (Walker, et al 2004).

Peatland was originally formed as the peat swamp forest that was expulsive to people, because the land was muddy and difficult to be cultivated. Once the land was cultivated, the land started the subsidence unevenly among the plots. This peatland experienced the intensive exploitation only since 1980's by the companies of oil palm and timber plantation. After making the road and canal, people flowed into the area, and started the exploitation, and all of these exploitation promoted the degradation of peatland because of the massive drainage and fire. Degraded peatland is extensive, devastated, and really barren partly at the area suffered from the expose of acid sulfa.

These conditions are now attempted to be transformed with the idea of rewetting, revegetation and improvement of livelihood and entitlement of local people. This process of transformation is thought as the transformability, because rehabilitated peatland is totally different both from the dried and degraded peatland, and also from the original peat swamp forest that was really expulsive to people.

We have studies the vulnerability from the various points of view. Firstly we investigate the history of the exploitation of the peatland both by the companies, and also local people. Actually we have done research on the people and society on the peat land or the fringe area of peat dorm because people had kept their livelihood at the surrounding area of peat dorm. Local minority are included, so we have studied the peatland society that did not disturb the peat land seriously.

We have studied the vulnerability from the viewpoints of the rainfall, peatland fire, haze and health damage of local people. This topic is really challenging and important. We studies the history of rain fall, and fire with the historical studies. We started the investigation of health hazard caused by the haze of peatland fire in cooperation with hospitals in Riau and Central Kalimantan provinces. They expanded the network of monitoring air pollutant (PM 2.5 and CO2) during peatland fires, and a part of its result was published on an international journal (Notable Output 6). We also published a thesis, in which we show the dynamics of CO2 derived from decomposition of peat soils in accordance with the transformation of landscape (forest→devastated land), and the result of monitoring CH4 emission in Indonesian peatlands (Notable Output 10; Fig)We have studies the material cycling points of view, such as the vegetation, water and soil changes according to the peatland degradation, especially fire. We have studied the vulnerability from the viewpoints of land rights also especially on the state forest that has brought about the vague land rights of local people.

On the transformability, we have persuaded the villagers to participate in the restoration activities and also held Focus Group Discussion (FGD) in the village of Tanjing Leban, Bengkalis district. As a result, 24 households with the private land of 42 hectares newly decided to join the paludiculture program, and villagers planted vanilla and indigenous trees rewetting the dried peatlands. We have investigated the soil and plant changes after the fire to clarify the vulnerability of peatland and create the innovative way of paludiculture.

We analysed Provincial Spatial Planning (RTRW) and found out that it was designed based on the opinions of acacia and oil-palm companies, and, therefore, far narrower area than one that the BRG expected is designated as a peat- protected area. This has negative effect to eh transromability, so we analyse the reasons. At district/village level, we began the arrangement of counter mapping at the two villages in Pelalawan district for the purpose of seeking for the possibility of peatland restoration as bottom-up approach. We also suggested administrators to embed the improvement of vague land right and illegal occupation through the implementation of the social forestry program based on our research findings that the stronger the land rights, the better the management of the peatlands(Fig 7). Indeed, we began promoting the implementation of social forestry in combination with the peatland rehabilitation program. Or people will be actively involved in the peatland rehabilitation program because they can improve the land rights (so far land was disputed, but the conflict can be settled because of the social forestry program) with the taking part in the social forestry program cum peatland rehabilitation program. This approach is called the entitlement approach because the weak land rights is deprive of the entitlement, and improving the land rights is the improving the entitlement. Or with the coupling with the fundamental issue's improvement such as land title, we can secure the active participation of local people to the peatland rehabilitation program.

Transformability process is not only the change of landscape but also the improvement of people's livelihood and entitlement. These improvement of peat land society supported by the innovation of the puldiculture technology and approach including the organization and agrarian structure consist of the factors that form the new model of peatland society that will be diffuse to other areas.

Our idea of transformability is not limited to the local society. We find that as a result of the rapid expansions of palm-oil production (including the planting on the peatland) and the export of crude palm oil, while consumption and the production of non-tradable goods grew, the production of tradable goods has been stagnant in Indonesia. This resource intensive development, or primary commodity intensive development that sacrifice the industrialization, or the development of tradable goods industry is

the opposite side of the East Asia's export-oriented industrialization. Both of the patters of development have bias, so we intend to establish the peatland society that are not biased with the primary commodity intensive development. We intend to develop the society that does not sacrifice the environment, industry and agriculture. One of the solution is to curb the expansion of oil palm planting on the peatland, but to develop the oleo-chemical industry, and paludiculture that think of the development of processing industry.

PROGRESS SINCE THE LAST REPORTING

As for the progress of research project as a whole, we have elaborated the research concept, in which we have reconfigured the three themes of the History of Development, Peat Environment and Climate Change and, and explore them taking two approaches: i.e. studies on Vulnerability and ones on Transformability (see Fig. 3; 4. Amendments to Research …). Along these three themes and two approaches, each work group has made progresses toward drawing an integrated map of the peatland ecosystem, and establishing a reliable management guideline that can be applied to peatland restoration in other areas. In addition, we reinforced the PR activities (Fig. 9).

(1) The Community, Corporate and Governance Group has made progress in studies especially on governance and trade. The group revealed discord in and between government offices related to peatland policies at central level. At provincial level, they analysed Provincial Spatial Planning (RTRW) and found out that it was designed based on the opinions of acacia and oil-palm companies, and, therefore, far narrower area than one that the BRG expected is designated as a peat- protected area. At district/ village level, the group began the arrangement of counter mapping at the two villages in Pelalawan district for the purpose of seeking for the possibility of peatland restoration as bottom-up approach. The group also suggested administrators to embed the improvement of vague land right and illegal occupation through the implementation of the restoration program based on our research findings that the stronger the land rights, the better the management of the peatlands(Fig 7). Indeed, the group began promoting the implementation of social forestry in combination with the peatland rehabilitation program. Or people will be actively involved in the peatland rehabilitation program because they can improve the land rights (so far land was disoputed, but the conflict was settled because of the social forestry program) with the involvement of social forestry program cum peatland rehabilitation program. In addition, the group clarified that, as a result of the rapid expansions of palm-oil production (including the planting on the peatland) and the export of crude palm oil, while consumption and the production of non-tradable goods grew, the production of tradable goods has been stagnant in Indonesia as a case of Dutch disease.

(2) The Material Cycling Group began the investigation of health hazard caused by the haze of peatland fire in cooperation with hospitals in Riau and Central Kalimantan provinces. They expanded the network of monitoring air pollutant (PM 2.5 and CO2) during peatland fires, and a part of its result was published on an international journal (Notable Output 6). The group also published a thesis, in which they show the dynamics of CO2 derived from decomposition of peat soils in accordance with the transformation of landscape (forest→devastated land), and the result of monitoring CH4 emission in Indonesian peatlands (Notable Output 10; Fig. 8). As for paludiculture, the members persuaded the villagers to participate in the restoration activities and also held Focus Group Discussion (FGD) in the village of Tanjing Leban, Bengkalis district. As a result, 24 households with the private land of 42 hectares newly decided to join the paludiculture program, and villagers planted vanilla and indigenous trees rewetting the dried peatlands. The group has investigated the soil and plant changes after the fire to clarify the vulnerability of peatland and create the innovative way of paludiculture.

(3) The International Research Group held a workshop in May 2018 and confirmed the framework of comparing the situations of peatlands in the world., the group investigated the social influences of forest fire in Central Kalimantan province, Indonesia, and conducted scoping investigations of peat area in Sarawak, Malaysia. In Peru, they prepared hearing investigations at village level, which will be conducted in the next year. In this year, they did not conduct the research in Russia because of the limitation of the budget.

○Project Members

The Community, Corporate, and Governance Group

◎ MIZUNO, Kosuke (Research Institute for Humanity and Nature / Center for Southeast Asian Studies, Kyoto University,Professor)

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○ OKAMOTO, Masaaki (Center for Southeast Asian Studies, Kyoto University,Professor)

○ OSAWA, Takamasa (Research Institute for Humanity and Nature,Researcher)

○	KAJITA, Ryosuke	(Research Institute for Humanity and Nature,Researcher)
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○ Future Themes

RESEARCH PLAN

a) Integrated socio-ecological and fire study at Tanjung Leban. Mapping of the land on the view points of peatland rehabilitation, water management, paludiculture will be combined with the socio-economic household survey, with that way the improvement of livelihood, conditions of socio-economic conditions such as the land title, income of household or education will be related to the participation of people to the rehabilitation program and to identify the effects of the rehabilitation programs.

b) Extensive household surveys especially with relation to the peatland degradation, rehabilitation and conflicts. Land rights are important factors that will be paid attention in relation to the peatland rehabilitation program, and social forestry.

c) Environmental policy decision and its implementation of the new governor in Riau Province. In June 2018, the election of governor was held in Riau province, and Syamsuar, who is a regent of Siak district and has produced the various results in environmental problems, carried with it surpassing the former governor who propelled the industrial development of peatlands in the province. It is an important task to explore the dynamics of environmental policies implemented by the new governor (will take office in March 2019) and clarify the structure of governance of environment at provincial level.

d) Counter mapping in the village of Rantau Baru, Pelalawan district. A sub-group of Community, Corporate and Governance group have arranged the produce of a peatland map, of which the villagers participate in the making process, in collaboration with local NGOs. While we practice this as an action research to reinforce the villagers land rights, we will clarify the processes of how counter mapping stimulates the villagers' motivations to obtaining land right and how the district government and acacia/ oil palm companies react to the movement.

e) Data rescue of rainfall data in peatland areas before deforestation and comparison with after. We have started digitalizing 19C Dutch-colonial data "Regenwaarnemingen in Nederlandsch-Indie". We will analyse and compare them with operational (BMKG) data after deforestation (since 1970s). We will also search other climatological data and disaster records at Dutch-Indonesian national archives.

f) Rainfall variabilities with annual/diurnal cycles and El Niño. We have started analyzing interannual/interlocal variabilities of seasonal cycles of rainfalls in Sumatera up to the Independence Era (1930s-60s). We will analyse also the diurnal cycles with a predawn peak of rainfall in Riau based on satellite observations. We will make drought caution, based on these analyses and climate predictions by meteorological agencies/institutes.

g) Radar hydrology and forest fire prevention. We have done radar station adoption at Sepahat fire-watch tower in Bukit Batu of Bengkalis, Riau, with the official clearance of radar installation from the local government (BPBD) of Benkalis. We will start continuous operation of radar observations after installation collaborated with central-government agencies (BPPT and BRG).

h) Change of forest properties and tree species traits according to soil type transition from tropical heath to peat swamp forests We had conducted permanent-plot census and architectural trait analysis for dominant tree species and understood the difference of forest dynamics between tropical heath and peat swamp forests in Central Kalimantan. Then, we will establish a series of plots according to soil type transition from tropical heath and peat swamp forests and clarify the environmental factors to explain the change of forest properties and tree species traits between these two type forests.

i) Relationship between species composition and environmental factors for after burnt grasslands in Indonesian peatlands. From 2014, we continue the research about relationships between grassland communities and environmental factors for after burnt peatlands in several villages at Bengkalis Regency, Riau Province in Sumatra. We had identified several grassland communities from field research and statistical analysis, and clarified the relationship between these communities and several environmental factors such as ground water level and water chemistry. We will extend our subject of study to various disturbed peatlands which have different disturbance severity and successional level. And, we also expand our research area widely and test our results in whole Indonesia. Finally, we will generalize and make the scenario for recovery of disturbed peatlands in Indonesia.

j) Validation of land suitability for forest rehabilitation and selection of native species for rehabilitation disturbed peatlands. We will establish the method to identify the land which is suitable for forest rehabilitation at the disturbed peatland. And, using experimental methods, we will

clarify the ecological traits of native tree species in the sight from environment adaptation, and select the suitable species for forest rehabilitation there.

k) International comparative study for the current status, forest management and rehabilitation methods for tropical peatlands. We will conduct literature study about current status of tropical peatlands and international comparative study for forest management and rehabilitation of it.

l) Reconstruction of research organization to explore the economic exploitation around sago production in the village of Kepau Baru, Bengkalis district. Although some members are continuously monitoring water levels and constructing canal blockings in the village, the research on the system of economic exploitation around sago production has been stagnant because the in-house member engaged in the task has resigned the job. In the next year, we will reconstruct the research organization and explore the problem.

h) Management and strategies of oil palm and timber plantation's companies in relation to the peatland use or peatland rehabilitation programs, and also their participation to the industrialization program for the down-stream industry. Impacts of oil palm and timber plantation's activities to the Indonesian macro economy will be studied.

●Achievements

○Papers

【Review Articles】

・YAMANAKA, M. D., S.-Y. OGINO, P.-M. WU, HAMADA J.-I., S. MORI, J. 2018,04 Maritime continent coastlines controlling Earth's climate. Prog. Earth Planet Sci. 5(21):1-28. DOI:10.1186/s40645-018-0174-9 (reviewed). (a review, Special Call for Excellent Papers on Hot Topics: 5. Asia

○Research Presentations

【Oral Presentation】

・SHIODERA, S. Species composition and environmental factors of grasslands developing on the burnt peatlands in Sumatra. 15th International Peat Congress 2016, 2106.08.15-2016.08.19, Pullman Hotel, Kuching, Sarawak, Malaysia.

Stage: Full Research

Project Name: Research and Social Implementation of Ecosystem-based Disaster Risk Reduction as Climate Change Adaptation in Shrinking Societies

Abbreviated Title: Eco-DRR project

Project Leader: YOSHIDA Takehito

Program 1: Societal Transformation under Environmental Change

URL: https://www.facebook.com/EcoDRR2018/

Key Words: Ecosystem-based Disaster Risk Reduction

○ Research Subject and Objectives

Problem, background, and objectives

Climate change is ongoing and projected to intensify in the future, and its impacts expand to various natural and human systems (IPCC 2014). Among the impacts, this project focuses on natural disasters, and it aims to contribute to adaptation strategy of reducing and managing the risks of natural disasters. The risk of climate change or natural disaster results from the interaction among climate-related hazard, exposure and vulnerability of human activities (IPCC 2012, 2014), so that adaptation to the natural disaster risk can be realized by diminishing exposure (by improving land use) and vulnerability to hazard. Our project mainly focuses on the land use in order to lower the disaster risk.

Existing hard-engineering countermeasures against natural disasters have target safety levels, below which natural disasters can be prevented. Although these countermeasures are effective if the hazard level of natural disaster is below the target safety level, we are increasingly being faced with the situation, in which the hazard level goes well beyond the safety level, resulting in a devastating natural disaster. Also, conventional countermeasures are sometimes criticized for negatively affecting natural environment and biodiversity that supply multiple ecosystem services supporting our livelihood. Eco-DRR (Ecosystem-based Disaster Risk Reduction) approaches focus on lowering the exposure of human activities to the hazard of natural disasters, by which the losses and damages of natural disasters can be reduced, if not prevented. Eco-DRR approaches take advantage of the multi-functionality of ecosystems, including their capacity to mitigate disasters while providing multiple ecosystem services (e.g. Convention on Biological Diversity 2015, UN Office for Disaster Risk Reduction 2015, Ministry of the Environment (MOE) Japan 2016). Thus, Eco-DRR approaches complement the existing conventional approaches against natural disasters, although the effectiveness and multi-functionality of Eco-DRR are not yet clearly and quantitatively understood (Science Council of Japan 2014, The Royal Society 2014).

Japan is facing aging and shrinking population, and it is leading to the abandonment of farmlands, houses and other intensive land use, providing an opportunity for improving the land use (e.g. Ministry of Land, Infrastructure, Transport and Tourism (MLIT) Japan 2015). The population of Japan increased substantially over the last century, making the risk of natural disasters larger and spreading wider. Evaluating the past change of natural disaster risks provides valuable information when considering the adaptation not only in Japan but also in other countries.

Given the above background, this project sets the two main goals.

Goal 1. Developing the methodology of evaluating the multi-functionality of Eco-DRR in terms of reducing natural disaster risks and other ecosystem services, and assessing Eco-DRR by comparing the multi-functionality between the past, the present and the future.

Goal 2. Supporting the implementation of Eco-DRR through transdisciplinary approaches in collaboration with local communities, governments, insurance industry and other stakeholders.

Methodology, structure and schedule

Three research components (described below) contribute to achieve the above two goals with the spatial scales of research.

Research component 1) Visualizing the risks of natural disasters in the present and the past

The risk components of hazards, exposure and vulnerability for different natural disasters will be analysed on the GIS, and then the risks of natural disasters in terms of monetary loss and the

number of victims will be evaluated and visualized as the risk maps for the present and the past. By comparing the maps between the present and the past, temporal changes of the natural disaster risks will be examined, and modeling the risk for the different scenarios of exposure will contribute to assess Eco-DRR.

Research component 2) Evaluating and modelling multi-functionality of Eco-DRR

Provisioning, regulating and cultural ecosystem services will be evaluated on the GIS, and their spatial distribution will be modelled in relation to population distribution and land use patterns. The model will be used for evaluating the ecosystem services for different land use scenarios to assess the potential of Eco-DRR.

Research component 3) Transdisciplinary scenario analysis and developing social and economic incentives of Eco-DRR

Together with local communities and local governments, transdisciplinary platforms will be formed at each of the local research sites by taking advantage of existing platforms. This transdisciplinary platform will function to deepen the understanding, discuss the future options, and build the consensus of Eco-DRR. Transdisciplinary scenario analysis will be conducted in consideration of climate change and shrinking population. Multiple scenarios of the future local community will be developed, and the risks of natural disasters and ecosystem services will be modelled for each scenario. In addition, traditional and local knowledge of Eco-DRR will be inventoried and evaluated for the multi-functionality to be shared in the platforms and the general

public.

In collaboration with insurance industry, a research forum will be formed to discuss the possibility and feasibility of what insurance industry can contribute to develop economic incentives of Eco-DRR. Also, various laws and institutions in national and local governments related to disaster risk reduction and land use will be assessed in the research forum as well.

Expected results

Visualization of the present status, historical changes and future scenarios of natural disaster risks and utilization of Eco-DRR will help us understand what and where natural disaster risks exist in relation to land use, how we happened to have the risks historically, and what options we have in the future. Our project also contributes to consensus building and developing social and economic incentives to promote and conserve Eco-DRR approaches by collaborating with diverse stakeholders in local communities, governments and insurance industry.

Project organization and membership

The research components 1 to 3 will be conducted by the groups and sub-groups. The total number of project members now count about 120.

Contribution to the program

Our project is affiliated with the Program 1 “Societal Transformation under Environmental Change” that aims at providing realistic perspectives and options to facilitate the transformation towards a

society that can flexibly respond to environmental changes and natural disasters.

Even in the highly developed countries such as Japan, natural disasters frequently occur and cause devastating losses and damages in human society, and there is an increasing trend of natural disasters caused by storms and typhoons, and heavy rain under the ongoing climate change. Existing countermeasures against natural disasters based on the conventional civil engineering technologies have target safety levels, below which natural disasters can be prevented. Although these countermeasures are effective if the hazard level of a natural disaster is below the target safety level, we are increasingly being faced with the situation, in which the hazard level goes well beyond the safety level, resulting in a devastating natural disaster. Also, conventional countermeasures are sometimes criticized for negatively affecting natural environment and biodiversity that supply multiple ecosystem services supporting our livelihood. Eco-DRR (Ecosystem-based Disaster Risk Reduction) approaches focus on lowering the exposure of human activities to the hazard of natural disasters, by which the losses and damages of natural disasters can be reduced, if not prevented. Eco-DRR approaches take advantage of the multi-functionality of ecosystems, including their capacity to mitigate disasters while providing multiple ecosystem services. Thus, Eco-DRR approaches complement the existing conventional approaches against natural disasters, although the effectiveness and multi-functionality of Eco-DRR are not yet clearly and quantitatively understood (Science Council of Japan 2014, The Royal Society 2014). Our project aims at deepening the understanding of Eco-DRR in an interdisciplinary way combining natural and social sciences, and contributes to the Program 1 by addressing the links between natural disasters and social issues.

Land use and land ownership are the key issue for the social implementation of Eco-DRR, and they are the most challenging issue when we discuss the future options and build the consensus of Eco-DRR at each local research site. Our project aims at understanding the history of land use change and examining the future scenarios of land use under the conditions of climate change and shrinking population, in relation to the laws and institutions associated with land use and land ownership. Land

ownership right in conformity with public welfare is described in the current constitution of Japan as well as in the former Meiji constitution, but the actual relationship between land ownership right and public welfare on the ground should be reviewed and assessed in light of disaster risk reduction and multi-functionality of land. Social transformation with regard to land use and land ownership will be considered in our project, which suggests the strong link between our project and the Program 1. The Program 1 has been having discussions with seminar talks by internal and external researchers on land use and land ownership, and we would like to continue contributing to it.

○ Progress and Results in 2018

Research component 1) Visualizing the risks of natural disasters in the present and the past

The methodology for evaluating and visualizing the risks of natural disasters in the present and the past was developed by examining the existing and new data sets of hazards, exposure and vulnerability. As a trial case, we evaluated the risk of flood in terms of potential economic losses and the number of potential victims at a prefecture scale of Shiga, as we will eventually evaluate and visualize the risks of natural disasters at a country-wide scale. Multiple data sets of flood hazard, exposure information including land use and buildings (micro geodata), and vulnerability estimates based on the standard manual by the MLIT are combined on the GIS to estimate the potential socio-economic loss of flood disaster. Future challenges exist in applying the method to multiple types of natural disasters, further improving the evaluation method, applying the method to other local research sites and larger spatial scales, etc.

Research component 2) Evaluating and modelling multi-functionality of Eco-DRR

The existing methodologies for evaluating and modelling ecosystem services were assessed to decide which methodology can be used for this project. Parameters and land use data sets have been reviewed and collected to be used for our analysis. As a trial case, we evaluated several ecosystem services at a prefecture scale of Shiga, as we will eventually evaluate them at a countrywide scale. In addition, for the scenario analysis that will be conducted at the next step, we examined the methodology of land use change modelling at a prefecture scale of Shiga and examined a BAU (Business As Usual) case of the future land use pattern and its relationship with flood hazard.

Research component 3) Transdisciplinary scenario analysis and developing social and economic incentives of Eco-DRR

We conducted research and actions for social implementation of Eco-DRR at three research sites of Shiga, Fukui and Chiba.

At the Fukui site, the relationship among land use, disaster risks, biodiversity and natural resources was explored in the Mikatagoko area, and the research results have been shared with local stakeholders at the meetings of the Mikatagoko Nature Restoration Committee to stimulate the discussions and planning of Eco-DRR in this area. At a prefecture scale of Fukui, the potential habitat of oriental white stork and its relation to flood hazard, and the relationship between the distributions of endangered species and flood and landslide hazards were explored. These research results are being shared with the Fukui prefectural government and others.

At the Shiga site, the relationship between natural resources and landslide was explored in the Hira mountain area, and the functioning and spatial position of traditional open levees was studied in the Adogawa river area. In addition, at the prefecture scale of Shiga, the historical relationship between land use and disaster risks, and the relationship between city planning of municipalities and flood risk were studied. These research results are being shared with local stakeholders and local governments.

At the Chiba site, the flood mitigating functions of wetlands and grasslands and its relations to biodiversity has been explored in the Inbanuma area, and the research results are being shared with local stakeholders.

At these sites and others in Toyama and Tohoku areas, the traditional and local knowledge of Eco-DRR including the history of land use management, flood and landslide control measures built during the Edo period, management of shelter woods around houses, etc. have been collected. These traditional and local knowledge of Eco-DRR will be made accessible to the general public by publishing a series of booklets introducing these knowledges.

As for the social and economic incentives, we examined the feasibility of natural disaster insurance to stimulate the implementation of Eco-DRR by comparing the insurance systems of different countries, and found that the current insurance system of Japan is not likely to be a good incentive in this case, although those of other countries also have different difficulties. Other incentives such as financial and investment schemes and various laws and institutions of the Japanese government have also been being examined.

Project organization and general activities

Our FR started in April 2018, and since then the organization of the project has been even more developed by having additional members joined us. The total number of project members now count about 120. Two postdocs and three research assistants

joined as in-house project members during 2018 to support the project leader and the core members in the headquarter function of the project and to play a central role in conducting the research components.

In November 2018, we had a general meeting of the project with about 60 participants to share the research results and discuss the future research plans. Five external advisors and three PDs also joined the general meeting and provided constructive suggestions in response to the current state of the project. In advance of the general meeting, we had a meeting for the core group, with which leaders and sub-leaders of research groups are affiliated. Another meeting of the core group will be held in March 2019.

The international affairs sub-group contributed to discussions and negotiations relating to Eco-DRR and publications including guidelines in various international organizations such as IUCN, the Ramsar Convention, the Convention on Biological Diversity, Japan International Cooperation Agency etc.

Overall self-evaluation and future challenges

During the FR1, research and actions for social implementation have been progressed in each group or sub-group as planned at the beginning of the project, and no significant difficulties or troubles were not observed. During the early phase of the project, we plan to focus mainly on producing research outcomes in each group and sub-group, instead of integrating those outcomes into a single scheme, which is planned at the later phase. However, discussions during the general meeting have identified the need of visualizing the directions of integration of outcomes from different groups and from three research sites, indicating what needs to be done in the next year in addition to the existing plans of research and actions.

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Group 3 (Social implementation)・SHIGA subgroup

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	WANG, Wen	(Graduate School of Global Environmental Studies, Kyoto University,Graduate student,Landscape architecture)
	OSAWA, Sotaro	(Graduate School of Engineering, Kyoto University,Graduate Student,Architecture)
	OCHIAI, Chiho	(Graduate School of Global Environmental Studies, Kyoto University,Assistant Professor,Community disaster prevention, Community participation type disaster reconstruction)
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	KUBOTA, Yoshiaki	(University of Toyama,Professor,Transdisciplinary platforms)
	KOBAYASHI, Hirohide	(Kyoto University,Associate Professor,Transdisciplinary platforms)
	SHIMADA, Kazuhisa	(The University of Shiga Prefecture,Associate Professor,Transdisciplinary platforms)
	TAKAHASHI, Hiroki	(Otsu City Museum of History,Curator,Japanese history)
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	YAMAMOTO, Kiyotatsu	(University of Tokyo,Associate Professor,Transdisciplinary platforms)
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Group 3 (Social implementation)・CHIBA subgroup

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	TSUGE, Takahiro	(Konan University,Professor,Transdisciplinary platforms, Developing incentives and institutions)
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Group 3 (Social implementation)・Incentive & Institution subgroup

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MURAKAMI, Akinobu	(Faculty of Engineering, Information and Systems, University of Tsukuba,Associate Professor,Visualizing and modelling risks of natural disasters, Developing incentives and institutions)
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Group 3 (Social implementation)･Traditional Local Knowledge subgroup

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Adviser

□ KAYABA, Yuichi	(Public Works Research Institute,Senior Scientist,External advisor)
□ SHIMATANI, Yukihiro	(Kyushu University,Professor,External advisor)
□ TAKEUCHI, Kazuhiko	(Integrated Research System for Sustainability Science, University of Tokyo,Director and Professor,External advisor)
□ NAKAMURA, Futoshi	(Hokkaido University,Professor,External advisor)
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○ Future Themes

Research component 1) Visualizing the risks of natural disasters in the present and the past

The risk components of hazards, exposure and vulnerability for different natural disasters (river flood, coastal flood and rainfall-induced landslides) will be analysed on the GIS by digitizing and integrating different source data (existing GIS data, various paper maps, government statistics, our own observation data, etc.). Then, the risks of different natural disasters in terms of monetary loss (according to the government manual, MLIT 2005) and the number of victims will be evaluated as the product of the components and visualized as the risk maps. The risk maps for the present will cover the all area of Japan including the local research sites of this project, and the maps for the past will cover the local research sites for the different times during the last century or so. By comparing the maps between the present and the past, temporal changes of the natural disaster risks will be examined. The disaster risks will also be modeled as a function of land use and population distribution, and the risks will be predicted for the different scenarios of exposure in the scenario analysis conducted together with the research component 2.

Research component 2) Evaluating and modelling multi-functionality of Eco-DRR

Provisioning, regulating and cultural ecosystem services will be evaluated on the GIS by the existing and currently developing methods (e.g. Hashimoto et al. 2014, Kabaya & Okayasu 2014, Englund et al. 2017) using the existing data and statistics, and our own observation data. Then, the spatial distribution of those ecosystem services will be analysed and modelled in relation to the

spatial distribution of population and land use. The model will be used for evaluating the change of ecosystem services for the different scenarios of land use to assess the potential multi-functionality of Eco-DRR in the scenario analysis conducted together with the research component 1. The spatial scale of this research ranges from the local research sites of this project to the all area of Japan.

Research component 3) Transdisciplinary scenario analysis and developing social and economic incentives of Eco-DRR

Together with local communities and local governments, transdisciplinary platforms were formed at each of the local research sites of this project by taking advantage of existing platforms such as a Nature Restoration Committee based on the law, a regional association and a watershed management committee, etc. This transdisciplinary platforms are functioning to deepen the understanding, discuss the future options, and build the consensus of Eco-DRR among local stakeholders. Transdisciplinary scenario analysis will be conducted in the platform in consideration of climate change and aging and shrinking population in order to stimulate the understanding and discussion. Multiple scenarios of the future local community will be developed in the platform by using participatory and other approaches, and the risks of natural disasters and ecosystem services will be modelled for each scenario using the research outcomes of the research components 1 and 2. Then, the results of the scenario analysis will be shared and discussed in the platform, and if

necessary, the analysis will be repeated for the different scenarios to stimulate consensus building. Other research outcomes of the research components 1 and 2 will also be shared in the platform. Depending on the consensus building in the platform, we will support the social implementation of Eco-DRR by making policy recommendations, contributing to land use planning, etc.

We continue the inventory of traditional and local knowledge of Eco-DRR, and we will evaluate the multi-functionality using the methodology of the research components 1 and 2. We are planning to publish the first booklet of the series that will make the traditional and local knowledge of Eco-DRR accessible to the general public.

As for the social and economic incentives, we will complete the analysis of natural disaster insurance in terms of the role of stimulating the implementation of Eco-DRR, and other incentives such as financial and investment schemes will be further examined. Also, various laws and institutions in the national and local governments related to disaster risk reduction and land use will be further assessed to examine the possibility of using existing legal frameworks for the promotion of Eco-DRR and to find the gaps that the existing laws and institutions do not secure.

Integration of the research outcomes

As research outcomes of each group and sub-group accumulate, we will start discussions toward the integration into a single, common scheme in order to simulate further discussions on better research directions and to identify the research gaps that the present research plan is not covering. As the first step, we will have a questionnaire survey among 120 members of the project covering a wide range of different disciplines and identify the common understanding of important concepts and major research agendas associated with Eco-DRR.

Study Area

Local research sites of the project include the Mikatagoko lakes and other areas in Fukui Prefecture, the Otsu and Takashima areas in Shiga Prefecture, and the Lake Inba area in Chiba Prefecture. Also, several research components will be conducted at a national scale of Japan.

Research schedule

Research subjects aiming at the goal 1 (methodology development and assessing Eco-DRR) will be conducted mostly in the earlier phase of the project, while those aiming at the goal 2 (implementation of Eco-DRR by transdisciplinary approaches) have longer scope of research development.

●Achievements

○Papers

【Original Articles】

・Yamamichi M, Kazama T, Tokita K, et al. 2018 A shady phytoplankton paradox: when phytoplankton increases under low light. Proceedings of the Royal Society B: Biological Sciences 285(1882). DOI:10.1098/rspb.2018.1067 (reviewed).

・Shoyama K, Braimoh AK, Avtar R, Saito O. 2018 Land Transition and Intensity Analysis of Cropland Expansion in Northern Ghana. Environmental Management 62(5):892-905. DOI:10.1007/s00267-018-1085-7 (reviewed).

・Saito O, Kamiyama C, Hashimoto S. 2018 Non-Market Food Provision and Sharing in Japan's Socio-Ecological Production Landscapes. Sustainability 10(1):213. DOI:10.3390/su10010213 (reviewed).

・Park CY, Lee DK, Krayenhoff ES, et al. 2018 A multilayer mean radiant temperature model for pedestrians in a street canyon with trees. Building and Environment 141:298-309. DOI:10.1016/j.buildenv.2018.05.058 (reviewed).

・Ngwese NM, Saito O, Sato A, et al. 2018 Traditional and Local Knowledge Practices for Disaster Risk Reduction in Northern Ghana. Sustainability 10(3):825. DOI:10.3390/su10030825 (reviewed).

・Hara Y, Ohsugi T, Tsuchiya K, et al. 2018 Post-disaster recovery linked with pre-disaster land development and damage density of Typhoon Yolanda: Toward better land-use planning in Tacloban City, the Philippines. Journal of Environmental Information Science 2017(2):1-12. DOI:10.11492/ceispapersen.2017.2_1 (reviewed).

・Onitsuka K, Ninomiya K, Hoshino S. 2018 Potential of 3D Visualization for Collaborative Rural Landscape Planning with Remote Participants. Sustainability 10(9):3059. DOI:10.3390/su10093059 (reviewed).

・Kitagawa J, Kojima H, Yoshida T, Yasuda Y. 2018 Adaptations of the Early Jomon people in their settlement relocation to climate change around Lake Mikata, Central Japan. Archaeological Research in Asia 16:66-77. DOI:10.1016/j.ara.2018.03.002 (reviewed).

・Furuta N, Shimatani Y. 2018 Integrating ecological perspectives into engineering practices – Perspectives and lessons from Japan. International Journal of Disaster Risk Reduction 32:87-94. DOI:10.1016/j.ijdrr.2017.12.003 (reviewed).

・Tashiro A, Uchiyama Y, Kohsaka R. 2018 Internal processes of Geographical Indication and their effects: an evaluation framework for geographical indication applicants in Japan. Journal of Ethnic Foods 5(3):202-210. DOI:10.1016/j.jef.2018.07.004 (reviewed).

・Tashiro A, Uchiyama Y, Kohsaka R. 2018 Marine Circular Economy towards Post-Disaster Reconstruction for Sustainability: Experiences in a Small Coastal Town of Northeast Japan. European Journal of Sustainable Development 7(3):81-89. DOI:10.14207/ejsd.2018.v7n3p81 (reviewed).

・Tashiro A, Sakisaka K, Okamoto E, Yoshida H. 2018 Differences in infant and child mortality before and after the Great East Japan Earthquake and Tsunami: a large population-based ecological study. BMJ Open 8(11):e022737. DOI:10.1136/bmjopen-2018-022737 (reviewed).

・Miyamoto Y, Seikai T, Yoshida T. 2018 Habitat restoration for Shijimi clam using local knowledge in the brackish lagoon Kugushi-ko. Proceedings of the 17th World Lake Conference, Lake Kasumigaura, Ibaraki, Japan:253-255.

・Kikuchi N. 2018 Co-creation of Local Values: Reintroduction of Oriental White Storks into the Wild. Sato T, Chabay I, Helgeson J (ed.) Transformations of Social-Ecological Systems. Ecological Research Monographs. Springer, Singapore, pp. 97-117. DOI:10.1007/978-981-13-2327-0_6 (reviewed).

・Sahle M, Saito O, Fürst C, Yeshitela K. 2018 Quantification and mapping of the supply of and demand for carbon storage and sequestration service in woody biomass and soil to mitigate climate change in the socio-ecological environment. Science of The Total Environment 624:342-354. DOI:10.1016/j.scitotenv.2017.12.033 (reviewed).

○Research Presentations

【Oral Presentation】

・Yamada Y, Yoshida T, Taki K, Ichinose T. Evaluation of multiple functionality - habitat gain and mitigation for flood risk. Training of Instructors on Ecosystem-based Disaster Risk Reduction and Climate Change Adaptation in Asia Pacific, 2019.03.18-2019.03.22, Faculty of Geography, Univesitas Gadjah Mada, Yogyakarta, Indonesia.

・Shimada K. Community disaster resilience - A case of Great East Japan Earthquake in 2011. 16th ASIA PACIFIC CONFERENCE, 2018.12.01-2018.12.02, 立命館アジア太平洋大学（大分県別府市）.

・Furuta N. The Role of Wetlands for Disaster Risk Reduction. International Symposium on the Conservation of the Coastal Areas of the Bay of Bengal, 2019.03.07, Dhaka, Bangladesh.

・Sawasaki T, Hashimoto S, Kishioka T. Unveiling voluntary farmland registration program to secure open-space for risk reduction and post-disaster restoration from earthquake: lessons learned from practices in Chukyo and Kinki, Japan. PAWEES-INWEPF International Conference Nara 2018, 2018.11.20-2018.11.22, Nara Kasugano International Forum (Nara City, Nara Prefecture).

・Hashimoto S, Sato Y, Morimoto H. Public-private collaboration in allotment garden operation has the potential to provide ecosystem services to urban dwellers more efficiently. PAWEES-INWEPF International Conference Nara 2018, 2018.11.20-2018.11.22, Nara Kasugano International Forum (Nara City, Nara Prefecture).

・Tashiro A, Uchiyama Y, Kohsaka R. Effect of Green Infrastructure on human health and natural disaster adaptation. The 12th annual APRU Global Health, 2018.10.28-2018.10.30, University of Malay (Kuala Lumpur, Malaysia).

・Miyamoto Y, Seikai T, Yoshida T. Habitat restoration for Shijimi clam using local Knowledge in the brackish lagoon Kugushi-ko. 17th World Lake Conference, Lake Kasumigaura, Ibaraki, Japan, 2018.10.15-2018.10.19, つくば国際会議場（茨城県つくば市）.

・Ichinose T. Depopulation in rural areas and Japanese National Spatial Strategies. 2018 Korea-Japan Rural Planning Seminar, 2018.10.12-2018.10.13, Rural Research Institute, KRC, City of Ansan, Kyunggi province, Korea.

・Hanafusa M, Taki K, Akiyama Y, et al. A case study on the "Location Optimizing Plan" for implementing ecosystem-based disaster risk reduction (Eco-DRR) measures in Shiga Prefecture, Japan. 9th Conference of the International Society for Integrated Disaster Risk Management, 2018.10.02-2018.10.04, University of New South Wales (Sydney, Australia).

・Morisaki M, Taki K, Managi S, et al. Estimation of economic value of Eco-DRR with hedonic approach. 9th Conference of the International Society for Integrated Disaster Risk Management, 2018.10.02-2018.10.04, University of New South Wales (Sydney, Australia).

・Yamada Y, Itagawa S, Yoshida T, et al. Integrated quantification of flood damage risk and habitat gain potential. 9th Conference of the International Society for Integrated Disaster Risk Management, 2018.10.02-2018.10.04, University of New South Wales (Sydney Australia).

・Ichinose T, Itagawa S, Yoshida, T. Land use scenario analysis for ecosystem-based disaster risk reduction (Eco-DRR): a case study in Mikatagoko Area, Fukui Pref., Japan. 9th Conference of the International Society for Integrated Disaster Risk Management, 2018.10.02-2018.10.04, University of New South Wales (Sydney, Australia). (in Japanese)

・Tashiro A, Uchiyama Y, Kohsaka R. Residents' preferable options for Green Infrastructure. International IUFRO conference, 2018.09.17-2001.09.19, City Conference Center (Czech Republic).

・Tashiro A, Uchiyama Y, Kohsaka R. Marine Circular Economy towards Post-Disaster Reconstruction for Sustainability: Experiences in a Small Coastal Town of Northeast Japan. ICSD 2018 : 6th International Conference on Sustainable Development, 2018.09.12-2018.09.13, Rome, Italy.

・Yamada Y, Itagawa S, Yoshida T, et al. Predicting the distribution of released Oriental white stork (Ciconia boyciana) in central Japan. 48th Annual Meeting of the Ecological Society of Germany, Austria and Switzerland, 2018.09.10-2018.09.14, University of Natural Resources and Life Sciences (Vienna, Austria).

・Muto Y, Kotani S, Miyoshi M, et al. Retarding Capacity Change of Wetland Paddy Fields due to House Land Development – toward Wise Land Use against Flood Utilising Paddy Fields as Green Infrastructure –. 21st Congress of International Association for Hydro-Environment Engineering and Research (IAHR), Asia Pacific Division (APD), 2018.09.02-2018.09.05, Yogyakarta, INDONESIA.

・Yamamoto J, Muto Y, Anase Y, Tamura T. Influence of Vegetation Propagation Condition on Flood Flow. IAHRAPD 2018, 2018.09.02-2018.09.05, Yogyakarta, Indonesia.

・Shimada K. Community Disaster Resilience in Satoyama – Cases of Great East Japan Earthquake in 2011. 22nd Conference of Asian Studies Association of Australia in 2018, 2018.07.03-2018.07.05, the University of Sydney（Sydney, Australia）.

・Tashiro A, Uchiyama Y, Kohsaka R. Marine Circular Economy towards Post-Disaster Reconstruction: Experiences in a Small Coastal Town of Northeast Japan. Circular Economy for Agri-Food Resource Management, 2018.06.12-2018.06.15, Hoam Faculty House at Seoul National University (Seoul, South Korea).

・Kohsaka R, Kajima S, Tashiro A, et al. The political ecology of regional names on agricultural products; Governing boundaries and qualities through Geographical Indications. Circular Economy for Agri-Food Resource Management, 2018.06.12-2018.06.15, Hoam Faculty House at Seoul National University (Seoul, South Korea).

・Uchiyama Y, Tashiro A, Kajima S, Kohsaka R. REDD+ for blue carbon ecosystems: A literature review. Circular Economy for Agri-Food Resource Management, 2018.06.12-2018.06.15, Hoam Faculty House at Seoul National University (Seoul, South Korea).

【Poster Presentation】

・Yoshida T, Furuta N, Khosaka R and colleagues Research and Social Implementation of Eco-DRR as Climate Change Adaptation in Shrinking Society. International Symposium on the Conservation of the Coastal Areas of the Bay of Bengal, 2019.03.07, Dhaka, Bangladesh.

・Yoshida T, Furuta N, Khosaka R and colleagues Research and Social Implementation of Eco-DRR as Climate Change Adaptation in Shrinking Society. PEDRR Fourth International Science-Policy Workshop, 2019.02.12-2019.02.14, UN campus (Bonn, Germany).

・Uchiyama Y, Tashiro A, Kohsaka R. Sustainable managements of green and blue infrastructures in urban areas with rapid aging: Citizens' attitudes toward their neighbouring environment. Urban Transitions 2018, 2018.11.25-2018.11.27, Sitges, Barcelona Spain.

・Tashiro A, Uchiyama Y, Kohsaka R. Residents' preferable option for Green Infrastructure: A case study of disaster-stricken urban areas, Japan. Urban Transitions 2018, 2018.11.25-2018.11.27, Sitges, Barcelona Spain.

・Morisaki M, Ichinose T, Yoshida T, et al. Estimation of Economic Value of Green Infrastructure Using Hedonic Pricing Method. JpGU Meeting 2018, 2018.05.20-2018.05.24, Chiba-City.

・Kohsaka R, Matsuoka H, Tashiro A, Uchiyama Y. Reflexivity and Ethics for ABS of the CBD: Empirical Analysis by Network of Scientific Articles with NLP. ISBER 2018 Annual Meeting 2018, 2018.05.20-2018.05.24, Dallas, USA.

【Invited Lecture / Honorary Lecture / Panelist】

・Furuta N. Advancing Eco-DRR for Urban Resilience, Sharing output of Asian Wetland Symposium 2017: focusing on functions and roles of urban wetlands for disaster risk reduction. 13th Meeting of the Conference of the Parties to the Convention on Wetlands Side Event, 2018.10.21-2018.10.29, United Arab Emirates.

・Tashiro A. Impact of Disasters on Disparities in Infant and Child Mortality: Lessons Learned from the 2011 Northeast Japan Earthquake. The 14th Asia Pacific Conference on Disaster Medicine, 2018.10.16-2018.10.18, Seaside Hotel Maiko Villa Kobe (Kobe, Hyogo).

・Ichinose T. Ecosystem-based disaster risk reduction in rural landscapes. Guest lecture of Environmental Management Seminar A, 2018.05.11, Graduate School of Global Environmental Studies, Kyoto University (Sakyo-ku, Kyoto).

Division Name: Fair Use and Management of Diverse Resources

Head of Division: NAKASHIZUKA Tohru

○ Research Subject and Objectives

Program Goal

Taking tradeoffs into account, this program provides multifaceted options to stakeholders involved in production, distribution, and consumption of resources, in order to realize fair use, optimal management, and wise governance of diverse resources including energy, water and ecological resources.

Mission

As has been pointed out in recent years by initiatives such as Future Earth, since global environmental problems are interlinked, it is not effective to attempt to solve isolated issues and co-design and co-production of results together with a range of stakeholders is essential. Recently, the nexus structure among energy, water and food has been emphasized as a resource issue, but in order to build a highly sustainable society, we need to safeguard humanity's base for survival through more comprehensive understandings that take into account not only these resources, but also ecological resources including ecosystem services and cultural resources. In particular, the comprehensive management of diverse resources, taking into consideration cultural resources that are related to high quality of life and spiritual abundance, has become important.

Resources are produced, circulated and consumed at different spatial scales by diverse stakeholders and throughout these processes there is a need for arrangements for fair use and management and methods for their evaluation. Also when considered as economic activities, the use of renewable natural resources is the key to the realization of a sustainable society and a transition of values and action from conventional thinking centered upon manufacturing capital towards an understanding of prosperity that includes hitherto externalized natural, human and social capital is needed. On the other hand, although in Asia large changes are occurring against the background of rapid economic growth, population increase and urbanization, also remaining are highly sustainable traditions of resource use that are culturally connected with the abundant subsistence base and that provide important suggestions for the future image of resource use.

While such case studies have been accumulated at RIHN thus far, there remain areas that are under-researched (for example resources such as energy, or enterprises as global stakeholders). In this program, we aim to explore resource use across multiple resources and spatial scales and with diverse stakeholders by developing new projects to address such areas while at the same time incorporating novel ideas from young scientists. Further, we will explore the conditions necessary for a transition of values and transformation of human behavior and propose policies and socio-economic institutions for the realization of fair resource management as well as criteria for their evaluation.

○ Progress and Results in 2018

Program 2 includes the following 3 projects (1 finished and 2 ongoing projects) up to now.

1) Creation of sustainable governance of new commons through formation of integrated local knowledge, lead by Dr. Tetsu Sato (- Mar 2017).

This project aimed to integrate local environmental knowledge. They developed a conceptual model of knowledge-based adaptive social transformation. One of important results is about the contribution of knowledge translators for community transformation by meta-analyses of RIHN Projects. Here, they found that the existence of balanced translators is most effective, while top-down translators are not effective. These results are very suggestive to consider the institutions for resource management.

2) Human-environmental security in Asia-Pacific ring of fire: Water-Energy-Food Nexus, lead by D. Aiko Endo (- Mar 2018).

This project aimed to sustainable management of Water-Energy-Food nexus, which is one of the key issues of Program 2. They achieved a lot to meet the two primary objectives; A) to understand the complexity of the WEF nexus system, and B) to create policy options to solve the identified nexus problems under scientific evidence and uncertainty. They developed a method to analyze multiple resources among local stake holders the end of this this fiscal year.

3) Biodiversity-driven Nutrient Cycling and Human Well-being in Social-Ecological Systems, lead by Dr. Noboru Okuda (-Mar 2020).

The third project deals with biodiversity and nutrient cycling for well-being in watershed level. They aim to establish a method of multi-level governance for sustainable watershed system, which also include the management issues of multiple resources. In

particular, they think local biodiversity could be a driving force to manage water quality and nutrient cycling, and at the same time, human well-being. They also want to refer the poverty and wealth disparity by comparing the two watersheds, one in developed (Japan) and another in developing countries (Philippines). After 2 year of Full Research period, they elucidated the linkage between irrigation of paddy fields, biodiversity, and nutrient cycling. They have started the comparative researches in Laguna Lake, Philippines.

Dr. Sato's project contributed to develop the meta-analysing methods on governance among multi-stakeholders, while Dr. Endo's project developed analytical methods on practical management system in local scale. Dr. Okuda's project is providing another example of multi-resource management (water, nutrient and ecological resources), which is rather different from Dr. Endo's project. Since these projects are the studies mostly on local scale, we tried to make discussion on resource dynamics and stakeholders mostly in regional or local scales, including private sectors. Now we are inviting other projects to apply along the context of Program 2.

Other than these outputs from projects above, we made discussions among scientists on the concept of 'fair use'of resources, which is one of the critical points of last EREC. We reviewed international literatures on 'equity', which is one of the key concepts relating to fairness. We are now preparing the method to describe the inter-linkages among multi-resources and multi-stakeholders (see sections below).

We identified the following challenging points.

1) What kind of conceptual framework on 'fairness' is necessary?

We are now discussing to propose the framework on 'fair use' of resources considering from 3 aspects; efficiency, sustainability and equity. At moment, we think efficiency could be evaluated by physical amount of wastes, economic costs sometimes including index such as Inclusive Wealth, when we consider ecological resources. Sustainability may be evaluated by some indices such as ecological footprint, environmental impacts, or self-sustainability within a area. Equity is most difficult part to evaluate, though we should propose some indices which could be evaluate from the aspects of economy, quality of life, happiness, well being and so on. Further discussions are needed to develop this idea.

2) How we can develop the method to describe and analyze the inter-linkage among multi- resources and multi-stakeholders?

We repeated the discussions among researchers, and have started to develop a method to describe and analyze the inter-linkages of multiple-resources by multi-stakeholders in various areas which have been studied by RIHN Project. At moment, the method to describe the synergy and tradeoff among resources and stakeholders in complexed matrices. We want to develop the ideas applying the method to some model areas of RIHN Project in the next fiscal year.

3) How we could enlarge the scale of scope and studies into global?

We hosted seminars inviting speakers including stakeholders and researchers of private sectors. Through the discussion, we the possibility of new research proposal to study global supply chain and environmental impacts. We would like to continue encouraging the proposal in this direction in coming fiscal year.

Synergy Effects

The ongoing projects are directing different aspects which included in the scope of Program 2. Dr. Sato's project (already finished) contributed to develop the meta-analysing methods on governance among multi- stakeholders, while Dr. Endo's project developed analytical methods on practical management system in local scale. Dr. Okuda's project is providing another example of multi-resource management (water, nutrient and ecological resources), which is rather different from Dr. Endo's project. Thus, integration of the results of these projects would make progress of Program 2 as a whole, though still the integrating roadmap is not very clear.

Considering this situation, we made a discussion to propose the evaluation system on 'fair use'of multi- resources by multi-stakeholders. We are developing a method to describe the situation of local resource use. We would like to this method to the areas of their study sites to detect the possibility of universal application. We would also like to invite new proposal of Incubation Research, providing necessary information for the candidate of researchers.

○Project Members

Kunihiko Kobayashi (Research Institute for Humanity and Nature Program2,Researcher)

Takashi Haraguchi (Research Institute for Humanity and Nature Program2,Researcher)

○ Future Themes

We invited research proposals which meet the concept of Program 2. In particular, I welcome the project to study the use of multi-resources by multi-stakeholders in global scale. In this sense we want to host some seminars to discuss this issue, including international enterprise, as one of the important international stake holders. Also, we would like to encourage the development of the proposed RIHN Feasible Studies to be admitted as Full Research, including a study on global supply chain and Benefit sharing of genetic resources.

●Achievements

○Papers

【Original Articles】

- Takafumi Ohsawa, Naoya Furuta, Futoshi Nakamura, Taku Kadoya, Tohru Nakashizuka 2018,11 Challenges of post-Aichi Biodiversity Ttargets from ecological perspectives. JAPANESE JOURNAL OF CONSERVATION ECOLOGY.
- Oguro,M., Taki, H., Konuma. A., Uno, M. & Nakashizuka, T. 2018,10 Importance of national or regional specificity in the relationship between pollinator dependence and production stability. Sustain Science Volume 13. DOI:10.1007/s11625-018-0637-3
- Oka, C., Aibaa, M. & Nakashizukaa, T. 2018,09 Phylogenetic clustering in beneficial attributes of tree species directly linked to provisioning, regulating and cultural ecosystem services. Ecological Indicators Volume 96(Part 1):477-495. DOI:https://doi.org/10.1016/j.ecolind.2018.09.035
- Nakagawa, M., Ushio, M., Kume, T. & Nakashizuka, T. 2018,08 Seasonal and long-term patterns in litterfall in a Bornean tropical rainforest. Ecological Research.
- Imai, H. & Nakashizuka, T. 2018,08 An Analysis of 15 Years of Trends in Children's Connection with Nature and its Relationship with Residential Environment. Ecosystem Health and Sustainability Volume 4(Issue 8):177-187. DOI:https://doi.org/10.1080/20964129.2018.1511225
- Aiba, M., Shibata, R., Oguro, M. & Nakashizuka, T. 2018,07 The seasonal and scale-dependent associations between vegetation quality and hiking activities as a recreation service. Sustainability Science:1-11. DOI:https://doi.org/10.1007/s11625-018-0609-7

○Research Presentations

【Invited Lecture / Honorary Lecture / Panelist】

- Tohru Nakashizuka Climate change impacts on terrestrial ecosystems in Japan. ISPRS Technical Commission III WG III/2, 10 Joint Workshop, 2019.03.12-2019.03.14, Kyoto.

Stage: Full Research

Project Name: Biodiversity-driven Nutrient Cycling and Human Well-being in Social-Ecological Systems

Abbreviated Title: Ecological Recycling Project (e-REC Project)

Project Leader: OKUDA Noboru

Program 2: Fair Use and Management of Diverse Resources / Diversity Program

Key Words: Biodiversity, Ecosystem service, Human well-being, Nutrient balance, Watershed governance

○ Research Subject and Objectives

Since the Anthropocene, overexploitation of basal resources due to mass production has led to disturbance of natural biogeochemical cycles of macronutrients, such as nitrogen and phosphorus, in watersheds (Sutton et al. 2013). Such nutrient imbalances have caused serious environmental problems, contributing to cultural eutrophication and water pollution (Smith and Schindler 2009). The nutrient imbalances also skew biological communities toward overwhelming superiority of nuisance species, as in the case of harmful algal blooms. The anthropogenic disturbances in the nutrient cycling result in deterioration of ecosystem services in quality and quantity through the loss of ecosystem functions provided by biodiversity (Anderson et al. 2002; Hoagland et al. 2002). At present, it has been recognized that nutrient imbalances and biodiversity loss are so common and prevalent throughout the planet, posing a risk to sustainable human development (Rockström et al. 2009). These are considered global environmental issues, while their causes and effects vary among watersheds, in which there exist a variety of social issues specific to local communities.

In the top-down oriented watershed management, in general, researchers elucidate causality of nutrient imbalances based on scientific data, while governments take institutional, technological and economic approaches based on rationality to reduce nutrient loadings for public health. However, the modern issues related to nutrient imbalances are complicated and elusive not only because much of nutrients are loaded from non-point sources such as agricultural wastes but also because a driver of nutrient resource exploitation is often remote from the source of nutrient loading. With the increasing complexity of society, the top-down oriented watershed management solely has difficulty in inclusive solution of diverse issues related to nutrient imbalances.

Researches on watershed management and governance tend to assess how institutions, technology and politics can improve environmental deterioration at the watershed scale (Abell et al. 2002; ILEC 2005), often neglecting individual and community viewpoints. By contrast, many community-based researches have regarded socioeconomic and ecological settings as constraints for local communities and neglected feedbacks from community actions to a larger social-ecological system (but see Ostrom 2007, 2009). A limited number of researches have explicitly treated with interactions between local and watershed scales, focusing on 'watershed' as a spatial unit in which waters and nutrients are cycled (Bressers and Kuks 2004; RIHN Project 3-1 2007; Wada 2009). However, a common goal is needed for multi-stakeholders at multi-organization levels to be involved in the solution of diverse issues both at local and watershed scales. Expanding the concept of 'adaptive governance of social-ecological systems' (Folke et al. 2005) to watershed systems, we aims to develop a method of 'adaptive watershed governance', in which the stakeholders are involved in enhancement of three components, biodiversity, nutrient cycling and well-being, all of which are essential to social-ecological health of watershed system. For this purpose, two approaches are taken for the adaptive watershed governance: one is institutional, technological and economic (ITE) approach by governments to solve issues at watershed scale based on rationality and another social-cultural approach to empower for local environmental governance in the context of life and livelihood for local communities , in order to reduce discommunication among different stakeholders at different organization levels.

○ Progress and Results in 2018

1. Project Progress during the FR Period to Date

a) Synoptic research as macro-scopic approach at the watershed scale

Based on synoptic monitoring for biodiversity and nutrients in the whole catchment of Yasu River, we performed a structural equation modelling to examine how human activities, especially land uses, can affect spatial pattern of water quality and biodiversity, and then got preliminary analytical results. Analytical results of synoptic questionnaire survey on subjective well-being and environmental consciousness were fed back to upstream and coastal community workshops, in which action plans will be and were discussed to empower for forest conservation and macrophyte composting, respectively.

b) Action research as a micro-scopic community-based approach

In the middle-stream farmer community, we experimentally demonstrated that practice of winter irrigation is effective in reduction of phosphorous loading as well as in enhancement of wetland biodiversity in rice paddies. In the coastal area, we found

that lagoon ecosystems have the high rate of biological P recycling, using the δ18Op analysis. In the coastal urban communities which suffer from macrophyte overgrowth, we organized stakeholder workshops to know the potential need for macrophyte resources and discuss how to promote the use of macrophyte resources, collaborating with a core project, entitled 'Open Team Science Project' (PI: Yasuhisa Kondoh). Such research collaboration led to an idea to develop macrophyte portal as an internet media which may be effective in facilitation of involvement by individualized urban residents in the macrophyte resource recycling. In the middle-stream and downstream farmer communities, we held Local Cooperation Seminars to share scientific knowledge on how rehabilitation of habitat networks facilitates frog and fish spawning migration. In both areas, many participants from out-communities as well as their own communities got interested in these conservation activities.

c) Construction of an integrated model for four gears

Compiling analytical data on synoptic researches on biodiversity, nutrients and well-being, we got a preliminary result of an integrated model to visualize relationships among four components essential to social-ecological health of watershed system, based on the structural equation modelling. After completion of this project, we expect that the model will be used as a communication supporting tool for diverse stakeholders to envision the future of watershed.

d) Formation of watershed forum in the Silang-Santa Rosa sub-watershed

In the Silang-Santa Rosa sub-watershed, groundwater issues are relevant to stakeholders because their lives and livelihoods greatly depend on groundwater resources. While sharing our assessment results on groundwater nitrogen pollution, we held a total of nine workshops for stakeholders to identify their own specific issues related to groundwater and discuss solution strategy and action plans. A watershed forum is being developed and a Stakeholders' Assembly was co-organized with the watershed management council. In this assembly, we took scientific and emotional approaches to visualize spatial pattern of groundwater pollution on the map and to visualize connectivity among groundwater, life and livelihood using a short movie, respectively. A questionnaire survey revealed that both approaches were effective in attracting participants' interests in groundwater issues. This assembly generated various commitments by local governments to develop and implement watershed related policies, increased knowledge and awareness of watershed issues by participants and increased interest in collaboration in watershed governance.

2. Progress since the last reporting

a) Synoptic research as macro-scopic approach at the watershed scale

Based on synoptic monitoring for biodiversity and nutrients in the whole catchment of Yasu River, we performed a structural equation modelling to examine how human activities, especially land uses, can affect spatial pattern of water quality and biodiversity, and then got preliminary analytical results . Analytical results of synoptic questionnaire survey on subjective well-being and environmental consciousness were fed back to upstream and coastal community workshops, in which action plans will be and were discussed to empower for forest conservation and macrophyte composting, respectively.

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○Project Members

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○ YACHI Shigeo	(Center for Ecological Research, Kyoto University,Associate Professor,Theoretical Ecology)
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【Nutrient Management Working Group】

○ SANTOS-BORJA Adelina	(Office of the General Manager, Laguna Lake Development Authority,Division Chief III, International Linkages and Research Developme nt Unit,Limnology Environmental Science Integrated Lake Basin Management)
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【Advisory Board】

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□ KAWABATA Zen’ ichiro	(Research Institute for Humanity and Nature,Emeritus Professor,Aquatic Ecosystem Ecology)
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ISHIDA Takuya	(Research Institute for Humanity and Nature,Researcher,Forest Environmental Science)
LAMBINO Ria Adoracion A.	(Research Institute for Humanity and Nature,Researcher,Environmental Governance)

UEHARA Yoshitoshi　(Research Institute for Humanity and Nature,Resarch Associate,Ecology)

○ Future Themes

With the reduced budget, it is not realistic to practice and compare our watershed governance across all of our study watersheds. Thus we will not conduct intensive field researches in three domestic watersheds (Hachiro Lagoon, Inba Marsh and Lake Shinji) other than Lake Biwa. Based on archives and documents, however, we will examine how governmental politics on development and environmental conservation have affected these four domestic watershed systems and how their social-ecological status have varied among these watersheds through interactions with each other, according to Advocacy Coalition Framework (ACF) as well as to Institutional Analysis and Developmental (IAD) Framework. We expect to find what is a turning point for the watershed governance to drive into the good relationship between humanity and nature through our comparison. If time and budget permit us, we may also use Social-Ecological System (SES) Framework to analyse cross-scale linkages of the natural resource governances within and between watershed systems.

●Achievements

○Papers

【Original Articles】

- Wu, Q., K. Kawano, Y. Uehara, N. Okuda, M. Hongo, S. Tsuji, H. Yamanaka & T. Minamoto 2018,04 Environmental DNA reveals nonmigratory individuals of Palaemon paucidens overwintering in Lake Biwa shallow waters. Freshwater Science 37.0. DOI:10.1086/697542

○Research Presentations

【Oral Presentation】

- Uehara, Y., H. Takayama, Y. Kataoka, T. Kikkou, M. Nemoto, T. Kokita, T. Otake & N Okuda Remarkable homing ability of a pelagic crucian carp “Carassius auratus grandoculis. 6th International Otolith Symposium, 2018.04.15-2018.04.20, Keelung, Taiwan.
- Peralta, E. M., C. B. Bacinillo, J. C. A. Balani, S. E. Basmala, E. J. S. S. Calalin, M. A. G. Calleja, J. B. C. Go, M. T. S. Gosiengfiao, F. A. T. Valdecañas, J. N. Gregorio, N. Mendoza, T. Ishida, F. S. Magbanua, J. C. A. Briones, R. D. S. Papa & N. Okuda ”Interactions between humanity and carps in view of alienologyLittoral food web analysis: Stable isotopes reveal anthropogenic impacts on Oreochromis niloticus and its food sources in Laguna de Bay”. The 8th Fisheries Science Conference, 2018.09.05-2018.09.06, Pasay City, Philippines.
- Saitoh, Y., T. Nakano, K.-C. Shin, K. Yamashita, H. Amakawa, C. Yoshimizu, J. Matsubayashi, Y. Kato, H. Togashi, Y. Amano, Y. Kurita, N. Okuda & I. Tayasu Spatial variation of neodymium and strontium isotope ratios of shellfish soft bodies in the coastal sea of eastern Tohoku District. JpGU Meeting 2016, 2016.05.22-3016.05.26, Makuhari Messe.

Research Program3: Designing Lifeworlds of Sustainability and Wellbeing

Program Director: SAIJO Tatsuyoshi

○ Research Subject and Objectives

Our "lifeworlds" are composed of the physical spaces and socio-cultural spheres of our everyday lives. They are continually reproduced, reimagined, and evolving through an interactive and reflexive relationship with society, culture, and nature. Program 3 proposes research aimed at illuminating reciprocal linkages between diverse rural and urban lifeworlds and contributing to the solution of sustainability problems by working with various societal partners such as governments, companies, and citizen groups. Special emphasis is placed on envisioning sustainable futures that improve wellbeing and gauging their feasibility.

Missions

More than 60% of the world's population resides in Asia and the regions surrounding it. Over a third of global environmental activity occurs there. Within these places lies an incredible diversity of cultures, histories, societies, economies, livelihoods, and ecologies. It is also affected by myriad global and local environmental issues such as population increase, air, water, soil, and coastal pollution, increasing greenhouse gas emissions, and biodiversity loss. At the same time, growing wealth disparity, social isolation, rising levels of poverty, and the disappearance of traditional culture and knowledges are emerging.

Within these processes, the combination of migration between the countryside and cities, and rural depopulation with urban concentration is accompanied by rapid socio-cultural change, resource over-use, and the deterioration of the natural environment. Both urban and rural lifeworlds are disintegrating rapidly. Consequently, through the reconstruction of the lifeworld concept and by highlighting the reciprocal linkages between rural and urban spaces, Program 3 designs lifeworlds of sustainability and wellbeing and co-creates concrete pathways for their realization.

In these same places, diverse world-views and experiences related to the ways in which humanity and nature can exist have accumulated. Pre-existing, yet latent, diverse socio-cultural elements, such as livelihood styles, lay knowledge, conflict resolution strategies, and the vitality of the people themselves can be called upon to address problems and help to chart a course toward possible future societies. Program 3 builds upon these experiences and knowledges of human-nature interaction to propose concrete changes needed to achieve a sustainable society.

Through the transformations and frameworks leading to sustainable urban and rural lifeworld design, the existing economic systems, markets, and political decision making systems will also require fundamental shifts in the way they are conceived. However, Program 3 will not investigate top-down approaches to system change, but will work with local residents, government officials, companies, citizen groups and other various stakeholders to propose sustainable alternatives and gauge their feasibility.

In order not to run the risk of developing proposals that are only applicable to specific regions or sites, Program 3 will aim for research results that are generalizable, but retain their diversity.

○ Progress and Results in 2018

1. General Structure of Activities in Program 3

One of our underlying activities of program 3 is a monthly meeting with members of the FEAST project (Lifeworlds of Sustainable Food Consumption and Production: Agrifood Systems in Transition) led by Steven R. McGreevy, the Sanitation Value Chain project (The Sanitation Value Chain: Designing Sanitation Systems as Eco-Community-Value System) led by Taro Yamauchi and the SRIREP project (Co-creation of Sustainable Regional Innovation for Reducing Risk of

High-impact Environmental Pollution) led by Masayuki Sakakibara. In each meeting, members reported problems of on-going research projects, gave mini-lectures of their current research results, publication information, forthcoming events, and so on. The discussion always went beyond each project, and members of each project began to share the idea of members of other projects and research methods. I also organized a research workshop for each project independently with spending many hours for each, and gave numerous comments.

2. Support for IS and FS projects

I participated in numerous workshops of IS and FS projects that intended to be projects of Program 3 and gave comments and advices. As for FS projects aiming at Program 3, I organized several presentations with at least three hours. I supported the Okabe project (Future Image of Living Sphere by Restructuring Sustainable Relation between Humans and Land), the Mori project (Developing Interactive Rural-Urban Systems to Improve Human Well-being: Migration for Humanities and Nature), and the Matsuda project (Transformation and Reconstruction of Agricultural Diversity in Southeast Asia). Each project was improved quite a lot during this year.

3. A New Tool for Program 3: An Intergenerational Retrospective Approach

I started introducing Future Design for projects in Program 3 from the last year, and "future" is now one of key words in addition to lifeworlds, sustainability, wellbeing and design in program 3's mission statement. In addition to usual Future Design approach, I found that an intergenerational retrospective approach is effective for our sustainable future. In this approach, several newspaper articles (or events) of the past are given to a person. This person is asked to suppose that he/she can give advices for the past people who were related to the articles or events. After this experience, this person is asked to suppose that he/she would be an imaginary future person and then give advices to the current generation. We call this an intergenerational retrospective approach. The following two projects show that this approach is very effective.

Let me explain them. The first one is by Nakagawa, Arai, Kotani Nagano and Saijo (2018). Nakagawa et al. (2018) recruited 379 ordinary people from Kochi Prefecture in Japan and conducted a deliberation experiment in which teams of four were created with current generation teams and imaginary future generation teams in which all four members were in the imaginary future generation. Employing the Harvard case method in business schools, teaching materials were developed to teach national and prefectural financial administration in a short time. Among these, as national policies, maintaining the status quo or reducing the amount of money given to local prefectures (two policies) were proposed, and as prefectural policies, maintaining the status quo or supporting for specific regional agglomeration aimed at regional self-reliance (two policies) were proposed. The participants assigned to the current generation group debated about the most favorable policies among the four (2 x 2) for society in 2047 and then chose one of the four, and then reported their preference as an individual. Meanwhile, the participants assigned to the imaginary future generation group was asked to undertake two procedures. First, before the debate, they were asked to have the (retrospective) experience of reading newspapers from 30 years ago and sending advice to the people of 30 years ago. They then "time-shifted" to 30 years in the future, as a group debating from the perspective of the year 2047, which of the four policies they would want people to choose in 2017 and then chose one of the four. After this stage, they reported their selection as an individual living in 2047. After the experiment, they filled in questionnaires designed to measure the qualities of "generativity" (engaging actively in behavior that creates value for the next generation) and "critical thinking" (the quality of being able to think logically without bias). If their score was higher than the median value in at least one of these two indicators, an imaginary future person was more likely than a current generation person to choose to support specific regional agglomeration aimed at regional self-sustainability. In other words, people with a high score in at least one of these indicators came to choose a scenario that took account of future generations, owing to the experience of the "social mechanism" of becoming a future generation person in the twin procedures.

The second one is by Nakagawa, Kotani, Matsumoto and Saijo (2019). Nakagawa et al. (2018) recruited 155 ordinary participants in Kochi Prefecture—where 84% of the land area is forested—using the case method to present them with the history, current situation, and issues for debate surrounding Kochi's forests, and also with five relevant policy options or scenarios (maintenance of the status quo; intentional neglect of inefficient forests; minimum care for inefficient forests; provision of forest roads allowing the continuance of forestry business; and turning the forested land into recreation forests). When no conditions were imposed, before debate, the current generation groups' most favored option was turning the forested land into a recreational forest. When asked to debate the future of Kochi's forests in the four-person team, their most favored scenario changed to minimum care for inefficient forests. Meanwhile, the future generation persons were asked to undertake the same twin procedures as in Nakagawa et al. (2018). The scenario selected by most individuals after giving advice to people of 30 years ago was to provide forest roads to continue the forestry business, and the scenario selected most frequently after they had subsequently debated as an imaginary future generation was also the provision of forest roads. In other words, in this experiment, it was found that even without debate, the "social mechanism" of looking back at the past had a big effect on scenario selection.

○Project Members

Every member of
FEAST, Sanitation, and
SRIREP projects.

○ Future Themes

1. The Mission Statement of Program 3

The mission statement is not mine, but is roughly given by RIHN from the very beginning. As I showed in the previous section, we will try to rewrite the mission statement using plain and concrete words and definitions including “future” elements. Of course, this depends upon how we agree upon the rewriting. This rewrite will attract new incoming projects that I will be interested in. Even though this rewriting is successful, each project might not be fit into the mission statement. For this reason, I will seek soft cooperation among all projects and members in RIHN. Of course, the current members of program 3 will be major part of program 3.

2. “Future Design” elements in projects

This is related to 1. I will find “Future Design” elements in on-going research projects in program 3’s projects as well as other projects, and then find mutually beneficial small projects. Since I find that members of each project is so busy that they do not have any time to do other than their own assignments, this approach will be effective.

3. Recruiting good projects

Although the current scheme of RIHN’s projects is not attractive to science scholars, it is quite attractive to social science scholars and hence I would like to recruit good projects around the world. We changed our selecting process of projects this academic year so that each program director has relatively more voice than before. In other words, we will be able to avoid situations such that a project is chosen even if the director does not want to get it, or a project is not chosen even if the director would like to choose it.

4. The Development of Future Design

Future Design is a methodology to incorporate future in designing social systems so that it can apply many possible situations. Since Kyoto prefecture, Uji city in Kyoto, Nagaokakyo city in Kyoto, and many other locations such as Suita city in Osaka, Matsumoto city in Nagano, Yahaba town in Iwate and the Ministry of Finance asked us to help them regarding their own problems, we started cooperation with them using our own Future Design approach. We have been accumulating many examples of social systems so that many other locations in Japan may have benefits from them. At least four newspapers featured Future Design in their editorials of new year’s day this year. We would like to propose our method to the Ministry of Internal Affairs and Communications in near future, and then we hope that the Ministry will ask all local cities and towns to use our Future Design approach since Japan is a centralized country in this respect. At the same time, we would like to disseminate the experiences and information to members of RIHN so that they will be able to incorporate them in their projects.

●Achievements

○Papers

【Original Articles】

- Jingchao Zhang, Koji Kotani, Tatsuyoshi Saijo 2019,02 "Low-quality or high-quality coal? Household energy choice in rural Beijing Energy Economics". Energy Economics 78:81-90. DOI:10.1016/j.eneco.2018.11.005 (reviewed).
- Yoshinori Nakagawa, Koji Kotani, Mika Matsumoto, and Tatsuyoshi Saijo 2019,01 "Intergenerational retrospective viewpoints and individual preferences of policies for future: A deliberative experiment for forest management". Futures 105:40-53. DOI:10.1016/j.futures.2018.06.013 (reviewed).
- Junyi Shen, Takako Nakashima, Izumi Karasawa, Tatsuro Furui, Kenichiro Morishige, Tatsuyoshi Saijo 2018,10 Examining Japanese women's preferences for a new style of postnatal care facility and its attributes. International Journal of Health Planning and Management:1-12. DOI:10.1002/hpm.2544 (reviewed).
- Zhang Jingchao, Koji Kotani, Tatsuyoshi Saijo 2018,06 "Public acceptance of environmentally friendly heating in Beijing: A case of a low temperature air source heat pump". Energy Policy 117:75-85. DOI:10.1016/j.enpol.2018.02.041 (reviewed).

○**Research Presentations**

【Oral Presentation】

・Tatsuyoshi Saijo Future Design. Future Design: Exploring Affirmative Futures through an Intergenerational Outlook, 2019.01.08-2019.01.09, Arizona State University, America.

・Tatsuyoshi Saijo Future Desigh. 地球研-SRC との共同ワークショップ, 2018.10.29-2018.10.30, Stockholm , Sweden.

・Tatsuyoshi Saijo Future Design. Future Earth Special Seminar, 2018.10.03, 総合地球環境学研究所、京都市.

・Tatsuyoshi Saijo Future Design: An Overview. World Social Science Forum 2018, 2018.09.25-2018.09.28, Fukuoka International Congress Center, Fukuoka, Japan.

・Tatsuyoshi Saijo Future Design: Bequeathing Sustainable Natural Environments and Sustainable Societies to Future Generations. , 2018.09.07, Duke Nicholas Institute for Environmental Policy Solutions, Durham, America.

【Invited Lecture / Honorary Lecture / Panelist】

・Tatsuyoshi Saijo An Overview of Future Design. Futurability: Intergenerational Equity and Sustainable Governance, 2019.03.22, Academia Sinica, Taipei, Taiwan.

・Tatsuyoshi Saijo Future Design: Bequeathing Sustainable Natural Environments and Sustainable Societies to Future Generations. Annual Scientific Conference and 86th General Membership Assembly, 2019.03.11, Phillippine Intenational Convention cemter, Phillippine.

・Tatsuyoshi Saijo Future Desigh. Future Earth Philippines Program, 2018.11.19, Manila, Philippines.

・Tatsuyoshi Saijo Future Design . HKUST Workshop on Experimental Economics, 2018.10.20, The Hong Kong University of Science and Technology, HongKong.

・Tatsuyoshi Saijo Future Design. New Directions in Economic Theory and Empirical Economics, 2018.08.17-2018.08.18, Kolkata, India.

Stage: Full Research

Project Name: Lifeworlds of Sustainable Food Consumption and Production: Agrifood Systems in Transition

Abbreviated Title: FEAST Project

Project Leader: Steven R. McGreevy

Program 3: Designing Lifeworlds of Sustainability and Wellbeing

URL: http://feastproject.org/

Key Words: agrifood transition, sustainable food consumption and production, foodshed mapping, participatory backcasting, Asian food ethics, social change, social practice

○ Research Subject and Objectives

Agrifood systems in Asia face a myriad of sustainability challenges related to declining environmental health (GHG, resource overuse, pollution, soil fertility), loss of diversity (biological, cultural, knowledge), and the deterioration of small-scale farming due to globalizing market forces (Wegner & Zwart 2011; McIntyre et al. 2009). On the consumption side, over-reliance on globalized food flows limit consumer agency and decrease food security and sovereignty, while diets shift to more processed food, creating public health impacts (rise in diabetes, obesity) (Carolan 2011, Ezzati et al. 2005, ICN2 2014). The ways in which food is provided, consumed and governed need urgent change, but we lack understanding of how agrifood transitions emerge and take root (e.g. Bui et al 2016), and the role of existing and alternative institutions and policy (e.g. Meadowcroft 2011), social practices (e.g. Shove et al. 2012, Spaargaren 2011), and economic arrangements in advancing sustainable transitions (DeAlisa et al. 2014, Infante & Gonzalez de Molina 2013).

The FEAST project takes a transdisciplinary approach to explore the realities and potential for sustainable agrifood transition at sites in Japan, Thailand, Bhutan, and China with significance for the entire region. We analyze patterns of food consumption, food-related social practices and their socio-cultural meanings, and consumer-based agency to change deeply-held cultural dimensions. We map and evaluate food systems specific to national, regional, and local production, distribution, and consumption contexts. Building upon that work, we engage in action research to partner with stakeholders to vision desirable and plausible futures and to initiate food citizenship-oriented experiments and actions. FEAST co-designs and co-produces socially-robust knowledge and mechanisms that challenge mainstream economic thinking on consumption and growth, work to redefine the notion of long-term food security at the regional level, and engage society in a public debate on our relationship with food and nature that questions shared beliefs and values to reacclimatize consumers as citizens and co-producers in the foodscapes around them. FEAST will contribute to a growing body of research that merges the literatures of sustainable food consumption (iPES-Food 2015, Lykke Syse & Lee Muller 2015, Reisch et. al 2013) and social transformation/transitions (Grin et al. 2010, Spaargaren et al. 2012).

FEAST Working Groups will produce four types of knowledge relevant to catalyzing agrifood transitions. These are: 1) contextual knowledge of contemporary national, regional, and local food systems (production, distribution, and consumption); 2) co-produced visions of alternative food consumption and production practices and corresponding municipal-level transition plans identifying research, education, and policy needs; 3) modeling- and scenario-based knowledge supporting deliberation and planning processes; and 4) knowledge of two intervention strategies: the social learning dynamics affecting execution and effectiveness of workshop-based consensus-building for collective food action; and the significance of new methods of market transparency (e.g. eco-labels, food impact smartphone apps) in food system change. A significant portion of the research is transdisciplinary in nature and many final outputs are geared for public use‐including collective visioning and creation of new, empowered institutions to implement food policy. These “lighthouses” enable this project to have real-world impact beyond the five-year research period.

Contribution to Program 3

FEAST helps to achieve P3’s mission by exploring the human and social dimensions of existing and alternative lifeworlds in both rural and urban spheres as they relate to food. FEAST also looks closely at the future and how social change and planning (design) processes can be co-initiated in society.

So far, FEAST has contributed significantly to the program mission, title (lifeworlds is a concept that FEAST deals with), and in providing intellectual space to co-develop concepts and methods for the program at large. In particular, FEAST brings intellectual robustness to the program (as well as to the entirety of RIHN) by way of introducing concepts and theories that have not yet been sufficiently absorbed by ongoing projects and the institute. FEAST has initiated discussion on key concepts such as lifeworld, sustainability, and well-being; on theories of social (ie. transition, transformation) and mindset change (ie. individual, social, and mutual learning); economic (degrowth, doughnut economics, commons, value chains) and political (decentralized,

participatory governance & new institutions) alternatives; and design and planning (food waste to production & rural-urban linkages; food and energy co-production; urban greenspace and infrastructure; self-reliant local food production systems). All of these concepts are available as integrative spaces to coalesce individual research project trajectories and results into a broad, but coherent narrative around the challenging program task of "designing lifeworlds of sustainability and wellbeing."

One example of project-to-project collaboration was evident at the World Social Science Forum 2018, held in Fukuoka, where FEAST and the Sanitation Value Chain Project co-organized a session entitled "Lifeworlds of sustainability and well-being in a shrinking Japan." Papers in the session explored the ways in which shrinking urban and rural societies experiencing economic decline are enhancing sustainability and enabling new, more satisfying ways of living counter to contemporary adherence to mass consumerism and economic growth. An edited volume for RIHN's Springer Book series is planned as a concrete output of this collaboration.

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○ Progress and Results in 2018

Each project working group (WG) has made progress on their research plans for FR3.

WG1: Food System Mapping & Modelling

To date, WG1 has used GIS datasets, public statistics, and consumer surveys to map "origins" and "destinations" of food flow from international and domestic wholesale markets to their place of consumption at the regional/city level (Kyoto, Noshiro, and Nagano). Consumer surveys and "personal foodsheds" have also provided a baseline regarding food consumption habits and localized spatial patterns for food procurement that are used by other WGs. Using satellite imagery, the current condition and potential for urban agriculture in Kyoto City was analyzed and saw a 10% decrease over a ten-year period. WG1 is also tasked with measuring the environmental impact of food consumption using ecological footprint (EF) calculations. Last year, the EF of food consumption for all 47 prefectures in Japan was calculated, as well as the EF of food imports and exports. Building from prior work on food system statistical mapping of inter-regional food flow, we moved to asking the question "how much of a reduction in the size of the EF associated with food can we conceive through changes in production (agroecological), distribution

(regional food system), and consumption (diets)?" Scenarios and models are currently under development to answer this question.

WG2: Collaborative approaches to food citizenship

WG2 is interested in the development of civic food networks (CFN) and their impact on food policy and agrifood system transition at the regional scale. Stakeholder workshops are used to form and extend civic networks and to build consensus on legitimate policy and planning frameworks for food in the future. After fieldwork in North America to profile and analyze one form of CFN—food policy councils (FPC)—and its relevance to the Japanese context, stakeholder workshops and reflexive action research methods have been used to explore consensus building, legitimization processes, and the role of future visions in planning and policy undertaking. Over 20 workshops have been held over the course of the project and many forms of workshop facilitation and mediating/exploratory tools have been developed (games, role-playing).

Last year, six workshops were held across the four Japanese sites (Kyoto: 3, Kameoka: 1, Nagano: 1, Akita: 1) on a range of issues relevant to local food policy and the issues stakeholders feel are urgent and actionable. In Kyoto, FEAST partnered with organic farming organizations to hold visioning and backcasting workshops on ideal and desirable rural futures. FEAST worked closely with Kyoto Organic Action, a new organization struggling with fair and logistically feasible organic food distribution. Building on past work and new and emerging networks, new initiatives with children's canteens, organic product distributors, and school lunch program advocates were discussed and plans for concrete policy undertakings are being conceived.

WG3: Agroecological strategies in policy and practice

WG3 explores policy and practice dimensions of agrifood transitions toward agroecological production in Japan and Bhutan. Fieldwork and analysis on support structures for new farmers in Japan as well as a typology of pathways into farming was conducted and found that support for agroecological-styled farming is limited in both countries and that new entry farmers must experiment with hybridized and peasant-like modes of farming and agrarian lifestyles. Building on a pilot study from last year, municipal level agricultural policies are currently being assessed as to their orientation to agroecological principles. At the farm-level, fieldwork and interviews with farmers and food producers practicing seed saving and sharing throughout Japan revealed multiple patterns of seed handling and values associated with the practice. Through our partnership with Royal University of Bhutan, College of Natural Resources, a multi-site household survey (n=249) was conducted in Bhutan focusing on agroecological practices and food consumption habits and how they have changed over the past 20 years.

WG4: Supporting tools for sustainable regional production

WG4 research is concerned with conducting innovative experiments for supporting the sustainable development of small-scale farming and farmer livelihoods via carbon offsetting techniques and co-designed marketing schemes. Over the first two years, stakeholder meetings have been held to incorporate their knowledge into the designing of an eco-branding tool-kit - a beta-version "open-brand starter kit" aimed at local governments is being drafted. Last year, agricultural yield experiments continued to gauge the effectiveness of solar-sharing vegetable growing conditions (under solar panels) in Kameoka City and the potential for farmer income. Field trials of biochar amended vegetables in Shanghai were conducted, and the results of a survey to gauge the receptivity of Chinese consumers to accept eco-friendly products versus products that are assured to have a high food safety standard were analyzed.

WG5: Transparent food chains

WG5 strives to measure the environmental, social, and health impacts of food products and disseminate this information to the public through a smartphone app. A prototype for the app was developed using a redacted version of a 1.6 million entry database and uploaded to Apple's Testflight service. Environmental impact data from various fresh products produced in Japan (marine, meat, dairy, vegetables, fruits) were calculated (LCA-CO2). Inquiries were made on corporate social responsibility data for Japanese food companies, but not many options are available beyond self-sourcing. Consumer-side app user testing will be underway soon.

Here is a brief overview of some of the many FEAST 2018 research results.

－analyzed the Ecological Footprint of Japan's food consumption by sector and COICOP category for all 47 prefectures, by age and income group. Found that processed foods linked with importation are most impactful along with high income households.

－calculated the Ecological Footprint of Japan's food trade, both the imports and exports, and what countries are most influential in creating impacts. China, USA, and Australia compose over 50% of Japan's imported food ecological footprint with cropland, grazing land, and fishing ground usage being very high.

－examined and mapped agricultural land use in Kyoto City (2007-2017) to better understand the status and transition of agricultural land for potential use in urban agriculture under future conditions of population decline. Results showed a decline of 209 ha or 10% agricultural land use over ten years. Post-agricultural land uses were residential (40%) and vacant land (28%), which have implications for localizing food production and food system planning.

－conducted survey in three rural Bhutanese districts on agricultural and food consumption change (n=249) with the help of the Royal University of Bhutan, College of Natural Resources (MOU). Results are wide-ranging and pertain to changing patterns of meat consumption and the relationship to imported foods, generational gap in what is consumed, insights into how people eat food, strong seasonal variance in how people procure food, and perceptions of organic. Follow-up surveys planned in 2019 in growing urban Thimphu, towns bordering India, and remote districts to the East.

－held two-day scenario-building workshop with colleagues from Mahidol (MOU with Faculty of Social Sciences and Humanities) and Chulalongkorn Universities to follow-up on consumer visioning workshops held in Bangkok in 2017. The social practices of food purchasing, eating out, and home cooking were "storified" into narratives and pathways were created to reassemble socio-technical dimensions (materials, competencies, meanings eg. Shove et al. 2012) into the future.

－summarized the experience of re-agrarianisation in Japan and the farming modes typical to Japan from the post WWII period to now. Unlike many countries, hybridized farming modes that embrace elements of peasant-like orientations remain in Japan to this day and the strong presence of community mindsets and logics influences this reticence.

－developed a series of pathways into agrarian lifestyles for the next generation of farmers in Japan. Using mixed methods, cases of new farmers establishing themselves in Kyoto and Nagano were examined to develop representative pathways travelled by new farmers. Local community was found to play a critical role in the progression of farmers along pathways into agriculture.

－developed prototype for open source FEAST Food Transparency App and 1.6 million food item database. App will allow consumers to receive environmental, social, and health impact data on the food products they purchase. App is now being tested, but is online via the Apple Testflight interface.

FEAST is comprised of five working groups (WG), each with two WG chairpersons, and at least one RIHN research staff as WG liaison and contributor. FEAST headquarters, located at RIHN, acts as both a project managerial team and active research staff. This year we added two more HQ members to assist in coordinating bottom-up action research activities in Japan and production-side socio-ecological research.

Over the course of the first and second year of research, we found that a particular theme was resonating with many of the WG: informal food practices. Examples include hobby gardening, seed sharing, urban foraging, and gathering edible wild plants, alongside rediscovered activities such as raising urban livestock (chickens and beekeeping). Put together, they also make up an informal food system, largely invisible in official food-related statistics, and contribute to local food security as well as individual and cultural wellbeing. A new inter-WG collaboration was initiated on this topic including multiple Kaken applications.

○Project Members

◎ MCGREEVY, Steven Robert	(Research Institute for Humanity and Nature,Associate Professor,Environmental Sociology)
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	OTA, Kazuhiko	(Research Institute for Humanity and Nature,Researcher,Japanese Environmental Ethics)
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○ Future Themes

FEAST will be entering its four year and we will begin to enter a phase of winding-down the project with an emphasis on completing fieldwork and beginning publication in earnest. The following is a rough outline of what is expected to occur in 2019-2020.

Agroecology in Asian contexts: a focus on practices, farmer livelihoods, traditional knowledge, and drivers for scaling up: A host of fieldwork and analytical-oriented research on agroecology is scheduled for next year, in partnership with colleagues at University of California, Berkeley and College of Natural Resources, Royal University of Bhutan. Preeminent agroecology scholar Miguel Altieri, along with Clara Nicholls (Permanent Lecturer) and Antoinette Dumont (Post-doc, Alistair Iles advising), will work closely with FEAST to assess a set of agroecological farming initiatives in Japan to develop a series of socio-ecological indicators relevant to sustainability, resiliency, biodiversity, productivity, autonomy, stability, labor conditions, and food self-sufficiency. We expect this assessment will lead to better understanding of the drivers pushing or deterring agroecology forward in Japan. Similarly, a large-scale assessment (n=400) of Bhutanese farms in five, diverse provinces will add to an overall analysis relevant to the region at large.

Bhutan urban food transitions: In addition to the rural focus on agroecology, a survey and assessment of Bhutan's urban food transitions will take place in the nation's capital, Thimphu, one of the fastest urbanizing regions in South-Asia. The research will examine how food consumption habits as well as new, more global food markets are changing. There will be a focus on the younger generation and their values and perceptions around food-related social practices and the future of food consumption, as well as an appraisal of food flowing into the country via border town trading areas, such as Phuntsholing.

Evaluation of future social practice scenarios with Bangkok food stakeholders: Following up with colleagues at Mahidol and Chulalongkorn Universities in Thailand, we will conduct workshops with food stakeholders in Bangkok on the future scenarios we generated at the workshop in FY2018. The three storified narratives for food purchasing, eating out, and home cooking and the future pathways developed for each will be assessed by stakeholders, and their feedback will be reintegrated into the scenarios and eventually used for urban food system planning proposals for the city. At a minimum, we plan on presenting our findings to the Thai Ministry of Public Health.

Exploring innovative urban food security through serious games, food futures, scenarios: Working closely with our colleagues at Utrecht University, we plan on continuing to work with stakeholder groups at our Japanese sites to develop

plausible and desirable food future scenarios and serious games as both planning tools and exploratory educational methods. For use in planning and policy, the environmental and social impacts of these scenarios will be measured with various assessment techniques (EF, IO tables) and incorporated into future scenario modelling for regional/city-level foodsheds. Educational and experimental gaming methods will be developed in conjunction with domestic university colleagues and game development studios and released to the public at large. FEAST plans to lead a group of game scholars and industry partners to host the first official "Games for Change" event in Asia by the end of the project period.

Foodshed planning workshops and regional diet scenario modelling: Field sites in Japan will shift from visioning to concrete backcasting and planning workshops. Planning potential foodsheds will go hand in hand with facilitated discussions on diet types, policy intervention, and educational goals over 10-20-30 year time horizons and fed into site-specific reports for the public. At the same time, using contextual research and desirable food future visions as a basis, Japanese diet scenarios consistent with plausible distribution channels, land use and crop options, as well as alternative lifestyles (self-production, communal consumption, etc) will be modelled. Stakeholder feedback on the model scenarios will also be measured.

Food policy for sustainable food transition reports: As a culmination of various assessments of sustainable food policy-relevant research at our Japanese sites, reports for the public will be co-authored with stakeholders. The reports will include site-specific research results on current conditions around food and agriculture change, environmental and social assessments of the implications of the current trajectories, desirable future food visions generated at each site, and possible policy and planning interventions to reach said future states. It is hoped that these reports will create an educational opportunity for learning about food and agriculture and generate bottom-up support for food policy actions.

Informal food lifeworlds and food future fictions: Ethnographic research on consumers and food producers operating within "informal" food systems will continue at sites in Japan with an emphasis on the significance of informal food practices on individual and cultural wellbeing and quality of life. In addition, Christine Barnes from King's College London will work with us to examine the impacts of digital foodscapes on the future food imaginaries of Japan. First, a digital food taxonomy will identify key voices and themes that influence digital food culture across a range of social media platforms, and then, in collaboration with local artists and university students, an "interactive dining experience" will combine art, digital media, and fictional food futures as a way to critically interrogate the role of digital media in shaping the contemporary and future cultural politics of Japans food culture.

Consumer app prototype testing: After producing a prototype of the FEAST ShokuMieruka (Food Transparency) app and publishing it online, we will take the next steps in seeing the app released fully to the public via the Apple App Store. Before this is possible, target user group testing of the app design, data availability, and information platform functions will take place to tune the app to user preferences. At the same time, data for the health impacts of processed foods will be included in the app as well as seasonal fresh produce, fish, meat, and dairy LCA-CO2 data for Japan.

●Achievements

○Books

【Chapters/Sections】

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- Ota, Kazuhiko, Tomoyoshi Murata, Hamada Ryosuke 2018,08 What Does "Soil Is Valuable" Mean? Institutional Design and Ethics for Sustainable Use of Soil Resources. Paul B. Thompson, Kirill O. Thompson (ed.) Agricultural Ethics in East Asian Perspective: A Transpacific Dialogue. Springer, pp.197-211.

○Papers

【Original Articles】

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- Hara, Yuji, Yuki Sampei, Hirotaka Tanaka 2018,04 The Minabe-Tanabe Ume System: Linkage of Landscape Units by Locals. Sustainability 10(4). DOI:10.3390/su10041079 (reviewed).
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- Oda, Kimisato, Christoph D. D. Rupprecht, Kazuaki Tsuchiya, Steven R. McGreevy 2018,04 Urban agriculture as a sustainability transition strategy for shrinking cities? Land use change trajectory as an obstacle in Kyoto City, Japan. Sustainability 10(4). DOI:10.3390/su10041048 (reviewed).
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- Zhang J N, Zhou S, Sun H F, Zhang X X. 2018 Research progress and prospects on the biochar's application in Chinese vegetable field. Research of Agricultural Modernization (农业现代化研究) 39(4):543-550. (in Chinese) in Chinese with English abstract

○Research Presentations

【Oral Presentation】

- Fujiwara, Natsumi, Masashi Tachikawa, Naoki Yoshikawa, Steven R. McGreevy, & Atsushi Inaba Sustainable food consumption: environmental, social, and public health issues. Ecobalance 2018, 2018.10.09-2018.10.12, KFC Hall, Tokyo.
- Hara, Yuji Assessing supply-demand balance of nitrogen toward local-scale organic material circulation: a case studyof suburban residential district in Metro Manila. American Association of Geographers Annual Meeting 2018, 2018.04.10-2018.04.14, New Orleans, Lousiana, USA.
- Iwashima, Fumi Transition of Reproductive Work in Post War Rural Japan: Housewife Ideology and Household Technology. The 15th International Conference of the East-Asian Agricultural History, Government and Farmers in East Asian Agricultural History, 2018.09.12-2018.09.15, Seoul National University, the Republic of Korea.
- Kawai, Ayako Why farmers engage in seed saving practice in an industrialized country – motivations and values. American Association of Geographers Annual Meeting 2018, 2018.04.10-2018.04.14, New Orleans, Louisiana, USA.
- Kawai, Ayako Informal management and sharing of seeds in Japan. World Social Science Forum 2018 - CS4-07 Building a new food economy in Japan through sharing, collaboration, and commoning, 2018.09.25-2018.09.28, Fukuoka Convention Center, Fukuoka.
- Kim, Minseo, Christoph D. D. Rupprecht and Katsunori Furuya Residents' perception of the possibility of informal green space as an alternative urban green space – A case study of Ichikawa City, Japan. American Association of Geographers Annual Meeting 2018, 2018.04.10-2018.04.14, New Orleans, Louisiana, USA.
- Kobayashi, Mai Bhutan's Changing Landscape of Food Sharing: what persists and resisted within the nation's modernizing efforts. American Association of Geographers Annual Meeting 2018, 2018.04.10-2018.04.14, New Orleans, Lousiana, USA.
- Kobayashi, Mai The dragon's tryst with happiness: meat sovereignty, and Bhutan's culture of sin. 6th Degrowth Conference, 2018.08.21-2018.08.25, Malmö, Sweden.
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- Kobayashi, Mai A look in to Bhutan's transitions in wild food security. World Social Science Forum 2018 - CS3-02 The wild food basket: recreating urban and rural ecosystems as food sources, 2018.09.25-2018.09.28, Fukuoka Convention Center, Fukuoka.
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- Mangnus, Astrid From imagination to transformation? Evaluating the long-term impacts of visioning, back-casting and gaming on the Kyoto food system. World Social Science Forum 2018 - CS4-05 Using game-based methods for sustainability transformations : lessons from practice and theory, 2018.09.25-2018.09.28, Fukuoka Convention Center, Fukuoka.
- McGreevy, Steven R. Lifeworlds of sustainable food consumption and production: agrifood systems in transition. 4th Kyoto University - Wageningen University International Graduate Workshop on Food, Farm, and Rural Development, 2018.05.09, Kyoto University, Kyoto.
- McGreevy, Steven R. Social practices, food futures, and "sticky knowledge" -- motivating change in everyday life?. Society for the Advancement of Socio-Economics, 2018.06.23-2018.06.25, Doshisha University, Kyoto. Session on "Alternatives to Capitalism; Changing everyday life-- changing capitalism"
- McGreevy, Steven R. Redefining wellbeing amongst new settlers in a withering rural Japan. World Social Science Forum 2018 - CS1-03 Lifeworlds of Sustainability and Wellbeing in a Shrinking Japan, 2018.09.25-2018.09.28, Fukuoka Convention Center, Fukuoka.
- Oda, Kimisato and Christoph D. D. Rupprecht Mapping agricultural land use change in Kyoto City (Japan) from 2007 to 2016. American Association of Geographers Annual Meeting 2018, 2018.04.10-2018.04.14, New Orleans, Louisiana, USA.
- Ota, Kazuhiko How do we describe the enjoyment of informal food practices?: Analysis of theoretical framework and key concepts. American Association of Geographers Annual Meeting 2018, 2018.04.10-2018.04.14, New Orleans, Lousiana, USA.
- Ota, Kazuhiko Develop Food Strategies and Plans through Gaming Methods in Kyoto. World Social Science Forum 2018 - CS4-05 Using game-based methods for sustainability transformations : lessons from practice and theory, 2018.09.25-2018.09.28, Fukuoka Convention Center, Fukuoka.
- Ota, Kazuhiko What is Food Citizenship?: Empowerment, Political Participation, Cosmopolitanism. The 11th International Conference on Applied Ethics, 2018.12.15-2018.12.16, Kyoto University.
- Ota, Kazuhiko Analysis of Sustainability Transitions Pathways Using the Concept of Milieu: Structuring Socio-technical-ecological Complexity. ACERP2019, 2019.03.21-2019.03.23, City Center Hotel, Tokyo.
- Ota, Kazuhiko & Steven R. McGreevy Games and gaps for normative food futures: The role of researchers in facilitating creative transdisciplinary processes. Asia-Pacific Society for Agriculture and Food Ethics (APSafe), 2018.05.10-2018.05.12, National Taiwan University, Taipei, Taiwan.
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- Rupprecht, C. D. D. Subsist and thrive: caring for people and nature in post-growth urban Japan. World Social Science Forum 2018 - CS1-03 Lifeworlds of Sustainability and Wellbeing in a Shrinking Japan, 2018.09.25-2018.09.28, Fukuoka Convention Center, Fukuoka.
- Rupprecht, C. D. D., Kawai, A. Decolonizers of the imaginary: Future and past generations, non-humans and spiritual beings. 6th International Degrowth Conference, 2018.08.21-2018.08.25, Malmö.
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・Rupprecht, C. D. D., Mangnus, A., Vervoort, J., Kantamaturapoj, K., Ota, K., McGreevy, S., Taniguchi, Y. et al. Empowering residents to co-design their food systems: experimenting with future-oriented methods in Japan and Thailand. European Association of Social Anthropologists Meeting, 2018.08.14-2018.08.17, Stockholm.

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・Spiegelberg, Maximilian The new force of beekeeping is an old one: about hobby beekeepers in Japan. The 14th Asian Apicultural Association Conference: Bees, Environment and Sustainability, 2018.10.22-2018.10.25, Jakarta, Indonesia.

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・Spiegelberg, Maximilian, Christoph D. D. Rupprecht, Rika Shinkai and Jinchao Gan Honey bees in urban Kyoto—a revival story? Bee super-highways and potential impact on urban agriculture. World Social Science Forum 2018 - CS3-02 The wild food basket: recreating urban and rural ecosystems as food sources, 2018.09.25-2018.09.28, Fukuoka Convention Center, Fukuoka.

・Tamura, Norie Light the fire of “Degrowth” –towards the transition of agrifood systems in Japan. The 6th International Degrowth Conference in Malmö, 2018.08.21-2018.08.25, Malmö, Sweden.

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・Vervoort, Joost How can societal game design capacities contribute to anticipatory governance? Comparing the Netherlands and Japan. World Social Science Forum 2018 - CS4-05 Using game-based methods for sustainability transformations : lessons from practice and theory, 2018.09.25-2018.09.28, Fukuoka Convention Center, Fukuoka.

【Poster Presentation】

・Watanabe, Kazuhito Estimation of Carbon Footprint Associated with Bonito Consumption. Ecobalance 2018（The 13th Biennial International Conference on EcoBalance）, 2018.10.09-2018.10.12, KFC Hall & Rooms, Ryogoku, Tokyo.

・Watanabe, Kazuhito & Kiyotaka Tahara Environmental burden of Japanese fishery. LCA FOOD 2018, 2018.10.17-2018.10.19, The SUKOSOL BANGKOK, Bangkok, Thailand.

【Invited Lecture / Honorary Lecture / Panelist】

・McGreevy, Steven R. Special Symposium: Realizing Sustainable Food (Panelilst). Kyoto University International Symposium “Food & Sustainability”, 2018.10.29-2018.10.30, . DOI:Kyoto University Clock Tower Centennial Hall

・Rupprecht, C. D. D. Residents’ appreciation and management preferences of informal green space across four major Japanese shrinking cities. Japan Geoscience Union Annual Meetin 2018, 2018.05.20-2018.05.24, Makuhari Messe.

・Rupprecht, C. D. D. From residents' view of nature to more-than-human urban planning. Japanese Institute for Landscape Architecture, mini-forum Ecological Design of Urban Landscapes (pannelist), 2018.05.26-2018.05.27, Kyoto University. (in Japanese)

・Rupprecht, C. D. D. Applying residents' views of informal greenspace to urban green design. 5th Research Meeting, Road Ecology Research Society of Japan, 2018.06.09-2018.06.09, Tokyo. (in Japanese)

・Rupprecht, C. D. D. MC for Panel Discussion. The 23rd RIHN Regional Community Seminar: Towards bee-friendly cities - Co-creating urban futures, 2018.11.04, Nakagyo Ward Office, Kyoto. (in Japanese)

・Rupprecht, C. D. D. Beyond anthropocentrism - Towards a multispecies concept of sustainability. RIHN-Peking University Lectures, 2019.03.19, Beijing.

・Spiegelberg, Maximilian Honeybee Geographies: Exploring new productions of nature, space, knowledge, and power. American Association of Geographers Annual Meeting 2018, 2018.04.10-2018.04.14, New Orleans, Louisiana, USA. Panelist

Stage: Full Research

Project Name: The Sanitation Value Chain: Designing Sanitation Systems as Eco-Community-Value System

Abbreviated Title: Sanitation

Project Leader: YAMAUCHI Taro

Program 3: Designing Lifeworlds of Sustainability and Wellbeing

URL: http://www.chikyu.ac.jp/sanitation_value_chain/

Key Words: resources oriented sanitation; value chain

○ Research Subject and Objectives

a) Problem, background, and objectives

Global environmental problem discussed in the project:

The word "sanitation" refers to the provision of facilities and services for the safe disposal and resource recovery of human urine, feces, and wastewater. Sanitation is essential for promoting health, preventing environmental pollution, conserving ecosystems, and recovering and recycling resources. Therefore, it can be said that sanitation is closely related to such current global issues as poverty, urban slums, conservation of ecosystems, and resource management. In the developing world, the population is growing rapidly, especially in urban slums, and there is high child mortality and poverty issues (see Supplementary Fig. 0-1). It has been reported that as of 2015, 2.4 billion people were still using unimproved sanitation facilities, including 946 million people who were still practicing open defecation (UN, 2015). On the other hand, depopulation and aging are progressing, especially in the rural parts of the developed world (see Supplementary Fig. 0-2), and the financial capabilities of municipalities, who manage sanitation systems, are becoming weaker and weaker.

Key question of the project:

The questions "How can we handle the waste from 10 billion people in the future?" and "How can we achieve the water and sanitation targets in the sustainable development goals (SDGs)?" are global environmental problems that need to be solved.

Working hypothesis of the research:

Hypothesis-1: Current sanitation issues are caused by the dissociation between the value that they provide and the values of individual people and/or communities.

Hypothesis-2: Sanitation technologies cannot work well without a support system. The mismatch between the prerequisites of technologies and local characteristics makes sanitation issues more complicated.

Key concept - Sanitation value chain:

The project proposes a sanitation value chain, which entails the following basic policies: 1) Put the values of people and communities at the center of the discussion, and prepare a sanitation system to drive this value chain; 2) design the sanitation system by focusing on direct incentives for individual users and communities; 3) recognize that a sanitation system is an integrated system with social and technical units; and 4) design the sanitation system by making a good match between social characteristics and the prerequisites of technologies.

Why a value chain?:

We strongly believe that 1) the planning and installation of infrastructures such as sanitation systems is nothing, but planning and installing a value chain, as shown in Supplemental Fig. 0-3, is more valuable; and 2) because of the weakening of municipalities, the prerequisites of the current management model for water and sanitation systems will be no longer be met in the future.

b) Methodology

Four research steps to achieve the goal:

In Topic 1 (Life), field and literature surveys are performed to 1) analyze the values and happiness of people; 2) understand norms relating to human excreta in the current situation, as well as historical changes; 3) re-evaluate the value of sanitation systems; 4) analyze the mismatch between the prerequisites of sanitation technologies and the region-specific characteristics of humans and communities by gathering failed cases; 5) understand historical changes in the sanitation systems of target areas; and 6) match the values of people and communities to the value provided by sanitation systems. In Topic 2 (Technology), four research activities are planned: 1) Summarizing the prerequisites of sanitation technologies; 2) re-evaluating the value of sanitation systems; 3) analyzing the mismatch between the prerequisites of sanitation technologies and the region-specific characteristics of humans and communities by gathering failed cases; and 4) developing required technologies. In Topic 3 (Co-creation), the following three steps will be adapted: 1) identifying stakeholders and understanding the structure of the values of

people and communities using a field survey; 2) analyzing the hierarchy and structure of stakeholders' value chain and evaluating their mutual affinity; and 3) developing the co-creation process. In Topic 4 (Visualization), the main activity is developing visualization methods for our concept and research results using various media and techniques. We strongly recognize the importance of visual images in the trans-disciplinary (TD) approach.

Field study:

The project will involve field studies in 1) the rural area of Ishikari River Basin, 2) rural and urban areas in Burkina Faso, 3) an urban slum in Indonesia, and 4) an urban slum in Zambia.

c) Goals and Expected results

The goals of this research project are 1) to propose that a sanitation value chain is relevant to both developing and developed countries; 2) to design several pilot studies demonstrating the significance of societal, academic, and professional involvement in the co-creation of this value chain; and 3) to contribute to the establishment of a new interdisciplinary academic foundation regarding sanitation. Examples of the sanitation value chain will be demonstrated and co-created at the pilot study sites.

d) Project organization and membership

For project management, a coordination group has been organized. Four research teams have also been organized.

e) Current status of research on resource oriented sanitation

Research groups in Switzerland, Germany, Sweden, Norway, and Finland are studying resource recovery-type sanitation. The specialist groups of the International Water Association (IWA) jointly held an international conference (S2SMALL) in October 2017. Also, the topics of the 6th Dry Toilet conference (DT2018) held in August 2018 were as follows: research on the safe use of excreta and/or urine; social and cultural aspects of sustainable sanitation; sanitation and nutrient recycling in business; cross-organizational cooperation and co-creation; hi- and low-tech solutions in urban/rural environments; "ecosan" meets the water-food-energy nexus; promoting sustainable sanitation and nutrient recycling among different stakeholders; and community engagement. Seven members of the project including the leader, sub-leader, and core members contributed to DT2018. The four research topics included in the project can make a big contribution to global research on sanitation.

Program 3 Goal

Our "lifeworlds" are composed of the physical spaces and socio-cultural spheres of our everyday lives. They are continually reproduced, reimagined, and evolved through an interactive and reflexive relationship with society, culture, and nature. Program 3 proposes research aimed at illuminating the reciprocal linkages between diverse rural and urban lifeworlds and contributing to solving sustainability problems by working with various societal partners such as governments, companies, and citizen groups. Special emphasis is placed on envisioning sustainable futures that improve wellbeing and gauging their feasibility.

Contribution to Program 3

In the mission statement of Program 3, there is the following message: "Through the reconstruction of the lifeworld concept and by highlighting the reciprocal linkages between rural and urban spaces, Program 3 designs lifeworlds of sustainability and wellbeing and co-creates concrete pathways for their realization." We think that sanitation is an essential system for lifeworlds. Sanitation contributes to human public health, material/resource recycling by society, and environmental pollution/ecosystem management. In our project, sanitation value chains for not only rural areas but also for urban areas are discussed. When it comes to the sanitation value chain for urban areas, we design material and value flows between rural and urban spaces.

Our Program 3 mission statement also says that "Pre-existing, yet latent, diverse socio-cultural elements, such as livelihood styles, lay knowledge, conflict resolution strategies, and the vitality of the people themselves can be called upon to address problems and help to chart a course toward possible future societies. Program 3 builds upon these experiences and knowledge of human-nature interaction to propose concrete changes needed to achieve a sustainable society." We could not succeed in installing a practical scale sanitation system in Burkina Faso as part of the SATREPS project, and we think that the reason for this was the lack of analysis of the human and social aspects. In our project, we carefully examine the values of people and communities, as well as norms related to human excreta at our field sites.

The mission statement includes the following message: "Program 3 will not investigate top-down approaches to system change, but will work with local residents, government officials, companies, citizen groups and other various stakeholders to propose sustainable alternatives and gauge their feasibility." The co-creation of a "sanitation value chain" is one of the important points in our sanitation project.

We will contribute to the mission by aiming to design lifeworlds; showing solutions; proposing a social transition; realizing the co-creation of a sanitation value chain with diverse stakeholders; and establishing an academic foundation for sanitation. Our program director, Dr. Saijo, has proposed the concept of "future design," and he stresses the importance of a "virtual future generation" in design. Our sanitation project has started the discussion on how to include the "virtual future generation" in the design process of a sanitation value chain.

○ Progress and Results in 2018

Project Progress during the FR Period to Date

(1) Achievement – 1: The launch of an international journal on sanitation and publication of the second volume:

The international online journal "Sanitation Value Chain" was launched in November 2017. The ISSN is 2432-5066 (online) and the journal web site is http://www.chikyu.ac.jp/sanitation_value_chain/journal.html. We established an international editorial board of sanitation specialist from seven countries. The second volume of the journal was successfully issued in November 2018.

(2) Achievement-2: Holding and co-hosting 22 international and domestic conferences and workshops:

We organized 11 meetings each in 2017 and 2018 (Annex 2). Typical meetings include the Zambia Water Forum and Exhibition (ZAWAFE2017 and 2018), the International Symposium on Green Technology for Value Chains (GreenVC2017 and 2018), Workshops on Science Communication, and the Indonesia & Philippine & Japan Joint International Seminars on Water and Sanitation (Bandung, October 2017 and Manila, January 2019).

(3) Achievement-3: Conclusion of research agreement:

Implementation agreements (IAs) and research contracts (RCs) were concluded in accordance with the signing of MOUs between the Indonesian Institute of Sciences (LIPI) and RIHN, University of Zambia (Zambia) and RIHN, and AJPEE (Burkina Faso) and RIHN.

(4) Achievement -4: Toilets that can concentrate urine:

In order to co-create a sanitation value chain for managing human urine in urban areas, transporting urine to rural farm land is essential. The technology required for transporting urine is volume reduction technology for cost reduction. As a technology to concentrate urine, we examined the forward osmosis (FO) process this year. The results obtained were as follows: 1) The area of the forward osmotic membrane required to concentrate 1 L of urine is 55.6 cm2. This area is small enough to install the urine concentration device in a toilet bowl. 2) It was shown that 78.6% of ammonia, 97.8% of potassium, and 99.6% of phosphate can be recovered.

(5) Achievement -5: Toilets that can produce phosphorus fertilizer:

It was confirmed that the phosphorus in urine can be recovered directly from urine as calcium phosphate (DCPD) using shell as a calcium source, and we clarified the reaction pathway and rate. Thus, by installing a simple shell-packed column in the urine collection pipe of a toilet, it has become possible to make a toilet that produces phosphorus fertilizer. We set up a compost toilet with a phosphorus recovery function at RIHN and started demonstration experiments from March 2018.

(6) Achievement-6: New method for analyzing exposure pathways of pathogens using molecular biology:

We developed a new method for analyzing the infection route from feces to people. In this method, pathogenic Escherichia coli was separated and quantified using the PCR method, and the pathway was identified from the pathogenic Escherichia coli type. As a result, it was found that the type of Escherichia coli in drinking water and in feces was different, as shown in Supplementary Fig. 2-1, suggesting the importance of other sources of contamination such as livestock. Also, three prioritized exposure pathways were identified: pond bathing, outdoor playing, and drinking,

(7) Achievement-7: Evaluation of inactivation mechanism of virus during urine concentration:

The real-time qPCR method was applied to six target genome regions for monitoring MS2 (an indicator of virus) infectivity during the urine concentration process, and we found that 1) uncharged ammonia is the predominant factor in MS2 inactivation, 2) genome damage is the main mechanism of MS2 infectivity loss, and 3) MS2 infectivity loss in urine can be predicted by ion composition and speciation.

(8) Achievement – 8: Agricultural technology for compost, urine, and reclaimed gray water reuse:

Salinity management of soil is essential when compost, urine, and reclaimed gray water are reused on farm land. A mathematical simulation model was developed for describing the fate of salts in a soil system, and the leaching requirement for removing salts was evaluated using this model. The fate of pathogens in the soil system was evaluated, and the health risk to farm workers was estimated.

(9) Achievement-9: Acceptability of the sanitation system was evaluated from the technical side:

We conducted a survey on a new prototype model of a composting type toilet at the LIPI and a mosque in Sapporo. The results were as follows: 1) Half of the people answered that the bad smell was a point to be checked; 2) 70% of respondents worried about excreta sticking to the toilet bowl; 3) the new-type toilet was acceptable; and 4) 70% were unsatisfied with its size and 40% felt discomfort when sitting on the toilet seat, feeling like they might fall into the hole. We also conducted a survey on dewatered digested sludge for use as a soil conditioner in Iwamizawa, Japan.

(10) Achievement-10: Visualization of research:

1) The video "Samurai-kun Sanitation Value Chain" (Indonesian version) was produced and screened at Bandung in 2017. In 2018, the video was revised and screened at a junior high school and among flower farmers in Bandung. The Japanese version was screened at RIHN's Open House event; 2) the playlist of SVC video archives has been opened up to the public on YouTube. Eight presentation videos have been distributed. 3) Original toilet paper was produced as a promotional item for the project using illustrations to make our research concept visible. 4) We participated in RIHN's project on visualization of state-of-the-art research.

(11) Achivement-11: Intensive fieldwork at field sites:

Indonesia site: 1) Health of infants and their fecal management by caretakers; 2) norms, consciousness, and values relating to human waste; 3) mental health and living conditions of urban slum dwellers; and 4) presentation of research results at an international conference (GreenVC2018).

Ishikari site: 1) Design of a water source management system coordinated with local high schools and local governments and its demonstration; 2) technology packages suitable for regional autonomous water supply (membrane treatment, sensor rings, data handling) installed locally, data collection; 3) interviewed the Furano city water supply and sewer division on the issue of septic tank management.

Burkina Faso site: 1) Conducted surveys on the private sector's removal of sludge from households in the capital city and rural areas, revealing that the number of private companies was rapidly increasing in the capital city, whereas in rural areas, a few workers independently removed the sludge by developing manual techniques through their own efforts; 2) concluded an MOU, IA, and RC with a local non-governmental organization (NGO).

Zambia site: 1) Implemented a session and an exhibition booth at ZAWAFE2018; 2) conducted field surveys and held workshops; 3) based on MOU, concluded IA and RC with the Integrated Water Resource Management of the University of Zambia.

Progress since the last reporting

(1) Achievement 1: Overall achievements of the project:

1) Reviewed the concepts of the "sanitation value chain," conventional "value chain analysis," and "value flow analysis" to examine the methodology to co-create value chains with local stakeholders. Consequently, constructed a framework consisting of three values (health and well-being, materials, and socio-culture). 2) Published the second volume of the international journal Sanitation Value Chain. 3) Published an academic book ("Resources Oriented Agro-Sanitation Systems," by Springer). 4) Held (including co-hosting) international and national conferences (11 in total). 5) Based on MOU with the University of Zambia, IA and RC were concluded. Also, concluded MOU, IA, and RC with an NGO in Burkina Faso.

(2) Achievement 2: Historical changes in sanitation problems in India:

A cultural anthropologist who had been studying Dalits (Untouchables), scavengers in India, joined our project. Her study, published in our journal, revealed the historical process of the development of low-cost flush toilets in contemporary India, as a part of the "liberation of manual scavengers," led by Gandhi and his followers (Gandhians). While Gandhi attempted to focus on the dignified notion of scavenging work and exhorted people to improve the working environment of scavengers in order to

eradicate untouchability, the Gandhians intended to change the structure of toilets so that one could not look at his own dirt. In that process, modern sanitation discourse spread to the public and it was related to discrimination.

(3) Achievement 3: Development of a urine concentration system using forward osmosis process:

The urine concentration process is important as it can increase the value of urine by reducing transportation and application costs. We developed a urine concentration system using the FO process; it showed a five-fold concentration of urine. In this year, we investigated 1) the diffusivity of ammonia in the solutions through the FO membrane and 2) the fouling of the membrane with repetitive concentrations of urine. As a result, we found the diffusivity depends on pH and the repetition of urine concentration caused fouling by scale generation and absorption of saccharides into the membrane.

(4) Achievement 4: Value chain co-creation scheme:

In order to know how the co-creation of a sanitation value chain can be achieved, 1) in Ishikari river basin, we analyzed the current value chain of the community-based water management system, and conducted some trials with related local actors, including high school students, to co-create a new value chain for a community-based water management system. This process seems to be applicable to the co-creation of a sanitation value chain. 2) In Indonesia, we discussed with candidate actors a sanitation value chain trial in Bandung city, and we revealed their motivations, requirements, and concerns. The actors included garbage collectors, farmer, agri-business companies, religious educators, etc.

(5) Achievement 5: Visualization of the research:

1) The video “Samurai-kun Sanitation Value Chain” (Indonesian version) was revised and screened at Smp negeri 1 lembang (a junior high school in Lembang, Bandung) and flower farms in Lembang, Bandung; 2) The playlist of SVC video archives has been opened up to the public on YouTube. Eight presentation videos have been distributed; 3) we produced original toilet paper as a promotional item using illustrations to visualize our concept.

Most Notable Outputs to Date

Award

1. Ito R, Funamizu N: The best paper award: The full authors are Guizani M, Yajima K, Kawaguchi T, Ito R, Funamizu N. The title of the paper is Morphological, chemical and Electro chemical carbon based and novel metal electrode characterization for use in water electrochemical disinfection, 1st Euro-Mediterranean Conference for Environmental Integration, November 22-25, 2017, Sousse, Tunisia.

2. Funamizu N: Environment Reconstruction and Recycling Bureau Director Award, Ministry of the Environment. October 10, 2017.

3. Funamizu N: Hokkaido Social Contribution Award, Hokkaido Government. August 4, 2018.

External fund

4. Ushijima K: Title: Transition to regional autonomous next-generation type water infrastructure management system. Source: The Cabinet Office "Strategic Innovation Creation Program (SIP)" "Infrastructure Maintenance / Update / Management Technology" (JST Management, Period: from September, 2016 to March, 2019).

Journal publication

5. The international scientific journals “Sanitation Value Chain” ISSN 2432-5058 (print), ISSN 2432-5066 (online). Editor in chief: Yamauchi T. Vol. 1 and Vol. 2. (http://www.chikyu.ac.jp/sanitation_value_chain/journal.html)

Videos/Photographic Works

6. Sanitation Education Program (Free lecture series), SVC Video Archives on ‘YouTube’. (https://www.youtube.com/channel/UCcDLZXSBauZWQSGE29x7lYg). (https://www.youtube.com/channel/UCP5lF0CgqTWUqv9nUKE_R8A/playlists)

Symposia/Conferences/Workshops (Organized or Co-organized)

7. The International Symposium on Green Technology for Value Chains. The first symposium: 3-5 October, 2016, the second symposium October 23-24, 2017, Jakarta, Indonesia.

8. Zambia Water Forum and Exhibition (ZAWAFE) 2017, RIHN project session, 12 June 2017, RIHN project session and Dziko Langa booth, 12 June 2018, Lusaka, Zambia.

9. International workshop for Sanitation Value Chain 2019 in Philippine “Social Acceptance of New Technology”. 26 January 2019, De La Salle University, Manila, Philippines.

Book

10. Funamizu N (ed.) (2018) Resource-Oriented Agro-sanitation Systems: Concept, Business Model, and Technology. Springer Japan, Tokyo, 314pp.

Academic Papers

11. Ushijima K., Funamizu N, Nabeshima T, Hijikata N, Ito R, Sou M, Maiga AM, Sintawardani N (2015) The Postmodern Sanitation - Agro-sanitation Business Model as a New Policy -, Water Policy, 17(2); 283-298. DOI:10.2166/wp.2014.093

12. Hijikata N, Tezuka R, Kazama S, Otaki M, Ushijima K, Ito R, Okabe S, Sano D, Funamizu N (2016) Bactericidal and virucidal mechanisms in the alkaline disinfection of compost using calcium lime and ash, Journal of Environmental Management, Journal of Environmental Management, Vol.181, 721-727. DOI: 10.1016/j.jenvman.2016.08.026

13. Ito R, Funamizu N (2016) Phosphate Recovery from synthetic Urine with shell of Mizuhopecten Yessoensis, Journal of Water and Environment Technology, 14(6), 437-446 .

14. Ito R, Tanie M, Ushijima K, Nilawati D, Sintawardani N, Funamizu N (2017) Evaluation of acceptance of a composting toilet prototype for people in slum area in Indonesia, Desalination and Water Treatment. DOI: 10.5004/dwt.2017.20880

15. Otsuka Y, Agestika L, Widyarani, Sintawardani N, Yamauchi T (2018) Risk factor for undernutrition and diarrhea prevalence in an urban slum in Indonesia: Focus on water, sanitation, and hygiene. American Journal of Tropical Medicine and Hygiene, 100(3):727-732. DOI:10.4269/ajtmh.18-0063

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○ Future Themes

(1) Four Research Topics to achieve the goals

The project is proposing a new concept, a sanitation value chain, which has the following basic policies: 1) Put the values of people and communities at the center of the discussion, and prepare a sanitation system to drive this value chain; 2) design the sanitation system by focusing on direct incentives for individual users and communities; 3) recognize that a sanitation system is an integrated system with social and technical units; 4) design the sanitation system by making a good match between the social characteristics and prerequisites of technologies. Accordingly, the goals of this research project are to 1) propose the concept of a sanitation value chain as relevant to both developing and developed countries; 2) design several pilot studies to demonstrate the significance of societal, academic, and professional involvement in the co-creation of this value chain; and 3) contribute to the establishment of a new interdisciplinary academic foundation regarding sanitation. In order to achieve the goals, we will adopt four points of view (Topics 1, 2, 3, and 4).

In Topic 1(Life), the following six research activities are planned: (1-1) Field survey for analyzing people's values and happiness; (1-2) field and literature survey on norms related to human excreta in current contexts as well as historical changes; (1-3) field and literature survey to re-evaluate the value of sanitation systems; (1-4) field and literature survey to analyze the

mismatch between the prerequisites of sanitation technologies and the region-specific characteristics of humans and communities by gathering failed cases; (1-5) field and literature survey on historical changes in sanitation systems of target areas; and (1-6) matching the values of people and communities to the value provided by sanitation systems.

In Topic 2 (Technology), the following four research activities are planned: (2-1) Literature survey on the prerequisites of sanitation technologies; (2-2) field and literature survey on the prerequisites of sanitation technologies by gathering success stories; (2-3) field and literature survey to re-evaluate the value of sanitation systems; and (2-4) field and literature survey to analyze the mismatch between the prerequisites of sanitation technologies and region-specific characteristics of humans and communities by gathering failed cases.

In Topic 3 (Co-creation), the following four activities are planned: (3-1) Identifying stakeholders and understanding the structure of the values of people and communities; (3-2) analyzing the hierarchy and structure of stakeholders' value chain and evaluating their affinity; (3-3) developing the co-creation process; and (3-4) demonstrating the co-creation of a sanitation value chain.

In Topic 4 (Visualization), we will develop a transmission method using various media and methods related to our concept and research results. We strongly recognize the importance of visual images as one way to express the outcome.

(2) Fields

The project involves field studies in 1) a rural area in Ishikari River Basin, 2) a rural area in Burkina Faso, 3) an urban slum in Indonesia, and 4) an urban slum in Zambia.

(3) Activities in 2019

Topic 1 Life group:

1) Fieldwork by cultural anthropologists in Burkina Faso, Cameroon, and India; 2) analysis of questionnaire survey on norms related to human excreta in Japan, Indonesia, and Burkina Faso; and 3) a theoretical study on the notion of value for comparison.

Topic 2 Technology group:

1) Analysis of prerequisites and material flow of sanitation technologies; 2) developing new methodology for identifying exposure pathways of pathogens; 3) analysis of Sanitation value chain of wastewater treatment and sludge reuse for agriculture in Ishikari; and 4) developing new sanitation technologies with different prerequisites (disinfection method for solids, nutrient recovery from urine).

Topic 3 Co-creation group:

1) Conducting trial of co-creation process with actors who may relate to the sanitation value chains in Indonesia and Hokkaido; 2) analyzing the findings from the co-creation experience from three value viewpoints; and 3) proposing several crude models of the approach and methodology for sanitation value chain co-creation.

Topic 4 Visualization group:

1) Prototyping a short concept video utilizing the characteristics of several image expressions; 2) archiving video of events for the sake of sharing information among researchers in remote areas; and 3) conducting a qualitative survey of science communication aiming for concept visualization in transdisciplinary research among researchers in different disciplines.

Indonesia team:

Based on the team's aim of developing a mechanism for a sanitation value chain for the local residents in the slums and suburbs of Bandung city, we have conducted field surveys with potential participants who can be players in the demonstration of the sanitation value chain. In 2019, we will 1) select a specific target area and community as the pilot site for co-creating a sanitation value chain, 2) decide which sanitation technology should be introduced experimentally to the pilot site, and 3) make concrete plans for the following questions on co-creating a sanitation value chain: "How can the players utilize sanitation technology such as composting toilets?," "How can they collect and transport human feces and urine?," and "How are they able to gain economic and non-economic benefits by using compost fertilizer?"

Ishikariteam:

We have already co-created and proposed a local community-based water management system, and we have found that it may be difficult to apply it directly to the sanitation system, in terms of the differences between historical actors and so on. Therefore, we

will 1) analyze our co-creation experience and propose a water management system in light of the structure of the problem, the process to reach a solution, and the arrangement of real activities to drive the system; 2) make a plan for the co-creation of a sanitation value chain on the basis of that analysis; and 3) conduct some trials on the co-creation.

Burkina Faso team:

1) Interviews with a president and workers at private company who remove fecal sludge in an urban area (Ouagadougou), especially regarding their areas of activity and their development; 2) interviews with workers engaged in the removal of fecal sludge in a rural area (Kongoussi), especially regarding the cultural aspects of their activities and their historical development; 3) preparation of workshop about sanitation and compost from human excreta for local NGOs and residents at the pilot farm, where the use of compost from human excreta has already been introduced with our project's cooperation in a rural area (Kongoussi). Regarding these activities, we will study the cultural and social aspects of fecal sludge management in Burkina Faso.

Zambia team:

In the Peri urban area of Lusaka city, it has been necessary to both raise the awareness of residents and pursue sanitation improvement. In FY 2019, we plan to 1) begin preparation for building a business model through the co-creation process with local children and a youth group called 'Dziko Langa (my community),' who will be the main body and will continue the activities. 2) We will investigate the correlation between sanitation and health damage (e.g., cholera outbreaks in the rainy season) by aiming to identify the source and pathway of infection by investigating the sanitary environment.

●Achievements

○Books

【Authored/Co-authored】

- Mangané IK (in collaboration with Nakao S) 2018,12 La mémoire d'El Hadj Beinké Souleymane Mangané. Research Institute for Humanity and Nature, kyoto, Japan, 152pp. (in French)

【Chapters/Sections】

- Do K, Harada H, Saizen I 2018,08 Enhancement of biogas production from anaerobic digestion of disintegrated sludge: a techno-economic assessment for sludge management of wastewater treatment plants in Vietnam. Chan HY & Sopian K (ed.) Renewable energy in developing countries: local development and techno-economic aspects. Green Energy and Technology. Springer. DOI:10.1007/978-3-319-89809-4

○Editing

【Editing / Co-editing】

- Yamauchi T et. al. (ed.) 2018,11 . Sanitation Value Chain, 2(1). Research Institute for Humanity and Nature, Kyoto, 54pp.
- Funamizu N (ed.) 2018,07 Resource-Oriented Agro-sanitation Systems: Concept, Business Model, and Technology. Springer Japan, Tokyo, 314pp.

○Papers

【Original Articles】

- Tsuyoshi Kato, Ayano Kobayashi, Wakana Oishi, Syun-suke Kadoya, Satoshi Okabe, Naoya Ohta, Mohan Amarasiri, Daisuke Sano 2019,03 Sign-constrained linear regression for prediction of microbe concentration based on water quality datasets. Journal of Water and Health. (reviewed). Accepted
- Mokhtar Guizani, Megumi Saito, Ryusei Ito, Naoyuki Funamizu 2019,03 Combined FO and RO system for the recovery of energy from wastewater and the desalination of seawater. Desalination and Water Treatment. (reviewed). Accepted
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・Eiji Haramoto, Masaaki Kitajima, Akihiko Hata, Jason R. Torrey, Yoshifumi Masago, Daisuke Sano, Hiroyuki Katayama 2018,05 A review on recent progress in the detection methods and prevalence of human enteric viruses in water. Water Research(135):168-186. DOI:10.1016/j.watres.2018.02.004 (reviewed).

・Mamoru Oshiki, Takayuki Miura, Shinobu Kazama, Takahiro Segawa, Satoshi Ishii, Masashi Hatamoto, Takashi Yamaguchi, Kengo Kubota, Akinori Iguchi, Tadashi Tagawa, Tsutomu Okubo, Shigeki Uemura, Hideki Harada, Naohiro Kobayashi, Nobuo Araki, Daisuke Sano 2018,04 Microfluidic PCR amplification and MiSeq amplicon sequencing techniques for high-throughput detection and genotyping of human pathogenic RNA viruses in human feces, sewage, and oysters. Frontiers in Microbiology(9):830. DOI:10.3389/fmicb.2018.00830 (reviewed).

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・Wang P, Hao M, Han W, Yamauchi T 2018 Factors associated with nutritional status and motor development among young children in suburban Northeast China. Nursing & Health Sciences. (reviewed). in press

○Research Presentations

【Oral Presentation】

・Hidenori Harada Excreta and sanitary wastewater management in Asian and African countries. Special Seminar on Environmental Engineering, 2019.03.27, Kyoto University, Kyoto, Japan.

・Taro Yamauchi Designing Sanitation Systems as Eco-Community-Value System. A Seminar of "Dialogue of Indigeneity: Perspectives from Archaeology and Anthropology", 2019.03.21-2019.03.22, University of Oxford, UK.

・Hermes Dinala, Atupelye Komba, Sikopo Nyambe Water, Sanitation and Hygiene in Urban South, East Africa. Seminar on JAAS Hokkaido Branch, 2019.02.08, Hokkaido University, Sapporo.

・Sikopo Nyambe Dziko Langa: Action Research study in peri-urban Lusaka, Zambia. Seminar on JAAS Hokkaido Branch, 2019.02.08, Hokkaido University, Sapporo.

・Ikuo Kato, Mohan Amarasiri, Daisuke Sano Model development of natural decay of waterborne viruses in water environments. Tohoku University Environmental Studies Seminar 2018 in Institut Teknologi Bandung, 2018.12.19, Institut Teknologi Bandung, Indonesia.

・Ken Ushijima Value flow analysis approach for local water management system. 3rd International Symposium on Green Technology for Value Chains 2018, 2018.11.01-2018.11.02, Tangerang, Indonesia.

・Mayu Ikemi The Effect of Government Projects on Water Supply Improvement and Local Residents'Efforts : A Case Study of Rural Senegal. 3rd International Symposium on Green Technology for Value Chains 2018, 2018.11.01-2018.11.02, Tangerang, Indonesia.

・Taro Yamauchi Influence of water, sanitation, and hygiene (WASH) on child health in an urban slum of Indonesia. 3rd International Symposium on Green Technology for Value Chains 2018, 2018.11.01-2018.11.02, Tangerang, Indonesia.

・Khac-Uan Do, Hidenori Harada, Izuru Saizen Application of sludge disintegration to improve biogas production from sludge wasted from wastewater treatment plants in Vietnam. The 3rd International Symposium on Conservation and Management of Tropical Lakes, 2018.09.27-2018.09.28, Phnom Penh.

・Ken Ushijima, Naoyuki Funamizu, Taro Yamauchi Water and Sanitation System For A Shrinking Society. World Social Science Forum 2018, 2018.09.25-2018.09.28, Kyushu University, Fukuoka, Japan.

・Syun-suke Kadoya, Syun-ichi Urayama, Takuro Nunoura, Masaaki Kitajima, Satoshi Okabe, Toyoko Nakagomi, Osamu Nakagomi, Daisuke Sano Neutral evolution rate of rhesus rotavirus. 13th International dsRNA Virus Symposium, 2018.09.24-2018.09.28, Houffalize, Belgium.

・Daisuke Sano Wastewater reclamation/reuse and antimicrobial resistance. Workshop for the Global Water Pathogen Project and WHO: The Action Plan on Antimicrobial Resistance and Water Environment, IWA World Water Congress & Exhibition 2018, 2018.09.16-2018.09.20, Tokyo Big Sight, Tokyo, Japan.

・Mohan Amarasiri, Masaaki Kitajima, Satoshi Okabe, Daisuke Sano Contribution of specific interactions between human enteric viruses and wastewater solids on virus removal. Technical Session for Water Reclamation for Non-potable Reuse, IWA World Water Congress & Exhibition 2018, 2018.09.16-2018.09.20, Tokyo Big Sight, Tokyo, Japan.

・Tim Julian, Hasitha S. K. Vithanage, Min Li Chua, Masataka Kuroda, Ana K. Pitol, Pham Hong Lien Nguyen, Robert Canales, Shigeo Fujii, Harada Hidenori High time-resolution simulation of E. coli on Vietnamese farmers' hands based on videography and environmental microbial sampling. Annual congress of the Swiss Society for Microbiology 2018, 2018.08.28, Lausanne.

- Nyambe S, Hayashi K, Zulu J, Yamauchi T The image of peri-urban sanitation and health through the eyes of the young: Understanding community sanitation and health in Lusaka, Zambia. Dry Toilet Conference 2018, 2018.08.22-2018.08.24, Hiedanranta, Tampere, Finland.
- Guizani Mokhtar, Hassan Hamidah, Nikiema Benedicte Carolle, Ito Ryusei, Funamizu Naoyuki Ammonia Diffusion through a semipermeable membrane during Forward osmosis process. Dry Toilet Conference 2018, 2018.08.22-2018.08.24, Hiedanranta, Tampere, Finland.
- Haruna Onodera, Ryusei Ito, Naoyuki Funamizu, Koichi Yamaki, Takayoshi Konishi Inactivation of SAP in disposable diapers by acid solutions. Dry Toilet Conference 2018, 2018.08.22-2018.08.24, Hiedanranta, Tampere, Finland.
- Takato Matsuda, Ryusei Ito, Guizani Mokhtar, Naoyuki Funamizu Foulant analysis of FO membrane used for urine concentration. Dry Toilet Conference 2018, 2018.08.22-2018.08.24, Hiedanranta, Tampere, Finland.
- Ken Ushijima, Dewi Nilawati, Diana Rahayuning Wulan, Jovita Tri Astuti, Neni Sintawardani, Mayu Ikemi, Naoyuki Funamizu Comprehensive approach for improvement of living environment in urban slum of Indonesia – Analysis on urban metabolism and its harmonization with people's value system. Dry Toilet Conference 2018, 2018.08.22-2018.08.24, Hiedanranta, Tampere, Finland.
- Hidenori Harada, Doris A. Mchwampaka, Shigeo Fujii Long-term acceptability of urinediversion toilets in rural Malawi. Dry Toilet Conference 2018, 2018.08.22-2018.08.24, Hiedanranta, Tampere, Finland.
- Ryusei Ito, Minami Fujioka, Naoyuki Funamizu Production of nitrogen and potassium fertilizers from liquid waste of cattle barns. Dry Toilet Conference 2018, 2018.08.22-2018.08.24, Hiedanranta, Tampere, Finland.
- Koji HAYASHI, Seiji NAKAO and Taro YAMAUCHI Defecation without toilets - Toward the study of sanitation activities in the hunter-gatherers. The Twelfth International Conference on Hunting and Gathering Societies (CHAGS 12), 2018.07.23-2018.07.27, The School of Social Sciences, Universiti Sains Malaysia, Penang, Malaysia.
- Taro Yamauchi Co-Creating the Sanitation Value Chain: Designing Sanitation Systems as Eco-Community-Value Systems. International Conference Society for Human Ecology, 2018.07.07-2018.07.10, Lisbon, Portgal.
- Takao SHIMIZU The Process for Co-Created Technology for Combat Desertification: Collaboration of African Farmers and Japanese Scientists. 30th annual Meeting, Society for the Advancement of Socio-Economics, 2018.06.22-2018.06.24, Doshisha University, Kyoto.
- Taro Yamauchi Co-creating the Sanitation Value Chain in Lusaka, Zambia by Designing Sanitation Systems as Eco-Community-Value Systems. Zambia Water Forum and Exhibition (ZAWAFE) 2018, 2018.06.11-2018.06.13, Government Complex, Lusaka, Zambia.
- Sikopo Nyambe, Koji Hayashi, Joseph Zulu,Taro Yamauchi Dziko Langa Kilo! A health living, I see you!: Incorporating children and youth in peri-urban sanitation and health in Lusaka. Zambia Water Forum and Exhibition (ZAWAFE) 2018, 2018.06.11-2018.06.13, Government Complex, Lusaka, Zambia.
- Nyambe S, Hayashi K, Zulu J, Yamauchi T Dziko Langa Kilo! A health living, I see you!: Incorporating children and youth in peri-urban sanitation and health in Lusaka. Zambia Water Forum and Exhibition (ZAWAFE) 2018, 2018.06.11-2018.06.13, Government Complex, Lusaka, Zambia.

【Poster Presentation】

- Min Li Chua, Hidenori Harada, Shigeo Fujii, Md. Nazmul Ahsan, Akira Sakai, Michiya Kodera, Shotaro Goto, Shohagi Rani Saha Comparison of fecal exposure assessment in living environment between boy, girl and male adult in a slum in Khulna city, Bangladesh. IWA World Water Congress & Exhibition, 2018.09.20, Tokyo.

【Invited Lecture / Honorary Lecture / Panelist】

- Daisuke Sano Water Infrastructure & Virus Evolution. Seminar on Water Infrastructure & Virus Evolution, 2019.02.25, Faculty of Engineering, National University of Singapore.
- Daisuke Sano Inactivation and removal of viruses: is this a matter of virus evolution?. 6th International Society for Food and Environmental Virology (ISFEV) Conference, 2018.10.07-2018.10.10, Arizona State University, Phoenix, USA.
- Tetsuya Kusuda Choice Methodology of Optimum Solution for Efficient Water Use. The Special Seminar in Ege University, 2018.09.26, Izmir, Turkey.
- Hidenori Harada Lessons learnt from long-term NSS and FSM experiences in Japan, Developments in Faecal Sludge Management and Non-sewered sanitation. IWA World Water Congress & Exhibition, 2018.09.18, Tokyo.

Core Program

Program Director: TANIGUCHI Makoto

○ Research Subject and Objectives

Mission

Based on the mission of RIHN and in order to execute the strategies and policies formulated by the Council for Research Strategy, the Core Program undertakes research on an ongoing basis. During Phase III (2016-2021) of RIHN, the Core Program will develop concepts and methodologies to solve global environmental problems in collaboration with society.

The Core Program develops comprehensive and systematic concepts and methodologies for transdisciplinary and interdisciplinary research. Core Projects produce conceptual and methodological frameworks together with RIHN Research Projects based on individual methods, techniques, and tools from the divisions in the RIHN Center. Core Projects collaborate with Research Projects, building on the case studies developed by these projects, and develop comprehensive and systematic methodologies beyond an individual Research Program or Project. Core Projects also deliver completed concepts and methodology to Research Programs and Projects, the RIHN Center, and related stakeholders.

○ Progress and Results in 2018

The Core Program affiliates two Core Projects, “Environmental traceability project (FR2-PI: Ichiro Tayasu)”and “Information Asymmetry Reduction in Open Team Science for Socio-environmental Cases (FR1-PL: Yasuhisa Kondo)”, and one Core FS, “Co-design and stakeholder engagement according to geographical scales (FS-leader: Yuko Onishi)”. The Core Program develops comprehensive and systematic concepts and methodologies for interdisciplinary and transdisciplinary research to solve global environmental problems in collaboration with society, which will be widely applicable to global environmental issues, and accessible to related stakeholders. One of the cities collaborating with the Core Projects is Ohno City and RIHN reached an agreement to establish the RIHN Liaison Office in Ohno City. This new office will become a shared-use facility for joint research.

The Core Projects produce conceptual-methodological frameworks together with Research Projects, based on individual methods/techniques/tools from the divisions in the RIHN Center. In the case of the “Traceability Core Project (PI: Tayasu)”, the conceptual framework of “trust” has been developing between scientists and non-scientists (governors and citizens) as well as between consumers and producers, based on stable isotope techniques from the RIHN Center. The Core Projects collaborate with Research Projects, building on case studies of these Projects, and developing comprehensive and systematic methodologies beyond Research Programs-Projects. The “Traceability Core Project (PI: Tayasu)” has been studying this framework of “trust” in the Research Projects “FEAST (program 3, PI: McGreevy)” for consumers and producers and “Nutrient Cycling (program 2, PI: Okuda)” for scientists and non-scientists. Core Projects will deliver completed concepts/methodology to Research Programs-Projects, RIHN Center, and related stakeholders at the end of project. The Traceability Core Project is now in the FR2 stage, therefore the final results of this Core Project are currently in progress.

“Open team Science Core Project (PI: Kondo)” has been studying this of “trust” in the Research Projects “Historical Climate Adaptation (program 1, PI: Nakatsuka)” and “Nutrient Cycling (program 2, PI: Okuda)”. Core Projects will deliver completed concepts/methodology to Research Programs- Projects, RIHN Center, and related stakeholders at the end of project. The Traceability Core Project is now in the FR1 stage, therefore the final results of this Core Project are currently in progress.

Other activities of the Core Program are **research developments,** including Core FSs developments. The Core Program organized four core program seminars for research developments through discussion of comprehensive and systematic concepts and methodologies. Seminars, including collaboration with RIHN Research Projects as well as with the RIHN Center, featured speakers with the potential to further RIHN’s innovation. In addition, international alliances such as with SRC (Stockholm Resilience Center), opened the possibility for disseminating and sharing the fruits of research results.

We have made the following 4 Core Program seminar:

16th (Dec. 26, 2018):

"Core FS workshop: Co-design and stakeholder engagement according to geographical scales" Yuko Onishi (FS-leader)

15th (Dec. 19, 2018):

"Discussion for the workshop in EREC 2019" Core program all member

We discussed how to make synergy of core program/projects with research projects and RIHN center.

14th (Oct. 16, 2018):

"Progress report from Environmental traceability Project" IchiroTayasu (FR2-PI)

"Progress report from Target of Open team science Project" Ysuhisa Kondo (FR1-PI)

"Research Strategy for Core Program and Future plans for core program research" MakotoTaniguchi (Core program director)

"Correspondence of Core program to SDGs workshop" MakotoTaniguchi (Core program director)

13th (Apr. 25, 2018):

"Core program seminar procedures in 2018" MakotoTaniguchi (Core program director)

"Target of Environmental traceability Project and collaboration with research programs and RIHN center" IchiroTayasu (FR2-PI)

"Target of Open team science Project and collaboration with research programs and RIHN center" Ysuhisa Kondo (FR1-PI)

○Project Members

Makoto TANIGUCHI (RIHN,Professor)
Ichiro TAYASU (RIHN,Professor)
Yasuhisa KONDO (RIHN,Associate Professor)

○ Future Themes

Future Plan

1) The Core Program will synthesize the Core Projects and Core FSs to create synergy in the program, and to identify gaps within the existing Core Projects and FSs.

2) The Core Program will work more closely with the strategies and policies formulated by the Council for Research Strategy of RIHN.

3) The Core Program will seek opportunities to apply the developing concepts and methodologies to other Research Projects with relevant stakeholders.

4) The Core Program will work more closely with international alliances related to “Humanity and Nature” such as the Future Earth alliance, Resilience alliance, and Sustainability alliance to disseminate the results of Core Projects.

●Achievements

○Papers

【Original Articles】

- Benz, S, A., Bayer, P., Hamamoto, H., Blum, P., Arimoto, H., Taniguchi, M. 2018 Anthropogenic heat input and resulting heat storage increase in the urban groundwater of Osaka, Japan. STOTEN(643):1127-1136.
- Burnett, K., Wada, C., Taniguchi, M. Sugimoto, R., Tahara, D. 2018 Evaluating tradeoffs between groundwater pumping for snow-melting and nearshore fishery productivity in Obama City, Japan. Water 10:1556. DOI:doi:10.3390/w10111556
- Lee S., Taniguchi, M., Choi, J.Y., Mohtar, R.H., Yoo, S.H. 2018 An Analysis of the Water-Energy-Food-Land Requirements and CO2 Emissions for Food Security of Rice in Japan. Sustainability 10:3354.
- Taniguchi, M., Masuhara, N., Teramoto, S. 2018 Tradeoffs in the water-energy- food nexus in the urbanizing Asia-Pacific Region. Water International 43(6):892-903. DOI:10.1080/02508060.2018.1516104

○Research Presentations

【Oral Presentation】

- Taniguchi, M., Lee, S., Masuhara, N. Multi-scale water-energy-food nexus. American Geophysical Union, 2018.12.13, Washington, D.C., USA.
- Taniguchi, M., Lee, S., Masuhara, N. Urban water-energy-food nexus. Urban Nexus workshop, 2018.11.05, Research Institute for Humanity and Nature, Kyoto.

・Taniguchi, M. Water-energy-food nexus. RIHN-SRC joint workshop, 2018.10.29, Stockholm Resilience Center, Stockholm, Sweden.

・Taniguchi, M., Lee, S., Masuhara, N. Groundwater-energy-food nexus for sustainability. RFG, 2018.06.17, Vancouver, Canada.

・Taniguchi, M. Groundwater-energy-food nexus for sustainability. European Geoscience Union, 2018.04.09, Vienna, Austria.

【Invited Lecture / Honorary Lecture / Panelist】

・Taniguchi, M. Water-Energy-Food Nexus; An integrated governance of resources, economy and environment for sustainability. 2019.03.14, Flinders University, Adelaide, Australia.

・Taniguchi, M. International Symposium on Resources Nexus. 2019.03.06, RIHN, Kyoto.

・Taniguchi, M. Multi-scale water-energy-food nexus in Asia. THA2019, 2019.01.24, Bangkok.

・Taniguchi, M. Sustainable groundwater management in Anthropocene. THA2019, 2019.01.23, Bangkok.

・Taniguchi, M. Water-energy-food nexus for sustainability. Nexus KAN Steering Committee Meeting, 2019.01.14, Paris.

・Taniguchi, M. Nexus-KAN,Strategy for SDGs in Asia. Science Council in Asia, 2018.12.07, Science Council in Japan.

・Taniguchi, M. Integrated Management of Energy, Water and Food Supplies in Asia: Understanding Synergies and Trade-offs of 'Nexus' in National and Regional Contexts. World Social Science Forum, 2018.09.25-2018.09.25, Fukuoka, Japan.

・Taniguchi, M., Lee, S., and Masuhara,N. Multi-scale water-energy-food nexus for sustainability. Korean Water-Energy-Food Nexus symposium, 2018.09.13-2018.09.13, Seoul National University, Korea.

・Taniguchi, M. Global Sustainability with Groundwater in Asia. Keynote Speech in Sustainable Development of Water Resources to Achieve Water Security and Sustainable Growth. 45th Conference of International Association of Hydrogeologists, 2018.09.11, Daejeon, Korea.

・Taniguchi, M. Multi-scale Water-Energy-Food Nexus for Sustainability. ISAP2018, 2018.07.18, Pacifico Yokohama 2018,7,18, Yokohama.

・Taniguchi, M. Water projects in RIHN, invited video presentation. Water Resilience Workshop, 2018.05.03, Stockholm Resilience Center, Stockholm, Sweden.

・Taniguchi, M. Historical literacy on hydrology with humanity and nature interaction. European Geoscience Union, 2018.04.12, Vienna, Austria.

Stage: Full Research

Project Name: Proposal and verification of the validity of isotope environmental traceability methodology in environmental studies

Project Leader: Ichiro Tayasu

○ Research Subject and Objectives

We consider that water security, food security and environmental security are fundamental to the sustainability of human society in a changing world. In this project, we hypothesize that environmental traceability is a key concept in solving environmental issues for various stakeholders. For example, one certainly refuses to drink well water if it is obvious that the water comes from polluted drainage. Environmental traceability is an extension of the metaphor. However, it is usual that cause-and-effect relationships or even correlations are unclear. Stable isotope ratios of elements, together with the concentrations of elements, can trace a matter flow, the environmental condition of sites, ecosystem structure and food products. Spatio-temporal variation of multiple isotope ratios can be used for studying the earth systems from local to global point of view. The information may serve as a key for local people to consider water security, food security and environmental security, which are fundamental for the sustainability of human society, in terms of global viewpoint. Multi-isotope approach has successfully been applied to many previous projects in RIHN. Furthermore, the fact that RIHN is equipped with advanced isotope ratio mass spectrometers and elemental analysis systems confirms the advantage of adopting the approach and developing a new type of application of isotope tools for transdisciplinary approach.

How to use the environmental traceability concept is a methodology that we seek to establish in this study. However, how to use the methodology in the transdisciplinary point of view is not well studied so far, and we hypothesize the process should be different among the stakeholders, especially “who” considered the approach is applicable to the environmental issue. “Multi-Isoscapes” (use of multiple elements and multiple isotope ratios, and GIS based mapping technique), interview, workshop and questionnaire are methods for adopting environmental traceability in a given environmental issue.

In this project, we test if the environmental traceability concept is valid in environmental studies, I) Effectiveness of the environmental traceability concept, and II) Comparison with food traceability. For the research I), we test if there are any differences among three types of initiatives, (1) decision makers (2) citizens, and (3) researchers, in transdisciplinary research process by using environmental traceability methodology. For the research II), we test if to what extent are the two types of “traceability concept” different between food traceability and environmental traceability.

○ Progress and Results in 2018

Using the basic structure of the questionnaire to evaluate the validity of the use of environmental traceability methodology, which was determined in the previous year (2017), we applied the questionnaires to the symposiums in (1) Chikusa river watershed in Hyogo prefecture, (2) Otsuchi Town in Iwate prefecture, and (3) Saijo City in Ehime prefecture. Also, in collaboration with e-REC project, we took questionnaire in a forum in (4) Silang-Santa Rosa watershed in the Philippines. Furthermore, in collaboration with FEAST project, we took (5) an online survey related to food traceability among two countries (China and Thailand).

(1) Symposium and the questionnaire in Chikusa river watershed, Hyogo

On the 17th June 2018, the Lions Clubs within Chikusa river watershed held “Chikusa river forum” in Sayo town, Hyogo. In this symposium, we showed the origin and movement of dissolved ions of Chikusa river using stable isotope techniques, and evaluated the validity of the use of environmental traceability methodology by a questionnaire. We collected 66 sheets, consisting the recovery rate of 61%.

(2) Symposium and the questionnaire in Otsuchi Town, Iwate

On the 1st December 2018, Otsuchi Town held a symposium entitled “Symposium for application of spring water in Otsuchi Town” in Otsuchi Town, Iwate cosponsored by Otsuchi Town and its board of education. In this symposium, we showed the origin and movement of groundwater and also migration of three-spined stickleback using stable isotope techniques, and evaluated the validity of the use of environmental traceability methodology by a questionnaire. We collected 31 sheets, consisting the recovery rate of 57%.

(3) Symposium and the questionnaire in Saijo City, Ehime

On the 3rd March 2019, Saijo City held a symposium entitled “Groundwater symposium in 2019” in Saijo City, Ehime. In this symposium, the researches to solve the salinization and nitrogen pollution of groundwater using ion concentrations and stable isotope techniques were introduced, and we evaluated the validity of the use of environmental traceability methodology by a questionnaire. We collected 237 sheets, consisting the recovery rate of 64%.

(4) Symposium and the questionnaire in watershed of Lake Laguna, Philippines (in collaboration with the e-REC project)

On the 8th November 2018, e-REC project and multi-stakeholders in the Philippines held a forum entitled “Santa Rosa Watershed Stakeholders Assembly” in Binan City, the Philippines. In this forum, scientific approaches to clarify river condition and also nitrogen pollution and the origin of nitrogen in groundwater were introduced, and we evaluated the ideas of participants toward scientific research and watershed conservation by a questionnaire. We collected 121 sheets, consisting the recovery rate of 67%.

(5) Online survey related to food traceability (in collaboration with the FEAST project)

We carried out online survey related to food traceability among two countries (China and Thailand) in collaboration with the FEAST project as a series of investigation from last year. In this survey, we set five sources of information on food (Farmers, the Government, Producer associations, Experts, and Consumers). The experts were defined as independent, neutral researchers who use environmental traceability methods to test and analyze foods. We made five kinds of labels which include information and the source of the information shown above. These labels were combined with each of four food types: daily foods (milk, cooking oil) and expensive foods (wine, honey), and asked about consumers’ trust. We will investigate differences in consumers’ trust among labels, among food types, and among countries.

About the other study sites, we have studied the origin and dynamics of dissolved ions (nitrate and sulfate) in Chikusa river watershed, Hyogo by collecting water samples in August 2018 and February 2019.

○Project Members

◎ TAYASU Ichiro	(Research Institute for Humanity and Nature,Professor,Developing environmental traceability methodology)
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SAKURAI Shinji	(Osaka Prefecture University,Lecture)
YOSHIOKA Yumi	(Shimane University,Assistant Professor)

○ Future Themes

To verify the validity of the isotope environmental traceability methodology in environmental studies, we need to compare and analyze the results among sites. We are planning to hold a workshop in collaboration with various stakeholders especiallyadministrative people and researchers to find connections between environmentally traceable tools and various environmental problems. Through these works, we will establish a web-page and make a final report as a product of our project. As research achievements, the results of questionnaire in a symposium will be submitted to an academic paper in social science, the results of research in Chikusa river watershed will be submitted to an academic paper in natural science. Furthermore, the result of online questionnaire in collaboration with FEAST project has been prepared for an academic paper in social science.

●Achievements

○Books

【Chapters/Sections】

・Mori S 2018 Utilization of Environmental Water Resources in the Reconstruction of Otsuchi Town After the 2011 Tsunami. . Endo A. and Oh T (ed.) The Water-Energy-Food Nexus. Global Environmental Studies. Springer Nature Singapore Pte Ltd, pp.175-193.

○Papers

【Original Articles】

・Kato Y, Kondoh M, Ishikawa NF, Togashi H, Kohmatsu Y, Yoshimura M, Yoshimizu C, Haraguchi TF, Osada Y, Ohte N, Tokuchi N, Okuda N, Miki T, Tayasu I 2018 Using food network unfolding to evaluate food-web complexity in terms of biodiversity: theory and applications. Ecology Letters 21:1065-1074.

・Kume M, Mori S, Kitano J, Sumi T, Nishida S 2018 Impact of the huge 2011 Tohoku-oki tsunami on the phenotypes and genotypes of Japanese coastal threespine stickleback populations. Scientific reports 8:1684.

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・Saitoh Y, Nakano T, Shin K-C, Matsubayashi J, Kato Y, Amakawa H, Osada Y, Yoshimizu C, Okuda N, Amano Y, Togashi H, Kurita Y, Tayasu I 2018 Utility of Nd isotope ratio as a tracer of marine animals: regional variation in coastal seas and causal factors. Ecosphere 9(8):e02365.

・Ishikawa NF, Chikaraishi Y, Takano Y, Sasaki Y, Takizawa Y, Tsuchiya M, Tayasu I, Nagata T, Ohkouchi N 2018 A new analytical method for determination of the nitrogen isotopic composition of methionine: its application to aquatic ecosystems with mixed resources. Limnology and Oceanography. Methods 16(9):607-620.

○Research Presentations

【Oral Presentation】

・ Ichiro Tayasu “Current topics of Environmental Isotope Study in RIHN”. 8th Symposium on Environmental Isotope Study, 2018.12.21, RIHN, Kyoto.

・Hiroyuki Sase, Tsuyoshi Ohizumi, Takanori Nakano, Ichiro Tayasu, Masayuki Morohashi, Masaaki Takahashi, Naoyuki Yamashita, Yayoi Inomata, Tatsuyoshi Saito, Ki-Cheol Shin, Shiho Yabusaki “Application of the multi-isotopic analysis to the monitoring samples on transboundary air pollution and acid deposition”. 8th Symposium on Environmental Isotope Study, 2018.12.21.

・Ken’ichi Ohkushi, Ichiro Tayasu, Lei Fujiyoshi, Yabusaki Shiho, Ki-Cheol Shin, Tadashi Yokoyama, Hiromune Mitsuhashi, Kazuki Yasugi, Fumiko Furukawa, Masayuki Itoh “δ2H and δ18O results in the Chikusa River”. 8th Symposium on Environmental Isotope Study, 2018.12.21, RIHN, Kyoto.

・Shiho Yabusaki, Makoto Taniguchi, Ichiro Tayasu, Tomoya Akimichi, Noboru Ohomori, Ken Goto, Hitoshi Watanabe, Souichirou Watanabe “Study on groundwater flow system at Oshino Village in Yamanashi Prefecture— Report 4. Continuous observation of water temperature and EC on the Oshino-Hakkai from August to September, 2018 －”. 8th Symposium on Environmental Isotope Study, 2018.12.21, RIHN, Kyoto.

・Keisuke Kishimoto, Katsuyuki Yamashita, Osamu Okano, Hitoshi Chiba, Takanori Nakano “Water quality survey at Ono city, Fukui Prefecture”. 8th Symposium on Environmental Isotope Study, 2018.12.21, RIHN, Kyoto.

・Minoru Tokumasu, Ki-Cheol Shin, Yoshihiro Yamada “Origin of Saijo plain surface water analyzed from antimony”. 8th Symposium on Environmental Isotope Study, 2018.12.21, RIHN, Kyoto.

・Lei Fujiyoshi, Ichiro Tayasu, Shiho Yabusaki, Takashi Haraguchi, Chikage Yoshimizu, Kenichi Ohkushi, Fumiko Furukawa, Masayuki Itoh, Yudai Yamamoto, Tadashi Yokoyama, Hiromune Mitsuhashi “Dynamics of sulfate and nitrate inferred from stable isotope techniques in Chikusa river watershed, Hyogo Prefecture” . 8th Symposium on Environmental Isotope Study, 2018.12.21, RIHN, Kyoto.

・Kazuki Iwasa, Yoriko Yokoo, Chiharu Takeuchi, Miho Kawashima, Ichiro Tayasu “Sulfur isotope ratios of sulfate in Maruyama River”. 8th Symposium on Environmental Isotope Study, 2018.12.21, RIHN, Kyoto.

・Yoshitoshi Uehara, Osbert Leo A. Privaldos, Ria A. Rambino, Ken’ichi Osaka, Satoshi Asano, Rei Fujiyoshi, Yoshimizu Chikage, Takuya Ishida, Ichiro Tayasu, Adelina C. Santos-Borja, Noboru Okuda “How can we use stable isotope information for Transdisciplinary Research?-Case study for groundwater research in Silang Santa Rosa watershed in Philippines-“. 8th Symposium on Environmental Isotope Study, 2018.12.21, RIHN, Kyoto.

・Yunosuke Goto, Kiyoaki Kawai, Yasuharu Takashima, Ki-Cheol Shin, Ichiro Tayasu “Determination of the geographic origin of Welsh onion（Allium fistulosum L.）by Sr and Pb isotope ratio analysis”. 8th Symposium on Environmental Isotope Study, 2018.12.21.

・Christoph Rupprecht, Lei Fujiyoshi, Steven Mcgreevy, Ichiro Tayasu “Consumer trust in expert product labels: preliminary results of a five-country survey”. 8th Symposium on Environmental Isotope Study, 2018.12.21, RIHN, Kyoto.

・Hidetoshi Someda, Takashi Gakuhari, Ki-Cheol Shin, Ichiro Tayasu, Yasushi Kobayashi, Minoru Yoneda, Hajime Ishida “Estimation of geographic origin based on elementary analysis in human hard tissue 5th Report: Trial application of oxygen, carbon and sulfur isotope analysis in collagen for discriminating between Pilipino, Japanese and American”. 8th Symposium on Environmental Isotope Study, 2018.12.21, RIHN, Kyoto.

・Ichiro Tayasu “Use of multi-isotope ratios to study ecological and environmental science” . 6th Taiwan-Japan Ecology Workshop, 2018.11.24, National Cheng Kung University,Taiwan.

・Lei Fujiyoshi, Ichiro Tayasu, Shiho Yabusaki, Takashi Haraguchi, Chikage Yoshimizu, Kenichi Ohkushi, Fumiko Furukawa, Masayuki Itoh, Yudai Yamamoto, Tadashi Yokoyama, Hiromune Mitsuhashi “Dynamics of nitrate and sulfate inferred from stable isotope techniques in Chikusa river watershed, Hyogo Prefecture”. Symposium on Management of Land and Water Resources: Studies in Europe and Asia., 2018.11.22, Yamagata University, Yamagata.

・Nobuhito Ohte, Ken’ichi Osaka, Kazuo Isobe and Ichiro Tayasu “From leaves to lakes: Revealing the nitrogen dynamics in catchment ecosystems using stable isotope techniques” . The 17th World Lake Conference., 2018.10.18.

・Osbert Leo A. Privaldos, Ken’ichi Osaka, Yoshitoshi Uehara, Asano Satoshi, Lei Fujiyoshi, Chikage Yoshimizu, Ichiro Tayasu, Adelina C. Santos-Borja, Maria Pythias B. Espino, Noboru Okuda “Identification of nitrate sources in ground waters of Silang-Sta. Rosa subwatershed: an application of denitrifier method” . The 17th World Lake Conference, 2018.10.16.

・Noboru Okuda, Irisse Bianca De Jesus, Osbert Leo A. Privaldos, Tomoya Iwata, Yoshitoshi Uehara, Takuya Ishida, Satoshi, Asano, Ken’ichi Osaka, Lei Fujiyoshi, Chikage Yoshimizu, Ichiro Tayasu, Jonathan Carlo A. Briones, Francis S. Magbanua, Maria Pythias B. Espino, Adelina C. Santos-Borja, Rey Donne S. Papa “Nutrient cycling in the Laguna de Bay Watershed, the Philippines, in comparison with the Lake Biwa Watershed, Japan”. 2018 Japanese Association of Hydrological Sciences, 2018.10.13, RIHN, Kyoto.

- Sase, H., Morohashi, M., Takahashi, M., Saito, T., Yamashita, N., Inomata, Y,. Ohizumi, T., Shin, K-C., Tayasu, I. and Nakano, T. “Multi-isotopic approach for monitoring on atmospheric deposition in forests in Japan” . 7th ICP Forests Scientific Conference "Air pollution, climate change and forest ecosystems: Evidence for effects, adaptation, and mitigation strategies", 2018.05.22, Riga, Latvia.
- Ichiro Tayasu, Lei Fujiyoshi, Shiho Yabusaki, Ki-Cheol Shin, Takanori Nakano, Makoto Taniguchi “Multi-Isoscape approach to realize environmental traceability”. JpGU Meeting 2018, 2018.05.22, Makuhari-Messe, Chiba.
- Takashi F Haraguchi, Ryosuke Koda, Ichiro Tayasu “Evaluating the utility of nitrogen stable isotope measurements of feces as an indicator of crop damaging sika deer”. JpGU Meeting 2018, 2018.05.22, Makuhari-Messe, Chiba.
- Yoshikazu Kato, Noboru Okuda, Chikage Yoshimizu, Ichiro Tayasu “Biological specimens reveal centurial tropho-dynamics of predatory fishes”. JpGU Meeting 2018, 2018.05.22, Makuhari-Messe, Chiba.
- Shiho Yabusaki, Makoto Taniguchi, Ichiro Tayasu, Tomoya Akimichi, Noboru Ohomori, Ken Gotou, Hitoshi Watanabe, Souichirou Watanabe “Study on groundwater flow system at Oshino Village in Yamanashi Prefecture – Report 3. Characteristics of groundwater flow at Oshino Village by using observations of 2017” . JpGU Meeting 2018, 2018.05.22, Makuhari-Messe, Chiba.
- Lei Fujiyoshi, Kenichi Ohkushi, Yudai Yamamoto, Ichiro Tayasu, Tadashi Yokoyama, Hiromune Mitsuhashi, Fumiko Furukawa, Masayuki Itoh “Dynamics of dissolved ions inferred from sulfur isotope ratio of sulfate, nitrogen and oxygen isotope ratios of nitrate in Chikusa river watershed, Hyogo”. JpGU Meeting 2018, 2018.05.22, Makuhari-Messe, Chiba.
- Ken'ichi Ohkushi, Ichiro Tayasu, Shiho Yabusaki, Fujiyoshi Lei, Yudai Yamamoto, Takanori Nakano, Ki-Cheol Shin, Tadashi Yokoyama, Hiromune Mitsuhashi, Masayuki Itoh “Characteristics of H and O stable isotopic composition in the Chikusa River”. JpGU Meeting 2018, 2018.05.22, Makuhari-Messe, Chiba.
- Akira Ushikawa, Kenichirio Sugitani, Mariko Yamamoto, Koshi Yamamoto, Kazuyuki Muraoka, Jyunichi Kitamura, Tamihisa Ohta, Takashi Haraguchi, Ichiro Tayasu “Carbon and nitrogen isotope ratios and diets of Corbicula japonica and Corbicula leana in the Harai River (a branch river of the Kushida River, Mie Prefecture, central Japan) with rich riparian forests” . JpGU Meeting 2018, 2018.05.22, Makuhari-Messe, Chiba.
- Kai Nils Nitzsche, Yoshikazu Kato, Ki-Cheol Shin, Ichiro Tayasu “Understanding bioaccumulation of metals by aquatic organisms in streams of different bedrock geology using Sr and Mg isotopes”. JpGU Meeting 2018,, 2018.05.22, Makuhari-Messe, Chiba.
- Noboru Okuda, Takuya Ishida, Yoshitoshi Uehara, Tohru Ikeya, Satoshi Asano, Tomoya Iwata, Chia-Ying Ko, Elfritzson Peralta, Osbert Leo Privaldos, Irisse Bianca B. De Jesus, Ellis Mika Triño, Ken-ichi Osaka, Ichiro Tayasu “Biodiversity and phosphorus cycling in the river ecosystem”. JpGU Meeting 2018, 2018.05.21, Makuhari-Messe, Chiba.
- Osbert Leo Alcantara Privaldos, Ken'ichi Osaka, Yoshitoshi Uehara, Asano Satoshi, Lei Fujiyoshi, Chikage Yoshimizu, Ichiro Tayasu, Adelina C. Santos-Borja, Maria Pythias B. Espino, Noboru Okuda “Nitrate Dual-Stable Isotope Analysis Identifies Sources of Groundwater Nitrogen Pollution in the Silang-Sta. Rosa Subwatershed of Laguna de Bay”. JpGU Meeting 2018, 2018.05.21, Makuhari-Messe, Chiba.
- Tohru Ikeya, Takuya Ishida, Yoshitoshi Uehara, Satoshi Asano, Noboru Okuda, Masayuki Ushio, Shohei Fujinaga, Yuki Kobayashi, Ko Chia-Ying, Peralta Martin Elfritzson, Ichiro Tayasu, Tomoya Iwata “The examination of environmental factors on the community composition of riverine bacteria and microalgae in an epilithon during irrigation season in the Yasu River, Japan”. JpGU Meeting 2018, 2018.05.20, Makuhari-Messe, Chiba.

Stage: Full Research

Project Name: Information Asymmetry Reduction in Open Team Science for Socio-environmental Cases

Project Leader: KONDO Yasuhisa

Core Program

URL: https://openteamscience.jp/en/

○ Research Subject and Objectives

Problem, background, and objectives

Social issues caused by environmental deterioration present complex and multidimensional problems for science. To approach them, solution-oriented research has involved research experts from different domains (interdisciplinarity) and also practitioners such as governments, funders, industries, non-profit organizations, and civil members (transdisciplinarity). However, such team science is often disrupted by asymmetric information, knowledge, wisdom, value, socio-economic status, and power among actors. This Core Project, also called the Open Team Science (hereafter OpenTS) Project, develops a methodology to reduce (rather than dissolve) such socio-psychological asymmetry for the sake of more efficient transdisciplinary (TD) collaboration.

Methodology, structure, and schedule

To develop the methodology, this project interlinks the concept of open science as an open scientific knowledge production system with a TD approach to boundary spanning by transforming in-between spaces into "our" epistemic living spaces. Technically, boundary spanning can be achieved by a combination of (1) discovering and sharing the goals that actors with different interests can tackle together (transcending); (2) considering ethical equity, with special attention to empowering marginalized (or "small voice") actors; (3) developing fair data visualization based on the FAIR (findable, accessible, interoperable, and reusable) principles; and (4) facilitating dialogue. Civic Tech can be applied as a holistic approach. It is an open governance approach in which civic engineers develop a solution to local issues by using open governmental data and information and communication technologies.

As a working hypothesis, the proposed methodology is cyclically assessed and improved through practical case studies of community-based participatory research (CBPR) projects for socio-environmental issues (the hypothesis-practice-assessment cycle), with special interest in developing a method to measure participants' perceptual transformation.

The OpenTS Project is a three year project. During the first half of this period, we review case studies to develop the methodology and measurements, which are further tested by practical case studies during the second half.

Expected results

At the completion of the project, we expect to establish the OpenTS methodology by successfully interlinking open science and TD theories, with new knowledge about effective (and ineffective) combinations of visualization and dialogue tools, and with qualitative and quantitative methods to measure the effect of boundary spanning.

Project organization, membership, and collaboration with RIHN Research Projects

The organization of this Core Project is largely divided into the Research Group and the Practice Group, although boundary between (sub-)groups is loosely set in order to promote synergistic collaboration. The project consists of one project leader, six core members, eighteen regular members, four advisory members, two advisors, and two supporting staff members. Another five associate members will eventually participate in meetings and online discussions.

The Research Group is developing the OpenTS theory through an interdisciplinary review of member's case studies from the multifaceted viewpoints of philosophy, ethics, anthropology, social psychology, ecology, sustainability science, science and technology for society, open science theory, the science of team science (SciTS), and science communication, in an ad-hoc collaboration with the Historical Climate Adaptation, Sanitation, and FEAST Projects. The Practice Group focuses on waterweed recycling in the catchment of Lake Biwa, Japan, in a regular collaboration with the Ecological Recycling (e-Rec) Project, and on community-based built heritage management in Oman.

Contribution to the Core Program

The OpenTS Project contributes to the Core Program by developing the above-mentioned hypothesis-practice-assessment cycle as a common methodology of the Program, in collaboration with the Environmental Traceability Project. Moreover, the

conceptual importance of openness, fairness, and equity in the TD process has been recognized through the methodological development.

Application of the theory and methodology after Core Project

As an academic output, this Core Project will publish a mini book and portal website on OpenTS methodology, targeting early career researchers and practitioners, as well as peer-reviewed articles in international journals. These publications are released with an open-source license.

The project has two major interfaces of social outputs. The Research Group will make suggestions for national and international open science policies, while the Practice Group will contribute to community-based policymaking and social startups for the sustainable waterweed recycling in Lake Biwa and built heritage management in Oman.

At the RIHN, the OpenTS methodology developed by this Core Project will be inherited by upcoming research projects through the activities of the RIHN Center, which will disseminate OpenTS as a new research paradigm for transformative social-issue-oriented research.

○ Progress and Results in 2018

During the FR1 period, the project members concentrated on improving the OpenTS methodology by reviewing the literature and cases and by establishing international research partnerships as the External Research Evaluation Committee (EREC) suggested. Through participation in the SESYNC Boundary Spanning Symposium, the intensive joint research by Kondo, Miyata, and Vienni, and a series of project workshops, the core concepts of this Core Project, including "in-between spaces" and "transcending," were compared with the international literature and improved as follows.

While the current open science policy emphasizes open scientific knowledge, the OpenTS underlines open scientific knowledge production system and boundary spanning, particularly between the research community and society (Figure 1, top). Here, it has been noted that the term "open" includes a sense of inclusiveness as Civic Tech does, rather than the technical definition by which "knowledge is open if anyone is free to access, use, modify, and share it". The questionnaire surveys revealed that anxiety about involuntary use and exposure of "inconvenient truths" is the most serious barrier to open research data, particularly for early career researchers, who are exposed to tough job competition, because in their view, data are their exclusive resource for survival in academia. Consequently, the above-mentioned FAIR principle is applied as a realistic solution. Since knowledge production is the essence of scientific research, an open scientific knowledge production system, as well as opening up research data, information, and knowledge, may also contribute to boundary spanning by reducing asymmetries in the understanding of issues. Boundary spanning between the research community and society is on aspect of the TD approach. For boundary spanning, it is important to understand one's own epistemic living spaces and the in-between spaces between oneself and others, to recognize "our" living space, including others' spaces.

In order to achieve boundary spanning, transcending—discovering and sharing the goals that actors with different interests can tackle together—will be necessary, rather than aiming for simple diversion to avoid intractable conflicts. To this end, the status of each actor's understanding of the issue are visualized, and dialogue between actors are facilitated, while considering ethical equity and with special attention to empowering marginalized (or "small voice") actors. The effects of the graphic facilitation (Figure 1, d), in which conversation is depicted using graphics as it proceeds, are to be studied.

With regard to the practical application of the methodology to the waterweed issue in the catchment of Lake Biwa (Figure 1, a), four workshops were held, in collaboration with RIHN's Ecological Recycling Project, between November 2017 and August 2018, with the participation of local residents, governmental officers, and civic engineers (Figure 1, c). These workshops yielded concrete ideas for solutions such as making a herbarium with endemic species of waterweed.

The workshops also revealed the necessity of a value change so that an increasing number of people who would want waterweed compost, and the importance of a point system to acknowledge those who removed drifted waterweed (Figure 1, b) and made compost. These ideas and concepts were converged to develop a portal website on local social and environmental information about Lake Biwa, into which news and updates on waterweed recycling are embedded. Through the workshops and subsequent business meetings for development of the portal website, progress was clearly made in community building to scale up the waterweed compost recycling to a regional business. It is also notable that a suggestion from the project was reflected in the ecological conservation plan of Shiga Prefecture (Mother Lake 21 Plan Phase 2) in 2018.

○Project Members

◎ KONDO, Yasuhisa	(Research Institute for Humanity and Nature,Associate Professor,Coordination & Synthesis)
○ KUMAZAWA, Terukazu	(Research Institute for Humanity and Nature,Associate Professor,Meta-analysis (satoyama conservation in Kizugawa))
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○ KANO, Kei	(Shiga University,Associate Professor,Theory (science & policy communication))

○ NAKASHIMA, Ken'ichiro	(Hiroshima University,Associate Professor,Theory (social psychology))
○ ONISHI, Hideyuki	(Doshisha Women's College of Liberal Arts,Professor,Meta-analysis (heritage conservation & tourism))
○ NAKAHARA,Satoe	(Research Institute for Humanity and Nature,Researcher,Meta-analysis (waterweed in Lake Biwa))
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SATO Ken`ichi	(Faculity of Life Science, Kyoto Sangyo University NPO Hatenathon co-creative lab,Professor President,Visualization (Hatenathon))
SHIMOYAMA Sayoko	(LinkDate.org,Representative director,Meta-analysis (civic tech))
SEKINO, Tasuki	(International Research Center for Japanese Studies,Professor,Visualization (object-activity diagram))
TAYASU, Ichiro	(Research Institute for Humanity and Nature,Professor,Meta-analysis (isotope knowledge for society))
NAKATSUKA Takeshi	(Research Institute for Humanity and Nature,Professor,Meta-analysis (environmental change and society))
HAYASHI Kengo	(Institute of Industrial Science, the University of Tokyo,Lecturer,Meta-analysis (built heritage in Oman))
HAYASHI Koji	(Research Institute for Humanity and Nature,Researcher,Meta-analysis (small-scale water supply in Furano))
HAYASHI, Kazuhiro	(National Institute of Science and Technology Policy,Senior Research Fellow,Policy communication (open science))
FUKUNAGA Mayumi	(Graduate School of Frontier Sciences,the University of Tokyo,Associate professor,Theory (environmental ethics))
FUJISAWA Eiichi	(Ohmi DI Corporation Code for Shiga/Biwako,CEO and President Representative,Meta-analysis (waterweed in Lake Biwa))
MIYATA,Akihiro	(Graduate School of Arts and Sciences, the University of Tokyo,PhD student,Theory (philosophy))
MURAYAMA, Yasuhiro	(National Institute of Information and Communications Technology,Director,Policy communication (open science))
YAMAUCHI,Taro	(Research Institute for Humanity and Nature,Professor,Meta-analysis (sanitation in Zambia))
BENKARI, Naima	(College of Engineering,Sultan Qaboos University,Assistant Professor,Meta-analysis (built heritage in Oman))
Vienni Baptista,Bianca	(ETH Z?rich TD Lab,Postdoctoral Researcher,Theory (transdisciplinarity))

○ Future Themes

This Core Project has been more feasible than the previous form through the reformation in response to the following comments from the EREC 2017.

● What is to be researched did not become very clear... some Committee members were left wondering what the ultimate goal of the project is.

Keep in mind that this is a meta-research project, focusing on scientists' stewardship to others and society. The ultimate goal is to establish the transdisciplinary team science methodology based on the open science paradigm under which scientific research is conducted open by default.

● The project still needs to develop greater conceptual depth by clearly distinguishing knowledge and information and by considering values.

This Core Project applies the data-information-knowledge-wisdom model proposed by Bellinger et al. (2004). Values and socioeconomic status have been taken into account in the information asymmetry reduction model.

● Exactly what kind of gaps are to be bridged?

The information asymmetry in understanding the focal issues and other actors.

● The approach seems to lead to a relatively mechanistic view of communication.

The measurement targets the mental effects of information asymmetry reduction.

● The references to other projects were stated but sounded rather random.

Release of domination has been identified as a common meta-issue in information asymmetry reduction. This is realised by switched explanation in the pair of ID projects and by community empowerment in the TD and transitional projects.

● Overcoming knowledge information gap among actors should be approached both from researcher side and non-researcher side.

● How to define and evaluate the information gap? Who make the evaluation, who has the right and position to judge it?

The focus of this Core Project has been shifted to measuring the effects of information asymmetry reduction from both researcher and non-researcher sides.

● The project should not only focus on the Japanese culture but should simultaneously on Western culture.

To this end, this Core Project seeks collaborations with the stewardship team (Maria Tengö et al.) from the Stockholm Resilience Centre, the US National Socio-Environmental Synthesis Center (SESYNC), and other relevant institutes.

● There is a big gap between what is translated into English and what the presenter really meant in Japanese. A very serious coaching is needed to make this project fundable.

Professor Hisae Nakanishi is consulting on this year's proposal. English wording has been checked by Steven McGreevy.

●Achievements

○Books

【Chapters/Sections】

- Meddah, M.S., Benkari, N., Al-Busaidi, M 2019,02 Potential Use of Locally and Traditionally Produced Bending Construction Material. IOP Conf. Ser.: Mater. Sci. Eng. DOI:10.1088/1757-899X/471/4/042008
- Vienni, B. and C. Hidalgo 2018,07 Encrucijadas interdisciplinarias: cruces y encuentros en América Latina (Interdisciplinary crossroads: exchanges and encounters in Latin America). Encrucijadas interdisciplinarias. , In: Hidalgo, pp.5-12. (Other)
- Simon, C, B. Vienni, J. Taks and G. Cruz 2018,07 Aportes interdisciplinarios para el caso de estudios de la sequía agronómica en Uruguay. , In: Hidalgo, pp.31-46. (Other)

○Editing

【Editing / Co-editing】

- Yoshihiro Nishiaki, Seiji Kadowaki, Yasuhisa Kondo (ed.) 2018,12 PaleoAsia 2018 The International Workshop: Cultural History of PaleoAsia – Integrative Research on the Formative Process of Modern Human Cultures in Asia. PaleoAsia Project Series, 17. PaleoAsia Project Group, Tokyo, 112pp.
- Vienni, B (ed.) 2018,11 Interdisciplina y Transdisciplina. Revista ClimaCom, Brazi,
- Hidalgo, C; B. Vienni and C. Simón (ed.) 2018,09 Encrucijadas interdisciplinarias(Interdisciplinary crossroads). Colección Ciencia y Sociedad. Editorial CICCUS, Buenos Aires,Argentina, (Other) http://www.ciccus.org.ar/ed/book/encrucijadas-interdisciplinarias/
- Tara Beuzen-Waller, Friederike Stock, Yasuhisa Kondo Tara Beuzen-Waller, Friederike Stock, Yasuhisa Kondo eds. (ed.) 2018,07 Geoarchaeology: A toolbox for revealing latent data in sedimentological and archaeological records. Quaternary International, 483. Elsevier, Amsterdam, 210pp.

○Papers

【Original Articles】

- Yasuhisa Kondo; Atsushi Noguchi; Takehiro Miki; Tara Beuzen-Waller; Stéphane Desruelles; Éric Fouache 2018,09 Archaeological sites in the Wilayat Ibri, Adh Dhahirah Governorate. The Journal of Oman Studies 18:201-227. (reviewed).
- Vienni, B 2018,11 La institucionalización de la investigación inter- y transdisciplinaria: algunas experiencias del Desarrollo (Interdisciplinary and transdisciplinary institutionalization: some experiences from Development). Dossier Interdisciplina and Transdisciplina. Revista ClimaCom. (Other) (reviewed). Original Research
- Goñi, M., B. Vienni,F. Ferrigno 2018,11 Modalidades de trabajo en equipos interdisciplinarios: formatos, conceptos y dificultades. Una mirada desde Uruguay (Working modalities in interdisciplinary teams: formats, concepts and difficulties. A perspective from Uruguay). Dossier Interdisciplina and Transdisciplina. Revista ClimaCom. (Other) (reviewed). Original Research
- Kudo, M., Yoshizawa, G. and Kano, K. 2018,10 Engaging with policy practitioners How to cite to promote institutionalisation of public participation in science, technology and innovation policy. JCOM 17(04). DOI: 10.22323/2.17040801 (reviewed).
- Tatsuki Sekino 2018,10 Representation and comparison of uncertain temporal data based on duration. Proceedings of the 2018 Pacific Neighborhood Consortium Annual Conference and Joint Meetings . DOI:10.23919/PNC.2018.8579465 (reviewed).
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- Yasuhisa Kondo,Kazuhiro Hayashi,Asanobu Kitamoto 2018,07 Multifaceted workshops to envision the future of open science with society. Proceedings of 2018 7th International Congress on Advanced Applied Informatics:466-469. (reviewed).
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○Research Presentations

【Oral Presentation】

- ŌNISHI, Hideyuki Hybridization of two different cultural groups in the Ainu history. PaleoAsia2018 International Workshop: Cultural History of PaleoAsia-Integrative Research on the Formative Processes of Modern Human Cultures in Asia, 2018.12.15-2018.12.18, Kyoto, Japan.
- Satoe Nakahara Perceptions of the Radiation Disaster from H-bomb Testing in the Marshall Islands. 40th UGAT Annual Conference an International Gathering, 2018.11.08-2018.11.10, Puerto Princesa, Philippines.
- Satoe Nakahara The Ethics of Field Work with Rongelap Exposed to Radiation of H-Bomb Testing: Why Did the Rongelap People Refuse Money from Research Fund?". 18th International Union of Anthropological and Ethnological Sciences (IUAES) World Congress, 2018.07.14-2018.07.20, Florianópolis, Brazil.
- Kondo, Yasuhisa and Hideyuki ONISHI Lexical analysis of the concept of culture in the PaleoAsia project. PaleoAsia2018 International Workshop: Cultural History of PaleoAsia- Integrative Research on the Formative Processes of Modern Human Cultures in Asia, 2018.12.16-2018.12.18, 京都市.
- Akira Saito, Yasuhisa Kondo, Nozomi Mizota, Tomoko Koyama Contribution of the digital humanities methods to the construction of an overall picture of Francisco de Toledo's reducciones. 56° Congres Internacional de Americanistas, 2018.07.15-2018.07.20, Salamanca, Spain.
- Tatsuki Sekino Representation and Comparison of Uncertain Temporal Data based on Duration. Pacific Neighborhood Consortium Annual Conference 2018, 2018.10.27-2018.10.30, San Francisco, USA.

・Yasuhisa Kondo Interlinking open science to community-based participatory research for socio-environmental cases. The 3rd International Symposium on Decision Science for Future Earth: Transdisciplinary Science in Practice, 2018.09.24, 福岡県福岡市.

・Tatsuki Sekino HuTime Tutorial. The 3rd International Workshop on the Academic Asset Preservations and Sharing in Southeast Asia. 2018.08.23-24, INTEKMA Resort & Convention Center, 2018.08.23-2018.08.24, Shah Alam, Slangor Darul Ehsan, Malaysia.

・Yasuhisa Kondo, Kazuhiro Hayashi, Asanobu Kitamoto Contribution of the digital humanities methods to the construction of an overall picture of Francisco de Toledo's reducciones. IIAI AAI 2018, 2018.07.08-2018.07.13, 米子.

・ŌNISHI, Hideyuki Ainu historical heritage as common property of the local community. CHAGS (Conference on Hunting and Gathering Societies)XII Universiti Sains Malaysia, July 2018, Pulau Pinang, Malaysia.

・Meddah, M. S., Benkari, N., Al-Busaidi, M Potential Use of Locally and Traditionally Produced Bending Construction Material. 3rd World Multidisciplinary civil Engineering-Architecture-Urban planning symposium (WMCAUS) 2018, 2018.06.18-2018.06.22, Prague, Czech Republic.

・Yasuhisa Kondo, Ge Wang, Ui Ikeuchi, Kei Kano, Terukazu Kumazawa, Ken'ichiro Nakashima, Hideyuki Onishi, Takeshi Osawa, Tatsuki Sekino A new team-based research methodology for socio-environmental cases in the open science era. 日本地球惑星科学連合 2018 年大会, 2018.05.20-2018.05.24, 千葉市.

・Tatsuki Sekino Linked open data about calendrical periods. International Workshop on Spatio-Temporal Knowledge, May 2018, Taiwan.

【Poster Presentation】

・Yasuhisa Kondo, Yoko Iwamoto Network analysis of the interdisciplinary co-authorship of the PaleoAsia project. PaleoAsia 2018 International Workshop, 2018.12.15-2018.12.18, Kyoto International Conference Center and Research Institute for Humanity and Nature (Kyoto, Japan).

・Yasuhisa Kondo, Hideyuki Onishi, Yoko Iwamoto Lexical analysis of the concept of culture in the PaleoAsia project. PaleoAsia 2018 International Workshop, 2018.12.15-2018.12.18, Kyoto International Conference Center and Research Institute for Humanity and Nature (Kyoto, Japan).

・Yasuhisa Kondo, Ge Wang, Ui Ikeuchi, Kei Kano, Terukazu Kumazawa, Ken'ichiro Nakashima, Hideyuki Onishi, Takeshi Osawa, Tatsuki Sekino Information asymmetry reduction in open team science: call for international collaborators. SESYNC 2018 Boundary Spanning Symposium, 2018.06.11-2018.06.13, Annapolis, MD, USA.

・Yasuhisa Kondo, Ge Wang, Ui Ikeuchi, Kei Kano, Terukazu Kumazawa, Ken'ichiro Nakashima, Hideyuki Onishi, Takeshi Osawa, Tatsuki Sekino Information asymmetry reduction in open team science: call for international collaborators. SESYNC 2018 Boundary Spanning Symposium, 2018.06.11-2018.06.13, Annapolis, MD, USA.

【Invited Lecture / Honorary Lecture / Panelist】

・Yasuhisa Kondo Interlinking open science to community-based participatory research for socio-environmental cases. The 3rd International Symposium on Decision Science for Future Earth: Transdicsiplinary Science in Practice, 2018.09.24, JR Hakata City Conference Center.

・ŌNISHI, Hideyuki . Long-Term History on Ecological-Cultural Diversity in Northeast Asia Discussant Regional Structure and Its Change in Northeast Asia: In Search of the Way to Coexist from the Point of View of Transborderism, September 2018, Osaka, Japan.

・Satoe Nakahara The Importance of Knowledge and Social Network in the Community Reconstruction after Atomic Bomb Testing in the Marshall Islands. 2018 Nuclear Security Summit, 2018.12.11-2018.12.12, Washington DC, US.

・Yasuhisa Kondo Data-driven approach to identify early modern humans' ecological niche and optimal dispersal routes in Eurasia. Landscape Archaeology Conference 2018, 2018.09.17-2018.09.20, Newcastle, UK.

・Vienni, B Experiencias y desafíos de la institucionalización de la interdisciplina en América Latina. Instituto Integración del Saber, Universidad Católica de Argentina, 2018.10.17, Buenos Aires, Argentina. (Other)

・Vienni, B Challenges of interdisciplinary and transdisciplinary knowledge production: institutions, cultures and communities. Open Team Science Int'l Seminar, 2018.10.05, RIHN, Kyoto, Japan.

Stage: Pre-Research

Division Name: Co-Creation of Sustainable Regional Innovation for Reducing Risk of High-impact Environmental Pollution

Head of Division: SAKAKIBARA Masayuki

○ Research Subject and Objectives

1. Problem, background, and objectives

Mercury (Hg) is a toxic metal that seriously threatens the embryonic and early-childhood development of humans, and extremely poisonous to the human body. Mercury pollution is one of the most serious environmental issues and requires global action for its resolution (e.g. Gibb & O'Leary, 2014). Recent investigations by the United Nations Environment Programme (UNEP) have highlighted the enormity of Hg pollution in developing countries and the associated harmful effects on human health and ecosystems. One of the main causes of Hg pollution is Artisanal and small-scale gold mining (ASGM), in which Hg is used as the traditional method of amalgamation to extract gold from the ore rock and emit 37% of global anthropogenic Hg into the atmosphere (Fig. 9-1). This method is quicker, simpler, and more cost-effective than alternative methods, and is widely used in many ASGM communities (UNECA, 2002; Gibb & O'Leary, 2014). According to data from the UNEP, ASGM produces 15-20 % of global gold market. Almost 15 million people, including about 3 million women and children, participate in ASGM activities in more than 70 countries. The Hg pollution generated during ASGM indirectly affects more than 100 million people worldwide (UN, 2012; UNEP, 2013; ELI, 2014). Those ASGM activities are also sources of social problems, such as land tenure issues, social instability such as migration, and conflict between residents. The vicious cycle relating to poverty and environmental degradation in developing countries has long been discussed (WCED, 1987; World Bank, 1992; UNEP, 1995). However, the behavioural patterns that make it difficult for those living under chronically impoverished conditions to escape from those conditions are still not well understood (Sen, 1999; Banerjee & Duflo, 2011). The Minamata Convention on Hg is a global treaty established to protect human health and the environment from the adverse effects of Hg. The Convention addresses ASGM and the development of national plans to manage ASGM.

The objectives of our FR is 1) to understand the link between poverty reduction and environmental management in ASGM areas, 2) to establish a process for constructing sustainable societies through regional innovations in ASGM areas, and 3) to strengthen environmental governance in ASEAN countries.

2. Methodology, structure and schedule

In our FR, we will conduct within the context of all ASEAN countries:

a) Case studies on reduction of Hg pollution using a future scenario of ASGM in Indonesia and Myanmar

FR members will (1) undertake environmental impact assessments; (2) study living conditions, cultures, history, and regional sociology; (3) cultivate or organize transdisciplinary communities of practice (TDCOPs) used by transdisciplinary boundary object (TBO); (4) co-create future scenarios; (5) co-design and co-production of action plans; and (6) evaluate the progress of regional innovation by social, and economic studies.

b) Study on interregional networks that aim to generate Hg-free societies in Indonesia and Myanmar

The study of interregional networks will be conducted in three steps: (1) the construction of an exchange platform for information and collaboration on the management of Hg (2) the improvement of organizational and communication capacities; and (3) strengthening the communication policy to local and central governments.

c) Study on improvements in environmental governance in ASEAN countries

FR members will study the principles and processes used for multilayer and co-operative environmental governance. We will also investigate to strengthen the environmental governance of the ASEAN countries. In collaboration with the Japan Association for UNEP (JAUNEP), our FR will support the establishment of UNEP association in each country of ASEAN to tackle global environmental problems, such as the Hg pollution, at the level of the private sector.

d) Theoretical and practical studies of the design, practical use, and evaluation of TBO, and cultivation, development process, and roles of TDCOP

FR members will design TBOs, practically use, and evaluate them to cultivate the development processes of TDCOPs with the collaboration of key stakeholders (SHs) at the study areas.

3. Expected results

The regional innovation will arise as a consequence of environmental and industrial innovations introduced with a transdisciplinary approach, including the development of a future scenario for an Hg-free society, the co-creation and practical application of TBOs, and the mobilization of TDCOPs. By strengthening environmental governance, which consists of multiple layers of co-operative organizations, we will also develop a route via which the problem of global environmental Hg pollution can be resolved.

4. Project organization and membership

The research organization consists of 1) communicator, 2) culture, history, and behavioral transformation group, 3) social science group, 4) natural science group, 5) technological development group, and 6) project management group.

5. Contribution to the program

Our research project on Southeast Asia will contribute to Program 3. In Southeast Asia, the environmental disruption, biological diversity disappearance, expansion of the difference of the poverty and wealth, and traditional culture disappearance are progressing by the rapid expansion of the human activities. Moreover, the degradation of living space and the increased risk of global environmental pollution by ASGM activities in rural communities are accelerated by poverty. It will provide a concrete framework for realizing a sustainable society from this research, and in that we will propose the change to society with a concrete future possibility. Furthermore, Our FR project will take in the technique of the future design and future scenario which Program 3 has proposed as an effective technique for solving problem of regional society.

○ Progress and Results in 2018

1. Revised Research Plan in the PR

During the PR, our research plan submitted at the beginning of PR has been changed partially. It is based on the request of Ministry of Natural Resources and Environmental Conservation in Myanmar. It was judged by the core members that this change was important as it could develop our project more. The changed portion is to add the Mandalay region, Myanmar to the case study. The research plan is partially revised as shown in the following underline part (Fig. 9-2 & 3).

a) Case studies on reduction of Hg pollution using a future scenario of ASGM in Indonesia and Myanmar: We have been investigating the natural resources, and biological resource, Hg pollution of nature and human, and resident health effect, social-economy evaluation, and cultural history in Gorontalo and Bombana areas in Indonesia, and evaluated the present conditions of each ASGM area from a viewpoint of social capital. As for Myanmar, we have started the dialogues with Ministry of Natural Resources and Environmental Conservation in Mandalay Region and Nay Pyi Taw, and NGO, and co-design a research schedule. In addition to the above, in Indonesia, we have identified the key SHs during the dialogue process with the residents by the communicators. We have also co-created the future scenario for the reduction of Hg pollution with various SHs. Moreover, some of the TDCOPs are organized by the collaboration with the key SHs.

(b) Study on interregional networks that aim to generate Hg-free societies in Indonesia and Myanmar: We have been establishing the website of research network "Hg-Free Society Networks" by the Indonesian citizens' participation, and aiming to share the information related to the Hg pollution by ASGM, etc. As a target in the period of PR, we aim to have more than 1,000 members of the website. We also start the preparation for establishing a website for Myanmar people to share the information on Hg pollution.

(c) Study on improvements in environmental governance in ASEAN countries: We utilized the network formed from FS to PR, obtained a collaboration of the Japan UNEP association, and held the seminar for sharing knowledge and future collaboration with politicians, the administration persons, company staffs, researchers, the NGO person, and citizens. We have started the dialogs with the Myanmar government officials on an UNEP association in Myanmar.

(d) Theoretical and practical studies of the design, practical use, and evaluation of transformative boundary object (TBO), and cultivation, development process, and roles of transdisciplinary community of practice (TDCOP): We have started the dialog, obtained the reliability and agreement with the important and isolated SHs, and revealed practically what kind of TBO brings about the transformation to the actors in Indonesia and Myanmar.

2. Project Progress During the PR Period

In the case study (a), we have propelled the studies on the natural resource including the solid and fluid earth resources, and biological resource, Hg pollution of the nature and human, and resident health effect, social-economy evaluation, and cultural history in Gorontalo and Bombana areas in Indonesia. In particular, in the Bone Bolango Regency, Gorontalo Regency, and North Gorontalo Regency, the studies were conducted as the investigations of each ASGM site by 16 members. The investigation of Hg pollution and resident health effect were conducted in all the ASGM areas in these regencies. Moreover, baseline investigation for the statistical social-economy evaluation in FR was conducted as the important result. 20 key SHs were identified during the dialog process with the residents. In addition, we co-created a draft of the future scenario for the reduction

of Hg pollution with some key SHs. Furthermore, three TDCOPs were organized or cultivated by collaboration with the FR members and key SHs. In the meantime, the establishment of a preparatory committee for the Gorontalo Global Geopark was worked on. The seminar on preparatory committee establishment was held in September and it was sponsored by the Gorontalo Province, and the PL gave a special lecture about the potential and socioeconomic effect by the Gorontalo Global Geopark.

On (b) a study of interregional networks that aim to generate Hg-free societies in Indonesia, we have established the website of research network between areas in November: " Hg Free Society Networks " by the Indonesia citizen participation, and share the information related with the Hg pollution by ASGM etc. More than 300 members already have joined to the facebook page of " Hg Free Society Networks " in the early January 2019.

In the research (c) on environmental governance strengthening by the countries' citizen participation in Southeast Asia, we started the concertation with the administration officials of Indonesia and Myanmar in the PR. First, we had three meetings: in March, May, and July in 2018 with Dr. Emil Salim, the 1st Minister of Environment for discussions and exchanges of opinions about ASGM in Indonesia. Moreover, we visited Myanmar and held the meetings with senior officials: Director of Ministry of Natural Resources and Environmental Conservation, Environmental Conservation Department in Mandalay City and then with Director General and other senior officials of Ministry of Natural Resources and Environmental Conservation, Environmental Conservation Department in Nay Pyi Taw city in Myanmar and explained the purpose and plan of our FR. We have agreed on the collaboration with the Ministry of Natural Resources and Environmental Conservation, Environmental Conservation Department offices, and advancing the processes at this moment. In February, we concluded on MoU between the Ministry and RIHN after sharing the details of the contents of our FR in December.

In the research (d), the FR member show the results of some domestic case studies on community of practice. We also started the dialog with the important and isolated SHs.

In addition, we held the 3rd International Conference of Transdisciplinary Research on Environmental Problems in Southeast Asia (TREPSEA2018) at the State University of Gorontalo in Gorontalo City, Indonesia. More than 200 participants: researchers, scientists, and SHs from five countries: Indonesia, Japan, Lesotho, Myanmar and Vietnam took part in the conference. We showed the research plan of our PR and FR and discussed how we can solve the environmental problem including ASGM in the ASEAN countries. This result will be published in Elsevier as a post-proceeding book with refereeing the end of 2019. Moreover, we co-sponsored the international seminar "1st ASEAN-Japan Meeting Point of Collaboration by SHs and Researchers for Reducing Environmental Problems in ASEAN Countries" on 8-9th December in Bandung Institute of Technology in Bandung City, Indonesia. More than 120 researchers and SHs attended the seminar from seven ASEAN countries and Japan.

○Project Members

◎	SAKAKIBARA, Masayuki	(Research Institute for Humanity and Nature,Professor,Research supervisor)
○	TANAKA, Katsuya	(Shiga University,Professor,Multivariate statistics of propensity score on economics)
○	MATSUDA, Hiroyuki	(Yokohama National University,Professor,Leader of Natural Science Group)
○	SHIMAGAMI, Motoko	(Ehime University,Associate Professor,Sociology of community in ASGM area)
○	MATSUMOTO, Yuichi	(Kwansei Gakuin University,Professor,Theoretical and practical studies on TDCOP)
○	KASAMATSU, Hiroki	(Ehime University,Senior Assistant Professor,Sociology of the local community in ASGM area)
○	BOBBY	(Network Activities Groups,Chief Executive Officer,Practice of action program and its management in Myanmar)
○	KIMIJIMA, Satomi	(Research Institute for Humanity and Nature,Reseacher,Case studies of ASGM sites in Indonesia and Myammar)
○	KAUNG, Xiaoxu	(Research Institute for Humanity and Nature,Reseacher,Chemical analysis of environmental samples)
○	WIN THIRI KYAW	(Research Institute for Humanity and Nature,Reseacher,Medical study on mercury toxicity in Myanmar)
	KOMATSU, Satoru	(Nagasaki University,Associate Professor,Social economic evaluation in ASGM area)
	YAMAMOTO, Yuki	(Nagasaki University,Associate Professor,Social economic evaluation in ASGM area)
	NARABAYASHI, Kenji	(Ehime University,Professor,Environmental Law in Southeast Asian Countries)
	KITAMURA, Kenji	(Kanazawa Univirsity,Assistant Professor,Theoretical study on TDCOP)
	ABE, Akira	(Mie Prefectural College Of Nursing,Professor,Theoretical research on poverty and environmental ethic problems)
	MIYAKITA, Takeshi	(Kumamoto Gakuen University,Professor,Research on a reconstruction of community / Epidemiologic survey on ASGM areas)
	SAYANAGI, Nobuo	(Yamanashi Eiwa College,Associate Professor,Psychological study on poverty in ASEAN countries)

YAMAGUCHI, Tsutomu	(ESPEC MIC Corp.,Chief of Nagoya office,Technological support for the development of plant products)
SUGAWARA, Hisanari	(Gunma Museum of Natural History,Curator,Study on community management of global geopark)
Okamoto, Ikuko	(Toyo University,Professor,Study on internatioal development)
MIYASAKI, Hidetoshi	(National Museum of Ethnology,Visiting Researcher,Case study of ASGM site in Mandalay Region, Myanmar)
ITO, Yutaka	(Akita Universitu,Lecturer,Social economic evaluation in ASGM area)
WATANABE, Yasuko	(Watanabe-tette,CEO,Design development of traditional hand-craft "Karawang" in Gorontalo province)
KOIZUMI, Hatsue	(Soshisha, the Minamata Disease Museum,Staff,Sociology of community in ASGM area)
ABBAS, Habo Hasriwiani	(Universitas Islam Indonesia,Lecturer and Researcher,Medical geology of traditional smelters in Sulawesi)
BASRI	(College of Health Sciences Makassar,Lecturer and Researcher,Environmental science in ASGM area in Bombana Regency, Southeast Sulawesi Province, Indonesia)
PRASETIA, Hendra	(Development of bioindicator using dendrochemistry)
GAFUR, Abdul Nurfitri	(Ehime University,Graduate student,Environmental science in ASGM area in Bone Bolango Regency)
PATEDA, Sri Manovita	(Ehime University,Graduate student,Development of bioindicator on mercury exposure)
BASIR	(Ehime University,Graduate student,Case study in Bombana Regency, Southeast Sulawesi Province, Indonesia)
BADARU, Arifia Warapsari	(Ehime University,Graduate student,Survey of geosites in Gorontalo Geopark Concept)
PULUHULAWA, Usman Fenty	(Gorontalo State University,Professor,Research on environmental low in Indonesia)
LALIYO, Abdul Rauf Lukman	(Gorontalo State University,Associate Professor,Study of governance of public government in Indonesia)
MOHAMAD, Jahja	(Gorontalo State University,Associate Professor,Physical analytical study on natural products)
ARIFIN, Indriati Yayu	(Gorontalo State University,Lecturer and Researcher,Study of medical geology in Gorontalo Province, Indonesia)
BAGA, Magdalena	(Gorontalo State University,Lecturer and Researcher,Cultural science and anthropogenic study in Gorontalo, Indonesia)
ZAENAL, Abidin	(Bogor Agricultural University,Lecturer and Researcher,Development of environmental remediation materials)
KARDENA, Edwan	(Institut Teknology Bandung,Associate Professor,Study of environmental governance in Indonesia)
KURNUAWAN, Andri Idham	(Institut Teknology Bandung,Lecturer and Researcher,Basic study of Geopark, Case study of ASGM site in Southern Bandung area, Indonesia)
ARIFIN, Bustanul	(University of Lampung,Professor,Socioeconomic evaluation of agricultural areas in Gorontalo province)
INTANASRI, Rizky Zahra	(Indonesian Public Health Association,Chief Officer,Local communicator)
MUHAMMAD, Gobel	(Local communicator)
MOHAD, Lamanasa	(Local communicator)
JOMAE, Kyoko	(Ehime University,Clerical Assistant,Project management)
MYO HAN HTUN	(Research Institute for Humanity and Nature,Research Associate,Management on websites and Supporting FR researchers)
TAKEHARA, Mari	(Research Institute for Humanity and Nature,Research Associate,Project management)

○ Future Themes

(1) Acquisition of research funds for project implementation

In the case study (a), we have propelled the studies on the natural resource including the solid and fluid earth resources, and biological resource, Hg pollution of the nature and human, and resident health effect, social-economy evaluation, and cultural history in Gorontalo and Bombana areas in Indonesia. In the Bone Bolango Regency, Gorontalo Regency, and North Gorontalo Regency, the studies were conducted as the investigations of each ASGM site. The investigation of Hg pollution and resident health effect also were conducted in all the ASGM areas in these regencies. Moreover, baseline investigation for the statistical social-economy evaluation in FR was conducted as the important result. 20 key SHs were identified during the dialog process with the residents. In addition, we co-created a draft of the future scenario for the reduction of Hg pollution with some key SHs. Furthermore, three TDCOPs were organized or cultivated by collaboration with the FR members and key SHs. In the meantime, the establishment of a preparatory committee for the Gorontalo Global Geopark was worked on. The biggest issue is the

acquisition of research expenses. Myanmar case studies will start from this fiscal year, but further research funding is essential for that. This issue will be addressed by all core members to be resolved in the past year.

(2) On the establishment the system for the inter-regional network

On (b) a study of interregional networks that aim to generate Hg-free societies in Indonesia, we have established the website of research network between areas in November: " Hg Free Society Networks " by the Indonesia citizen participation, and share the information related with the Hg pollution by ASGM etc. More than 350 members already have joined to the facebook page of " Hg Free Society Networks " in the early January 2019. However, the maintenance of the system including the contents is not necessarily sufficient. It is essential to add human resources as well as cost issues. Currently, we are calling on some participating universities in Indonesia and are working on establishing the sustainable system and network.

(3) For the establishment of UNEP Association in ASEAN countries

In the research (c) on environmental governance strengthening by the countries' citizen participation in Southeast Asia, we started the concertation with the administration officials of Indonesia and Myanmar in the PR. First, we had three meetings: in March, May, and July in 2018 with Dr. Emil Salim, the 1st Minister of Environment for discussions and exchanges of opinions about ASGM in Indonesia. Moreover, we visited Myanmar and held the meetings with senior officials: Director of Ministry of Natural Resources and Environmental Conservation, Environmental Conservation Department in Mandalay City and then with Director General and other senior officials of Ministry of Natural Resources and Environmental Conservation, Environmental Conservation Department in Nay Pyi Taw city in Myanmar and explained the purpose and plan of our FR. We have agreed on the collaboration with the Ministry of Natural Resources and Environmental Conservation, Environmental Conservation Department offices, and advancing the processes at this moment. In February, members of both Environment Conservation Departments were invited to RIHN, and the preparations for signing the memorandum between the central government and the Mandalay regional government and RIHN had been started. We will plan to launch this effort in nine other countries. Japan's UNEP will be able to cooperate in all these activities, and we will continue to work with them in dialogue with the governments of each country.

●Achievements

○Papers

【Original Articles】

- Pateda, S. M., Sakakibara, M. and Sera 2018,11 Lung Function Assessment as an Early Biomonitor of Mercury-Induced Health Disorders in Artisanal and Small-Scale Gold Mining Areas in Indonesia. International Journal of Environmental Research and Public Health 2018 15(11). DOI:10.3390/ijerph15112480 (reviewed).
- Iwasaki Y., Kagaya T., Matsuda H. 2018,10 Comparing macroinvertebrate assemblages at organic-contaminated river sites with different zinc concentrations: Metal-sensitive taxa may already be absent. Environmental Pollution(241):272-278. DOI:doi.org/10.1016/j.envpol.2018.05.041 (reviewed).
- Matsumoto, Y. 2018,10 Case study on enhancing learning in communities of practice: Non-canonical view and boundary crossing. Journal of Business Management 41:52-63. (in Japanese) (reviewed).
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○Research Presentations

【Oral Presentation】

- Sakakibara, M Futurability of Gorontalo Geopark- Promoting Earth Heritage & Sustaining Local Communities. , 2018.09.04-2018.09.04, Gorontalo Province, Indonesia.
- Kasamatsu, H. Sakakibara, M., Tanaka, K., Komatsu, S. and Shimagami, M. Transdisciplinary approaches for creation innovative livelihood alternatives in high environmental loading areas affected by mercury pollution in Indonesia. World Social Science Forum, 2018.09.25-2018.09.28, Fukuoka International Congress Center, Fukuoka city.

- Shimagami, M., Kasamatsu, H. and Sakakibara, M. Kikigaki Program as a Transformative Boundary Object for Stimulating Sustainable Refional Innovation through Cross-generational Urban-Rural Interaction: Case studies from Japan and Indonesia. he 3rd international conference of the Transdisciplinary Reseach on Environmental Problems in Southeaset Asia(TREPSEA), 2018.08.11-2018.08.12, Hotel TC Damhil UNG ,Gorontalo, Indonesia.
- Basri and Sakakbiara, M. Health Impact Assessment of Artisanal and Small-Scale Gold Mining in Bomabana, Southeast Sulawesi, Indonesia. The 3rd international conference of the Transdisciplinary Reseach on Environmental Problems in Southeaset Asia(TREPSEA), 2018.08.11-2018.08.12, Hotel TC Damhil UNG ,Gorontalo, Indonesia.
- Arifin, Y.I., Sakakbiara, M. and Sera, K. Assessing impact of artisanal and small scale gold mining activities on inhabitants and miners: a case study in Bolaang Mongohdow, North Sulawesi Province, Indonesia. The 3rd international conference of the Transdisciplinary Reseach on Environmental Problems in Southeaset Asia(TREPSEA), 2018.08.11-2018.08.12, Hotel TC Damhil UNG ,Gorontalo, Indonesia.
- Hendra Prasetia , Sakakibra, M. and Sera, K. Atmospheric Mercury Contamination Assessment Using Various Tree Bark in an ASGM Area in North Gorontalo Regency, Indonesia. The 3rd international conference of the Transdisciplinary Reseach on Environmental Problems in Southeaset Asia(TREPSEA), 2018.08.11-2018.08.12, Hotel TC Damhil UNG ,Gorontalo, Indonesia.
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- Kasamatsu, H., Shimagami, M. and Sakakibara, M. The Researchers Role and Future View of TDCOPs from Case Study of Dihime Limboto-ko, Gorontalo District. The 3rd international conference of the Transdisciplinary Reseach on Environmental Problems in Southeaset Asia(TREPSEA), 2018.08.11-2018.08.12, Hotel TC Damhil UNG ,Gorontalo, Indonesia.
- Andi, A., Sakakbiara, M. and Sano, S Heavy Metal Potential at Settling Pond of Coal Mining, East Kalimantan, Indonesia. The 3rd international conference of the Transdisciplinary Reseach on Environmental Problems in Southeaset Asia(TREPSEA), 2018.08.11-2018.08.12, Hotel TC Damhil UNG ,Gorontalo, Indonesia.
- Htun, M.H. and Sakakibara, M. Assessment of the Effectiveness of the Knowledge and Practice Based Mercury (HG) Free Society Networks for the Reduction of Mercury Pollution Problems in ASEAN Countries. The 3rd international conference of the Transdisciplinary Reseach on Environmental Problems in Southeaset Asia(TREPSEA), 2018.08.11-2018.08.12, Hotel TC Damhil UNG ,Gorontalo, Indonesia.
- Okazaki, K., Kurahashi, T., Yamazaki, S. and Sakakakibara, M. Temperature dependence for purification of leachate containing heavy metals by phytoremediation using the artificial channel. The 3rd international conference of the Transdisciplinary Reseach on Environmental Problems in Southeaset Asia(TREPSEA), 2018.08.11-2018.08.12, Hotel TC Damhil UNG ,Gorontalo, Indonesia.
- Sakakibara, M., Tanaka, K., Kasamatsu, H. and Shimagami, M. Co-creation of Sustainable Regional Innovation for Reducing Risk of High-impact Environmental Pollution. The 3rd international conference of the Transdisciplinary Reseach on Environmental Problems in Southeaset Asia(TREPSEA), 2018.08.11-2018.08.12, Hotel TC Damhil UNG ,Gorontalo, Indonesia.
- Sri Manovita Pateda, Sakakibara, M. and Sera, K. Lung function assessment as an early biomonitor of mercury-induced health disorders in an artisanal and smale-scale gold mining area of Gorontalo province,Indonesia. The 24th NMCC Annual Meeting, 2018.05.11-2018.05.12, Hotel Metropolitan Morioka, Morioka city.
- Hendra Prasetia,Sakakibara, M. and Sera, K. Atmospheric mercury contamination assessment using various tree bark in an ASGM area in North Gorontalo Rregency,Indonesia. The 24th NMCC Annual Meeting, 2018.05.11-2018.05.12, Hotel Metropolitan Morioka, Morioka city.

【Invited Lecture / Honorary Lecture / Panelist】

- Masayuki Sakakibara Transdisciplinary Reseach and Practice for Reducing Environmental Problems in ASEAN Countries. st ASEAN -Japan Meeting Pont of Collaboration by Stakeholders and Reseachers for Reducing Environmental Problems in ASEAN Coutries, 2018.12.08-2018.12.09, Bandung, Indonesia.
- Masayuki Sakakibara Co-Creation of Sustainable Regional Innovation for Reducing Risk of High-impact Environmental Pollution. International Lecturer, 2018.11.26-2018.11.26, Hasanuddin University, Makkasar, Indonesia.
- Masayuki Sakakibara Co-Creation of Sustainable Regional Innovation for Reducing Risk of High-impact Environmental Pollution. International Lecturer, 2018.11.25-2018.11.25, Public Health Universitas Muslim Indonesia, Makkasar, Indonesia.

・Masayuki Sakakibara Co-Creation of Sustainable Regional Innovation for Reducing Risk of High-impact Environmental Pollution. International Lecturer, 2018.11.25-2018.11.25, School of Health Sience of Makassar, Makassar, Indonesia.

Stage: Pre-Research

Division Name: Mapping the environmental impact footprint of cities, companies, and households

Abbreviated Title: Supply chain project

Head of Division: KANEMOTO Keiichiro

Key Words: Supply chain, MRIO, environmental impacts

○ Research Subject and Objectives

Economic growth in China and other developing countries is associated with severe global environmental problems, such as climate change and loss of biodiversity. Studies have shown that consumption in developed countries drives environmental emissions in developing countries. For example, we found that international trade is responsible for one third of the threats to biodiversity, mainly in developing countries. Furthermore, we demonstrated a link between geographical environmental emissions information and global supply chains. Unlike most studies, which focus on environmental emissions and international trade, this is the first study clarify the effect of global supply chains on environmental impacts. Further, in addition to countries and regions, we will estimate the environmental footprint of cities, companies and households.

○ Progress and Results in 2018

In 2018, we have firstly estimated the carbon footprint of 13,000 cities. Following are the key findings:

· Globally, carbon footprints are highly concentrated into a small number of dense, high-income cities and affluent suburbs

· 100 cities drive 18% of global emissions

· In most countries (98 of 187 assessed), the top three urban areas drive more than one-quarter of national emissions

· We define cities as population clusters, but in practice mapping footprints to local jurisdictional bounds is complex

· 41 of the top 200 cities are in countries where total and per capita emissions are low e.g. Dhaka, Cairo, Lima). In these cities population and affluence combine to drive footprints at a similar scale as the highest income cities

· For large and high-income cities, their total Scope 3 footprint is much larger than the city's direct emissions

· Radical decarbonization measures (limiting nonelectric vehicles; requiring 100% renewable electricity) can induce substantial emissions reductions beyond city boundaries. In wealthy, high-consumption, high-footprint localities such measures may require only a small investment relative to median income, yet accomplish large reductions in total footprint emissions

· Local action at the city and state level can meaningfully affect national and global emissions

Our findings are widely reported in the press, e.g. Scientific American, DailyMail, Newsweek, U.S. News, World Economic Forum, Kyodo News.

○Project Members

■グループ A

◎ KANEMOTO Keiichiro (The Research Institute for Humanity and Nature)
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OHNO Hajime (Tohoku University)
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KAGAWA Shigemi (Kyushu University)
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Moran Daniel	(Norwegian University of Science and Technology)
Lenzen Manfred	(The University of Sydney)
Verones Francesca	(Norwegian University of Science and Technology)
Geschke Arne	(The University of Sydney)

○ Future Themes

We will map the environmental impact footprint of cities, companies, and households.

●Achievements

○Papers

【Original Articles】

・Daniel Moran, Keiichiro Kanemoto, Magnus Jiborn, Richard Wood, Johannes Többen, Karen Seto. 2018,06 Carbon footprints of 13 000 cities. Environmental Research Letters 13(6). DOI:10.1088/1748-9326/aac72a (reviewed).

Incubation Studies

Humanities for the Environment: Developing a Cultural Approach to Environmental Knowledge

NILES Daniel (Research Institute for Humanity and Nature)

This project explores the significance of humanities scholarship to contemporary environmental research and sustainability challenges. The project's goal is to develop the environmental humanities in relation to the social-ecological concerns of the Anthropocene. It does so by organizing and conducting transdisciplinary research in long-standing cultural-ecological contexts (or social-ecological systems), developing the knowledge network of Asia-focused scholars working in environmental humanities, and developing innovative methods of humanities-science communication.

The project begins from the hypothesis that many different kinds of knowledge of the natural world exist and have supported sustainable human-environmental systems through time. This lived experience is therefore of great significance to contemporary sustainability challenges, but it has rarely been analyzed as such.

Cultural knowledge of environments is embedded in cultural phenomena such as agro-ecosystems, medicinal knowledge, built environment, and traditional technology and craft; such knowledge has enabled human existence over the long term. As systems of knowledge, however, such phenomena have been largely invisible to conventional scientific description. The central problem this proposal addresses is therefore to identify the non-scientific bodies of environmental knowledge that have sustained communities for generations, centuries, and millennia, to describe the structure and quality of this knowledge and to derive lessons of its relevance to contemporary social-ecological challenges.

Assessing and enhancing the environmental sustainability from edible insects

CÉSARD Nicolas (National Museum of Natural History, France)

With a growing global population, more sustainable diets and the use of new protein sources are needed. However if more than 2000 species of insects are currently known worldwide to be consumed as human food, many species harvested from the wild are threaten by overexploitation and habitat degradation. To respond to increasing demands, sustainable harvesting practices and knowledge need to be developed and implemented.

The project proposes to rely on the consumption of a small number of insect species and their sustainable methods of exploitation to promote and develop the conservation of their ecosystems, whether natural or agricultural. One insect family, the Vespidae (social wasps), seems particularly adapted to initiate the project during the FS phase (12 months). The project suggests to focus on the harvesting and semi-farming of edible Vespidae in Japan, China, Madagascar and La Reunion Island.

In our opinion, the most interesting research prospects concern the preservation of sustainable practices linked to production, the development of farming capacities for new species and the valorisation and enhancement of insects and their environment through environmental education, product traceability and the recognition of local food culture and heritage.

Quantifying and Typing Landform Transformations in Low-lying Large Cities: Toward Landscape Evaluations in Anthropocene

HARA Yuji (Faculty of System Engineering, Wakayama University)

Many monsoonal Asian large cities are located on alluvial lowlands, hence surface landform transformation is inherently required for land developments. Such landform transformations include fill material flows between source soil pit sites and land development sites, and new landscapes emerge in both sites. Because of ordinariness of soils in daily human living spaces as well as lack of quantification tools and dataset, classification and quantification of landform transformation are understudied. In this study, using several case study cities according to macro-scale landforms ranging from insular lowlands to continental delta, we calculated the volume and weight of artificially transformed soils, and flow distance between source and final development site. Furthermore, based on these data and existing numerical energy unit data, we examined total energy through landform transformation process. We also classify landform transformation patterns and induced landscapes with ecosystem services in both offsite source and onsite land development in consideration of macro-scale landform settings. Thus this study is first step toward holistic evaluations of human landform transformation as an agent of environmental changes on the earth in the context of Anthropocene.

Sustainable Urban Design using Inclusive Wealth

MANAGI Shunsuke (Kyushu University)

This study utilizes idea of The Inclusive Wealth Report 2014/2018. This report proposed. “Inclusive Wealth” as an expression of a country’s or region’s “wealth,” and an “Inclusive Wealth Index” as a standard economic indicator to be used as a yardstick for evaluating sustainability. With sustainability having been a vague concept to date, this index has the advantage of being an easy way to determine whether national and regional policies have improved sustainability based on a rise or fall in the index, and significant expectations are being placed on the index as an indicator of the achievement of the Sustainable Development Goals (SDGs).We study how each region can utilizes this index for future policy.

Study for energy transition policy and strategy towards RE100% Asian cities

KOBASHI Takuro (Renewable Energy Institute)

In the warm and relatively stable climate of the Holocene, human society gradually developed, expanded, and eventually reached to the current complex society. Especially, since the advent of fossil fuels as energy resources, social development accelerated, however, with increasing atmospheric CO_2 concentration. As a result, now the balance of the Holocene climate is at risk. In this study, using renewable energy, we aim to decarbonize the city energy systems that account for 40-70% of global CO_2 emissions, and aim to establish new energy systems sustainable for the next 1,000 years. Setting Kyoto, Shenzhen, San Diego as target cities, we conduct researches on techno-economic analyses, Future Design (FD) to take into account future generation, smart city with new technologies considering culture and tradition, decentralized generation systems, energy policy and institution, and sustainable practice and behavior. Working with citizens, policy makers, NGOs, industries, and researchers, we realize full transitions to sustainable and livelier cities.

RIHN Center

The RIHN Center provides foundations and platforms for RIHN's research activities and promotes engagement in interactive collaborations with academic and societal stakeholders. The Center also promotes capacity building activities related to global environmental studies.

The RIHN Center consists of four divisions. The Laboratory and Analysis Division develops and maintains the laboratory facilities necessary for research and fieldwork. The Information Resources Division maintains RIHN research databases and archive. The Communication Division develops a variety of communication strategies linking RIHN research to academic, public and user-specific communities. The Collaboration Division facilitates internal and external research networking as well as RIHN engagement with the international Future Earth initiative and manages activities of Future Earth in Asia.

Division Name: Laboratory and Analysis Division

Head of Division: TAYASU, Ichiro

○ Subject and Objectives

The Laboratory and Analysis Division organizes three types of collaborative study in the Phase III Medium-Term Plan.

(1) Research collaboration with research projects: The division manages eighteen basement laboratories dedicated to various analytical needs. The division is responsible for maintaining state-of-the-art facilities, especially stable isotope mass spectrometers, and collaborates with research projects.

(2) Research collaboration with core projects: A core project FR entitled "Proposal and verification of the validity of isotope environmental traceability methodology in environmental studies (FY2017-2019)" seeks to establish a methodology for how to use the concept of environmental traceability using multiple isotope ratios. The division collaborates with the project in an analytical viewpoint.

(3) Research collaboration with universities via "Environmental Isotope Study": The division provides "Joint Research Grant for the Environmental Isotope Study" for universities and affiliated institutions throughout Japan, allowing them to use the facilities and exchanging research information. From the FY2016, the division has started the two types of collaborations, "Collaborative research with the Division" or "General collaborative research".

○ Progress and Results in 2018

The division installed or maintained various analytical instruments in the laboratories.

The division accepted 59 proposals of "(A) General collaborative research", 15 proposals of "(B) Collaborative research with the Division", 2 proposals of "(C) Collaborative research with Environmental Traceability Project" and 4 proposals of "(D) Collaborative research with Ecosystem Traceability Project" in FY2018, under "Joint Research Grant for the Environmental Isotope Study".

The division organized a session in JpGU2018 entitled "H-TT18: Development and applications of environmental traceability methods" on 22 May 2018. 18 oral and 11 poster papers were presented in the session.

The division organized a short course of Environmental Isotope Study: Course 1 for heavy elements (28 - 31 August) and Course 2 for light elements (4-7 September). 8 researchers attended the course.

The division organized the sixth annual symposium of Environmental Isotope Study on 21 December. 121 researchers and students attended the symposium.

○Members

Laboratory and Analysis Division

◎ TAYASU, Ichiro	(RIHN Center,Professor)
SHIN, Kicheol	(RIHN Center,Assisitant Professor)
KATO, Yoshikazu	(RIHN Center,Researcher)
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YUZEN, Natsuko	(RIHN Center,Research Associate)
KURATA, Junko	(RIHN Center,Research Associate)
FUCHIGAMI, Yuriko	(RIHN Center,Clerical Assistant)

FY2018 members of Joint Research Grant for the Environmental Isotope Study

MORI, Yasunori	(Mie Prefecture Health and Environment Research Institute)
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SUGITANI, Kenichiro	(Graduate School of Environmental Studies Nagoya University)
KOSHIKAWA, Masami	(Center for Regional Environmental Research, National Institute for Environmental Studies)
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NAOE, Shoji	(Senior Scientist, Forest Ecology Group, Tohoku Research Center, Forestry and Forest Products Research Institute)
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YOKOO, Yoriko	(Faculty of Science and Engineering Doshisha University)
ISHIMARU, Eriko	(Hiroshima University Museum)
TOMINAGA, Osamu	(Fukui Prefectural University)
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YAMASHITA, Yoh	(Field Science Education and Research Center, Kyoto University)
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YAMANAKA Masaru	(Nihon University)
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ABE, Yutaka	(Kanagawa Prefecture Natural Environment Conservation Center)
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KOGURE, Tetsuya	(Interdisciplinary Faculty of Science and Engineering of Shimane University)
NAGATSUKA, Naoko	(National Institute of Polar Research)
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TAMURA, Tomomi	(Nara National Research Institute for Cultural Properties)
OHTA, Tamihisa	(University of TOYAMA)
HIURA, Tutomu	(Field Science Center for Northern Biosphere　Forest Research Station,Hokkaido University)
KODA, Ryosuke	(Research Institute of Environment, Agriculture and Fisheries, Osaka Prefecture)
TAKEUCHI, Nozomu	(Chiba University)
ABE, Osamu	(Nagoya University)
AKASAKA, Takumi	(Obihiro University of Agriculture and Veterinary Medicine)
HORIKAWA, Keiji	(University of TOYAMA)
IKEDA, Masayuki	(Shizuoka University)
SAITOH, Takeshi	(Graduate School of Science and Engineering,Saitama University)
KASHIWAYA, Koki	(Graduate School of Engineering, Kyoto University)
TAKANO, Shotaro	(Kyoto University)
GAKUHARI, Takashi	(Institute of Human and Social Sciences,Kanazawa University)
CHO, Kei	(Graduate School of University of TOYAMA)
NAKANISHI, Tetsuya	(Kyushu University)
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○ Future Themes

The division considers that “Environmental Isotope Study” is one of the most important function of RIHN as an Inter-University Research Institute Corporation. The division continuously develops analytical techniques to collect various environmental information in order to solve environmental issues.

●Achievements

○Papers

【Original Articles】

- Mai Takigami, K. Uzawa, Y. Seki, D.Morales Chocano & M. Yoneda 2019,03 Isotopic Evidence for Camelid Husbandry During the Formative Period at the Pacopampa Site, Peru. Environmental Archaeology. DOI: 10.1080/14614103.2019.1586091 (reviewed).
- Jochen Vogl, Yong-Hyeon Yim, Kyoung-Seok Lee, Heidi Goenaga-Infante, Dmitriy Malinovskiy, Sarah Hill, Tongxiang Ren, Jun Wang, Robert D. Vocke Jr., Karen E. Murphy, Naoko Nonose, Olaf Rienitz and Janine Noordmann 2019,03 Certification of ERM-EB400, the First Matrix Reference Material for Lead Isotope Amount Ratios, and ERM-AE142, a Lead Solution Providing a Lead Isotopic Composition at the Edge of Natural Variation. Geolstandards and Geoanalytical Research 43:22-37. (reviewed).
- Tamihisa Ohta, Shigeru Niwa, Tsutom Hiura 2019,02 Geographical variation in Japanese cedar shapes soil nutrient dynamics and invertebrate community. Plant and Soil 437(1):355-373. DOI:10.1007/s11104-019-03983-5 (reviewed).
- Kusaka, S. 2019,01 Stable isotope analysis of human bone hydroxyapatite and collagen for the reconstruction of dietary patterns of hunter-gatherers from Jomon populations. International Journal of Osteoarchaeology 29(1):36-47. DOI: 10.1002/oa.2711 (reviewed).

・Matsubayashi J, Umezawa Y, Matsuyama M, Kawabe R, Mei W, Wan X, Shimomae A, Tayasu I. 2018,12 Feeding experiments to test the applicability of segmental isotope analysis of teleost fish vertebrae. Limnology and Oceanography: Methods 17(2):87-96. DOI:10.1002/lom3.10298 (reviewed).

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・Kusaka, S., Yamada, Y., Yoneda, M 2018,08 Ecological and cultural shifts of hunter-gatherers of the Jomon period paralleled with environmental changes. American Journal of Physical Anthropology 167(2):377-388. DOI:10.1002/ajpa.23638 (reviewed).

・Kato Y., M. Kondoh, N. F. Ishikawa, H. Togashi, Y. Kohmatsu, M. Yoshimura, C. Yoshimizu, T. F. Haraguchi, Y. Osada, N. Ohte, N. Tokuchi, N. Okuda, T. Miki, I. Tayasu 2018,05 Using food network unfolding to evaluate food-web complexity in terms of biodiversity: theory and applications. Ecology Letters. DOI:10.1111/ele.12973 (reviewed).

・Ko, C.-Y., Iwata, T., Lee, J.-Y., Murakami, A., Okano, J., Ishikawa, N.F., Sakai, Y., Tayasu, I., Itoh, M., Song, U., Togashi, H., Nakano, S., Ohte, N. and Okuda, N. 2019,03 Assessing alpha and beta diversities of benthic macroinvertebrates and their environmental drivers between watersheds with different levels of habitat transformation in Japan. Marine and Freshwater Research 70(4):504-512. DOI:10.1071/MF18031 (reviewed).

・Matsubayashi, J., Umezawa, Y., Matsuyama, M., Kawabe, R., Mei, W., Wan, X., Shimomae, A. and Tayasu, I. 2019,02 Using segmental isotope analysis of teleost fish vertebrae to estimate trophic discrimination factors of bone collagen. Limnology and Oceanography: Methods 17:87-96. DOI:10.1002/lom3.10298 (reviewed).

・Sase, H., Takahashi, M., Matsuda, K., Sato, K., Tanikawa, T., Yamashita, N., Ohizumi, T., Ishida, T., Kamisako, M., Kobayashi, R., Uchiyama, S., Saito, T., Morohashi, M., Fukuhara, H., Kaneko, S., Inoue, T., Yamada, T., Takenaka, C., Tayasu, I., Nakano, T., Hakamata, T. and Ohta, S. 2019,01 Response of river water chemistry to changing atmospheric environment and sulfur dynamics in a forested catchment in central Japan. Biogeochemistry 142:357-374. DOI:10.1007/s10533-019-00540-1 (reviewed).

・Tanaka, H.O., Haraguchi, T.F., Tayasu, I. and Hyodo F. 2018,10 Stable and radio-isotopic signatures reveal how the feeding habits of ants respond to natural secondary succession in a cool-temperate forest. Insectes sociaux 66:37-46. DOI:10.1007/s00040-018-0665-0 (reviewed).

・Ishikawa, N.F., Chikaraishi, Y., Takano, Y., Sasaki, Y., Takizawa, Y., Tsuchiya, M., Tayasu, I., Nagata. T. and Ohkouchi, N. 2018,09 A new analytical method for determination of the nitrogen isotopic composition of methionine: its application to aquatic ecosystems with mixed resources. Limnology and Oceanography: Methods 16(9):607-620. DOI:10.1002/lom3.10272 (reviewed).

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・Saitoh, Y., Nakano, T., Shin, K-C., Matsubayashi, J., Kato, Y., Amakawa, H., Osada, Y., Yoshimizu, C., Okuda, N., Amano, Y., Togashi, H., Kurita, Y. and Tayasu, I. 2018,08 Utility of Nd isotope ratio as a tracer of marine animals: regional variation in coastal seas and causal factors. Ecosphere 9(8):e02365. DOI:10.1002/ecs2.2365 (reviewed).

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○Research Presentations

【Oral Presentation】

・Mana Mukai, Tamihisa Ohta, Ki-cheol Shin, Shin-ichiro Aiba, Kanehiro Kitayama Estimating the contribution of volcanic ash as a source of mineral nutrients in forest ecosystems on Yakushima Island using Sr and Pb stable isotopes. ESJ66, 2019.03.16, Kobe Convention Center.

・Minoru YONEDA・Takashi GAKUHARI・Yu ITAHASHI・Guoping SUN・Bin LIU ・Ningyuan WANG Oxygen isotope analysis of human and animal remains from the Neolithic site of the Lower Yangtze River region in light of human and object provenance. SEAA8, 2018.06.12, Nanjing University.

・Yasuda, K., N. Katsuta, M. Morimoto, O. Abe, S. Naito, S. Kawakami An investigation for depositional age of annually-laminated tufa by the high-resolution isotope analyses. Japan Geoscience Union Meeting 2018, May 2018, Chiba.

・Yuko T. Hanba, Tomomitsu Kinoshita, Takashi Kiyomizu, Saya Yamagishi, Etsu Yamada, Atsushi Kume Photosynthetic responses of landscape trees to urban environment –aiming to improve CO2 absorption by landscape trees – 2018. EAFES8, 2018.04.21, Graduate School of Bioagricultural Sciences, Nagoya University, in the Higashiyama Campus.

・Lei FUJIYOSHI, Kenichi OHKUSHI, Yudai YAMAMOTO, Ichiro TAYASU, Tadashi YOKOYAMA, Hiromune MITSUHASHI, Fumiko FURUKAWA, Masayuki ITOH Dynamics of dissolved ions inferred from sulfur isotope ratio of sulfate, nitrogen and oxygen isotope ratios of nitrate in Chikusa river watershed, Hyogo. Japan Geoscience Union Meeting, 2018.05.20-2018.05.24, Makuhari Messe, Chiba, Japan. (in Japanese)

・Lei Fujiyoshi, Ichiro Tayasu, Shiho Yabusaki, Takashi Haraguchi, Chikage Yoshimizu ,Kenichi Ohkushi, Fumiko Furukawa, Masayuki Itoh, Yudai Yamamoto, Tadashi Yokoyama, Hiromune Mitsuhashi Dynamics of nitrate and sulfate inferred from stable isotope techniques in Chikusa river watershed, Hyogo Prefecture . Management of Water and Land Resources: Studies in Asia and Europe, 2018.11.19-2018.11.23, Yamagata University, Yamagata , JAPAN.

・Lei Fujiyoshi, Ichiro Tayasu, Shiho Yabusaki, Takashi Haraguchi, Chikage Yoshimizu ,Kenichi Ohkushi, Fumiko Furukawa, Masayuki Itoh, Yudai Yamamoto, Tadashi Yokoyama, Hiromune Mitsuhashi Dynamics of nitrate and sulfate using stable isotope techniques in Chikusa river watershed, Hyogo Prefecture . Japan Society of Limnology 83 annual meeting in Okayama, 2018.10.05-2018.10.08, Okayama University, Okayama, Japan. (in Japanese)

【Poster Presentation】

・K. Lyalina, T. Haraguchi, R. Tanaka, M. Kawamura, K. Koba, I. Tayasu, H. Uno Assessing the habitat connectivity and distribution of organisms in Wakayama estuaries using C, N, and S stable isotope analysis. The 66th Annual Meeting of the Ecological Society of Japan, March 2019, Kobe.

・Sugimoto, N., Sakiyama, M., Hosono, T., and Tanimizu, M. Trace of anthropogenic nitrate in groundwater by isotopic proxies in Kumamoto area, Japan. European Winter Conference on Plasma Spectrochemistry 2019, 2019.02.07, Pau, France. THP-14

・Yumi Yoshioka, Kimihito Nakamura, Maho Ito, Hiroshi Takimoto, Shinji Sakurai and Haruhiko Horino Estimation of change in groundwater recharge sources in response to turbidification of river water by landslide. PAWEES-INEPF International Conference 2018 Nara, 2018.11.20, Nara Kasugano International Forum. Abstract p.149

・Konomi Fudamoto, Asano Ishikawa, Jun Kitano, Ki Cheol Shin, Ichiro Tayasu Differences in habitat salinity among ninesppine sticklebacks that were revealed by strontium isotope ratios of the otoliths. 9th International Conference on Stickleback Behavior and Evolution, 2018.07.05, Kyoto. Stickleback 2018 abstracts, P-16

・Sugimoto, N., Hosono, T., and Tanimizu, M. B-Li isotope systematic of groundwater for water flow proxy. Resources for Future Generations 2018, 2018.06.16-2018.06.21, Vancouver, Canada. No 1727

・Tanimizu, M., Sugimoto, N., and Umam, R. Geochemical characteristics of hydrothermal fluids observed along the major active fault system Geochemical characteristics of hydrothermal fluids observed along the major active fault system (MTL) in Japan. Resources for Future Generations 2018, 2018.06.16-2018.06.21, Vancouver, Canada. No 1734

・Umam, R., Tanimizu, M., Sugimoto, N., and Mori, Y. Geochemical characteristics of hydrothermal fluids observed along Median Tectonic Line in Mie-Prefecture, Japan. JPGU2018, 2018.05.22, Makuhari Messe. HTT18-P09

・Konomi Fudamoto, Asano Ishikawa, Jun Kitano, Ki-Cheol Shin, Ichiro Tayasu Using the otolith 87Sr/86Sr ratio to reveal the differences in habitat salinity among three sympatric ninespine sticklebacks (genus Pungitius). 6th International Otolith Symposium, April 2018, Taiwan.

・Hiromi Uno, Kseniya Lyalina, Ryosuke Tanaka, Mariko Kawamura, Takashi Haraguchi, Keisuke Koba, Ichiro Tayasu C, N, S isoscapes in estuaries to predict origin of mobile organisms. 8th Symposium on Environmental Isotope Study, 2018.12.21, RIHN, Kyoto.

・Soichiro Kusaka, Ki-Cheol Shin Zinc isotope analysis on human tooth enamel samples to reconstruct diet of the Jomon period. International Symposium: The Future of the Earth: Insights from island civilizations, 2019.03.16-2019.03.18, Granship, Shizuoka. Abstract, pp. 53

・Kimura S, Natuhara Y Influence of different farming methods on the trophic ecology of various tadpoles in paddy fields in Japan. Joint Meeting Ichthyologists and herpetologists, 2018.07.01, Rochester.

・Hiroyuki Sase, Masayuki Morohashi, Masaaki Takahashi, Tatsuyoshi Saito, Naoyuki Yamashita, Yayoi Inomata, Tsuyoshi Ohizumi, Ki-Cheol Shin, Ichiro Tayasu, Takanori Nakano Multi-isotopic approach for monitoring on atmospheric deposition in forests in Japan. European forests in a changing environment: Air pollution, climate change and forest management, 7th ICP Forests Scientific Conference, 2018.05.22-2018.05.23, Riga, Latvia. Abstracts, p.62

・Fujiyoshi L, Tayasu I, Yabusaki S, Haraguchi T, Yoshimizu C, Ohkushi K, Furukawa F, Itoh M , Yamamoto Y, Yokoyama Y, Mitsuhashi H Dynamics of sulfate and nitrate inferred from stable isotope techniques in Chikusa river watershed, Hyogo. The 8th Symposium on Environmental Isotope Study, 2018.12.21-2018.12.21, Research Institute for Humanity and Nature. (in Japanese)

Division Name: Information Resources Division

Head of Division: KUMAZAWA, Terukazu

○ Subject and Objectives

The information resources division is aiming to constructing an information hub associated with RIHN's activities.

(1) Collecting and accumulating research resources (data and information etc.) and promoting usage of them.

Printed matters and the other achievements associated with activities of projects or the institute are collected, and release from RIHN Archives and institutional repository.

(2) Researches about information technology to promote RIHN's activities

Novel information techniques or theories to contribute to activities of the institute are developed.

(3) Development of applications to use RIHN's resources

Developing of a web application RIHN Portal is in progress. It will provide function to retrieve and to show the resources accumulated in the RIHN Archives and the database of metadata related to the global environmental studies.

○ Progress and Results in 2018

Collection and accumulation of research resources

(Number of the registered into RIHN Archives in FY 2018)

bibliographic records: 559

objects: 121

electric data: 394

images: 0

(Activities about Institutional Repository in FY 2018)

Register count: 1,019

Download count: 86,529

View count: 8,350

(Total number of the registered into RIHN Archives as of 1st April)

bibliographic records: 8,772

objects: 3,223

electric data: 4,409

(Total count about Institutional Repository as of 2nd April)

Registered items: 2,751

(including 2,554 items released for public)

Researches about information technology

The following seminars and lectures were held in FY 2018.

5th Seminar
LIDAR and Archaeology
Date: 26th February 2019

6th Seminar
Digital Human Geography at Supra-Regional Scales
Date: 28th February 2019

7th Seminar
Our Sustainable Future and Local Dialects: Preservation, Archiving, and Revitalization
Date: 26th March 2019

Development of applications
In collaboration with the NIHU project the framework of the Web pages which is an entrance to access Web information resources and databases inside of RIHN including RIHN Archives was constucted. In FY 2018, themes relating with the project of Societal Adaptation to Climate Change: Integrating Palaeoclimatological Data with Historical and Archaeological Evidences, the project of Proposal and Verification of the Validity of Isotope Environmental Traceability Methodology in Environmental Studies and the Core Program were extracted, and icons about the themes were created for the web pages.

○ Future Themes

(1) Collecting and accumulating research resources

The achievements associated with activities of projects or the institute will be collected and accumulated continuously. The titles of the achievements will be translated into English or Japanese and the DOI will be added to the achievements.

(2) Researches about information technology to promote RIHN's activities

Research outcomes will be shared in the seminars, and applied to the RIHN Portal and the databases in RIHN.

(3) Development of applications to use RIHN's resources

The trial version of the RIHN Portal will be released, and icons representing the characteristics of the current projects are newly designed.

●Achievements

○Editing

【Editing / Co-editing】

- Yoshihiro Nishiaki, Seiji Kadowaki, Yasuhisa Kondo (ed.) 2018,12 PaleoAsia 2018 The International Workshop: Cultural History of PaleoAsia – Integrative Research on the Formative Process of Modern Human Cultures in Asia. PaleoAsia Project Series, 17. PaleoAsia Project Group, Tokyo, 112pp.
- Tara Beuzen-Waller, Friederike Stock, Yasuhisa Kondo (ed.) 2018,07 Special Issue Geoarchaeology: A toolbox for revealing latent data in sedimentological and archaeological records. Quaternary International, 483. Elsevier, Amsterdam, 210pp.

○Papers

【Original Articles】

- Yasuhisa Kondo, Atsushi Noguchi, Takehiro Miki, Tara Beuzen-Waller, Stéphane Desruelles, Éric Fouache 2018,09 Archaeological sites in the Wadi Al Kabir basin, Wilayat Ibri, Adh Dhahirah Governorate. The Journal of Oman Studies 18:201-227. (reviewed).

・Aiko Endo, Terukazu Kumazawa, Michinori Kimura, Makoto Yamada, Takaaki Kato, Kouji Kozaki 2018,09 Describing and Visualizing a Water–Energy–Food Nexus System. Water 10(9):1245. DOI:10.3390/w10091245 (reviewed).

・Yasuhisa Kondo, Kazuhiro Hayashi, Asanobu Kitamoto 2018,07 Multifaceted workshops to envision the future of open science with society. Proceedings of 2018 7th International Congress on Advanced Applied Informatics:466-469. (reviewed).

【Review Articles】

・Tara Beuzen-Waller, Friederike Stock, Yasuhisa Kondo 2018,07 Geoarchaeology: A toolbox for revealing latent data in sedimentological and archaeological records. Quaternary International 483:1-4. DOI:10.1016/j.quaint.2018.05.029

○Research Presentations

【Oral Presentation】

・Yasuhisa Kondo, Atsushi Noguchi, Kohei Tamura, Mitsuhiro Nakamura, Hiroyuki Kitagawa PaleoAsia DB Hackathon. The 6th Conference on Cultural History of PaleoAsia, 2018.11.17-2018.11.18, Koshiba Hall, The University of Tokyo, Bunkyo-ku, Tokyo, Japan. (in Japanese)

・Akira Saito, Yasuhisa Kondo, Nozomi Mizota, Tomoko Koyama Contribution of the digital humanities methods to the construction of an overall picture of Francisco de Toledo's reducciones. 56° Congres Internacional de Americanistas, 2018.07.15-2018.07.20, Universidad de Salamanca, Salamanca, Spain.

・Yasuhisa Kondo, Kazuhiro Hayashi, Asanobu Kitamoto Multifaceted workshops to envision the future of open science with society. IIAI AAI 2018, 2018.07.08-2018.07.13, Yonago Convention Center, Tottori.

・Sumiko Tsukamoto, Kyoko S Kataoka, Yasuhisa Kondo, Takehiro Miki, Taichi Kuronuma, Yuichi Hayakawa, Takashi Oguchi Luminescence dating of alluvial and fluvial sediments from Bat, Oman: implications to the humidity changes and human activities in the SE Arabia. Japan Geoscience Union Annual Meeting 2018, 2018.05.20-2018.05.24, Makuhari Messe, Chiba, Japan. (in Japanese)

・Jun Takakura, Yasuhisa Kondo, Hiroyuki Kitagawa The dispersals of modern humans into the Siberian Arctic in light of the paleoenvironmental reconstruction. The 5th Conference on Cultural History of PaleoAsia, 2018.05.12-2018.05.13, Motoyama Campus, Nagoya University. (in Japanese)

【Poster Presentation】

・Yasuhisa Kondo, Hideyuki Onishi, Yoko Iwamoto Lexical analysis of the concept of culture in the PaleoAsia project. PaleoAsia 2018 International Workshop, 2018.12.15-2018.12.18, Kyoto International Conference Center and Research Institute for Humanity and Nature (Kyoto, Japan).

・Yasuhisa Kondo, Yoko Iwamoto Network analysis of the interdisciplinary co-authorship of the PaleoAsia project. PaleoAsia 2018 International Workshop, 2018.12.15-2018.12.18, Kyoto International Conference Center and Research Institute for Humanity and Nature (Kyoto, Japan).

・Yasuhisa Kondo, Yoko Iwamoto Visualization of the interdisciplinary collaboration network of the PaleoAsia Project. The 6th Conference on Cultural History of PaleoAsia, 2018.11.17-2018.11.18, Koshiba Hall, The University of Tokyo, Bunkyo-ku, Tokyo, Japan.

・Yasuhisa Kondo, Atsushi Noguchi, Takehiro Miki, Taichi Kuronuma, Hiroyuki Kitagawa Archaeological survey of prehistoric sites in Oman: The discovery of Wadi Tanuf Cave 1. The 5th Conference on Cultural History of PaleoAsia, 2018.05.12-2018.05.13, Motoyama Campus, Nagoya University. (in Japanese)

・Hideyuki Onishi, Yasuhisa Kondo, Yoko Iwamoto Perspectives of Human Behavior as Culture A Case Study on Lexical Analysis of "Cultural History of PaleoAsia". The 5th Conference on Cultural History of PaleoAsia, 2018.05.12-2018.05.13, Motoyama Campus, Nagoya University. (in Japanese)

【Invited Lecture / Honorary Lecture / Panelist】

・Yasuhisa Kondo Data-driven approach to identify early modern humans' ecological niche and optimal dispersal routes in Eurasia. Landscape Archaeology Conference 2018, 2018.09.17-2018.09.20, Newcastle University and Durham University, UK.

・Yasuhisa Kondo JpGU-AGU Great Debate: Role of Open Data and Open Science in Geoscience. Japan Geoscience Union Annual Meeting 2018, 2018.05.23, Makuhari Messe, Chiba, Japan. A panelist

Division Name: Collaboration Division

Head of Division: ISHII, Reiichiro

○ Subject and Objectives

The Collaboration Division fosters research collaborations between RIHN and research institutions and organizations in Japan and abroad and also provides the organizational infrastructure for capacity building. It facilitates the conclusion of collaborative agreements with research institutions and local governments in Japan and abroad, the planning of collaborative research, and the development of proposals for new RIHN projects. While providing a forum for broad information exchange and discussion of research on global environmental problems, the Division also undertakes the development, maintenance and organization of advances personal, financial and institutional networks.

Based on the results of RIHN research projects, the Division further fosters active engagement with international research agenda setting and helps to enhance the presence of RIHN in the international research community. To this end, it serves as an international research hub, including by hosting the Regional Center for Future Earth in Asia.

Furthermore, in order to promote global environmental research and capacity building in Japan and the Asia region, together with the other Divisions it provides the necessary organizational and financial basis and supports the development and mobilization of capacity for inter- and trans-disciplinary research with researchers and societal stakeholders in Japan and Asia.

○ Progress and Results in 2018

1. Information Collection: Organizing seminars and workshops (with participation of research institutions and governments from Japan and abroad)

Held RIHN Seminars No. 158 to 168.

2. Building Collaborations: Supporting the conclusion and renewal of MoUs and Comprehensive Agreements with research and government institutions in Japan and abroad and collaborations for university education.

The Division supported the conclusion and renewal of thirty MoUs and Comprehensive Agreements with research and government institutions in Japan and abroad.

3. Management: Activities of the Future Earth Regional Center for Asia

In its role as host of the Regional Center for Future Earth in Asia, the Division organized meetings, workshops and capacity building activities relating to the Future Earth Program and maintained the Future Earth Asia website. In doing so it contributed to the development of national and regional networks engaged in the activities of Future Earth and the development of research agendas. In particular, it supported the development of the Knowledge-Action Network on Systems of Sustainable Consumption and Production and of thematic collaborations on air pollution and human health.

◇Organizing Symposia, seminars and committee meetings

・Special Lecture "Future Earth: Recent Developments" by Amy Luers, Future Earth Executive Director (October 2018, RIHN)

・ Future Earth Regional Workshop: How regional entities can engage in Future Earth global initiatives (October 2018, RIHN)

・Session “Future Earth in Asia: Regional and National Perspectives”at the 18th Conference of the Science Council of Asia (December 2018, Science Council of Japan)

◇Division staff participated in conferences and committee meetings related to the Future Earth as the representatives of the Regional Centre for Future Earth in Asia to collect relevant information and to enhance collaboration in Japan and abroad.

・Science Council of Japan Future Earth Promotion and Collaboration Committee meeting (8 August, 27 February 2019, Science Council of Japan）

・Future Earth National Committee for Japan meeting (17 May 2018, Science Council of Japan, 2 February 2019, The University of Tokyo)

・Future Earth Japan National Collaboration Sub-committee meeting/Steering Committee Meeting for Future Earth Japan National Committee (17 May 2018, Science Council of Japan)

・Future Earth Governing Council/Advisory Committee meetings and Future Earth Regional meeting (26-29 April, Montevideo, Uruguay)

◇Supported the development of the Knowledge-Action Network on Systems of Sustainable Consumption and Production (KAN-SSCP)

・Research and Engagement Plan approved by the Future Earth Executive Team (August 2018)

・Governance structure reorganized: Management Team and Steering Committee launched, reorganized from the Coordinating Team and Development Team.

・Session on “Demographic contraction and post-consumerism in contemporary Japan: Challenges, realities and benefits” at the World Social Science Forum 2018

(25-28 September 2018, Fukuoka)

◇Developed and updated contents for the website of the Regional Centre for Future Earth in Asia http://www.old.futureearth.org/asiacentre/ja

◇Updated contents on the Facebook for the Regional Centre for Future Earth in Asia https://www.facebook.com/futureearth.asiacentre

4. Obtaining external funds (Organizing meetings/workshops and writing proposals)

◇NIHU project: New Development in Ecohealth Research in Asia （Director：Hein Mallee）

The Project organized lectures and presentations on multiple occasions including the 1st Asia Forum on Ecohealth Research（November 2018, Haikou, China）and conducted field studies on “Health in daily life and conception of health by the local people”(January 2019, Hainan, China). The Project also published the Special Issue about Ecohealth Research of the Japanese Journal of Health and Human Ecology (Vol. 85(2019)). The Project disseminated research results and enhanced its network through those occasions.

◇Shortlisted to be interviewed for the MEXT Grant-in-Aid for Scientific Research on Innovative Areas with a proposal entitled “New Science for Sustainable Anthropocene” with Prof. Yasunari as the Director (hearing in May 2018).

5. Outreach : Organization of poster displays, presentations, lectures and seminars at academic meetings and publication of papers, books and pamphlets

◇JpGU-AGU Joint Meeting 2018（2018/5/20-5/24 Chiba）

Set up and maintained a booth for RIHN to present its research and results. Also conducted a presentation about the analysis of the process and outcome and insights obtained in relation to the development of the “Future Earth-GRPs integration for global environmental research”.

◇Lecture series for Doshisha University Science and Engineering Department（2018/5/11-6/29, Doshisha University）

Organized an 8-session lecture series on Environmental System to be conducted by RIHN early-career researchers for the freshmen of the Department of Science and Engineering of the Doshisha University.

◇Lectures on Environmental Studies for Peking University （2019/3/19, Peking University）

Conducted lectures in collaboration with Peking University. Seven lecturers participated from RIHN and gave lectures to students and lecturers of Peking University.

◇Contributed as principal authors to the Assessment Report on the Asia Pacific Region of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) (Reiichiro Ishii and Yuko Onishi)

○Project Members

◎ ISHII Reiichiro (Research Institute for Humanity and Nature, Associate Professor, Head of Division)
MALLEE, Hein (Research Institute for Humanity and Nature, Professor)
ONISHI Yuko (Research Institute for Humanity and Nature, Assisitant Professor)
JIANG, Hong-wei (Research Institute for Humanity and Nature, Specially Appointed Assistant Professor, EcoHealth)
OKA Masami (Research Institute for Humanity and Nature, Research Associate)
OKAMOTO Takako (Research Institute for Humanity and Nature, Research Associate)

●Achievements

○Books

【Chapters/Sections】

・Tetsuzo Yasunari, Hein Mallee, and Reiichiro Ishii 2018,10 Asia's Sustainability Challenges and Future Earth. Tom Beer, Jianping Li, Keith Alverson (ed.) Global Change and Future Earth. Cambridge University Press, pp.388-397. DOI: 10.1017/9781316761489

○Papers

【Original Articles】

・Hein Mallee・Kazuhiko Moji 2019,01 Health humanities. Japanese Journal of Health and Human Ecology 85(1):3-5. (reviewed).

○Research Presentations

【Oral Presentation】

・Hein Mallee Future Earth Regional Centre for Asia. Future Earth Governing Council Meeting, 2018.04.28, Uruguai, Montebideo.

Division Name: Communication Division

Head of Division: ABE, Ken-ichi

○ Subject and Objectives

The basis of the Communication Division activities is “knowledge-networking”: reediting an isolated and diffused knowledge information and presenting them as a new knowledge/concept.

There are three supporting activities. Firstly, we review a new result transmission technique, which helps us to construct the platform fostering bidirectional knowledge information, in the transdisciplinary era through the method development such as practically using video resources. Secondly, considering environmental education as a great opportunity to exchange knowledge information with the next generation, “RIHN-Environmental Education Method” and its materials will be developed with gathered and integrated RIHN research project achievements. Finally, we are engaged in works related to the creation of new ideas and values, aims to establish a new-value-creating-methodology by organizing results of activity fruits and higher-order connecting knowledge information of RIHN projects.

○ Progress and Results in 2018

【Research Development of Achievement Transmission Technique in the Transdisciplinary Era】

Plan❶ Development a method of research result

・Making an Exhibition 360 camera movie, VR and projection mapping in Mumokuteki café Kyoto.

・As a new research information transmission that incorporates art, conducted a theater Workshop “The pleasure of farming: connecting rural of Asia in theater workshops”

Plan❷ Enhancement of cooperation with relevant organizations

・Meetings with Ritsumeikan University, College of Image Arts and Sciences and Kim Satbyul(Specially appointed assistant professor, RIHN Center) to discuss effective methods towards result transmission and current trend.

Plan❸ Improvement of contents

・Transmission of project research results on Video and Social media (1. “life with soil” directed by Yuya Takeda: Ritsumeikan University & Yutaka Mimura:RIHN Center, 2. “Global Important Agricultural Heritage System Takachihogo-Shiibayama Site Takachiho, Hinokage, Gokase, Morotsuka, Shiiba—Ordinary Is Extraordinary” produced by RIHN and NHK Educational Corporation). A video work was presented to the public in the 13th International Symposium “Humanities on the Ground: Confronting the Anthropocene in Asia”, organized by RIHN.

【Research and Development of Materials for Environmental Education】

Plan❶ Host a gathering of Environmental education

・Conducted classes in Rakuhoku Senior High School and Hokuryo Senior High School students (1st and 2nd grade) coordinated by RIHN and published the results as a report booklet.

Plan❷ Development of materials for environmental education

・Cooperation with Rakuhoku Senior High School and Hokuryo Senior High School students, presentation at RIHN Open House and the Earth Hall of Fame KYOTO, and targeted school teachers training.

【New Ideas and Values Creation through knowledge information networking】

Plan❶ Host a seminar

・“Knowledge Creation Seminar” for two times in collaboration with Honen-in temple Kyoto and Kyoto Seika University.
・〝Dialogue: the way of view on the nature in Japan” in collaboration with Expo ’90 Foundation, The Earth Hall of Fame Kyoto

Plan❷ Survey with RIHN project members

・Local related seminar in the project commissioned from Hinokage town, Miyazaki Prefecture, with the FEAST project

Others

①Research Development of Achievement Transmission Technique in The Transdisciplinary Era

・We have searched the conservation condition of image contents cooperatively with Information Infrastructure Department, RIHN Center. We are now proceeding with data conversion to be able to watch and preparing for release.
・Yutaka Mimura (RHIN Center) was supported by a grant from the Kochi Cultural Foundation, coordinated a workshop in collaboration with local residents, artists and Kochi University at Nuta Village, Otoyo-cho, Nagaoka District, Kochi Prefecture. Produced folk songs as an outcome method of trans-disciplinary research, and contributed to the recording and dissemination of local communities.

②Research and Development of Materials for Environmental Education

・We held exhibition of the International Children’s Painting on the Environment and introduced totally 150 painting to the public in the annual event “Kyoto Environment Festival 2018”, organized by Kyoto Prefecture.

③New Ideas and Values Creation through knowledge information networking

・”Forum of Person engaged in Globally Important Agricultural Heritage System” held in RIHN. Person engaged in GIAHS joined from 8 GIAHS sites in Japan.
・Create short movie about Miyazaki GIAHS site with English sub, that is for cleating “Civic Pride”. This work is in collaborate with Miyazaki Prefecture.

○**Members**

◎ ABE Ken-ichi	(Research Institute for Humanity and Nature,Professor,Ecological Anthropology)
○ NILES,Daniel	(Research Institute for Humanity and Nature,Associate Professor,Geography)
○ MIMURA Yutaka	(Research Institute for Humanity and Nature,Researcher,Architectural History, Urban History, Historical GIS)
○ SHIMADA Nahoko	(Research Institute for Humanity and Nature,Researcher,Study of Ecological thought)
○ KISHIMOTO Sayaka	(Research Institute for Humanity and Nature,Research Associate,International Collaboration Studies)

●Achievements

○Books

【Chapters/Sections】

・Niles, Daniel 2018,04 Agricultural Heritage and Conservation Beyond the Anthropocene. Angela M. Labrador and Neil Asher Silberman (ed.) The Oxford Handbook of Public Heritage Theory and Practice . Oxford University Press. DOI:10.1093/oxfordhb/9780190676315.013.2

○Papers

【Review Articles】

・Daniel Niles and Narifumi Tachimoto 2018,10 Science and the experience of nature. Nature Sustainability 1:540-543. DOI: 10.1038/s41893-018-0124-y (reviewed).

○Research Presentations

【Oral Presentation】

・Daniel Niles Highlands as cultural-ecological nexus territory: An example from Northern Thailand. 2019 RIHN FEAST Project General Assembly, 2019.01.13-2019.01.14, Kyoto.

・Daniel Niles Humanities on the ground: The everyday aesthetics of lived environmental experience. RIHN International Symposium, 2018.12.12-2018.12.15, Kyoto.

・Daniel Niles Linking the mental and the material: Tracing the patterns of environmental knowledge. Workshop of the Center for Japanese Studies + Department of Anthropology, 2018.11.09-2018.11.10, U.C.Berkeley.

・Daniel Niles Return of the basket: On art, aeshetics, and ecology. Archaelolgical Research Facility, Department of Anthropology, 2018.10.31, U.C.Berkeley.

・Daniel Niles Confronting the Anthropocene in Asia. World Social Science Forum, 2018.09.25-2018.09.28, Fukuoka.

・Daniel Niles The ecosystems of everyday life. RIHN Seminar for the "Humanities for the Environment" project proposal, 2018.09.21, Kyoto.

・Daniel Niles A Knowledge-based approach to agricultural heritage. Nan Province Workshop on Globally Important Agricultural Heritage Systems, 2018.07.24, Nan City(Thailand).

・Daniel Niles Globally Important Agricultural Heritage Systems: Key concepts. Nathional Workshop on Globally Important Agricultural Heritage Systems, 2018.07.19, Khon Kaen(Thailand).

・Daniel Niles Globally Important Agricultural Heritage Systems: Cultural Dimensions. Nathional Workshop on Globally Important Agricultural Heritage Systems, 2018.07.19, Khon Kaen(Thailand).

・Daniel Niles Globally Important Agricultural Heritage Systems: Proposal process. Nathional Workshop on Globally Important Agricultural Heritage Systems, 2018.07.19, Khon Kaen(Thailand).

・Daniel Niles The challenge of deep transdisciplinarity. Kyoto Transdisciplinary & Transnational Forum, 2018.06.03, Kyoto.

【Invited Lecture / Honorary Lecture / Panelist】

・Daniel Niles Globally Inportant Agriculture Heritage Systems(GIAHS) and the future of sustainable agriculture. GIAHS Seminar, 2018.12.08, Wakayama.

・Daniel Niles Sustainability and the natures of environmental knowledge. Guest Lecture, 2018.10.30, U.C.Berkeley.

Outreach Programs and Events

1. RIHN International Symposium

In order to diffuse the findings of FR projects, the RIHN 13th International Symposium "Humanities on the Ground: Confronting the Anthropocene in Asia" was held on 13-14 December 2018 at the Lecture Hall, RIHN. The details of the symposium are as follows.

RIHN 13th International Symposium

<Wednesday, December 13>

Plenary Session

Chair: Hein MALLEE (RIHN)

Welcome and Opening Remarks: YASUNARI Tetsuzo (Director-General, RIHN)

Introduction to Plenary Session: Hein MALLEE

Keynote Address: Risk and Responsibility in the Anthropocene
Sheila JASANOFF (Harvard University, USA)

Session 1: Knowledge, science, and the experience of nature

Introduction to Session 1
Kaoru SUGIHARA and Masahiro TERADA

Global History of Science as a Knowledge Resource for the Anthropocene
Matthias SCHEMMEL (Max Planck Institute for the History of Science, Germany)

The Emergence of Queer Nature in Modern Science: Minakata Kumagusu (1867-1941) and Microbial Knowledge
Eiko HONDA (University of Oxford, UK)

Morally Attuning to, and Living in, the Changing Weather: A Case from Farmers of Northern Thailand
Chaya VADDHANAPHUTI (Chiang Mai University, Thailand)

Humanities on the Ground: The Everyday Aesthetics of Lived Environmental Experience
Daniel NILES (RIHN)

Why Anthropocene History is not Environmental History: Clearing the Ground for a New Field
Julia Adeney THOMAS (University of Notre Dame, USA)

Discussion
Katrin KLINGAN (Haus der Kulturn der Welt [HKW], Germany)
Christoph ROSOL (HKW/Max Planck Institute for the History of Science, Germany)
Discussants

<Thursday, December 14>

Session 2: Facing the ever-present agency of environment

Chair: Daniel NILES (RIHN) and Kazuhiko OTA (RIHN)

Introduction to Session 2
Daniel NILES and Kazuhiko OTA

Retrieving Earthliness: Philosophy and Practice of Natural Farming in Japan
Augustin BERQUE (École des Hautes études en Sciences Sociales, France)

Thinking about Politics beyond the Human: Towards a Multispecies Conception of Political Membership and Stakeholding in our Planet's Future
Maya KÓVSKAYA (AMOR MUNDI Guerilla Think Tank for Ecological Justice, Anthropocene Research and Curatorial Platform, Thailand/USA)

First, Love the Volcano: Forming Geological Kinships in Japan

Emily SEKINE (The New School for Social Research, USA)
Postwar Typhoons and the Reshaping of Japan's Environment
Julia Mariko JACOBY (Max Planck Institute for the History of Science, Germany)
Discussion
Chair: SAIJO Tatsuyoshi (RIHN)
Akio TANABE (The University of Tokyo, Japan), Discussant

Session 3: Management systems of the Anthropocene
Chair: Steven MCGREEVY (RIHN) and Christoph RUPPRECHT (RIHN)
Introduction to Session 3
Steven MCGREEVY and Christoph RUPPRECHT
Being Affected by Sinking Deltas: Changing Landscapes, Resilience and Complex Adaptive Systems in the Scientific Story of the Anthropocene
Atsuro MORITA (Osaka University, Japan)
Digital Control and the Earth Ecosystem Will the Governance of the Anthropocene be Designed in East Asia?
Stéphane GRUMBACH (INRIA & ENS Lyon, France)
Sustainable Urban Systems, a Research Agenda
Stephanie PINCETL (Institute of the Environment and Sustainability, University of California, Los Angeles, USA)
Discussion
Soraj HONGLADAROM (Chulalongkorn University, Thailand)
Kyoko SATO (Stanford University, USA)
Discussants

General Discussion
Chair: Hein MALLEE (RIHN)
Discussion across All Sessions,
Comments by Sheila JASANOFF (Harvard University, USA)
Closing Remarks
Kaoru SUGIHARA (RIHN)

<Friday, December 15>
Anthropocene on the ground
Workshop at Shibunkaku Gallery, Kyoto
Erasing and revealing
Exercise by ZHENG Chongbin (Independent artist, China/USA)
Earthbound knowledge: The Anthropocene Curriculum
Christoph ROSOL and Katrin KLINGAN (Haus der Kulturn der Welt Berlin/Max Planck Institute for the History of Science, Germany)
Anthropocene Curriculum East Asia
Short contributions by Eiko HONDA, Maya KÓVSKAYA, Daniel NILES and Masahiro TERADA
Discussion

2. Symposium of Environmental Isotope Study

Joint research grant for Environmental Isotope Study has conducted multidisciplinary joint researches using various isotope analysis facilities RIHN has maintained. To exchange research information and promote the Environmental Isotope Study network, "Symposium of Environmental Isotope Study" has been held once a year since 2011.

The 8th Annual Symposium of Environmental Isotope Study
Date: 21 December, 2018
Venue: RIHN

3. RIHN Public Seminars

In order to present RIHN research activity in a manner that accessible to the general public, since November 2004, RIHN has offered public lectures. Three seminars were held in 2018 at the Heart Pier Kyoto.

RIHN staff offer accessible explanations of global environmental problems, and the Public Seminars have stimulated engrossing discussions of contemporary environmental concerns.

The 77th Public Seminar 8 June, 2018
"After rain comes fair weather"—Terrible but deep relationships between climate variation and Japanese history
NAKATSUKA Takeshi (RIHN)

The 78th Public Seminar 11 October, 2018
Ecosystem-based Disaster Risk Reduction in the era of climate change
YOSHIDA Takehito (RIHN)
MASUHARA Naoki (RIHN)

The 79th Public Seminar 12 March, 2019
Peatland exploitation and environment in Indonesia with the perspectives on the relation between Indonesia (natural resource rich and exporting country) and Japan (natural resource import and manufactured goods exporting country)
MIZUNO Kosuke (RIHN)
YAMANAKA Manabu (RIHN)

4. Kyoto Municipal Science Center For Youth "Future Scientist Training Course"

RIHN has concluded an agreement on collaboration with Kyoto Municipal Science Center For Youth since 2011. In the fiscal year 2018, RIHN cooperated with Future Scientist Training Course as below. The whole course has organized by the Science Center For Youth, for elementary and junior high school students in Kyoto.

(Summer)
Date: 30 July, 2018
Venue: RIHN
Lecturer: SHIODERA Satomi (RIHN)

5. RIHN Open House

In order to introduce RIHN's research projects and facilities to the surrounding community, RIHN has opened our buildings to the public once a year since 2011. Several interesting events such as joint experiments, public talks, exhibitions, and games were conducted in order to deepen our interaction with local citizens in fiscal 2018.

Date: 27 July, 2018
Venue: RIHN

6. RIHN Area Seminars

The RIHN Area Seminars offer an opportunity for RIHN research staff to gather with regional intellectuals and local citizens to consider problems related to the environment and culture of each area of Japan. The first seminar was held in 2005. The fiscal year 2018, six seminars were held as below.

The 22nd RIHN Area Seminar (Hokkaido)
"Considering the lives and health of people from local and global viewpoints"
Date: 30 June 2018
Venue: Department of Health Sciences, School of Medicine, Hokkaido University

The 23rd RIHN Area Seminar (Kyoto)
"Towards bee-friendly cities - co-creating urban futures"
Date: 4 November 2018
Venue: Nakagyo Ward Office

The 24th RIHN Area Seminar (Hinokage)
"Heritage for Future: Humanity and Nature in Hinokage, Miyazaki"
Date: 23 November 2018
Venue: Hinokage Town Fukushikan

The 25th RIHN Area Seminar (Shiga)
Date: 2 December 2018
Venue: Lake Biwa Museum

The 26th RIHN Area Seminar (Osaka)
"How did our ancestors confront the climate variations? - From Yayoi era to Early Modern era –"
Date: 16 December 2018
Venue: Osaka Museum of History

The 27th RIHN Area Seminar (Kyoto)
"Future Design in Kyoto"
Date: 27 March 2019
Venue: TKP Garden City Kyoto

7. RIHN Tokyo Seminar

In order to gain the attention of researchers and the general public and to promote research cooperation and development, RIHN periodically holds seminars in Tokyo. We invite renowned Japanese researchers as well as public officials to discuss RIHN research project objectives and findings. The seminar was held in fiscal 2018 as below.

10th Tokyo Seminar

"Global Environment and Lifestyle: Learning in the Anthropocene III"
Date: 15-16 December, 2018
Venue: University of Tokyo

8. The Earth Forum Kyoto; International Symposium

RIHN, Kyoto Prefecture, Kyoto City, Kyoto University, and Kyoto Prefectural University co-host this forum in order to clearly convey our message of the importance of environmental issues to the world. The symposium was held in fiscal year 2018 as below.

The Earth Forum Kyoto; International Symposium

Date: 9 February, 2019
Venue: Kyoto International Conference Center

9. The Earth Hall of Fame KYOTO

The Earth Forum Kyoto invites world-renowned experts and activists to discuss the environmental and cultural bases of more responsible human societies. The Earth Hall of Fame Kyoto Award is given to those who have made exemplary contributions to the protection of the global environment. Organizers of the event are the International Institute for Advanced Studies, the Kyoto International Conference Centre, and RIHN.

The 2018 recipients of the Earth Hall of Fame Kyoto Award:

Christiana Figueres (Diplomat/Former Executive Secretary of the UN Framework Convention on Climate Change (UNFCCC))
Yamaori Tetsuo (Religious Scholar)
Ego Lemos (Singer/Environmentalist)

10. RIHN Seminars

RIHN Seminars are invited talks by esteemed Japanese or foreign researchers. The seminars provide opportunities for RIHN scientists to learn of the latest topics and research directions in a variety of fields; they also often are a first step toward future research collaborations between RIHN researchers and those of other institutions. Seminars are held several times a year.

158th	14 May, 2018 at RIHN Lecture Hall Hayanon's Science Manga: To Enhance Academic Outereach and Communication Hayanon (Hayanon's Science Manga Studio)
159th	18 May, 2018 at RIHN Lecture Hall Transcendence in international politics: science of paradigm shift NAKANISHI Hisae(Professor, Global Society Studies Cluster)
160th	5 June, 2018 at RIHN Seminar Rooms 1 & 2 Sanitation technologies and selection strategy for urban slum, peri-urban and rural communities

Aileen Huelgas-Orbecido (Associate Professor, Chemical Engineering Department, De La Salle University, Philippines)

161st 25 July, 2018 at RIHN Seminar Rooms 3 & 4
Promoting local food for upland sustainable development: Local coffee in Northern Thailand
Sittidaj Pongkijvorasin (Visiting Research Fellow, RIHN / Associate Professor, Faculty of Economics, Chulalongkorn University)

162nd 9 August, 2018 at RIHN Seminar Rooms 3 & 4
Engaging the future: Initiatives of the local community in the revival of the Vernacular Architecture in Oman
Naima Benkari (Visiting Research Fellow, RIHN / Assistant Professor, Sultan Qaboos University, Oman)

163rd 18 September, 2018 at RIHN Seminar Rooms 3 & 4
Humanity, nature, and our digital future
Is the digital revolution a mere consequence of global warming
Dr. Stephane Grumbach, an invited scholar from Institut National de Recherche en Informatique et Automatique (INRIA), France

164th 12 October, 2018 at RIHN Lecture Hall
Water - Bloodstream of the biosphere
Prof. Malin Falkenmark(Senior Advisor, Stockholm International Water Institute (SIWI)

165th 21 October, 2018 at Yoshida Campus, Kyoto University
Japanese View of Nature — Interdisciplinary Dialogue on the "Nature and Humanity"
BERQUE, Augustin Laurent Pierre (Retired Professor, Ecole des hautes etudes en sciences sociales (EHESS))

166th 17 December, 2018 at RIHN Seminar Rooms 3 & 4
Imagining and enacting sustainability transformations: foresight and gaming as anticipatory governance
Joost Mattheus Vervoort(Visiting Research Fellow/Assistant Professor, Copernicus Institute of Sustainable Development, Utrecht University, the Netherlands)
Astrid Mangnus(PhD Candidate, Copernicus Institute of Sustainable Development, Utrecht University, the Netherlands)

167th 20 March, 2019 at RIHN Seminar Rooms 1 & 2
Potentiality and Sustainable Management Strategy of Peatland in Bangladesh
Dr. MD Rostom Ali (Visiting Research Fellow/Professor, Bangladesh Agricultural University)

168th 18 March, 2019 at RIHN Seminar Rooms 1 & 2
The Tasks and Possibilities of Transdisciplinary Research - How is the Cooperation of Stakeholders with Different Interests (im)possible?

11. Lunch Seminars (Danwakai)

Lunch Seminars allow all RIHN research staff, including visiting professors, part-time researchers, foreign researchers and so on, to freely present their individual research to their colleagues in an informal and supportive forum. As these seminars promote creative thinking and constructive debates, they are held on a biweekly basis.

295th 29 May 2018
Long coastlines of the Indonesian "maritime continent" controlling global climate
YAMANAKA Manabu (Research Department, Researcher)

296th 19 June 2018
Category, indigenous people and peatland: Anthropological study on the eastern coast of Sumatra

OSAWA Takamasa (Research Department, Researcher)

297th 17 July 2018
Tropical peat swamp forests: past and future
SHIODERA Satomi (Research Department, Researcher)

298th 7 August 2018
Landscape in the Sea Mist
KAMAUCHI Hiromitsu (RIHN Center, Researcher)

299th 18 September 2018
Introduction of my previous research (Heavy metal pollution on farmland; Environmental education in Taiwan) and Eco-DRR research for now (land use simulation in Shiga)
Wanhui HUANG (Research Department, Researcher)

300th 30 October 2018
Insights on Human and Forest Relations based on my field work on Cardamon production sites in Cambodia
ISHIBASHI Hiroyuki (Research Department, Researcher)

301st 20 November 2018
Tale of 3 cities, 1 municipality and 3 villages in the Sta. Rosa subwatershed
Ria Lambino (Research Department, Researcher)

12. RIHN General Meeting (RGM)

RIHN researcher, office staffs, and outside research collaborators gather to review the year's progress. All project leaders present their research findings and accomplishments and receive questions from the floor.

Attracting 304 attendees in its three-day duration, the annual meeting generated dialogue among RIHN researchers and improved general awareness of RIHN's progress and evolution within the larger fields of environmental research.

Date: 28 - 30 November, 2018
Venue: Co-op inn Kyoto

13. Press Conferences

RIHN holds official press conferences in order to release information on its academic activities, research projects, symposia, publications and latest environmental findings. As a public institution with a public mandate, such activities provide an important link between RIHN and the citizenry. In fiscal 2018, press conferences were held as below.

The 1st Press Conference in FY2018
Date: 15 May, 2018
Venue: Kyoto Karasuma Convention Hall, Meeting room3

The 2nd Press Conference in FY2018
Date: 22 March, 2019
Venue: Kyoto Karasuma Convention Hall, Meeting room1

14. Publications

14-1 RIHN Series

"Role of biodiversity in recovery after disaster: Green reconstruction from the Great East Japan Earthquake"
Edited by Tohru Nakashizuka, Masakado Kawata, Makiko Imai and Yuko Kishikami (in Japanese)

14-2 RIHN Science Series

"Biosphere reserves: Nature conservation fostered by practices in local communities"
Edited by MATSUDA Hiroyuki, SATO Tetsu and YUMOTO Takakazu (in Japanese)

14-3 Others

"Global Climatology: Variability, Change and Evolution of Climate System"
Edited by YASUNARI, Tetsuzo (in Japanese)

"Water-Energy-Food Nexus regarding Geothermal Resource: Towards Inter-disciplinary and Trans-disciplinary Approaches"
Edited by Kenshi Baba, Naoki Masuhara, Aiko Endo (in Japanese)

"Transformations of Social-Ecological Systems Studies in Co-creating Integrated Knowledge Toward Sustainable Futures"
Edited by Sato, Tetsu, Ilan Chabay, Jennifer Helgeson

14-4 RIHN News: Humanity & Nature Newsletter

This periodical communicates RIHN identity and latest news to specific research communities. The newsletter is published in an A4 format with easy-to read content. Issues 72-76 were published in fiscal year 2018.

Individual Achievements

A	AKIMICHI Tomoya	Emeritus Professor
	ABE Ken-ichi	Professor
	ADACHI Kaori	Visiting Researcher
	AKIMICHI Tomoya	Emeritus Professor
	ASANUMA-BRICE, Cécile	Visiting Professor
B	BERQUE, Augustin Laurent Pierre	Invited Scholar
E	ENDO Aiko	Visiting Associate Professor
F	FUJII Shigeo	Visiting Professor
	FUJIYOSHI Rei	Researcher
G	GRUMBACH, Stephane Marie	Invited Scholar
H	HABU Junko	Visiting Professor
	HAYASHI Hiroaki	Visiting Professor
	HAYASHI Koji	Researcher
	HAYASHIDA Sachiko	Visiting Professor
	HOMMA Saki	Research Associate
	HUANG, Wan Hui	Researcher
I	IKEYA Tohru	Researcher
	IMAIZUMI Aki	Researcher
	ISHIBASHI Hiroyuki	Researcher
	ISHIDA Takuya	Researcher
	ISHII Reiichiro	Associate Professor
	ISHIKAWA Satoshi	Visiting Professor
	ITO Keisuke	Researcher
	IWAMOTO Yoko	Research Associate
J	JIANG, Hong-wei	Research Fellow NIHU for Area Studies
K	KAJITA Ryosuke	Researcher
	KAMATANI Kaoru	Visiting Associate Professor
	KAMAUCHI Hiromitsu	Researcher
	KANEMOTO Keiichiro	Associate Professor
	KANIE Norichika	Visiting Professor
	KARATSU Fukiko	Research Associate
	KASUGA Fumiko	Visiting Professor
	KATO Yoshikazu	Researcher
	KATSURA Tomomi	Research Associate
	KAWASAKI Masahiro	Visiting Professor
	KIKUCHI Naoki	Visiting Associate Professor
	KIM Satbyul	Research Fellow NIHU for Area Studies
	KIMURA Ayako	Research Associate
	KISHIMOTO Sayaka	Research Associate
	KOBAYASHI Kunihiko	Researcher
	KOBAYASHI Mai	Researcher
	KOBAYASHI Yuko	Research Associate
	KOHSAKA Ryo	Visiting Professor
	KONDO Yasuhisa	Associate Professor
	KOZAN Osamu	Visiting Associate Professor
	KUMAZAWA Terukazu	Associate Professor
	KURATA Junko	Research Associate
	KURIU Harumi	Research Associate
	KUSAGOU Takayoshi	Visiting Professor
L	LAMBINO, Ria Adoracion Apostol	Researcher

	LEE, Sanghyun	Researcher
	LI, Zhen	Researcher
M	MALLEE, Henricus Paulus	Professor
	MASUHARA Naoki	Senior Researcher
	MATSUDA Hirotaka	Visiting Associate Professor
	MATSUMOTO Takuya	Visiting Researcher
	MATSUOKA Yuko	Research Associate
	MC GREEVY, Steven Robert	Associate Professor
	MIMURA Yutaka	Researcher
	MIURA Tomoko	Research Associate
	MIZUMA Sakiko	Research Associate
	MIZUNO Kosuke	Professor
	MOREAU, Yoann	Visiting Associate Professor
	MORI Koichiro	Visiting Professor
	MORIKAWA Mika	Research Associate
	MURATA Fumi	Research Associate
	MYO HAN HTUN	Research Associate
N	NAKAGAMI Ken'ichi	Visiting Professor
	NAKAHARA Satoe	Researcher
	NAKAI Minami	Research Associate
	NAKAO Seiji	Researcher
	NAKASHIZUKA Tohru	Specially Appointed Professor
	NAKATSUKA Takeshi	Professor
	NILES, Daniel Ely	Associate Professor
	NISHIDA Takaaki	Researcher
	NITZCHE, Kai	Visiting Researcher
O	OH Tomohiro	Visiting Researcher
	OHTA Kazuhiko	Researcher
	OKA Masami	Research Associate
	OKABE Akiko	Visiting Professor
	OKAMOTO Takako	Research Associate
	OKUDA Noboru	Associate Professor
	OMORI Yasuhiro	Visiting Professor
	ONISHI Yuko	Assistant Professor
	OSAWA Takamasa	Researcher
R	RAMPISELA, Dorotea	Visiting Professor
	RUPPRECHT, Christoph David Dietfried	Senior Researcher
S	SAIJO Tatuyoshi	Specially Appointed Professor
	SAITO Yu	Researcher
	SAKAKIBARA Masayuki	Professor
	SEKINO Tatsuki	Professor
	SENDA Masako	Research Associate
	SHIBATA Akira	Visiting Professor
	SHIBATA Rei	Researcher
	SHIMADA Nahoko	Researcher
	SHIMAUCHI Risa	Research Associate
	SHIMIZU Takao	Researcher
	SHIN, Kicheol	Associate Professor
	SHINKAI Rika	Visiting Researcher
	SHIODERA Satomi	Researcher

	SHIRAIWA Takayuki	Visiting Associate Professor
	SPIEGELBERG, Maximilian	Researcher
	SUDA Masashi	Visiting Researcher
	SUETSUGU Satoko	Research Associate
	SUGIHARA Kaoru	Specially Appointed Professor
	SUZUKI Haruka	Researcher
	SUZUKI Takami	Visiting Professor
T	TAKEHARA Mari	Research Associate
	TAKESHIMA Hirohiko	Visiting Researcher
	TAKEUCHI Kiyoshi	Visiting Associate Professor
	TAMURA Norie	Senior Researcher
	TANAKA Ueru	Visiting Professor
	TANIGUCHI Makoto	Professor
	TAYASU Ichiro	Professor
	TERADA Masahiro	Visiting Associate Professor
	TOYAMA Mari	Specially Appointed Associate Professor
	TSUSHIMA Akane	Researcher
U	UEDA Sachiko	Research Associate
	UEHARA Yoshitoshi	Researcher
W	WANG-ERLANDSSON, Lan	Visiting Researcher
	WATANABE Kazuo	Visiting Associate Professor
	WATANABE Kirie	Research Associate
Y	YABUSAKI Shiho	Researcher
	YAMAMOTO Aya	Research Associate
	YAMANAKA Manabu	Researcher
	YAMAUCHI Taro	Professor
	YASUDA Akiko	Research Associate
	YASUNARI Tetsuzo	Director-General
	YONEMOTO Shohei	Visiting Professor
	YOSHIDA Takehito	Associate Professor
	YOSHIMIZU Chikage	Researcher
	YUZEN Natsuko	Research Associate

FUJIYOSHI Rei

Researcher

Born in 1985.

[Academic Career]

Faculty of Fisheries Science, Hokkaido University, Bachelor (2010)

Course in Geochemistry, Division of Earth System Science, Graduate School of Environmental Science, Hokkaido University, M.Course (2012)

Course in Geochemistry, Division of Earth System Science, Graduate School of Environmental Science, Hokkaido University, D.Course (2017)

[Professional Career]

Assistant Technical Staff, Field Science Center, Faculty of Agriculture, Yamagata University (2017)

[Higher Degrees]

D.Sc(Hokkaido University,2017)

M.Sc(Hokkaido University,2012)

[Fields of Specialization]

Environmental Science using Isotopes

—Achievements—

[Papers]

[Original Articles]

- Joseph M. Craine, Andrew J. Elmore, Lixin Wang, Julieta Aranibar, Marijn Bauters, Pascal Boeckx, Brooke E. Crowley, Melissa A. Dawes, Sylvain Delzon, Alex Fajardo, Yunting Fang, Lei Fujiyoshi, Alan Gray, Rossella Guerrieri, Michael J. Gundale, David J. Hawke, Peter Hietz, Mathieu Jonard, Elizabeth Kearsley, Tanaka Kenzo, Mikhail Makarov, Sara Marañón-Jiménez, Terrence P. McGlynn, Brenden E. McNeil, Stella G. Mosher, David M. Nelson, Pablo L. Peri, Jean Christophe Roggy, Rebecca Sanders-DeMott, Minghua Song, Paul Szpak, Pamela H. Templer, Dewidine Van der Colff, Christiane Werner, Xingliang Xu, Yang Yang, Guirui Yu, Katarzyna Zmudczyńska-Skarbek 2018 Isotopic evidence for oligotrophication of terrestrial ecosystems. Nature Ecology & Evolution 2:1735-1744. DOI:10.1038/s41559-018-0694-0 (reviewed).

[Research Presentations]

[Oral Presentation]

- Lei FUJIYOSHI, Kenichi OHKUSHI, Yudai YAMAMOTO, Ichiro TAYASU, Tadashi YOKOYAMA, Hiromune MITSUHASHI, Fumiko FURUKAWA, Masayuki ITOH Dynamics of dissolved ions inferred from sulfur isotope ratio of sulfate, nitrogen and oxygen isotope ratios of nitrate in Chikusa river watershed, Hyogo. Japan Geoscience Union Meeting, 2018.05.20-2018.05.24, Makuhari Messe, Chiba, Japan. (in Japanese)
- Lei Fujiyoshi, Ichiro Tayasu, Shiho Yabusaki, Takashi Haraguchi, Chikage Yoshimizu, Kenichi Ohkushi, Fumiko Furukawa, Masayuki Itoh, Yudai Yamamoto, Tadashi Yokoyama, Hiromune Mitsuhashi Dynamics of nitrate and sulfate inferred from stable isotope techniques in Chikusa river watershed, Hyogo Prefecture . Management of Water and Land Resources: Studies in Asia and Europe, 2018.11.19-2018.11.23, Yamagata University, Yamagata, JAPAN.
- Lei Fujiyoshi, Ichiro Tayasu, Shiho Yabusaki, Takashi Haraguchi, Chikage Yoshimizu, Kenichi Ohkushi, Fumiko Furukawa, Masayuki Itoh, Yudai Yamamoto, Tadashi Yokoyama, Hiromune Mitsuhashi Dynamics of nitrate and sulfate using stable isotope techniques in Chikusa river watershed, Hyogo Prefecture . Japan Society of Limnology 83 annual meeting in Okayama, 2018.10.05-2018.10.08, Okayama University, Okayama, Japan. (in Japanese)

[Poster Presentation]

- Fujiyoshi L, Tayasu I, Yabusaki S, Haraguchi T, Yoshimizu C, Ohkushi K, Furukawa F, Itoh M, Yamamoto Y, Yokoyama Y, Mitsuhashi H Dynamics of sulfate and nitrate inferred from stable isotope techniques in Chikusa river watershed, Hyogo. The 8th Symposium on Environmental Isotope Study, 2018.12.21-2018.12.21, Research Institute for Humanity and Nature. (in Japanese)
- Fujiyoshi L, Tayasu I, Yabusaki S, Haraguchi T, Yoshimizu C, Ohkushi K, Furukawa F, Itoh M, Yamamoto Y, Yokoyama Y, Mitsuhashi H Chikusa river watershed seen from multi-elements. The 14th "Kyosei-no-Hiroba", 2019.02.11-2019.02.11, Museum of Nature and Human Activities,Hyogo. (in Japanese)
- Fujiyoshi L, Tayasu I, Yabusaki S, Haraguchi T, Yoshimizu C, Ohkushi K, Furukawa F, Itoh M, Yamamoto Y, Yokoyama Y, Mitsuhashi H Origin and Dynamics of sulfate and nitrate inferred from stable isotope techniques in Chikusa river watershed, Hyogo. The 66th ANNUAL MEETING OF THE ECOLOGICAL SOCIETY OF JAPAN, 2019.03.15-2019.03.19, Kobe Convention Center. (in Japanese)

HABU Junko

Professor

Born in 1959.

[Professional Career]

Visiting Professor, Research Institute for Humanity and Nature, Kyoto, Japan (2016)
Professor, Research Institute for Humanity and Nature, Kyoto, Japan (2014)
Professor, Department of Anthropology, University of California, Berkeley (2010)
Associate Professor, Department of Anthropology, University of California, Berkeley (2002)
Assistant Professor, Department of Anthropology, University of California, Berkeley (1996)
Faculty Lecturer, Department of Anthropology, McGill University(1994)
Full-time Research Associate (joshu), Faculty of Science, The University of Tokyo (1984)

[Higher Degrees]

Ph.D. (Archaeology, Department of Anthropology, McGill University, 1996)
M.A. (Archaeology, Division of History, Keio University, 1984)
B.A. (Archaeology, Department of Ethnology and Archaeology, Division of History, Keio University, 1982)

[Academic Society Memberships]

American Anthropological Association
Society for American Archaeology
Sigma Xi
American Geophysical Union
Indo-Pacific Prehistory Association
Society for East Asian Archaeology
Japanese Archaeological Association
Society of Archaeological Studies of Japan
The Anthropological Society of Nippon
Japan Association for Quaternary Research
Japanese Society for Scientific Studies on Cultural Property
Kagoshima Archaeological Association
Association for Edo Period Archaeology

—Achievements—

[Papers]

[Original Articles]

・Habu, J. 2018,11 Jomon Food Diversity, Climate Change and Long-term Sustainability: What I Have Learned by Doing Archaeological and Ethnographic Studies in Japan. The SAA Archaeological Record 18(4):27-30.

HAYASHI Koji

Researcher

Born in 1972.

[Higher Degrees]

Ph.D.(The Graduate University for Advanced Studies, 2007)

[Fields of Specialization]

Ecological Anthropology

African Area Studies

—Achievements—

[Research Presentations]

[Oral Presentation]

・Hayashi K Attempt of Sanitation Value Chain Model in Africa: From case studies of Zambia and Cameroon. Kochi University and RIHN Joint Workshop “Collaborative Innovation of the Future Design and People”, 2018.10.26, Kochi University, Nangoku city, Japan. (in Japanese)

・HAYASHI K, NAKAO S and YAMAUCHI T Defecation without toilets - Toward the study of sanitation activities in the hunter-gatherers. The Twelfth International Conference on Hunting and Gathering Societies (CHAGS 12), 2018.07.23-2018.07.27, The School of Social Sciences, Universiti Sains Malaysia, Penang, Malaysia.

[Poster Presentation]

・Hayashi K, Nyambe S, Harada H, Chua M.L, Ito R, Ushijma K, Kataoka Y, Yamauchi T How to design sanitation value chain in African slum: Focus on "Value in Health", case study of local community activities in Lusaka, Zambia. The 10th RIHN seminar in Tokyo, Global Environment and Life Culture - Learning of the Anthropocene, 2018.12.15, Tokyo University, Tokyo, Japan. (in Japanese)

・Hayashi K, Nakao S, Yamauchi T Excretion behavior of Baka hunter-gatherers: From time-space analysis by individual observations in Cameroon. 55th Conference of Japan Association for African Studies, 2018.05.26-2018.05.27, Hokkaido University, Sapporo, Japan. (in Japanese)

KAJITA Ryosuke

Researcher

Born in 1989.

[Academic Career]

Faculty of Foreign Language, Osaka University (2012)

Graduate School of Asian and African Area Studies, Kyoto University (2017)

[Professional Career]

Researcher, Center for Southeast Asian Studies, Kyoto University (2017)

Researcher, Research Institute for Humanity and Nature (2017)

[Higher Degrees]

Master Degree of Area Studies (Kyoto University, 2014)

Doctoral Degree of Area Studies (Kyoto University, 2017)

[Fields of Specialization]

Area Studies

[Academic Society Memberships]

Japan Society for Natural Disaster Science

Society of Historical Earthquake Studies

—Achievements—

[Research Presentations]

[Oral Presentation]

- Ryosuke Kajita Historical Rainfall Data of Indonesia in the Late 19th Century by using Dutch Colonial Materials. The 11th Annual ACRE Meeting, ACRE Southeast Asia-2, 2018.11.15-2018.11.16, Tokyo Metropolitan University.
- Ryosuke Kajita Historical precipitation data in Sumatra and Kalimantan from 1879 to 1900, by using Dutch colonial materials. 7th International Conference on Sustainable Future for Human Security, 2018.10.29-2018.10.30, Padang, Indonesia.

[Poster Presentation]

- Ryosuke Kajita Reconstruction of historical rainfall data in Colonial Indonesia: focusing in the late 19th century. World Social Science Forum 2018, 2018.09.25-2018.09.28, Fukuoka, Japan.

[Invited Lecture / Honorary Lecture / Panelist]

- Ryosuke Kajita Career path after GSS program. Career Development and Choices along Research on Water, Energy or Disaster Management, 2018.10.23, Kyoto University. A side event hosted by UNESCO Chair on Water, Energy and Disaster Management for Sustainable Development

KANEMOTO Keiichiro

Associate Professor

[Awards]

Highly Cited Researcher in the field of Cross-Field, Clarivate Analytics, 2018

Outstanding Reviewer Awards for Environmental Research Letters, IOP Publishing, 2018

—Achievements—

[Papers]

[Original Articles]

- Moinul Islam, Keiichiro Kanemoto, Shunsuke Managi. 2019,02 Growth potential for CO2 emissions transfer by tariff reduction. Environmental Research Letters. DOI:10.1088/1748-9326/aaf688 (reviewed).
- Arne Geschke, Julien Ugon, Manfred Lenzen, Keiichiro Kanemoto, Daniel Moran. 2019,01 Balancing and Reconciling Large Multi-Regional Input-Output Databases Using Parallel Optimisation and High-Performance Computing. Journal of Economic Structures 8(2). DOI:10.1186/s40008-019-0133-7 (reviewed).
- Keiichiro Kanemoto, Tesshu Hanaka, Shigemi Kagawa, Keisuke Nansai. 2018,07 Industrial clusters with substantial carbon-reduction potential. Economic Systems Research. DOI:10.1080/09535314.2018.1492369 (reviewed).
- Daniel Moran, Keiichiro Kanemoto, Magnus Jiborn, Richard Wood, Johannes Többen, Karen Seto. 2018,06 Carbon footprints of 13 000 cities. Environmental Research Letters 13(6). DOI:10.1088/1748-9326/aac72a (reviewed).

[Research Presentations]

[Oral Presentation]

- Keiichiro Kanemoto Spatial Footprint Analysis. Australia – Japan Computational Sustainability Research Workshop, December 2018, Sydney.
- Satoru Chatani, Midori Kurogi, Yuta Fujii, Susumu Tohno, Keiichiro Kanemoto, Keisuke Nansai. “Simulation study for influences of consumptions in major countries on air quality and human health in Asia through global supply chains”. 17th Annual CMAS Conference, 2018.10.22-2018.10.24, 100 Friday Center Dr Chapel Hill, NC 27517 United States.

[Poster Presentation]

- Yuji Fujii, Midori Kurogi, Susumu Tohno, Satoru Chatani, Keiichiro Kanemoto, Kanemoto Nansai. “The economic loss of PM2.5-related mortality in Asia from consumption-based perspectives”. SETAC Europe 24th Annual LCA Case Study Symposium, 2018.09.24-2018.09.26, Vienna, Austria.

KONDO Yasuhisa

Associate Professor

Born in 1979.

[Academic Career]

Department of Archaeology, The University of Tokyo, PhD course (2006-2009)

Department of Archaeology, The University of Tokyo, master course (2002-2005)

Department of Archaeology, The University of Tokyo, undergraduate course (1998-2002)

[Professional Career]

Visiting Research Fellow, National Institute of Science and Technology Policy (2016)

Associate Professor, Research Institute for Humanity and Nature (2014)

JSPS Research Fellow (PD), Tokyo Institute of Technology (2011)

Project Researcher, The University Museum, The University of Tokyo (2010)

Visiting Scholar, Center for Spatial Information Science, The University of Tokyo (2010)

JSPS Research Fellow (PD), The University of Tokyo (2009)

JSPS Research Fellow (DC2), The University of Tokyo (2008)

[Higher Degrees]

D.Litt. (The University of Tokyo, 2010)

M.A. (The University of Tokyo, 2005)

[Fields of Specialization]

Open Science
Geographical Information Science
Archaeology

[Academic Society Memberships]

International Association of Geomorphologists
Computer Applications and Quantitative Methods in Archaeology (CAA)
CIPA Heritage Documentation
European Geosciences Union (EGU)
Japan Geoscience Union (JpGU)
GIS Association of Japan (GISA)
The Association of Japanese Geographers (AJG)
Anthropological Society of Nippon
Society of Archaeological Studies
Japan Society for West Asian Archaeology (JSWAA)
Japanese Palaeolithic Research Association (JPRA)
Japan Consortium for International Cooperation in Cultural Heritage
Japan Society for Research Policy and Innovation Management (JSRPIM)

[Awards]

Kurita Water and Environmental Research Award (2016)
CSIS DAYS 2011 Presentation Award (2011)
Japanese Society for Archaeological Informatics Katata Award (2008)

—Achievements—

[Editing]

[Editing / Co-editing]

- Yoshihiro Nishiaki, Seiji Kadowaki, Yasuhisa Kondo (ed.) 2018,12 PaleoAsia 2018 The International Workshop: Cultural History of PaleoAsia – Integrative Research on the Formative Process of Modern Human Cultures in Asia. PaleoAsia Project Series, 17. PaleoAsia Project Group, Tokyo, 112pp.
- Tara Beuzen-Waller, Friederike Stock, Yasuhisa Kondo (ed.) 2018,07 Special Issue Geoarchaeology: A toolbox for revealing latent data in sedimentological and archaeological records. Quaternary International, 483. Elsevier, Amsterdam, 210pp.

[Papers]

[Original Articles]

- Yasuhisa Kondo, Atsushi Noguchi, Takehiro Miki, Tara Beuzen-Waller, Stéphane Desruelles, Éric Fouache 2018,09 Archaeological sites in the Wilayat Ibri, Adh Dhahirah Governorate. The Journal of Oman Studies 18:201-227. (reviewed).
- Yasuhisa Kondo, Kazuhiro Hayashi, Asanobu Kitamoto 2018,07 Multifaceted workshops to envision the future of open science with society. Proceedings of 2018 7th International Congress on Advanced Applied Informatics:466-469. DOI: 10.1109/IIAI-AAI.2018.00100 (reviewed).

[Review Articles]

- Tara Beuzen-Waller, Friederike Stock, Yasuhisa Kondo 2018,07 Geoarchaeology: A toolbox for revealing latent data in sedimentological and archaeological records. Quaternary International 483:1-4. DOI:10.1016/j.quaint.2018.05.029

[Research Presentations]

[Oral Presentation]

- Yasuhisa Kondo, Atsushi Noguchi, Kohei Tamura, Mitsuhiro Nakamura, Hiroyuki Kitagawa PaleoAsia DB Hackathon. The 6th Conference on Cultural History of PaleoAsia, 2018.11.17-2018.11.18, Koshiba Hall, The University of Tokyo, Bunkyo-ku, Tokyo, Japan. (in Japanese)
- Akira Saito, Yasuhisa Kondo, Nozomi Mizota, Tomoko Koyama Contribution of the digital humanities methods to the construction of an overall picture of Francisco de Toledo's reducciones. 56° Congres Internacional de Americanistas, 2018.07.15-2018.07.20, Universidad de Salamanca, Salamanca, Spain.
- Yasuhisa Kondo, Kazuhiro Hayashi, Asanobu Kitamoto Multifaceted workshops to envision the future of open science with society. IIAI AAI 2018, 2018.07.08-2018.07.13, Yonago Convention Center, Tottori.
- Yasuhisa Kondo, Ge Wang, Ui Ikeuchi, Kei Kano, Terukazu Kumazawa, Ken'ichiro Nakashima, Hideyuki Onishi, Takeshi Osawa, Tatsuki Sekino Open team science: A new team-based research methodology for socio-environmental cases in the open science era. Japan Geoscience Union Annual Meeting 2018, 2018.05.23, Makuhari Messe, Chiba, Japan.
- Yasuhisa Kondo, Noboru Okuda, Satoshi Asano, Kanano Ishikawa, Kei Kano, Kaoru Kamatani, Terukazu Kumazawa, Kenichi Sato, Sayoko Shimoyama, Eiichi Fujisawa, Kyohei Matsushita, Ken'ichi Wakita A community-based open governance approach to waterweed recycling in the Lake Biwa catchment. Japan Geoscience Union Annual Meeting 2018, 2018.05.20-2018.05.24, Makuhari Messe, Chiba, Japan. (in Japanese)
- Sumiko Tsukamoto, Kyoko S Kataoka, Yasuhisa Kondo, Takehiro Miki, Taichi Kuronuma, Yuichi Hayakawa, Takashi Oguchi Luminescence dating of alluvial and fluvial sediments from Bat, Oman: implications to the humidity changes and human activities in the SE Arabia. Japan Geoscience Union Annual Meeting 2018, 2018.05.20-2018.05.24, Makuhari Messe, Chiba, Japan. (in Japanese)
- Jun Takakura, Yasuhisa Kondo, Hiroyuki Kitagawa The dispersals of modern humans into the Siberian Arctic in light of the paleoenvironmental reconstruction. The 5th Conference on Cultural History of PaleoAsia, 2018.05.12-2018.05.13, Motoyama Campus, Nagoya University. (in Japanese)

[Poster Presentation]

- Yasuhisa Kondo, Hideyuki Onishi, Yoko Iwamoto Lexical analysis of the concept of culture in the PaleoAsia project. PaleoAsia 2018 International Workshop, 2018.12.15-2018.12.18, Kyoto International Conference Center and Research Institute for Humanity and Nature (Kyoto, Japan).
- Yasuhisa Kondo, Yoko Iwamoto Network analysis of the interdisciplinary co-authorship of the PaleoAsia project. PaleoAsia 2018 International Workshop, 2018.12.15-2018.12.18, Kyoto International Conference Center and Research Institute for Humanity and Nature (Kyoto, Japan).
- Yasuhisa Kondo, Yoko Iwamoto Visualization of the interdisciplinary collaboration network of the PaleoAsia Project. The 6th Conference on Cultural History of PaleoAsia, 2018.11.17-2018.11.18, Koshiba Hall, The University of Tokyo, Bunkyo-ku, Tokyo, Japan.
- Yasuhisa Kondo, Ge Wang, Ui Ikeuchi, Kei Kano, Terukazu Kumazawa, Ken'ichiro Nakashima, Hideyuki Onishi, Takeshi Osawa, Tatsuki Sekino Information asymmetry reduction in open team science: call for international collaborators. SESYNC 2018 Boundary Spanning Symposium, 2018.06.11-2018.06.13, Loews Annapolis Hotel, Annapolis, MD, USA.
- Yasuhisa Kondo, Atsushi Noguchi, Takehiro Miki, Taichi Kuronuma, Hiroyuki Kitagawa Archaeological survey of prehistoric sites in Oman: The discovery of Wadi Tanuf Cave 1. The 5th Conference on Cultural History of PaleoAsia, 2018.05.12-2018.05.13, Motoyama Campus, Nagoya University. (in Japanese)
- Hideyuki Onishi, Yasuhisa Kondo, Yoko Iwamoto Perspectives of Human Behavior as Culture A Case Study on Lexical Analysis of "Cultural History of PaleoAsia". The 5th Conference on Cultural History of PaleoAsia, 2018.05.12-2018.05.13, Motoyama Campus, Nagoya University. (in Japanese)

[Invited Lecture / Honorary Lecture / Panelist]

- Yasuhisa Kondo Interlinking open science to community-based participatory research for socio-environmental cases. The 3rd International Symposium on Decision Science for Future Earth: Transdicsiplinary Science in Practice, 2018.09.24, JR Hakata City Conference Center.
- Yasuhisa Kondo Data-driven approach to identify early modern humans' ecological niche and optimal dispersal routes in Eurasia. Landscape Archaeology Conference 2018, 2018.09.17-2018.09.20, Newcastle University and Durham University, UK.

・Yasuhisa Kondo JpGU-AGU Great Debate: Role of Open Data and Open Science in Geoscience. Japan Geoscience Union Annual Meeting 2018, 2018.05.23, Makuhari Messe, Chiba, Japan. A panelist

KUMAZAWA Terukazu

Associate Professor

Born in 1974.

[Higher Degrees]

Dr of Engineering

[Fields of Specialization]

Environmental planning

Regional informatics

—Achievements—

[Papers]

[Original Articles]

・Aiko Endo, Terukazu Kumazawa, Michinori Kimura, Makoto Yamada, Takaaki Kato, Kouji Kozaki 2018,09 Describing and Visualizing a Water–Energy–Food Nexus System. Water 10(9):1245. DOI:10.3390/w10091245 (reviewed).

MASUHARA Naoki

Senior Researcher

Born in 1974.

[Academic Career]

Department of Environmental Engineering, Faculty of Engineering, Osaka University (1997)

Department of Local Administration, Faculty of Politics, Waseda University, M. Course (2000)

Department of Local Administration, Faculty of Politics, Waseda University, D. Course w/o Dissertation (2007)

[Professional Career]

Researcher, Research Institute for Local Initiatives of Environmental Policy (2000)

Visiting researcher, Comprehensive Center for Environmental Research, Waseda University (2007)

Visiting researcher, Center for Regional Studies, Hosei University (2009)

Deputy Director-General, Research Institute for Local Initiatives of Environmental Policy (2011)

Project researcher, Asia Ring-of-Fire Nexus project, RIHN (2013)

[Higher Degrees]

Doctor of Engineering (Osaka University, 2017)

Master of Political Science (Waseda University, 2000)

[Fields of Specialization]

Public Administration

Local Government Studies

Environment and Energy Policy

Citizen Participation Studies

[Academic Society Memberships]

The Society of Environmental Science, Japan

The Center for Environmental Information Science

[Awards]

Encouragement award from the Society of Environmental Science, Japan (2012)

Award of excellent presentation from the Japan Association for Planning and Public Management (2017)

Award of excellent poster presentation from the Center for Environmental Information Science (2018)

—Achievements—

[Books]

[Chapters/Sections]

- M Kimura, N Masuhara, K. Baba 2018,05 Making Social Networks Visible: Shared Awareness Among Stakeholders on Groundwater Resources. A Endo・T Oh (ed.) The Water-Energy-Food Nexus: Human-Environmental Security in the Asia-Pacific Ring of Fire. Global Environmental Studies. Springer, pp.273-286.
- K Baba, N Masuhara, M Kimura 2018,05 Scenario-based Approach to Local Water-energy-food Nexus Issues with Experts and Stakeholders. A Endo・T Oh (ed.) The Water-Energy-Food Nexus: Human-Environmental Security in the Asia-Pacific Ring of Fire. Global Environmental Studies. Springer, pp.321-333.

[Papers]

[Original Articles]

- Makoto Taniguchi, Naoki Masuhara, Shun Teramoto 2018,10 Tradeoffs in the water-energy- food nexus in the urbanizing Asia-Pacific region . Journal Water International 43(6):892-903. DOI:10.1080/02508060.2018.1516104 (reviewed).

[Research Presentations]

[Oral Presentation]

- Naoki Masuhara Changes of Local Resource Utilization after 1960: Japan's Medium-term Development Strategy and Its Impacts. International Workshop on Resource Nexus and Asia's Great Acceleration, 2019.03.10-2019.03.11, RIHN, Kyoto city, Kyoto Prefecture.

[Poster Presentation]

- Naoki Masuhara, Sanghyun Lee and Makoto Taniguchi Decision-making Gaps regarding Food-Energy-Water Nexus? A Case Study of the Kyoto City in Japan. AGU 2018 Fall Meeting, 2018.12.10-2018.12.14, Washington, DC. DOI:10.1002/essoar.10500658.1
- Naoki Masuhara Citizens' Consciousness and Interest: A Study on Groundwater Issues in Saijo City, Japan. World Social Science Forum 2018, 2018.09.25-2018.09.28, Fukuoka City, Fukuoka Prefecture.

[Invited Lecture / Honorary Lecture / Panelist]

- Naoki Masuhara (Invited Lecture) Relationships between geothermal power developments and conflicts in Japan after the Great Eastern Japan Earthquake of 2011. Workshop on Energy and Environmental Research, 2019.03.25, University of Hawaii.

MCGREEVY, Steven R.

Associate Professor

Born in 1978.

[Academic Career]

Division of Natural Resource Economics, Graduate School of Agriculture, Kyoto University (2008-2012)
College of Continuing Education, University of Minnesota (2002-2004)
St. John's University- Collegeville, MN (1997-2000)

[Professional Career]

Lecturer, Seisen Jogakuin College (2007)
Monbukagakusho Scholar, Graduate School of Agriculture, Kyoto University (2009)
Lecturer, Nagano National College of Technology (2011)
Assistant Professor, Research Institute for Humanity and Nature (2013~)

[Higher Degrees]

D.Ag. (Kyoto University, 2012)
M.LS. (University of Minnesota-Twin Cities, 2004)
B.A.: Major- Biology; Minor- Environmental Studies (St. John's University- Collegeville, MN, 2000)

[Fields of Specialization]

Rural Sustainable Development
Environmental Sociology

[Academic Society Memberships]

Japan Biochar Association
International Biochar Initiative
Japanese Association for Rural Studies
Rural Sociology Society
Future Earth Systems of Sustainable Consumption and Production Knowledge-Action Network

—Achievements—

[Papers]

[Original Articles]

- McGreevy, Steven R., Mai Kobayashi, & Keiko Tanaka. 2018,09 Agrarian pathways for the next generation of Japanese farmers. Canadian Journal of Development Studies / Revue canadienne d'etudes du developpement 40(2):272-290. DOI: 10.1080/02255189.2018.1517642 (reviewed).
- Hisano, Shuji, Motoki Akitsu, & Steven R. McGreevy 2018,07 Revitalising Rurality under the Neoliberal Transformation of Agriculture: Experiences of Re-agrarianisation in Japan. Journal of Rural Studies 61:290-301. DOI:10.1016/j.jrurstud. 2018.01.013 (reviewed).
- Oda, Kimisato, Christoph D. D. Rupprecht, Kazuaki Tsuchiya, & Steven R. McGreevy 2018 Urban Agriculture as a Sustainability Transition Strategy for Shrinking Cities? Land Use Change Trajectory as an Obstacle in Kyoto City, Japan. Sustainability 10(4):1048. DOI:10.3390/su10041048 (reviewed).

[Research Presentations]

[Oral Presentation]

- McGreevy, Steven R. & Matsudaira Naoya Reevaluating the peasantry: Similarities and differences from Japan and abroad. Japanese Association for Rural Studies, 2018.10.26-2018.10.28, MIyazaki Prefecture, Takachiho. (in Japanese) Annual Theme Session

- Fujiwara, Natsumi, Masashi Tachikawa, Naoki Yoshikawa, Steven R. McGreevy, & Atsushi Inaba Sustainable food consumption: environmental, social, and public health issues. Ecobalance 2018, 2018.10.09-2018.10.12, KFC Hall, Tokyo.
- McGreevy, Steven R. Redefining well-being amongst new settlers in a withering rural Japan. World Social Science Forum 2018, 2018.09.25-2018.09.28, Fukuoka, International Congress Center.
- McGreevy, Steven R. (Chair) Session: Lifeworlds of Sustainability and Wellbeing in a Shrinking Japan. World Social Science Forum 2018, 2018.09.25-2018.09.28, Fukuoka, International Congress Center.
- Rupprecht, Christoph, Astrid Mangnus, Joost Vervoort, Kanang Kantamaturapoj, Kazuhiko Ota, Steven R. McGreevy, & Yoshimitsu Taniguchi. Empowering residents to co-design their food systems: Experimenting with future-oriented methods in Japan& Thailand. European Association of Social Anthropologists, 2018.08.14-2018.08.17, Stockholm University.
- McGreevy, Steven R. Social practices, food futures, and "sticky knowledge" -- motivating change in everyday life?. Society for the Advancement of Socio-Economics, 2018.06.23-2018.06.25, Doshisha University, Kyoto. Session on "Alternatives to Capitalism; Changing everyday life-- changing capitalism"
- Tamura, Norie, Imaizumi, Aki & Steven R. McGreevy Participatory workshops for transitioning to sustainable agrifood systems: evaluating the impact of backcasting and gaming methods. Conference of the Food Systems Research Association of Japan, 2018.06.16-2018.06.17, Tokyo University, Tokyo. (in Japanese)
- Ota, Kazuhiko & Steven R. McGreevy Games and gaps for normative food futures: The role of researchers in facilitating creative transdisciplinary processes. Asia-Pacific Society for Agriculture and Food Ethics (APSafe), 2018.05.10-2018.05.12, National Taiwan University, Taipei, Taiwan.
- McGreevy, Steven R. Lifeworlds of sustainable food consumption and production: agrifood systems in transition. 4th Kyoto University - Wageningen University International Graduate Workshop on Food, Farm, and Rural Development, 2018.05.09, Kyoto University, Kyoto.

[Poster Presentation]

- Rupprecht, Christoph D. D., Fujiyoshi Lei, McGreevy Steven R., & Ichiro Tayasu Consumer trust in expert product labels: Preliminary results of a five-country survey. 8th Symposium on Environmental Isotope Study, 2018.12.21, Research Institute for Humanithy and Nature .

[Invited Lecture / Honorary Lecture / Panelist]

- McGreevy, Steven R. The future of food and agriculture in Nagano City - Citizen power to catalyze transition (Nagano shi no shoku to nou no mirai - Shimin no chikara de transition [tenkan] wo okosu ni ha). NAGANO Nou to Shoku no Kai, 2018.08.28, Nagano City, Matsushiro. (in Japanese)

NAKAHARA Satoe

Researcher

Born in 1965.

[Academic Career]

Graduate School of Comprehensive Human Sciences, Kobe University, D. Course (2007)

Graduate School of Comprehensive Human Sciences, Kobe University, M. Course (1999)

Department of Language and Area Studies, Osaka University of Foreign Studies (1997)

[Professional Career]

Researcher, Research Institute for Humanity and Nature (2018to present)

Special Appointment Researcher, Chukyo University Institute of Social Science(2009 to present)

[Higher Degrees]

Ph.D (Kobe University, 2007)

Master (Kobe University, 1999)

[Fields of Specialization]

Cultural Anthropology

Peace Studies

[Academic Society Memberships]

The Japanese Society of Cultural Anthropology

The Japanese Society for Oceanic Studies

—Achievements—

[Research Presentations]

[Oral Presentation]

- Satoe Nakahara Perceptions of the Radiation Disaster from H-bomb Testing in the Marshall Islands (Panel Organizer, Panel Title: The Everyday Life of Victims in Radiation Effects). 40th UGAT Annual Conference an International Gathering, 2018.11.08-2018.11.10, Puerto Princesa, Philippines.
- Satoe Nakahara The Ethics of Field Work with Rongelap Exposed to Radiation of H-Bomb Testing: Why Did the Rongelap People Refuse Money from Research Fund?. 18th International Union of Anthropological and Ethnological Sciences (IUAES) World Congress, 2018.07.16-2018.07.20, Florianópolis, Brazil.
- Satoe Nakahara Community Reconstruction after Atomic Bomb Testing in the Marshall Islands from the Point of View of the Knowledge and Relationship. The Fourth Conference of East Asian Environmental History (EAEH 2017), 2018.10.26-2018.10.28, Tianjin, Chaina.

[Invited Lecture / Honorary Lecture / Panelist]

- Satoe Nakahara The Importance of Knowledge and Social Network in the Community Reconstruction after Atomic Bomb Testing in the Marshall Islands. 2018 Nuclear Security Summit, 2018.12.11-2018.12.12, Washington DC, US.

NAKAO Seiji

Researcher

Born in 1986.

[Academic Career]

Department of Studies of Foreign Affairs, Faculty of Foreign Affairs, Tokyo University of Foreign Studies (2009)

Graduate School of Humanities, Graduate Program in Anthropology, MA, Nanzan University (2012)

Graduate School of Humanities, Graduate Program in Anthropology, Ph. D, Nanzan University (2017)

[Professional Career]

Research Fellowship for Young Scientists, Japan Society for the Promotion of Science (2012-2015)

Part-time lecturer, Faculty of Sociology, Chukyo University (2016-2017)

[Higher Degrees]

Ph. D (University of Nanzan, 2017)

[Fields of Specialization]

Historical Anthropology

History of West Africa

[Academic Society Memberships]

Japan Association for African Studies

The Japanese Society of Cultural Anthropology

[Awards]

SOStierra2017 International Conference on Vernacular Earthen Architecture, Conservation and Sustainability. Honorable Award "Transforming Kasena houses and indigenous building technology in Burkina Faso" (H. KOBAYASHI, T. SHIMIZU, M. ITO & S. NAKAO) (2017)

(390) Hayashi K, Nakao S, Yamauchi T: The best Poster award: Excretion behavior of Baka hunter-gatherers: From time-space analysis by individual observations in Cameroon. 55th Conference of Japan Association for African Studies, 27 May 2018, Hokkaido University, Sapporo, Japan.

(393) Nakao S: Junior researchers award of Research Institute for Humanity and Nature, RIHN. 7 September 2018.

—Achievements—

[Books]

[Authored/Co-authored]

・Mangané IK (in collaboration with Nakao S) 2018 La mémoire d'El Hadj Beinké Souleymane Mangané. RIHN, Kyoto, 152pp. (in French)

[Research Presentations]

[Oral Presentation]

・Shimizu, T. and S. Nakao Preparatory study for elucidation of the socioeconomic role of the human feces processing supplier of the sub-Saharan African; examples in Burkina Faso. 55th Conference of Japan Association for African Studies, 2018.05.27, Hokkaido University, Sapporo, Japan. (in Japanese)

・Nakao, S. The history and the current conditions of the sanitation improvement in Burkina Faso. 55th Conference of Japan Association for African Studies, 2018.05.27, Hokkaido University, Sapporo, Japan. (in Japanese)

NAKASHIZUKA Tohru

Specially Appointed Professor

Born in 1956.

—Achievements—

[Papers]

[Original Articles]

・Takafumi Ohsawa, Naoya Furuta, Futoshi Nakamura, Taku Kadoya, Tohru Nakashizuka 2018,11 Challenges of post-Aichi Biodiversity Ttargets from ecological perspectives. JAPANESE JOURNAL OF CONSERVATION ECOLOGY.

・Oguro,M., Taki, H., Konuma. A., Uno, M. & Nakashizuka, T. 2018,10 Importance of national or regional specificity in the relationship between pollinator dependence and production stability. Sustain Science. DOI:https://doi.org/10.1007/s11625-018-0637-3

・Oka, C., Aibaa, M. & Nakashizuka, T. 2018,09 Phylogenetic clustering in beneficial attributes of tree species directly linked to provisioning, regulating and cultural ecosystem services. Ecological Indicators:477-495. DOI:https://doi.org/10.1016/j.ecolind.2018.09.035

・Imai, H. & Nakashizuka, T. 2018,08 An Analysis of 15 Years of Trends in Children's Connection with Nature and its Relationship with Residential Environment. Ecosystem Health and Sustainability Volume 4(Issue 8):177-187. DOI:https://doi.org/10.1080/20964129.2018.1511225

・Nakagawa, M., Ushio, M., Kume, T. & Nakashizuka, T. 2018,08 Seasonal and long-term patterns in litterfall in a Bornean tropical rainforest. . Ecological Research.

・Aiba, M., Shibata, R., Oguro, M. & Nakashizuka, T. 2018,07 The seasonal and scale-dependent associations between vegetation quality and hiking activities as a recreation service. Sustainability Science:1-11. DOI:https://doi.org/10.1007/s11625-018-0609-7

[Research Presentations]

[Invited Lecture / Honorary Lecture / Panelist]

・Tohru Nakashizuka Climate change impacts on terrestrial ecosystems in Japan. ISPRS Technical Commission III WG III/2, 10 Joint Workshop, 2019.03.12-2019.03.14, Kyoto.

・Tohru Nakashizuka Evaluating ecosystem services provided by rural areas to cities. International Workshop "Bioeconomy-changing rural landscapes for sustainable economic development", 2018.11.16, Kobe, Hyogo, Japan.

NAKATSUKA Takeshi

Professor

Born in 1963.

—Achievements—

[Papers]

[Original Articles]

・Chenxi Xu, Wenling An, S.-Y. Simon Wang, Liang Yi, Junyi Ge, Takeshi Nakatsuka, Masaki Sano, Zhengtang Guo 2019,01 Increased drought events in southwest China revealed by tree ring oxygen isotopes and potential role of Indian Ocean Dipole. Science of the Total Environment (661.0):645.0-653.0.

・Uemura, R., M. Uemura, M. Sano, T. Nakatsuka 2018,11 A 180-year-long isotopic record of tree-ring cellulose on Okinawa Island, Japan. Geochemical Journal.

・Li, Q., Y. Liu, T. Nakatsuka, K. Fang, H. Song, R. Liu, C. Sun, G. Li, K. Wang 2018,10 East Asian Summer Monsoon moisture sustains summer relative humidity in the southwestern Gobi Desert, China: evidence from δ18O of tree rings. Climate Dynamics :1.0-17.0. DOI:https://doi.org/10.1007/s00382-018-4515-6 1391663.0

・Hisamochi, R., Watanabe, Y., Sano, M., Nakatsuka, T., Naoyuki Kurita, Miyuki Matsuo-Ueda, Hiroyuki Yamamoto, Suyako Tazuru, Junji Sugiyama 2018,12 Cellulose oxygen isotopic composition of teak (Tectona grandis) collected from Java Island: a tool for dendrochronological and dendroclimatological analysis. Dendrochronologia(52):80-86. DOI:https://doi.org/10.1016/j.dendro.2018.09.010

・Chenxi Xu, Nathsuda Pumijumnong, Takeshi Nakatsuka, Masaki Sano, Zhengtang Guo 2018,09 Inter-annual and multi-decadal variability of monsoon season rainfall in central Thailand during the period of 1804-1999-inferred from tree ring oxygen isotopes. International Journal of Climatology 38.0(15.0):5766.0-5776.0. DOI:doi.org/10.1002/joc.5859

・Caceres, M.L.L., S.Nakano, J.P.Ferrio, M.Hayashi, T. Nakatsuka.,M.Sano,Y.Yamanaka、Y.Nobori 2018,07 Evaluation of the effect of the 2011 Tsunami on coastal forests by means of multiple isotopic analyses of tree-rings. Isotopes in Environmental and Health Studies . (reviewed). Article number: 15386

・Nakai, W., N. Okada, M. Sano, T. Nakatsuka 2018,09 Sample preparation of ring-less tropical trees for δ18O measurement in isotope dendrochronology. TROPICS (27).

・Nabeshima, E., T. Nakatsuka, A. Kagawa, T. Hiura, R. Funada 2018,06 Seasonal changes of δD and δ18O in tree-ring cellulose of Quercus crispula suggest a change in post-photosynthetic processes during earlywood growth. Tree Physiology, tpy068. DOI:https://doi.org/10.1093/treephys/tpy068

・Xu, C., Sano, N., Ashok Priyadarshan Dimri, Rengaswamy Ramesh, Takeshi Nakatsuka, Feng Shi, and Zhengtang Guo 2018,05 Decreasing Indian summer monsoon on the northern Indian sub-continent during the last 180 years: evidence from five tree-ring cellulose oxygen isotope chronologies. Climate of the Past (14):653-664. DOI:https://doi.org/10.5194/cp-14-653-2018 (reviewed).

・Xu, C., J. Shi, Y. Zhao, T. Nakatsuka, M. Sano, S. Shi, Z. Guo 2018,04 Early summer precipitation in the lower Yangtze River basin for AD 1845–2011 based on tree-ring cellulose oxygen isotopes. Climate Dynamics,. DOI:https://doi.org/10.1007/s00382-018-4212-5 (reviewed).

[Research Presentations]

[Oral Presentation]

・Nakatsuka T New perspectives in historical studies provided by high resolution paleoclimate data. WEHC 2018, 2018.08.01, Boston, USA.

NITZSCHE, Kai

JSPS Postdoctoral Fellow

Born in 1987.

[Academic Career]

Humboldt University of Berlin, Doctor Course (2017)

Georg-August-University of Goettingen, Master Course (2012)

University of Bremen, Bachelor Course (2010)

[Professional Career]

Postdoctoral Research Fellow of the Japan Society for the Promotion of Science and the Alexander von Humboldt Foundation, Research Institute for Humanity and Nature (2017-present)

Graduate Researcher, Leibniz Centre for Agricultural Landscape Research (2013-2016)

[Higher Degrees]

Ph.D (Humboldt University of Berlin, 2017)

MSc (Georg-August-University of Goettingen, 2012)

BSc (University of Bremen, 2010)

[Fields of Specialization]

Isotope Biogeochemistry

Landscape Ecology

Soil Science

[Academic Society Memberships]

Ecological Society of Japan

—Achievements—

[Papers]

[Original Articles]

・Kayler Z.E., Badrian M., Frackowski A., Rieckh H., Nitzsche K.N., Kalettka T. and Gessler A. 2018 Ephemeral kettle hole water and sediment temporal and spatial dynamics within an agricultural catchment. Ecohydrology 11(e1929). DOI:https://doi.org/10.1002/eco.1929 (reviewed).

OKUDA Noboru

Associate Professor

Born in 1969.

[Professional Career]

Lecturer, Mie University, Department of Liberal Arts (1998)
Postdoctoral fellow, Ehime University, Department of Biology and Earth Science (1998)
Research Fellow, Ehime University, Center for Marine Environmental Studies (2002)
Associate Professor, Kyoto University, Center for Ecological Research (2005)
Invited Associate Professor, Research Institute for Humanity and Nature (2013)
Associate Professor, Research Institute for Humanity and Nature (2014)

[Higher Degrees]

B.S. (Science University of Tokyo, Department of Biological Science, 1992)
M.S. (Ehime University, Department of Biology, 1994)
Ph.D. (Kyoto University, Department of Biology, 1998)

[Academic Society Memberships]

The Ichthyological Society of Japan
The Ecological Society of Japan
Japan Ethological Society
Society of Evolutionary Studies
The Japanese Society of Fisheries Science
The Japanese Society of Limnology

[Awards]

Best Poster Award for International Symposium “Long-term Variations in the Coastal Environments and Ecosystems” held in Ehime University (2004)
Young Ichthyologist Award 2005 from The Ichthyological Society of Japan (2005)
CHED REPUBLICA AWARDS(2016)
35th Association of Systematic Biologists of the Philippines-Symposium and Annual Meeting「Taxonomic Sufficiency: Implications from ecological studies on aquatic insects in Philippine watersheds」（2017）
Ecological Research Award: Integrating isotopic, microbial, and modeling approaches to understand methane dynamics in a frequently disturbed deep reservoir in Taiwan. By Itoh, M., H. Kojima, P.-C. Ho, C.-W. Chang, T.-Y. Chen, S. S.-Y. Hsiao, Y. Kobayashi, M. Fujibayashi, S.-J. Kao, C.-h. Hsieh, M. Fukui, N. Okuda, T. Miki & F.-K. Shiah（2018）

—Achievements—

[Papers]

[Original Articles]

・Wu, Q., K. Kawano, Y. Uehara, N. Okuda, M. Hongo, S. Tsuji, H. Yamanaka & T. Minamoto 2018,04 Environmental DNA reveals nonmigratory individuals of Palaemon paucidens overwintering in Lake Biwa shallow waters. Freshwater Science 37.0. DOI:10.1086/697542

[Research Presentations]

[Oral Presentation]

・Uehara, Y., H. Takayama, Y. Kataoka, T. Kikkou, M. Nemoto, T. Kokita, T. Otake & N Okuda Remarkable homing ability of a pelagic crucian carp ‘‘Carassius auratus grandoculis. 6th International Otolith Symposium, 2018.04.15-2018.04.20, Keelung, Taiwan.

OSAWA Takamasa

Researcher

[Professional Career]

Researcher, Research Institute for Humanity and Nature (2017)

Post-doctoral Fellow, Tokyo University of Marine Science & Technology (2015)

[Higher Degrees]

PhD (University of Edinburgh 2016)

MSc (London School of Economics and Political Science 2010)

Master of Marine Science (Tokyo University of Marine Science & Technology 2009)

[Fields of Specialization]

Social Anthropology

[Academic Society Memberships]

The Japanese Society of Cultural Anthropology

the International Society for Hunter Gatherer Research

—Achievements—

[Research Presentations]

[Oral Presentation]

- Osawa, T. 'Externalization of state power: Orang asli on the eastern coast of Sumatra′. 12th International Conference on Hunting and Gathering Societies (CHAGS 12), 2018.07.26, Malaysia Sains University, Penang.

[Invited Lecture / Honorary Lecture / Panelist]

- Osawa, T. 'Category, Indigenous people and peatland: Anthropological study on the endigenous people in eastern Sumatra. 296th RIHN Lunch Seminar, 2018.06.19, RIHN, Kyoto. (in Japanese)
- Osawa, T. 'Distance from the state power: Anarchism among orang asli on the eastern coast of Sumatra'. Kyoto Jinruigaku Kenkyukai, 2018.06.08, Kyoto university, Kyoto. (in Japanese)

OTA Kazuhiko

Researcher

Born in 1985.

[Academic Career]

Department of Agriculture, Regional Ecosystem, Tokyo University of Agriculture and Technology (2008)

Master's degree in Symbiosis for Sustainable Sociology, Tokyo University of Agriculture and Technology (2010)

Doctoral degree in Social Sciences of Agriculture and Forest Symbiosis, Tokyo University of Agriculture and Technology (2012)

[Professional Career]

Part-time lecturer at Musashi High School & Junior high school (2010)

Part-time lecturer at Toho High School & Junior High School (2010)

Part-time lecturer at Musashi University (2013)

[Higher Degrees]

PhD(Tokyo University of Agriculture and Technology,2012)

[Fields of Specialization]
Environmental Ethics
Landschaft theory

[Academic Society Memberships]
The Japan Association of Contemporary and Applied Philosophy
The Association for Kyosei Studies
Japanese Society of Soil Science and Plant Nutrition
Japanese Association for Comparative Philosophy
International Society for Environmental Ethics
American Association of Geographers

—Achievements—

[Books]

[Chapters/Sections]

・OTA Kazuhiko, MURATA Tomoyoshi, OHKURA Toshiaki, HAMADA Ryunosuke 2018,07 What Does “Soil Is Valuable” Mean? Institutional Design and Ethics for Sustainable Use of Soil Resources. Paul B. Thompson, Kirill O. Thompson (ed.) Agricultural Ethics in East Asian Perspective: A Transpacific Dialogue. Springer, pp.197-211.

[Research Presentations]

[Oral Presentation]

・Kazuhiko Ota, Steven McGreevy Games and gaps for normative food futures: The role of researchers in facilitating creative transdisciplinary processes. APsafe 2018, 2018.05.10-2018.05.12, National Taiwan University, Taipei.

・Kazuhiko Ota How do we describe the enjoyment of informal food practices?: Analysis of theoretical framework and key concepts. American Association of Geographers, Annual Meeting 2018, 2018.04.10-2018.04.14, Sheraton New Orleans Hotel, New Orleans.

RUPPRECHT, Christoph D. D.

Senior Researcher

Born in 1983.

[Academic Career]
Griffith University, Environmental Futures Research Institute, PhD Urban geography, planning, ecology (2015)
Ludwig-Maximilians-University Munich, Department for Asian Studies, Magister Artium (2009)
Ludwig-Maximilians-University Munich, Faculty of Biology, EES Master Program Guest Student (2008)
Hokkaido University Short Term Exchange Program (2006)

[Professional Career]
Senior Researcher, FEAST Project, Research Institute for Humanity and Nature (2018-)
Project Researcher, FEAST Project, Research Institute for Humanity and Nature (2016-2018)
Adjunct Lecturer, Kyoto University (2017-)
Adjunct Lecturer, Doshisha University (2017-)
Adjunct Lecturer, Graduate School of Agricultural and Life Sciences / Faculty of Agriculture, University of Tokyo (2017)
Visiting Researcher, Environmental Futures Research Institute, Griffith University (2015)

[Higher Degrees]
Ph.D. Geography, Urban Planning, Ecology (Griffith University 2015)

M.A. Japanology, Biology, Philosophy (Ludwig-Maximilians-University Munich 2009)

[Fields of Specialization]

Urban geography
Environmental planning
Food systems
Degrowth
Informal green space

[Academic Society Memberships]

Japanese Institute of Landscape Architecture
Japan Geoscience Union
American Association of Geographers
Royal Geographical Society with IGB
East Asian Anthropological Association

[Awards]

Japan Geoscience Union Meeting Student Outstanding Presentation Award (2013)
American Association of Geographers Urban Geography Specialty Group Dissertation Award (2016)

—Achievements—

[Papers]

[Original Articles]

- Schröder, S, Vergragt, P., Brown, H. S., Dendler, L., Gorenflo, N., Matus, K., Quist, J., Rupprecht, C. D. D., Tukker, A., Wennersten, R 2018,12 Advancing sustainable consumption and production in cities - A transdisciplinary research and stakeholder engagement framework to address consumption-based emissions and impacts. Journal of Cleaner Production. DOI:10.1016/j.jclepro.2018.12.050 (reviewed).
- Kim, M., Rupprecht, C. D. D., Furuya, K. 2018,09 Residents' Perception of Informal Green Space—A Case Study of Ichikawa City, Japan. Land 7(3):102. (reviewed).
- Oda, K., Rupprecht, C. D. D., Tsuchiya, K., McGreevy, S. R. 2018,04 Urban Agriculture as a Sustainability Transition Strategy for Shrinking Cities? Land Use Change Trajectory as an Obstacle in Kyoto City, Japan. Sustainability 10(4):1048. DOI:10.3390/su10041048 (reviewed).

[Research Presentations]

[Oral Presentation]

- Spiegelberg, M., Shinkai, R., Rupprecht C. D. D. Neonicotinoids in the household: Thinking through neonicotinoid-based pesticides in everday life: What the bees are teaching us. 2019.03.19, Kyoto. (in Japanese)
- Rupprecht, C. D. D., Kawai, A. Decolonizers of the imaginary: Future and past generations, non-humans and spiritual beings. RIHN Program 3 Seminar, 2019.03.06, RIHN.
- Rupprecht, C. D. D. Imagined futures: planning for the unknown. Workshop on the future of food and agriculture in Bhutan. Workshop on the future of food and agriculture in Bhutan, 2019.02.19-2019.02.19, Royal University of Bhutan (College for Natural Resources).
- Rupprecht, C. D. D. Subsist and thrive: caring for people and nature in post - growth urban Japan. World Social Science Forum, 2018.09.25-2018.09.28, Fukuoka.
- Spiegelberg, M., Rupprecht, C. D. D., Shinkai, R., Gan, J. Honeybees in urban Kyoto - bee superhighways and potential impact on urban agriculture. World Social Science Forum, 2018.09.25-2018.09.28, Fukuoka.
- Rupprecht, C. D. D., Kawai, A. Decolonizers of the imaginary: Future and past generations, non-humans and spiritual beings. First North-South Conference on Degrowth, 2018.09.03-2018.09.07, Mexico City.
- Rupprecht, C. D. D., Oda, K., Tsuchiya, K., McGreevy, S. Urban agricultural land loss in Kyoto, Japan: human wellbeing implications beyond food security. RGS-IBG Annual Meeting, 2018.08.28-2018.08.31, Cardiff.

・Rupprecht, C. D. D., Kawai, A. Decolonizers of the imaginary: Future and past generations, non-humans and spiritual beings. 6th International Degrowth Conference, 2018.08.21-2018.08.25, Malmö.

・Rupprecht, C. D. D., Mangnus, A., Vervoort, J., Kantamaturapoj, K., Ota, K., McGreevy, S., Taniguchi, Y. et al. Empowering residents to co-design their food systems: experimenting with future-oriented methods in Japan and Thailand. European Association of Social Anthropologists Meeting, 2018.08.14-2018.08.17, Stockholm.

・Rupprecht, C. D. D. Unintentional radicals? Informal gardening and changing social imaginaries in shrinking Japanese cities. Society for the Advancement of Socio-Economics 30th Annual Conference, Alternatives to Capitalism: Changing Everyday Life, Changing Capitalism session, 2018.06.23-2018.06.25, Doshisha University, Kyoto.

・Rupprecht, C. D. D. Food and informality: conceptualizing the other food system(s). American Association of Geographers Annual Meeting, 2018.04.09-2018.04.14, New Orleans.

・Oda, K., Rupprecht, C. D. D. Mapping agricultural land use change in Kyoto City (Japan) from 2007 to 2017. American Association of Geographers Annual Meeting, 2018.04.09-2018.04.14, New Orleans.

・Kim, M., Rupprecht, C. D. D., Furuya, K. Residents' Perception of the Possibility of Informal Green Space as an Supplementary Urban Green Space – A Case Study of Ichikawa City, Japan. American Association of Geographers Annual Meeting, 2018.04.09-2018.04.14, New Orleans.

・Spiegelberg, M., Gan, J., Shinkai, R., Rupprecht, C. D. D Trespassing foragers: Urban beekeeping in Japan on a formal-informal gradient. American Association of Geographers Annual Meeting, 2018.04.09-2018.04.14, New Orleans.

[Invited Lecture / Honorary Lecture / Panelist]

・Rupprecht, C. D. D. Beyond anthropocentrism - Towards a multispecies concept of sustainability. RIHN-Peking University Lectures, 2019.03.19, Beijing University.

・Rupprecht, C. D. D. Applying residents' views of informal greenspace to urban green design. 5th Research Meeting, Road Ecology Research Society of Japan, 2018.06.09-2018.06.09, Tokyo. (in Japanese)

・Rupprecht, C. D. D. From residents' view of nature to more-than-human urban planning. Japanese Institute for Landscape Architecture, mini-forum Ecological Design of Urban Landscapes (pannelist), 2018.05.26-2018.05.27, Kyoto University. (in Japanese)

・Rupprecht, C. D. D. Residents' appreciation and management preferences of informal green space across four major Japanese shrinking cities. Japan Geoscience Union Annual Meetin 2018, 2018.05.20-2018.05.24, Makuhari Messe.

SAIJO Tatsuyoshi

Specially Appointed Professor

Born in 1952.

[Academic Career]

Graduated from Faculty of Economics, University of Kagawa(1975)

Completed Master Course(Economics) Hitotsubashi University(1978)

Completed DoctoralCourse(Economics)University of Minnesota(1985)

[Professional Career]

Lecturer, Department of Economics, Ohio State University(1985)

Assistant Professor, Department of Economics, University of California at Santa Barbara(1986)

Assistant Professor, Institute of Socio-Economic Planning, University of Tsukuba(1988)

Post-Doctoral Fellow, Center in Political Economy, Washington University at St. Louis(1989)

Visiting Assistant Professor, Department of Economics, University of of California at Santa Barbara(1989)

Associate Professor, Institute of Socio-Economic Planning, University of Tsukuba(1991)

Professor, Institute of Socio-Economic Planning, University of Tsukuba(1995)

Professor, Institute of Social and Economic Research, Osaka University(1995)

Visiting Scholar, Rational Choice Center, Department of Economics, Duke University(1999)

Faculty Fellow, Research Institute of Economy, Trade and Industry(2001)
Research Associate, California Institute of Technology(2002)
Associate member of the Science Council of Japan（2006）
Professor at Research Institute for Sustainability Science at Osaka University(2006)
Researcher at CASSEL, UCLA(2007)
Vice President of Economic Science Association(2010)
Professor, Center for Environmental Innovation Design for Sustainability, Osaka University(2010)
Professor, School of Management, Kochi University of Technology（2013）
Specially Appointed Professor atResearch Institute for Sustainability Science at Osaka University(2013)
Member of the Science Council of Japan（2014）
Professor, Institute of Economic Research, Hitotsubashi University(2015)
Professor, School of Management and Research Center of Future Design, Kochi University of Technology(2016)
Specially Appointed Professor, Research Institute for Humanity and Nature(2016)

[Higher Degrees]

Doctor of Philosophy, University of Minnesota(1985)
Master of Economics, Hitotsubashi University(1978)
Bachelor of Economics, University of Kagawa(1975)

[Fields of Specialization]

Future Design

[Academic Society Memberships]

Society for Environmental Economics and Policy Studies
Economic Science Association
Japanese Economic Association

—Achievements—

[Papers]

[Original Articles]

- Junyi Shen, Takako Nakashima,　Izumi Karasawa, Tatsuro Furui, Kenichiro Morishige, Tatsuyoshi Saijo 2018,10 Examining Japanese women's preferences for a new style of postnatal care facility and its attributes. International Journal of Health Planning and Management:1-12. DOI:10.1002/hpm.2544 (reviewed).
- Zhang Jingchao, Koji Kotani, Tatsuyoshi Saijo 2018,06 "Public acceptance of environmentally friendly heating in Beijing: A case of a low temperature air source heat pump". Energy Policy 117:75-85. DOI:10.1016/j.enpol.2018.02.041 (reviewed).

[Research Presentations]

[Oral Presentation]

- Tatsuyoshi Saijo Future Design. Future Design: Exploring Affirmative Futures through an Intergenerational Outlook, 2019.01.08-2019.01.09, Arizona State University, America.
- Tatsuyoshi Saijo Future Design: An Overview. World Social Science Forum 2018, 2018.09.25-2018.09.28, Fukuoka International Congress Center, Fukuoka, Japan.
- Tatsuyoshi Saijo Future Design: Bequeathing Sustainable Natural Environments and Sustainable Societies to Future Generations. 2018.09.07, Duke Nicholas Institute for Environmental Policy Solutions, Durham, America.

[Invited Lecture / Honorary Lecture / Panelist]

- Tatsuyoshi Saijo An Overview of Future Design. Futurability: Intergenerational Equity and Sustainable Governance, 2019.03.22, Academia Sinica, Taipei, Taiwan.
- Tatsuyoshi Saijo Future Design: Bequeathing Sustainable Natural Environments and Sustainable Societies to Future Generations. Annual Scientific Conference and 86th General Membership Assembly, 2019.03.11, Philippine Intenational Convention center, Philippine.

・Tatsuyoshi Saijo Future Desigh. Future Earth Philippines Program, 2018.11.19, Manila, Philippines.

・Tatsuyoshi Saijo Future Design . HKUST Workshop on Experimental Economics, 2018.10.20, The Hong Kong University of Science and Technology, HongKong.

・Tatsuyoshi Saijo 「Future Design」. New Directions in Economic Theory and Empirical Economics, 2018.08.17-2018.08.18, Kolkata, India.

SAKAKIBARA Masayuki

Professor

Born in 1959.

[Academic Career]

April 1978 – March 1982: Hokkaido University School of Science

April 1982 – March 1984: Master Course of Graduate School of Science, Hokkaido University

April 1984 – Sept. 1987: Doctor Course of Graduate School of Science, Hokkaido University

[Professional Career]

April 1988- July 1988: Research Fellow of the Japan Society for the Promotion of Science

Aug. 1988- Oct. 1993: Assistant professor of Department of Earth Sciences, Faculty of Science, Ehime University

Nov. 1993- March 2005: Associate Professor of Department of Earth Sciences, Faculty of Science, Ehime University

April 2005- March 2006: Professor of Department of Earth Sciences, Faculty of Science, Ehime University

April 2006- Professor of Graduate School of Science and Engineering, Ehime University

April 2013- Director of Asia-Africa Center, Institute for International Relations

April 2015- Director SUIJI (Six-University Initiative Japan Indonesia) Promotion Office

April 2016－2017 Vice Dean of Faculty of Collaborative Regional Innovation

April 2018 Special Aide to the President of Ehime University

June 2018- Professor of RIHN

[Higher Degrees]

D.Sc(Hokkaido University, 1987)

—Achievements—

[Papers]

[Original Articles]

・Pateda, S. M., Sakakibara, M. and Sera 2018,11 Lung Function Assessment as an Early Biomonitor of Mercury-Induced Health Disorders in Artisanal and Small-Scale Gold Mining Areas in Indonesia. International Journal of Environmental Research and Public Health 2018 15(11). DOI:10.3390/ijerph15112480 (reviewed).

・Gafur, N. A., Sakakibara, M., Sano, S., and Sera, K. 2018,10 A Case Study of Heavy Metal Pollution in Water of Bone River by Artisanal Small-Scale Gold Mine Activities in Eastern Part of Gorontalo, Indonesia. Water 10(1507):10. DOI: 10.3390/w10111507 (reviewed).

[Research Presentations]

[Oral Presentation]

・Kasamatsu, H. Sakakibara, M., Tanaka, K., Komatsu, S. and Shimagami, M. Transdisciplinary approaches for creation innovative livelihood alternatives in high environmental loading areas affected by mercury pollution in Indonesia. World Social Science Forum, 2018.09.25-2018.09.28, Fukuoka International Congress Center, Fukuoka city.

- Masayuki Sakakibara Futurability of Gorontalo Geopark- Promoting Earth Heritage & Sustaining Local Communities. 2018.09.04-2018.09.04, Gorontalo Province, Indonesia.
- Shimagami, M., Kasamatsu, H. and Sakakibara, M. Kikigaki Program as a Transformative Boundary Object for Stimulating Sustainable Refional Innovation through Cross-generational Urban-Rural Interaction: Case studies from Japan and Indonesia. he 3rd international conference of the Transdisciplinary Reseach on Environmental Problems in Southeaset Asia(TREPSEA), 2018.08.11-2018.08.12, Hotel TC Damhil UNG, Gorontalo, Indonesia.
- Basri and Sakakbiara, M. Health Impact Assessment of Artisanal and Small-Scale Gold Mining in Bomabana, Southeast Sulawesi, Indonesia. The 3rd international conference of the Transdisciplinary Reseach on Environmental Problems in Southeaset Asia(TREPSEA), 2018.08.11-2018.08.12, Hotel TC Damhil UNG, Gorontalo, Indonesia.
- Hendra Prasetia, Sakakibra, M. and Sera, K. Atmospheric Mercury Contamination Assessment Using Various Tree Bark in an ASGM Area in North Gorontalo Regency, Indonesia. The 3rd international conference of the Transdisciplinary Reseach on Environmental Problems in Southeaset Asia(TREPSEA), 2018.08.11-2018.08.12, Hotel TC Damhil UNG, Gorontalo, Indonesia.
- Arifin, Y.I., Sakakbiara, M. and Sera, K. Assessing impact of artisanal and small scale gold mining activities on inhabitants and miners: a case study in Bolaang Mongohdow, North Sulawesi Province, Indonesia. The 3rd international conference of the Transdisciplinary Reseach on Environmental Problems in Southeaset Asia(TREPSEA), 2018.08.11-2018.08.12, Hotel TC Damhil UNG, Gorontalo, Indonesia.
- Pareda, S., Sakakibara, M. and Sera, K. Early Detection of Mercury-induced Health Disorders in Artisanal and Small-scale Gold Mining Area in Gorontalo Province. The 3rd international conference of the Transdisciplinary Reseach on Environmental Problems in Southeaset Asia(TREPSEA), 2018.08.11-2018.08.12, Hotel TC Damhil UNG, Gorontalo, Indonesia.
- Abbas, H.H., Sakakibara, M., Sera, K. and Sididi, M. The Social Economic and Mercury Exposure of Goldsmith in Manggala Subdistrict of Urban Artisanal Gold Minig (UAGM) Area in Makassar, South Sulawesi, Indonesia. The 3rd international conference of the Transdisciplinary Reseach on Environmental Problems in Southeaset Asia(TREPSEA), 2018.08.11-2018.08.12, Hotel TC Damhil UNG, Gorontalo, Indonesia.
- Gafur, N. A., Sakakibara, M., Sano, S. and Sera, K. Heavy Metal Pollution of Bone River water and Sediment in Gorontalo Province, Indonesia. The 3rd international conference of the Transdisciplinary Reseach on Environmental Problems in Southeaset Asia(TREPSEA), 2018.08.11-2018.08.12, Hotel TC Damhil UNG, Gorontalo, Indonesia.
- Andi, A., Sakakbiara, M. and Sano, S Heavy Metal Potential at Settling Pond of Coal Mining, East Kalimantan, Indonesia. The 3rd international conference of the Transdisciplinary Reseach on Environmental Problems in Southeaset Asia(TREPSEA), 2018.08.11-2018.08.12, Hotel TC Damhil UNG, Gorontalo, Indonesia.
- Kasamatsu, H., Shimagami, M. and Sakakibara, M. The Researchers Role and Future View of TDCOPs from Case Study of Dihime Limboto-ko, Gorontalo District. The 3rd international conference of the Transdisciplinary Reseach on Environmental Problems in Southeaset Asia(TREPSEA), 2018.08.11-2018.08.12, Hotel TC Damhil UNG, Gorontalo, Indonesia.

[Invited Lecture / Honorary Lecture / Panelist]

- Masayuki Sakakibara Transdisciplinary Reseach and Practice for Reducing Environmental Problems in ASEAN Countries. st ASEAN -Japan Meeting Pont of Collaboration by Stakeholders and Reseachers for Reducing Environmental Problems in ASEAN Coutries, 2018.12.08-2018.12.09, Bandung, Indonesia.
- Masayuki Sakakibara Co-Creation of Sustainable Regional Innovation for Reducing Risk of High-impact Environmental Pollution. International Lecturer, 2018.11.26-2018.11.26, Hasanuddin University, Makkasar, Indonesia.
- Masayuki Sakakibara Co-Creation of Sustainable Regional Innovation for Reducing Risk of High-impact Environmental Pollution. International Lecturer, 2018.11.25-2018.11.25, Public Health Universitas Muslim Indonesia, Makkasar, Indonesia.
- Masayuki Sakakibara Co-Creation of Sustainable Regional Innovation for Reducing Risk of High-impact Environmental Pollution. International Lecturer, 2018.11.25-2018.11.25, School of Health Sience of Makassar, Makassar, Indonesia.

SHIBATA Rei

Researcher

Born in 1987.

—Achievements—

[Papers]

[Original Articles]

- Haga, C., Inoue, T., Hotta, W., Shibata, R., Hashimoto, S., Kurokawa, H., Machimura, T., Matsui, T., Morimoto, J., Shibata, H 2018,08 Simulation of natural capital and ecosystem services in a watershed in Northern Japan focusing on the future underuse of nature: by linking forest landscape model and social scenarios. Sustainability Science. DOI:https://doi.org/10.1007/s11625-018-0623-9 (reviewed).
- Masahiro, A., Shibata, R., Oguro, M., Nakashizuka, T. 2018,07 The seasonal and scale-dependent associations between vegetation quality and hiking activities as a recreation service. Sustainability Science. DOI:https://doi.org/10.1007/s11625-018-0609-7 (reviewed).

SHIMADA ″tama″ Nahoko

Researcher

[Academic Career]

Department of Lifology, Graduate School of Human Cultures, University of Shiga Prefecture, D. Course(2012)

[Professional Career]

Specially Appointed Researcher, Center for Southeast Asian Studies, Kyoto University(2008)

Adjunct Teacher, Kyoto University of Art and Craft (2013-)

Adjunct Teacher, Kwansei Gakuin University(2015)

Adjunct Teacher, Seisen University(2015)

[Higher Degrees]

M.Human Culture (The University of Shiga Prefecture, 2008)

[Fields of Specialization]

Architecture,

Study of Ecological Thought

[Academic Society Memberships]

The Society of Global Civilization,

Japan Society of Lifology

[Awards]

Yoshikazu Takaya Area Study Prize（2019）

—Achievements—

[Books]

[Chapters/Sections]

・SHIMADA Nahoko 2019,03 第 5 章「"流域"を超える朽木のモノと生き物－木材と魚－」、第 13 章「朽木の神社地誌—土地に生きるカミの行方—」. MIZUNO Kazuharu・FUJIOKA Yuichiro (ed.) 滋賀県朽木谷の自然・社会・文化の変容. Kaiseisha, Otsu-city, Shiga-prefecture. (in Japanese)

SPIEGELBERG, Maximilian

Researcher

Born in 1981.

[Professional Career]

2013-2010 Coordinator, Interdisciplinary Distance-learning Environmental Studies Master, FernUni Hagen

2009 Field Assistant, Project on Combating Desertification, GTZ Turkmenistan & Bonn

[Higher Degrees]

Ph.D. Environmental Management (Kyoto Uni, 2017)

M.A. Peace & Conflict Studies (Philipps Uni Marburg, 2009)

B.Sc. Environmental & Resource Management (BTU Cottbus, 2006)

—Achievements—

[Research Presentations]

[Oral Presentation]

・Spiegelberg, Maximilian; Rupprecht, Christoph D. D.; Shinkai; Rika Prospectus of the seminar. The 23rd RIHN Regional Community Seminar: Towards bee-friendly cities - Co-creating urban futures, 2018.11.04, Nakagyo Ward Office, Kyoto.

・Spiegelberg, Maximilian; Rupprecht, Christoph D. D.; Shinkai; Rika; Gan, Jinchao “The new force of beekeeping is an old one: about hobby beekeepers in Japan”. 14th conference of Asian Apis Association, 2018.10.13-2018.10.25, Jakarta, Indonesia.

・Spiegelberg, Maximilian; Rupprecht, Christoph D. D.; Shinkai; Rika; Gan, Jinchao “Honeybees in urban Kyoto -Bee superhighways and potential impact on urban agriculture-“. World Social Science Forum, 2018.09.25-2018.09.28, Fukuoka, Japan. part of the panel ‘The wild food basket: recreating urban and rural ecosystems as food sources’

・Spiegelberg, Maximilian; Rupprecht, Christoph D. D.; Shinkai; Rika; Gan, Jinchao Trespassing foragers: Urban beekeeping in Japan on a formal-informal gradient. American Association of Geographers Annual Meeting 2018, 2018.04.10-2018.04.14, New Orleans, Lousiana, USA.

・Spiegelberg, Maximilian Honeybee Geographies: Exploring new productions of nature, space, knowledge, and power. American Association of Geographers Annual Meeting 2018, 2018.04.10-2018.04.14, New Orleans, Louisiana, USA. Panelist

・Spiegelberg, M., Gan, J., Shinkai, R., Rupprecht, C. D. D Trespassing foragers: Urban beekeeping in Japan on a formal-informal gradient. American Association of Geographers Annual Meeting, 2018.04.09-2018.04.14, New Orleans.

[Poster Presentation]

・Maximilian Spiegelberg; Lihua Cai; Natuski Shimizu “Kyoto University CoHHo garden – A community space”. Kyoto University International Symposium “Food & Sustainability”, 2018.10.29-2018.10.30, Kyoto University.

[Invited Lecture / Honorary Lecture / Panelist]

・Spiegelberg, Maximilian Honeybee Geographies: Exploring new productions of nature, space, knowledge, and power. American Association of Geographers Annual Meeting 2018, 2018.04.10-2018.04.14, New Orleans, Louisiana, USA. Panelist

SUGIHARA Kaoru

Specially Appointed Professor

Born in 1948.

[Academic Career]

Graduated from Faculty of Economics, Kyoto University, March 1971
Completed the Master Course (Economics), University of Tokyo, June 1973
Completed the Doctor Course (Economics), University of Tokyo, March 1976

[Professional Career]

Worked for Marubeni Corporation, Dublin Office (1976)
Lecturer in Economic History, Faculty of Economics, Osaka City University (1978)
Associate Professor of Economic History, Faculty of Economics, Osaka City University (1981)
Lecturer in the Economic History of Japan, Department of History, School of Oriental and African Studies (SOAS), University of London (1985)
Senior Lecturer in the Economic History of Japan, Department of History, SOAS, University of London (1991)
Professor of Economic History, Faculty of Economics (from 1997 Graduate School of Economics, Osaka University (1996)
Professor of The Center for Southeast Asian Studies (CSEAS), Kyoto University (2006)
Professor of Graduate School of Economics, University of Tokyo (2012)
Professor of National Graduate Institute for Policy Studies (GRIPS), Tokyo (2013)
Senior Professor of National Graduate Institute for Policy Studies (2014)
Specially Appointed Professor of Research Institute for Humanity and Nature (cross appointment with GRIPS from April to September 2016: full appointment from October 2016)
Member, Science Council of Japan (2011)

[Higher Degrees]

Doctor of Economics, University of Tokyo
MA (Economics), University of Tokyo
BA (Economics), Kyoto University

[Fields of Specialization]

Economic History
Environmental History

[Academic Society Memberships]

Socio-Economic History Society
Business History Society of Japan
The Japan Association of Asian Studies
The Japanese Association for South Asian Studies

[Awards]

*The 39th Nikkei Keizai Tosho Bunkasho [The Nikkei Book Prize for Economics], 1996
*The 18th Suntory Gakugeisho [The Suntory Book Prize for Academic Works], 1996

—Achievements—

[Books]

[Chapters/Sections]

・Sugihara, K. 2018,11 “Varieties of Industrialization: An Asian Regional Perspective”. in Giorgio Riello and Tirthankar Roy (ed.) Global Economic History. Bloomsbury Academic, London, pp.195-214.

[Research Presentations]

[Oral Presentation]

・Sugihara, K. “The Great Acceleration in Asia: The Resource Nexus and Social Tipping Points”. International Workshop on Resource Nexus and Asia's Great Acceleration, 2019.03.10-2019.03.11, Research Institution for Humanity and Nature, Kyoto.

・Sugihara, K. “The Seafront Resource Nexus around the Tokyo Bay: Social Tipping Points in circa 1970”. Fourth Research Seminar for Program 1 on ‘Urban Space and Resource Nexus’, 2019.01.18, RIHN, Kyoto.

・Sugihara, K. (Introduction and Chair) “Session 1 ‘Knowledge, Science and the Experience of Nature’. The 13th International Symposium ‘Humanities on the Ground: Confronting the Anthropocene in Asia, 2018.12.13, RIHN, Kyoto.

・Sugihara, K. (Discussant) “Reciprocal Comparisons and the Asian Paths of Economic Development”, Session on 'Asia in the Anthropocene (CS5-08)'. The Fourth World Social Science Forum, 2018.09.26, Fukuoka International Congress Center, Fukuoka.

・Sugihara, K. (Moderator of the Session and Presenter) "Monsoon Asia, Industrial-Urban-Regional Nexus and Environmental Sustainability: Reflections of Asia’s Historical Experiences" Session on 'Transformation of Resource Base in Asia’s Economic Development and Its Costs: Sustainability of Local, National and Regional Nexus (CS4-03)'. The Fourth World Social Science Forum, 2018.09.25, Fukuoka International Congress Center, Fukuoka.

・Sugihara, K. (Discussant) Comments on "Tropical Paths and Trade Integration" Session on 'Tropical Economies in the Making of the Modern World (310121) '. The18th World Economic History Congress, 2018.07.31, Boston Marriott Cambridge and MIT Campus, Boston.

・Sugihara, K. "Intra-Asian Trade and Asia’s Economic Development in the Long Nineteenth Century", Session on 'Building a Global History of Economic Divergence (310202)’. The 18th World Economic History Congress, 2018.07.31, Boston Marriott Cambridge and MIT Campus, Boston.

・Sugihara, K. "Local and Regional Payment Methods and the Growth of World Trade in the Long Nineteenth Century", Session on 'Multiple Payment Systems in Globalizing Economies (300212)'. The 18th World Economic History Congress, 2018.07.30, Boston Marriott Cambridge and MIT Campus, Boston.

[Invited Lecture / Honorary Lecture / Panelist]

・Sugihara, K. (Keynote address) "The Asian Path of Economic Development and Its Relevance to Sub-Saharan Africa". The First Conference of Japan Society for Afrasian Studies, 2018.10.06, Kansai University, Suita.

・Sugihara, K. (Moderator) Session on ' The Belmont Forum–NORFACE Transformations to Sustainability Rrogramme: Re-structuring the Field of Sustainability Research for Sustainable and Secure Futures ('CS1-11)'. The Fourth World Social Science Forum, 2018.09.26, Fukuoka International Congress Center, Fukuoka.

・Sugihara, K. “(Co-organizer and co-chair) Session on Societal Response to Climate Variation: Institution, Market, and Social Change in Early Modern and Modern Japan (010214)”. The 18th World Economic History Congress, 2018.08.01, Boston Marriott Cambridge and MIT Campus, Boston.

・Sugihara, K. (Invited Lecture) "Monsoon Asia, Intra-Asian trade and the Transformation of Resource Nexus". New Approaches in Asia-Pacific Historical and Contemporary Studies, 2018.07.02, Waseda University, Tokyo. (Sponsored by the Harvard-Yenching Institute and Waseda University’s Global Asia Research Center.)

SUZUKI Haruka

Researcher

—Achievements—

[Papers]

[Original Articles]

・Haruka Suzuki 2018 Peatland development by local people and effects on local water use in Kepau Baru, Meranti, Riau, Indonesia. The proceedings of the International Workshop on Forest Ecological Resources Security for Next Generation: Development and Routine Utilization of Forest Ecological Resources and their Domestication. pp.58-62.

TANAKA Ueru

Visiting Professor

Born in 1960.

[Academic Career]

Faculty of Agriculture, Hirosaki University (4/1979-3/1983)
Graduate School of Agriculture, Kyoto University (Master Course, 4/1988-3/1990)
Graduate School of Agriculture, Kyoto University (Doctor Course, 4/1990-9/1990)

[Professional Career]

June/1983- April/1987: Lecturer, Department of Horticulture, Jomo Kenyatta Collage of Agriculture and Technology, Kenya (as a member of Japan Overseas Cooperation Volunteers)
Oct/1990- Sept/1999: Assistant Professor, College of Agriculture, Kyoto University
Sept/1999- March/2002: Associate Professor, College of Agriculture, Kyoto University
April/2002- Sept/2011: Associate Professor, College of Global Environmental Studies, Kyoto University
Oct/2011- March/2016: Associate Professor, Research Institute for Humanity and Nature
April/2016- Present: Professor, Research Institute for Humanity and Nature

[Higher Degrees]

Dr.Agric(Kyoto Univeristy, 1997)

[Fields of Specialization]

Environmental Agriculture, Soil Science, Terrestrial Ecosystems Management, Rural Development Studies

[Academic Society Memberships]

Japanese Society of Soil Science and Plant Nutrition, Japanese Society of International Development Studies, Japanese Society of International Rural Development Studies, Japanese Journal of Tropical Agriculture and development, Japanese Society of Pedologist, Japanese Society of African Studies, Japanese Society of Agricultural Systems

[Awards]

SSPN Young Scientist Award(2000)
ASABE Peper Award（2010, Cowin）
SSPN Award 2012（2013, Cowin）
Japan Society for International Development, Best Poster Award（2013,Cowin）
Japan Society for International Development, Excellent Poster Award（2013,Cowin）
Japan Association for Arid Land Studies, Best Poster Award (2013, Cowin）
20th World Congress of Soil Science, Best Poster Award（2014, Cowin）

20th World Congress of Soil Science, Best Presentation Award（2014, Cowin）
EMASSA-2014 (Tamil Nadu, India), Best Poster Award (2014, Cowin)
41st Hitach Foundation Environment Award and Award by Minister of Environment (2014, Cowin）
25th Nikkei Award for Global Environmental Technology (2015, Cowin)

—Achievements—

[Research Presentations]

[Oral Presentation]

・MIYAZAKI H., K. P. SINGH, UCHIYAMA Y., ENDO H., ISHIMOTO Y. and TANAKA U. Pastoralism in Northwestern - Focus on Relationship between Pastoralist and Agriculturist . France-Japan Joint Symposium "Landscape in the Anthropocene", 2106.12.05-2016.12.08, Fondation France-Japon de l'EHESS, Paris, France.

TANIGUCHI Makoto

Professor

Born in 1959.

[Academic Career]

University of Tsukuba, Japan Ph.D. Hydrology (1987)
University of Tsukuba, Japan M.S. Hydrology (1984)
University of Tsukuba, Japan B.S. Geosciences (1982)

[Professional Career]

Research Institute for Humanity and Nature, Associate Professor (2007 -)
Research Institute for Humanity and Nature, Associate Professor (2003 - 2007)
Department of Earth Sciences, Nara University of Education, Professor (2000 - 2003)
Department of Earth Sciences, Nara University of Education, Associate Professor (1993 - 2000)
Department of Earth Sciences, Nara University of Education, Research Associate (1988 - 1990)
Division of Water Resources, CSIRO, Australia, Visiting Scientist (1987 - 1988)

[Higher Degrees]

D.Sc (The University of Tsukuba,1987)
M.Sc.(The University of Tsukuba,1984)

[Fields of Specialization]

Environmental dynamic analysis
Hydrology/Weather/Oceanic physics

[Academic Society Memberships]

American Geophysical Union
International Association of Hydrological Sciences
International Association of Hydrogeology
Japanese Association of Groundwater Hydrology
Japanese Association of Hydrological Science
Japan Society of Engineering Geology
The Japan Society of Hydrology and Water Resources
The Association of Japanese Geographers
The Japanese Society of Limnology

[Awards]

Award of 7th Japanese Association of Limnology (Yoshimura Prize, 2005)

Research award from the Association of Japanese Geographers (1987)

—Achievements—

[Papers]

[Original Articles]

- Lee S., Taniguchi, M., Choi, J.Y., Mohtar, R.H., Yoo, S.H. 2018 An Analysis of the Water-Energy-Food-Land Requirements and CO2 Emissions for Food Security of Rice in Japan. Sustainability 10(9):3354.
- Taniguchi, M., Masuhara, N., Teramoto, S. 2018 Tradeoffs in the water-energy- food nexus in the urbanizing Asia-Pacific Region. Water International 43(6):892-903. DOI:10.1080/02508060.2018.1516104
- Burnett, K., Wada, C., Taniguchi, M. Sugimoto, R., Tahara, D. 2018 Evaluating tradeoffs between groundwater pumping for snow-melting and nearshore fishery productivity in Obama City, Japan. Water 10:1556. DOI:doi:10.3390/w10111556
- Nakajima, T., Sugimoto, R., Tominaga, O., Takeuchi, Honda, H., Shoji, J., Taniguchi, M. 2018 Fresh and recirculated submarine groundwater discharge evaluated by geochemical tracers and a seepage meter at two sites in the Seto Inland Sea, Japan. Hydrology 5(61). DOI:doi:10.3390/hydrology5040061

[Research Presentations]

[Oral Presentation]

- Taniguchi, M., Lee, S., Masuhara, N. Multi-scale water-energy-food nexus. American Geophysical Union, 2018.12.13, Washington, D.C., USA.
- Taniguchi, M., Lee, S., Masuhara, N. Urban water-energy-food nexus. Urban Nexus workshop, 2018.11.05, Research Institute for Humanity and Nature, Kyoto.
- Taniguchi, M. Water-energy-food nexus. RIHN-SRC joint workshop, 2018.10.29, Stockholm Resilience Center, Stockholm, Sweden.
- Taniguchi, M., Lee, S., Masuhara, N. Groundwater-energy-food nexus for sustainability. RFG, 2018.06.17, Vancouver, Canada.

[Invited Lecture / Honorary Lecture / Panelist]

- Taniguchi, M. Multi-scale water-energy-food nexus in Asia. THA2019, 2019.01.24, Bangkok.
- Taniguchi, M. Sustainable groundwater management in Anthropocene. THA2019, 2019.01.23, Bangkok.
- Taniguchi, M. Water-energy-food nexus for sustainability. Nexus KAN Steering Committee Meeting, 2019.01.14, Paris.
- Taniguchi, M. Nexus-KAN,Strategy for SDGs in Asia. Science Council in Asia, 2018.12.07, Science Council in Japan.

TAYASU Ichiro

Professor

Born in 1969.

[Academic Career]

Department of Zoology, Graduate School of Science, Kyoto University, Doctor Course(1997)

Department of Zoology, Graduate School of Science, Kyoto University, Master Course(1994)

Department of Zoology, Faculty of Science, Kyoto University(1992)

[Professional Career]

Professor, RIHN Center, Research Institute for Humanity and Nature (2016)

Professor, Center for Research Promotion, Research Institute for Humanity and Nature (2014)
Associate Professor, Center for Ecological Research, Kyoto University (2003)
Assistant Professor, Research Institute for Humanity and Nature (2002)
Postdoctoral Research Fellow (Research Abroad) of the Japan Society for the Promotion of Science; Laboratoire d'Ecologie des Sols Tropicaux, Institut de Recherche pour le Developpement (2000)
Postdoctoral Research fellow (PD) of the Japan Society for the Promotion of Science; Laboratory of Forest Ecology, Graduate School of Agriculture, Kyoto University, Japan (1997)

[Higher Degrees]

Ph.D (Kyoto University, 1997)
M Sc. (Kyoto University, 1994)

[Fields of Specialization]

Isotope Ecology
Animal Ecology
Freshwater Ecology
Soil Ecology
Isotope Environmental Science

[Academic Society Memberships]

Ecological Society of Japan
The Japanese Society of Limnology
The Japanese Society of Soil Zoology
The International Union for the Study of Social Insects
Japan Geoscience Union
Advancing the Science of Limnology and Oceanography

[Awards]

16th Inoue Research Award for Young Scientists (1999)
20th Biwako Prize for Ecology (2019)

—Achievements—

[Papers]

[Original Articles]

- Ko, C.-Y., Iwata, T., Lee, J.-Y., Murakami, A., Okano, J., Ishikawa, N.F., Sakai, Y., Tayasu, I., Itoh, M., Song, U., Togashi, H., Nakano, S., Ohte, N. and Okuda, N. 2019,03 Assessing alpha and beta diversities of benthic macroinvertebrates and their environmental drivers between watersheds with different levels of habitat transformation in Japan. Marine and Freshwater Research 70(4):504-512. DOI:10.1071/MF18031 (reviewed).
- Matsubayashi, J., Umezawa, Y., Matsuyama, M., Kawabe, R., Mei, W., Wan, X., Shimomae, A. and Tayasu, I. 2019,02 Using segmental isotope analysis of teleost fish vertebrae to estimate trophic discrimination factors of bone collagen. Limnology and Oceanography: Methods 17:87-96. DOI:10.1002/lom3.10298 (reviewed).
- Sase, H., Takahashi, M., Matsuda, K., Sato, K., Tanikawa, T., Yamashita, N., Ohizumi, T., Ishida, T., Kamisako, M., Kobayashi, R., Uchiyama, S., Saito, T., Morohashi, M., Fukuhara, H., Kaneko, S., Inoue, T., Yamada, T., Takenaka, C., Tayasu, I., Nakano, T., Hakamata, T. and Ohta, S. 2019,01 Response of river water chemistry to changing atmospheric environment and sulfur dynamics in a forested catchment in central Japan. Biogeochemistry 142:357-374. DOI:10.1007/s10533-019-00540-1 (reviewed).
- Tanaka, H.O., Haraguchi, T.F., Tayasu, I. and Hyodo F. 2018,10 Stable and radio-isotopic signatures reveal how the feeding habits of ants respond to natural secondary succession in a cool-temperate forest. Insectes sociaux 66:37-46. DOI:10.1007/s00040-018-0665-0 (reviewed).

・Ishikawa, N.F., Chikaraishi, Y., Takano, Y., Sasaki, Y., Takizawa, Y., Tsuchiya, M., Tayasu, I., Nagata. T. and Ohkouchi, N. 2018,09 A new analytical method for determination of the nitrogen isotopic composition of methionine: its application to aquatic ecosystems with mixed resources. Limnology and Oceanography: Methods 16(9):607-620. DOI:10.1002/lom3.10272 (reviewed).

・Suetsugu, K., Ohta, T. and Tayasu, I. 2018,08 Partial mycoheterotrophy in the leafless orchid Cymbidium macrorhizon. American Journal of Botany 105(9):1595-1600. DOI:10.1002/ajb2.1142 (reviewed).

・Saitoh, Y., Nakano, T., Shin, K-C., Matsubayashi, J., Kato, Y., Amakawa, H., Osada, Y., Yoshimizu, C., Okuda, N., Amano, Y., Togashi, H., Kurita, Y. and Tayasu, I. 2018,08 Utility of Nd isotope ratio as a tracer of marine animals: regional variation in coastal seas and causal factors. Ecosphere 9(8):e02365. DOI:10.1002/ecs2.2365 (reviewed).

・Endo, H., Fukuda, H., Takahashi, D., Okumura, Y., Inomata, E., Yoshimizu, C., Tayasu, I. and Nagata, T. 2018,07 Influence of isotope fractionation on the nitrogen isotope composition of the brown macroalga Undaria pinnatifida. Phycological Research 66:262-268. DOI:10.1111/pre.12332 (reviewed).

・Kato, Y., Kondoh, M., Ishikawa, N.F., Togashi, H., Kohmatsu, Y., Yoshimura, M., Yoshimizu, C., Haraguchi, T.F., Osada, Y., Ohte, N., Tokuchi, N., Okuda, N., Miki, T. and Tayasu, I. 2018,05 Using food network unfolding to evaluate food-web complexity in terms of biodiversity: theory and applications. Ecology Letters 21:1065-1074. DOI:10.1111/ele.12973 (reviewed).

・Sugio, K., Miyaguni, Y. and Tayasu, I. 2018,04 Characteristics of dispersal flight and disperser production in an Asian dry-wood termite, Neotermes koshunensis (Isoptera, Kalotermitidae). Insectes Sociaux 65:323-330. DOI:10.1007/s00040-018-0616-9 (reviewed).

TERADA Masahiro

Visiting Associate Professor

[Professional Career]

Associate Professor, Research Institute for Humanity and Nature, Kyoto, Japan(2012)

Visiting Associate Professor, Research Institute for Humanity and Nature, Kyoto, Japan（2015）

Visiting Scholar, Max-Planck-Institute for History of Science,Berlin, Germany（2016）

[Higher Degrees]

M.Lit(Osaka University,1998)

[Fields of Specialization]

Environmental Humanities

History/Metahistory

Study on the Anthropocene

—Achievements—

[Papers]

[Original Articles]

・Masahiro Terada 2018,06 “Food as Ingredient for Memory: The exhibition “Food-scape in Mindscape” “. Blog entry for “Lifeworlds of Sustainable Food Consumption and Production: Agrifood System in Transition“.

TSUSHIMA Akane

Researcher

—Achievements—

[Papers]

[Original Articles]

・Masashi Niwano, Teruo Aoki, Akihiro Hashimoto, Sumito Matoba, Satoru Yamaguchi, Tomonori Tanikawa, Koji Fujita, Akane Tsushima, Yoshinori Iizuka, Rigen Shimada, and Masahiro Hori 2018 NHM–SMAP: spatially and temporally high-resolution nonhydrostatic atmospheric model coupled with detailed snow process model for Greenland Ice Sheet. The Cryosphere(12):635-655. (reviewed).

YAMANAKA Manabu D.

Researcher

Born in 1955.

[Academic Career]

Doctor Course, Department of Atmosphere-Hydrosphere Science, Graduate School of Science, Nagoya University (1985)
Research Student, Institute of Space and Astronautical Science, Ministry of Education, Science and Culture (1981-85)
Master Course, Department of Atmosphere-Hydrosphere Science, Graduate School of Science, Nagoya University (1982)
Auditor, Faculty of Science, Kyoto University (1979-80)
Course for High-School Teacher of Science, Osaka Kyoiku University (1979)

[Professional Career]

JICA Expert, Can Tho University, Vietnam (2018)
Project Researcher, Research Institute for Humanity and Nature (2018)
JICA Expert, Department of Meteorology, Sri Lanka (2016)
Professor Emeritus, Kobe University (2016)
Senior Staff, Japan Agency for Marine-Earth Science and Technology (2016)
JICA Expert, Agency for Assessment and Application of Technology, Indonesia (2010-14)
Principal Scientist, Japan Agency for Marine-Earth Science and Technology (2009)
Professor, Graduate School of Science, Kobe University (2007)
Senior Scientist, Japan Agency for Marine-Earth Science and Technology (2007)
Group Leader, Frontier Observational Research System for Global Change, Japan Marine Science and Technology Center (1998)
Professor, Graduate School of Science and Technology, Kobe University (1998)
Associate Professor, Radio Atmospheric Science Center, Kyoto University (1995)
Lecturer, Radio Atmospheric Science Center, Kyoto University (1989)
Lecturer, Faculty of Education, Yamaguchi University (1987)
JSPS Postdoctoral Fellow, Institute of Space and Astronautical Science (1986)
JSPS Junior Research Fellow, Water Research Institute, Nagoya University (1985)
Technical Assistant, Research Reactor Institute, Kyoto University (1979-1980)

[Higher Degrees]

D.Sc (Nagoya University, 1985)
M.Sc (Nagoya University, 1982)

B.Ed (Osaka Kyoiku University, 1979)

[Fields of Specialization]

Atmosphere-Hydrosphere Science

[Academic Society Memberships]

The Meteorological Society of Japan
The Oceanographic Society of Japan
The Society of Geomagnetism and Earth, Planetary and Space Sciences (SGEPSS)
The Japanese Society for Planetary Sciences
Japan Geoscience Union (JpGU)

—Achievements—

[Papers]

[Original Articles]

- Katsumata, M., S. Mori, Hamada, J.-I., M. Hattori, F. Syamsudin and M. D. Yamanaka 2018,10 Diurnal cycle over a coastal area of the maritime continent as derived by special networked soundings over Jakarta during HARIMAU2010. Prog. Earth Planet Sci. 5(64):1-19. DOI:10.1186/s40645-018-0216-3 (reviewed). (Special Call for Excellent Papers on Hot Topics: 5. Asia Monsoon Hydroclimate)
- Mori, S., Hamada J.-I., M. Hattori, P.-M. Wu, M. Katsumata, N. Endo, K. Ichiyanagi, H. Hashiguchi, A. A. Arbain, R. Sulistyowati, S. Lestari, F. Syamsudin, T. Manik and M. D. Yamanaka 2018,09 Meridional march of diurnal rainfall over Jakarta, Indonesia, observed with a C-band Doppler radar: An overview of the HARIMAU2010 campaign. Prog. Earth Planet Sci. 5(47):1-23. DOI:10.1186/s40645-018-0202-9 (reviewed). (Special Call for Excellent Papers on Hot Topics: 5. Asia Monsoon Hydroclimate)

[Review Articles]

- Yamanaka, M. D., S.-Y. Ogino, P.-M. Wu, Hamada J.-I., S. Mori, J. Matsumoto and F. Syamsudin 2018,04 Maritime continent coastlines controlling Earth's climate. Prog. Earth Planet Sci. 5(21):1-28. DOI:10.1186/s40645-018-0174-9 (reviewed). (a review, Special Call for Excellent Papers on Hot Topics: 5. Asia Monsoon Hydroclimate)

[Research Presentations]

[Oral Presentation]

- 山中大学 豪雨発生予測への大気レーダー応用可能性：日本およびインドネシアの場合. 第 12 回 MU レーダー・赤道大気レーダーシンポジウム, 2018.09.05-2018.09.06, 宇治. (in Japanese) http://www.rish.kyoto-u.ac.jp/ear/ear-sympo-program2018.pdf
- 山中大学 熱帯海岸降雨集中帯としての泥炭地域：「生存基盤指数」の「飽和」？. 熱帯泥炭社会プロジェクト幹事会セミナー, 2018.09.03, 京都. (in Japanese)
- Yamanaka, M. D. Radar Monitoring dan Fenomena El Niño. Rapat Koordinasi, Program Restorasi Gambut di Wilayah Kabupaten Bengkalis Melalui Penguatan Bidang Penelitian Lintas Lembaga Dalam dan Luar Negeri Dalam Rangka Pengurangan Resiko Bencana Kabut Asap, 2018.07.31, Bengkalis, Riau, Indonesia. (Other) (Bahasa Indonesia)
- 山中大学 インドネシア「海大陸」の長い海岸線が決める地球の気候. 地球研ランチセミナー, 第 295 回, 2018.05.29, 京都. (in Japanese)
- Yamanaka, M. D. Climate dynamics referenced to coastline: A retrospective. JpGU 2018, 2018.05.20-2018.05.24, Makuhari. ACG37-05, https://confit.atlas.jp/guide/event-img/jpgu2018/ACG37-05/public/pdf?type=in&lang=en
- Ogino, S.-Y., M. D. Yamanaka, S. Mori, J. Matsumoto Tropical coastal dehydrator: A new view of global atmospheric water circulation. JpGU 2018, 2018.05.20-2018.05.24, Makuhari. ACG37-06, https://confit.atlas.jp/guide/event-img/jpgu2018/ACG37-06/public/pdf?type=in&lang=en
- 荻野慎也・山中大学・森修一・松本淳 熱帯沿岸脱水機: 全球海陸水循環における沿岸降水の働き. 日本気象学会 2018 年春季大会, 2018.05.16-2018.05.19, つくば. (in Japanese) http://www.metsoc.jp/default/wp-content/uploads/2018/03/S2018oral_20180406.pdf 予稿集 p.172（C205）

[Poster Presentation]

・Ogino, S. Y., M. D. Yamanaka, S. Mori and J. Matsumoto Tropical coastal dehydrator in global atmospheric water circulation: An overview. 8th GEWEX Open Science Conference: Extremes and Water on the Edge, 2018.05.06-2018.05.11, Canmore, Alberta, Canada. https://www.gewexevents.org/wp-content/uploads/gravity_forms/34-85b8bfd87c728fd2acbb60a1555f2e79/2018/05/Ogino_A-18.pdf

YAMAUCHI Taro

Professor

Born in 1968.

[Academic Career]

School of Health Sciences, Faculty of Medicine, University of Tokyo, B.A. (1993)

School of International Health, Graduate School of Medicine, University of Tokyo, M. Health Sci. (1995)

School of International Health, Graduate School of Medicine, University of Tokyo, Ph.D. (Health Sci.) (1998)

[Professional Career]

Part-time Lecturer, Kagawa Nutrition University (1998)

Visiting Fellow, Research School of Pacific and Asian Studies, Australia National University (1999)

Post-doctoral Fellow, Japan Society for the Promotion of Science (JSPS) (2000)

Assistant Professor, Department of Human Ecology, Graduate School of Medicine, University of Tokyo (2002)

Visiting Associate Professor, National Institute for Humanity and Nature (2007)

Associate Professor, Faculty of Health Sciences, Hokkaido University (2007)

Professor, Faculty of Health Sciences, Hokkaido University (2013)

Professor,Research Institute for Humanity and Nature(2018)

[Higher Degrees]

Ph.D(The University of Tokyo, 1998)

M.Health Sci.(The University of Tokyo, 1995)

[Fields of Specialization]

Human Ecology

Global Health

Biological Anthropology

Human Nutrition

—Achievements—

[Papers]

[Original Articles]

・Yumiko Otsuka, Lina Agestika, Widyarani, Neni Sintawardani, Taro Yamauchi 2019,01 Risk factor for undernutrition and diarrhea prevalence in an urban slum in Indonesia: Focus on water, sanitation, and hygiene. American Journal of Tropical Medicine and Hygiene 100(3):727-732. DOI:DOI:10.4269/ajtmh.18-0063 (reviewed).

・Hasegawa J, Suzuki H, Yamauchi T 2018,11 Impact of season on the association between muscle strength/volume and physical activity among community-dwelling elderly people living in snowy-cold regions. Journal of Physiological Anthropology 37(25). DOI:10.1186/s40101-018-0186-6 (reviewed).

・Yumiko OTSUKA, Ken USHIJIMA, Mayu IKEMI, Dewi NILAWATI, Neni SINTAWARDANI, Taro YAMAUCHI 2018,11 Mapping of water, sanitation, hygiene and child health in an urban slum of Indonesia. Sanitation Value Chain 2(1): 27-37. DOI:DOI:10.20568/00002639 (reviewed).

・Sikopo Nyambe, Koji Hayashi, Joseph Zulu, Taro Yamauchi 2018,11 Water, Sanitation, Hygiene, Health and Civic Participation of Children and Youth in Peri-Urban Communities: An Overview of Lusaka, Zambia. Sanitation Value Chain 2(1):39-54. DOI:DOI:10.20568/00002640 (reviewed).

・M. Ikemi, K. Ushijima, Y. Otsuka, T. Yamauchi, D. Nilawati, D. R. Wulan, and N. Sintawardani 2018 Economic situation of value chain actors in urban slums of Bandung: A case of Kiaracondong. IOP Conference Series: Earth and Environmental Science 160(012019). (reviewed).

・Nagahori C., Kinjo Y., Vodounon AJ., Alao MJ., Padounou Batossi G., Hounkpatin B., Amoule Houenassi E., Yamauchi T. 2018 Possible effect of maternal safe food preparation behavior on child malnutrition in Benin, Africa. Pediatrics International 60:875-881. DOI:10.1111/ped.13656 (reviewed).

・Yumiko Otsuka, Lina Agestika, Widyarani, Neni Sintawardani, Taro Yamauchi 2018 Risk factor for undernutrition and diarrhea prevalence in an urban slum in Indonesia: Focus on water, sanitation, and hygiene. American Journal of Tropical Medicine and Hygiene in press. DOI:10.4269/ajtmh.18-0063 (reviewed).

・Nagahori C, Kinjo Y, Vodounon AJ, Alao MJ, Padounou Batossi G, Hounkpatin B, Amoule Houenassi E, Yamauchi T 2018 Possible effect of maternal safe food preparation behavior on child malnutrition in Benin, Africa. Pediatrics International 60:875-881. (reviewed).

・M. Ikemi, K. Ushijima, Y. Otsuka, T. Yamauchi, D. Nilawati, D. R. Wulan, and N. Sintawardani 2018 Economic situation of value chain actors in urban slums of Bandung: A case of Kiaracondong. IOP Conference Series: Earth and Environmental Science 60 (012019). (reviewed).

・Wang P, Hao M, Han W, Yamauchi T 2018 Factors associated with nutritional status and motor development among young children in suburban Northeast China . Nursing & Health Sciences in press. (reviewed).

[Research Presentations]

[Oral Presentation]

・Taro Yamauchi Designing Sanitation Systems as Eco-Community-Value System. A Seminar of "Dialogue of Indigeneity: Perspectives from Archaeology and Anthropology" , 2019.03.21-2019.03.22, University of Oxford, UK.

・Yumiko Otsuka, Lina Agestika, Hidenori Harada,Widyarani, Neni Sintawardani, Taro Yamauchi Influence of water, sanitation, and hygiene (WASH) on child health in an urban slum of Indonesia. Green Technology for Value Chains 2018, 2018.11.01-2018.11.02, Tangerang, Indonesia.

・Ken Ushijima, Naoyuki Funamizu, Taro Yamauchi Water and Sanitation System. For a Shrinking Society. World Social Science Forum 2018, 2018.09.25-2018.09.28, Fukuoka, Japan.

・Nyambe S, Hayashi K, Zulu J, Yamauchi T The image of peri-urban sanitation and health through the eyes of the young: Understanding community sanitation and health in Lusaka, Zambia. Dry Toilet Conference 2018, 2018.08.22-2018.08.24, Hiedanranta, Tampere, Finland.

・Koji Hayashi, Seiji Nakao, Taro Yamauchi Defecation without toilets - Toward the study of sanitation activities in the hunter-gatherers. The Twelfth International Conference on Hunting and Gathering Societies (CHAGS 12), 2018.07.23-2018.07.27, Penang, Malaysia.

・Taro Yamauchi Co-creating the Sanitation Value Chain in Lusaka, Zambia by Designing Sanitation Systems as Eco-Community-Value Systems. Zambia Water Forum and Exhibition (ZAWAFE) 2018, 2018.06.11-2018.06.13, Lusaka, Zambia.

・NYAMBE Sikopo, HAYASHI Koji, YAMAUCHI Taro Using photographs to tell the story of sanitation and health in peri-urban Lusaka, Zambia. The 55th JAAS Annual Meeting, 2018.05.26, Hokkaido Univ., Sapporo. (in Japanese)

[Invited Lecture / Honorary Lecture / Panelist]

・Taro YAMAUCHI Measuring human behavior, activity pattern and daily life: Perspectives from daily time-space use to nutritional adaptation. The 48th Hominization Conference: Nomadic life and Hominization, 2019.02.28-2019.03.01, Primate Research Institute Kyoto University, Inuyama City. (in Japanese)

・Taro Yamauchi Co-creating the sanitation value chain: Designing sanitation system as eco-community-value systems. Society for Human Ecology (SHE) 2018, 2018.07.07-2018.07.10, Lisbon, Portuguese.

YASUNARI Tetsuzo

Director-General

Born in 1947.

[Professional Career]

Director-General, Research Institute for Humanity and Nature (4/2013-)
Designated Professor, Hydrospheric Atmospheric Research Center (HyARC), Nagoya University. (4/2012-3/2013)
Professor, Hydrospheric Atmospheric Research Center (HyARC), Nagoya University. (8/2002-3/2012)
Leader, Global COE program “From Earth System Science to Basic and Clinical Environmental Studies” (2009-2012)
Leader, the 21st Century COE Program "The Sun-Earth-Life Interactive System (SELIS)" (2003-2008)
Visiting Professor, Department of Earth & Planetary Science, the University of Tokyo. (4/2003-3/2006)
Professor, Climatology & Meteorology, University of Tsukuba. (4/1992-7-2002)
Associate Professor, Climatology & Meteorology, University of Tsukuba. (6/1990-3/1992)
Assistant Professor, Climatology & Meteorology, University of Tsukuba. (8/1984-8/1985)
Visiting Scientist, Department of Meteorology, Florida State University (8/1984-8/1985)
Research Associate, Center for Southeast Asian Studies, Kyoto University. (4/1977-3/1982)

[Higher Degrees]

D.Sc., Meteorology & Climatology (Kyoto University, 1981)
M.S., Meteorology (Kyoto University, 1974)

[Fields of Specialization]

Meteorology
Climatology
Climate systems studies

[Academic Society Memberships]

The Association of Japanese Geographers
Meteorological Society of Japan
Japan Society of Hydrology and Water Resources
The Japanese Society of Snow and Ice
American Geophysical Union
American Meteorological Society

[Awards]

Chichibuno-Miya Memorial award (as a group member) 1980
Yamamoto Prize, Meteorological Society of Japan 1981
Research Award (Gakkai-sho), Meteorological society of Japan 1986
Nikkei Prize for Global Environmental Study and Technology 1991
Fujiwara Prize, Meteorological Society of Japan 2002
International Award, Japanese Society of Hydrology and Water resources 2006
Meritorious Deed Award, Japan Society of Hydrology and Water Resources 2014
Japan Geoscience Union Fellow 2015
Best Paper Award of Society of Environmental Science, Japan 2015

—Achievements—

[Papers]

[Original Articles]

- Kanamori, H., T. Kumagai, H. Fujinami, T. Hiyama and T. Yasunari 2018,09 Effects of long- and short-term atmospheric water cycles on the water balance over the Maritime Continent. Journal of Hydrometeorology Vol.19. (reviewed).

・Naoyuki Kurita, Mayumi Horikawa, Hironari Kanamori, Hatsuki Fujinami, Tomo'omi Kumagai, Tomonori Kume, Tetsuzo Yasunari 2018,05 Interpretation of El Niño–Southern Oscillation‐related precipitation anomalies in north‐western Borneo using isotopic tracers. Hydrological Processes:2176-2186. (reviewed).

・Naoyuki Kurita, Mayumi Horikawa, Hironari Kanamori, Hatsuki Fujinami, Tomo'omi Kumagai, Tomonori Kume, Tetsuzo Yasunari 2018,05 Interpretation of El Niño–Southern Oscillation‐related precipitation anomalies in north‐western Borneo using isotopic tracers. Hydrological Processes:2176-2186. (reviewed).

[Research Presentations]

[Invited Lecture / Honorary Lecture / Panelist]

・Tetsuzo Yasunari Future Earth: towards global sustainability of the anthropocene?. Future Earth, Mongolia, 2018.06.08, Ulaanbaatar, Mongolia. (in Japanese)

Appendix 1 Number and Affiliation of Project Members

Project Number	Title of the project	Total	RIHN	University / College			Inter-University Research Institute	Public Institution	Private Institution	Others	Overseas Institution
				National	Public	Private					
Research Program 1 (FR5)	Societal Adaptation to Climate Change: Integrating Palaeoclimatological Data with Historical and Archaeological Evidences	75	3	32	3	15	6	7	3	2	4
Research Program 1 (FR2)	Toward the Regeneration of Tropical Peatland Societies: Building International Research Network on Paludiculture and Sustainable Peatland Management	73	5	31	2	6	0	2	3	1	23
Research Program 2 (FR1)	Research and Social Implementation of Ecosystem-based Disaster Risk Reduction as Climate Change Adaptation in Shrinking Societies	106	3	59	6	14	0	15	9	0	0
Research Program 2 (FR4)	Biodiversity-driven Nutrient Cycling and Human Well-Being in Social-ecological Systems	113	12	32	10	15	0	19	2	4	19
Research Program 3 (FR3)	Lifeworlds of Sustainable Food Consumption: Agri-food Systems in Transition	90	10	15	2	11	0	7	11	3	31
Research Program 3 (FR2)	The Sanitation Value Chain: Designing Sanitation Systems as Eco-Community-Value System	57	4	24	1	3	0	5	0	2	18
Research Program 3 (PR)	Co-creation of Sustainable Regional Innovation for Reducing Risk of High-impact Environmental Pollution	42	3	14	1	4	1	1	3	2	13
Research Program 2 (PR)	Mapping the Environmental Impact Footprint of Cities, Companies, and Household	23	1	10	0	3	0	2	0	0	7
Individual Collaboration FS (OKABE)	Future Image of Living Sphere by Restructuring Sustainable Relation between Humans and Land	12	0	9	0	0	0	0	0	0	3
Institutional Collaboration FS (KOHSAKA)	Fair and Equitable Benefit Sharing of Biological and Genetic Resources in the Era of Digital Information: Improving Livelihoods and Agrobiodiversity Conservation by Intellectual Property and Storylines	29	1	9	1	5	2	2	7	0	2
Institutional Collaboration FS (MATSUDA)	Transformation and Reconstruction of Agri-Cultural Diversity in Southeast Asia	13	1	3	0	4	0	3	0	1	1

Institutional Collaboration FS (MORI)	Developing Interactive Rural-Urban Systems to Improve Human Well-being: Migration for Humanity and Nature	13	0	9	1	3	0	0	0	0	0
Institutional Collaboration FS (HAYASHIDA)	Study of Behavior Modification of Public People by Sharing Daily Activity and Air Quality Information toward Clean Air and Promoting Public Health	23	0	18	0	3	0	2	0	0	0
Core Program (FR1)	Proposal and Verification of the Validity of Isotope Environmental Traceability Methodology in Environmental Studies	36	13	5	4	4	0	7	0	2	1
Core FS (KONDO)	Information Asymmetry Reduction in Open Team Science for Socio-environmental Cases	30	9	8	1	3	2	3	2	0	2
Core FS (ONISHI)	Co-design and stakeholder engagement according to geographical scales	3	1	1	0	1	0	0	0	0	0
-	Cooperative research program on Environmental Isotope Study	76	7	45	3	5	1	11	3	0	1
	Total	814	73	324	35	99	12	86	43	17	125

As of 31 March, 2019

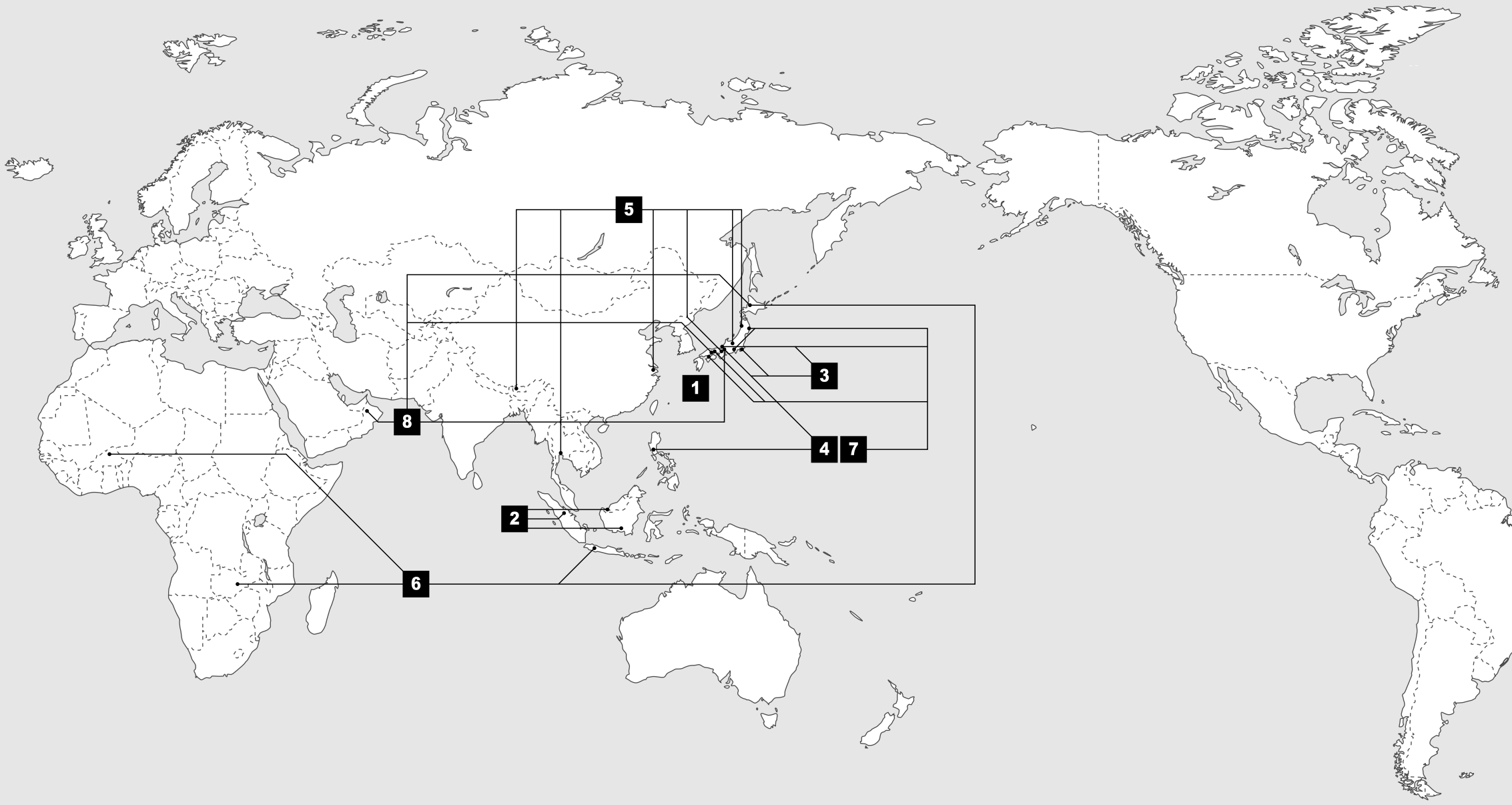
Appendix 2 Research Fields of Project Members

Project Number	Title of the Project	The Number of Projects Members				Research Background of Project Members
		Natural Sciences	Humanities	Social Sciences	Total	
Research Program 1 (FR5)	Societal Adaptation to Climate Change: Integrating Palaeoclimatological Data with Historical and Archaeological Evidences	37	35	3	75	(Natural Sciences) Digital Signal Processing, Paleoclimatology, Dendrochronology, Historical Climatology, Wood Anatomy, Paleoceanography, Dating Method, Plant Ecology, Isotopic Meteorology and Climatology, Climate Dynamics・Climate Modeling, Earth System Dynamics, Wood Science, Isotope Geochemistry, Glaciology, Hydrology, Geochronology, Earth Dynamics, Geochemistry, Forestry, Environmental Studies, Radiocarbon chronology, Climatology, Glaciology, Assimilation of old weather records (Humanities) Japanese Early Modern Age History, Archaeology, Japanese Early Modern Age Urban History・Comparative Studies of Historical Documents, Prehistorical Archaeology, Japanese Middle Age History, Japanese Archaeology, Theoretical Archaeology, Japanese History, Vegetational History, Edo-era History, Japanese Early Modern History, History of Ryukyu, Japanese Early Modern Age Emperor Studies/Economic History, Archaeology (Prehistoric-chronology), Archaeology (Yayoi-era), Prehistory, Human Informatics, Japanese Ancient History, Japanese Religious History, Japanese Middle Age History (Shoen/Village/Environment), Feudal Domain History (Social Sciences) Japanese Economic History・Historical Demography, Environmental Policy, Japanese Early Modern Age Economical and Social History
Research Program 1 (FR2)	Toward the Regeneration of Tropical Peatland Societies: Building International Research Network on Paludiculture and Sustainable Peatland Management	41	9	23	73	(Natural Sciences) GIS Spatial Informatics, Political Ecology, Environmental Engineering, Environmental Resource Geology, Environmental Anthropology, Meteorology, Physical Geography, Informatics, Plant Ecology, Forest Ecology, Hydrology, Mathematical Informatics, Computational Chemistry, Ecology, Policy Science, BiogeoChemistry, Atmospheric Chemistry, Atmospheric Environment, Air Quality Measurement, Carbon Cycle, Area Informatics, Urban Environmental Engineering, Soil Science, Hydrology, Land Use and Resource Management, Agriculture, Agrometeorology, Agricultural Hydrology, Agricultural Engineering, Limnology, Silviculture (Humanities) Environmental Science, Social Anthropology, Humanities, Anthropology, Regional Studies, Forest Policy, History (Social Sciences) Indonesian Political Economy, Indonesia Studies, Political Ecology, Development Studies, Environmental and Agricultural Change, Environmental NGO, Economics, Economic History, Natural Resource Management, Socioeconomic History, Social Anthropology, Human Geography, Anthropology, Politics, Political Economy, Regional Studies, Utilization of Local Wood, Agriculture, Folk Ecology
Research Program 2 (FR1)	Research and Social Implementation of Ecosystem-based Disaster Risk Reduction as Climate Change Adaptation in Shrinking Societies	70	8	28	106	(Natural Sciences) GIS, Landscape Science, Space Utilization Engineering, River Environment, Pollen Analysis, Environmental Systems Engineering, Environment Design, Environmental Studies, Environmental Impact Assessment, Environmental Policy, Advanced Environment, Environmental Agriculture, Fish Physiological Ecology, Spatial Information Science, Spatial Informatics, Community Ecology, Landscape Ecology, Landscape Ecological Conservation, Architecture, International Fisheries Development, Erosion Control, Sustainability Science, Forest Policy, Human Environment Design, Water Environment, Water Engineering, Ecology, Ecosystem Management, Ecosystem Management Engineering, Ecosystem Assessment Management, Biodiversity Informatics, Landscape Architecture, Regional Environment Studies, Rural Planning, Global Environmental Studies, GIS, Urban Planning, Urban Engineering, Civil Engineering, Civil Engineering Informatics, Statistical Science, Regional Planning, Conservation Ecology, Watershed Policy, Landscape Architecture, Landscape Ecology and Planning, Landscape Planning, Silviculture (Humanities) Environmental Epidemiology, Archeology, History by Region, Japanese History, Cultural Anthropology, Ethnology, Japanese History (Social Sciences) Community, Local Community Disaster Prevention, Community Participation in Disaster Recovery, Rviers, Environmental Economics, Environmental Sociology, Environmental Policy, Architecture, National Land Design, Natural Environment Policy, Natural Capital, Forest Community, Forest Policy, Hydrology, Politics, Landscaping, Tourism, Landscape Architecture, General Insurance, Regional Policy and Planning, City, Cultural Policy, Disaster Prevention, Water Environment, Agricultural Business Management, Regional Planning, Rural Informatization
Research Program 2 (FR4)	Biodiversity-driven Nutrient Cycling and Human Well-Being in Social-ecological Systems	84	3	26	113	(Natural Sciences) d18Op Isotope Analysis, Plankton Ecology, Plankton Ecology, Phosphorus Circulation, Stable Isotope Analysis of Food Webs, Nutrient Cycling, Satellite Ecology, Applied Ecology, Applied Geophysics, River Sediment Macroinvertebrate, Chemical Oceanography, Marine EcoSystem Engineering, Environmental Systems Engineering, Environmental Economy, Environmental Governance, Environmental Agriculture, Environmental Microbiology, Environmental Analytic Chemistry, Environmental Conservation, Fish Ecology, Fish Genetics and Breeding Science, Fungology, Fungal Diversity, Spatial Statistics, Community Ecology, Lake Synthetic Science, Lake Sediment Macroinvertebrate, Nitrate Isotope Analysis, Plant Ecology, Plant Physiological Ecology, Forestry and Environmental Studies, Forest Hydrology, Forest Ecology, Evolutionary ecology, Hydrosphere Ecology, Hydrosphere Chemistry, Aquatic Ecology, Aquatic Biology, Fisheries, Aquatic Biology, Underwater Acoustic Studies, Hydrological Science, Hydrology, Mathematical Biology, Evolutionary Biology, Ecological Stoichiometry, Ecological Science, Ecology, Ecosystem Ecology, Biological Science, BiogeoChemistry, Phycology, Freshwater Ecology and Parasitology, Groundwater Chemistry, Geophysics, Benthic Animal Diversity, Isotope Environmental Science, Stable Isotope Ecology, Microbial Ecology, Molecular Ecology, Analytical Chemistry, Conservation Ecology, Limnology, Limnology, Freshwater Ecology, Freshwater Biology, Basin Environmental Studies, Basin Water, River Basin Conservation (Humanities) Archaeology, Geomatics, Cultural Anthropology, Historical Geography (Social Sciences) Community and Project Development, Community Development, Community Organizations and Stakeholder Participation, Applied Economics, Environmental Economy, Environmental Sociology, Environmental Policy, Quantitative Sociology, Lake Policy, International Environmental Law, Industrial Ecology, Sociology, Social Psychology, Regional Planning, Regional Studies, Sociology of Local Community, Integrated Lake Basin Management, Rural Sociology
Research Program 3 (FR3)	Lifeworlds of Sustainable Food Consumption: Agri-food Systems in Transition	38	9	43	90	(Natural Sciences)Public Health, Life Cycle Assessment, LCA Analysis, Agroecology, App Design, Biochar Burying Agriculture, Food System, Modelling, River Ecosystem, Environmental Energy Science, Environmental Agriculture, Climatic Variation, Landscape, Cultivation Management, Social Ecological System, Biodiversity Informatics, Rural Sociology, Geography, Urban Agricultural Economic Management, Soil Science, Land Use Economics, Japanese Traditional Vegetables, Tropical Agricultural Ecology, Agriculture, Agri-food Social Science, Organic Agriculture, Organic Agriculture, Green Space Planning (Humanities) Agroforestry, Science and Technology Studies, Environmental Ethics, Social Statistics, Anthropology, Political Economy, Regional Policy and Planning, Cultural Anthropology, History (Social Sciences) CGE Analysis, Agrifood System, Agroecology, Innovation Studies, Green Consumer, Game Development, Gender Studies, Distribution of Superfoods, Criticism of Science, Development Sociology, Environmental Governance, Environmental Management, Environmental Impact Assessment, Environmental Planning, Environmental Sociology, Environmental Policy, Company Evaluation, Global Agricultural Economics, Sociology, Socioeconomics, Social Engineering, Social Policy, Food Sociology, Food Waste, Water Quality Monitoring, Policy Science, Organizational Theory, Geography, Urban / Rural Sociology, Agricultural Economics, Agri-food Social Science, Agricultural Policy, Rural Development Sociology, Rural Sociology, Crime Victims Support, Child Care
Research Program 3 (FR2)	The Sanitation Value Chain: Designing Sanitation Systems as Eco-Community-Value System	31	9	17	57	(Natural Sciences) Genetic Engineering, Sanitary Engineering, Chemical Engineering, Environmental and Sanitary Engineering, Environmental Engineering, Environmental Resources, Environmental and Sanitary Engineering, Health Science, Public Health Microbiology, Global Food Resources, River Management and Water Reuse, Water treatment Engineering, Regional Environment Studies, Regional Studies, Geomatics, Regional Agricultural Technologies (Humanities) International Health and Anthropology, Cultural Anthropology, Regional Studies, Agricultural Economics, Cultural Anthropology (Social Sciences) African Political Science, Sanitation Services, Medical Anthropology, Video Production, Nutritional Adaptation, Development Economics, Social Medicine, Sociology, Social Behavior, Community Participation, Human Ecology, Regional Planning, Urban and Regional Planning
Research Program 3 (PR)	Co-creation of Sustainable Regional Innovation for Reducing Risk of High-impact Environmental Pollution	24	6	12	42	(Natural Sciences) Medical Science, Applied Chemistry, Accelerator Science, Environmental Science, Environmental Economics, Environmental Ecology, Environmental Soil Science, Boundary Agriculture, Petrology, Atomic Collision Physics, Public Health, Resource Economics, Resource Engineering, Informatics Education, Forest Ecology, Living Environment, Ecology, Geoscience, Global Environmental Studies, Geology, Physics (Humanities) Environmental Law, Environmental Ethics, International Law, Local Government Policy, Culture and History (Social Sciences) Development Economics, Development Studies, Environmental Governance, Environmental Economics, Educational Psychology, Business Organization, Human Resources Development, Forest Science, Regional Environment Studies, Rural Sociology, Agricultural Economics, Rural Planning
Research Program 2 (PR)	Mapping the Environmental Impact Footprint of Cities, Companies, and Household	9	0	14	23	(Natural Sciences) Life Cycle Assessment, Marine Ecology, Chemical Engineering, Environmental Agriculture, Engineering, Science, Input-Output Analysis, Atmospheric Science, Soil Science, Civil Engineering, System Engineering (Social Sciences) Material Flow/Stock Analysis, Life Cycle Assessment, Applied Econometrics, Economics of Waste, Science and Technology Studies, Development Economics, Environmental Economy, Economic Statistics, Industrial Ecology, Input-Output Analysis
Individual Collaboration FS (OKABE)	Future Image of Living Sphere by Restructuring Sustainable Relation between Humans and Land	9	1	2	12	(Natural Sciences) Architectural Design, Architecture, Architectural Planning, Urban Planning (Humanities) Environmental Ethics (Social Sciences)Policy Science, Law
Institutional Collaboration FS (KOHSAKA)	Fair and Equitable Benefit Sharing of Biological and Genetic Resources in the Era of Digital Information: Improving Livelihoods and Agrobiodiversity Conservation by Intellectual Property and Storylines	16	2	11	29	(Natural Sciences) Political Ecology, Environmental Science, Environmental Conservation, Urban and Regional Planning, Marine Biology, Biomimetics, Intellectual Property and Genetic Resource Management, Molecular Biology, Bioresource Science, International Law of the Sea, Food Science, Genetic Resources Management, Access and Benefit-Sharing, Environmental Conservation (Humanities) Informatics, History of Cultural Exchange, Environmental Epidemiology, Social Development (Social Sciences) Development Administration, Environmental Economics, Environmental Sociology, International Environmental Law, Industrial Ecology, Resource Management, Environmental Policy, Law of the Sea, International Environmental Law, Genetic Resources Management
Institutional Collaboration FS (MATSUDA)	Transformation and Reconstruction of Agri-Cultural Diversity in Southeast Asia	4	0	9	13	(Natural Sciences) Environmental Studies, Landscape Ecology, Global Health, Agricultural and Rural Development (Social Sciences) Development Administration, Environmental Psychology, International Environmental Law, Social Epidemiology, Biotechnology Policy, Urban Engineering, Agricultural Economics
Institutional Collaboration FS (MORI)	Developing Interactive Rural-Urban Systems to Improve Human Well-being: Migration for Humanity and Nature	2	4	7	13	(Natural Sciences) GIS, Urban Engineering, Agricultural Civil Engineering (Humanities) Megacity, Architectural History, Urban History, Qualitative Research, Philosophy (Social Sciences) Communication Theory, Megacity and Architectural History, Environmental Economics, Environmental Sociology, Environmental Management, Business Management, Traffic Planning, Commercial Science, Agricultural Economics
Institutional Collaboration FS (HAYASHIDA)	Study of Behavior Modification of Public People by Sharing Daily Activity and Air Quality Information toward Clean Air and Promoting Public Health	15	5	3	23	(Natural Sciences) Remote Sensing, Environmental Epidemiology, Environmental Engineering, Environmental Informatics, Environmental Agriculture, Environmental Health, Public Health, Water Engineering, Atmospheric Chemistry, Atmospheric Science, Atmospheric Environment, Atmospheric Simulation, Atmospheric Modeling, Atmospheric Physics, Groundwater Hydraulics, Soil Science and Plant Nutrition, Soil Microbiology (Humanities) Time Geography, Regional Studies, Geography, Cultural Anthropology, Southern Asia Studies (Social Sciences) Hygieiology, Public Health, Global Health, Toxicology, Agricultural Economics
Core Program (FR1)	Proposal and Verification of the Validity of Isotope Environmental Traceability Methodology in Environmental Studies	23	2	11	36	(Natural Sciences) Science Education, Environmental Resource Geology, Petrology, Paleoclimatology, Hydrology, Ecological Science, Ecology, Global Environmental Studies, Geography, Isotope Environmental Science, Isotope Hydrology, Stable Isotope Ecology, Isotope Geology, Astrophysics, Limnology, Zooecology, Geochemistry, Groundwater Management, Conservation Biology, Museology (Humanities) Archaeology, Geomatics, Ecological Anthropology (Social Sciences) Environmental Management, Public Administration, Agricultural Economics, Fisheries Economics, Environmental Policy Evaluation, Sociology of Local Community, Social Psychology, Social Research
Core FS (KONDO)	Information Asymmetry Reduction in Open Team Science for Socio-environmental Cases	9	13	8	30	(Natural Sciences) Open Science Policy, Theory of Open Science, Sanitary Engineering, Science and Technology Communication, Paleoclimatology, Ecological Science, Ecology, Biogeochemistry, Solar Terrestrial Physics, Isotope Environmental Science, Stable Isotope Ecology, Developmental Biology (Humanities) Open Science Society, Theory of Open Science, Environmental Ethics, Archaeology, Informatics, Library and Information Science, Ecological Anthropology, Geomatics, Philosophy, History of Japan, Cultural Anthropology, History (Social Sciences) Open Science Policy, Social Innovation, Science and Technology Studies, Science and Technology Policy, Environmental Planning, Social Psychology, Regional Resource Planning, Area Informatics, Organic Chemistry
Core FS (ONISHI)	Co-design and stakeholder engagement according to geographical scales	1	0	2	3	(Natural Sciences) Biogeography (Social Sciences) Environmental Sociology, Environmental Policy
-	Cooperative research program on Environmental Isotope Study	75	1	0	76	(Natural Sciences) Cosmo and Geochemistry, Hot Spring Science, Chemical Oceanography, Anatomy, Irrigation and Drainage, Atmospheric Chemistry, Environmental Science, Mineralogy and Economic Geology, Fish Ecology, Ancient Environment, Paleoclimatology, Biomolecular Archaeology, Bioarcheology, Mining Engineering History, Economic Geology, Insect Ecology, Bioresource Science, Resource Geology, Resource Engineering, Disaster Engineering, Biological Anthropology, Tree Physiology, Plant Ecology, Plant Physiological Ecology, Forest Meteorology, Forest Hydrology, Forest Ecology, Wildlife Management, Forest Environment, Water Environment, Water Environment Management, Water Environment Engineering, Hydrosphere Chemistry, Hydrology, Applied Geology, Hydro-Geochemistry, Ecology and Environment, Ecology, Environmental Biophysics, BiogeoChemistry, Snow and Ice Science, Stratigraphy, Regional Studies, Geohydrology, Geochemistry, Geoscience, Environmental Chemistry, Geobiology, Geology, Isotope Hydrology, Stable Isotope Ecology, Isotope Geochemistry, Soil Science, Museology, Applied Chemistry, Analytical Chemistry, Cultural Assets Science, Conservation Ecology, Forensic Medicine, Inorganic Geochemistry, Limnology (Humanities) Archaeology
	Total	488	107	219	814	

As of 31 March, 2019

Research Project Sites

Appendix 3



Full-Research

Program 1 Societal Transformation under Environmental Change

1 Societal Adaptation to Climate Change: Integrating Palaeoclimatological Data with Historical and Archaeological Evidences

○Japan

2 Toward the Regeneration of Tropical Peatland Societies: Building International Research Network on Paludiculture and Sustainable Peatland Management

○Indonesia, Malaysia

3 Research and Social Implementation of Ecosystem-based Disaster Risk Reduction as Climate Change Adaptation in Shrinking Societies

○Japan

Program 2 Fair Use and Management of Diverse Resources

4 Biodiversity-driven Nutrient Cycling and Human Well-being in Social-Ecological Systems

○Japan, Philippines

Program 3 Designing Lifeworlds of Sustainability and Wellbeing

5 Lifeworlds of Sustainable Food Consumption and Production:Agrifood Systems in Transition

○Japan, Thailand, Bhutan, China

6 The Sanitation Value Chain: Designing Sanitation Systems as Eco-Community-Value System

○Zambia, Burkina Faso, Indonesia, Japan

Core Program

7 Proposal and Verification of the Validity of Isotope Environmental Traceability Methodology in Environmental Studies

○Japan, Philippines

8 Information Asymmetry Reduction in Open Team Science for Socio-environmental Cases

○Japan, Oman