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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 2017 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. 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 FY2017. I do hope this report will help you to understand the overall activity within the FY2017.

With best regards,

YASUNARI Tetsuzo
Director-General
Research Institute for Humanity and Nature

Research Activities

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 2017

Nakatsuka project: FR4

I am pleased to comment that the project is going well, and is most likely to yield excellent results with summary English-language publication (see Project Report).

Professor Nakatsuka and I organized a panel at the Annual Meeting of the Socio-economic History Society, the main learned society of the field, in May 2017. We discussed the possibility of reinterpretation of Tokugawa society in the light of climate and rainfall data. There was a rich exchange with economic and demographic historians. We also successfully applied for a session at the World Economic History Congress, Boston, in July-August 2018, with additional speakers including specialists on China, India, 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.

Mizuno project: FR1 (from January 2017)

This project began with high expectations (e.g. favourable reviews for the English publication of a results of research leading to FR) and fully developed academic and political contacts in Indonesia. After initial negotiations with affiliated projects (some key members were also involved in projects funded by JICA, CIFOR and other projects at Kyoto University), the specific goals of the RIHN project were identified, and the collaborative relationships with them were established (see Project Report). This is one of the most ambitious interdisciplinary and transdisciplinary projects in this field (and is known as such: most European initiatives have been scientist-driven).

Yoshida project FR1(from June 2017)

In spite of the fact that this project is primarily concerned with 'Ecosystem-based Disaster Risk Reduction (Eco-DRR)', it has been agreed that it is part of Program 1 (rather than Program 2), in view of its strong commitment to social transformation including engagement in local policy formulation with selected local or municipal authorities and ambition to influence national policy (see Project Report).

Other projects at IS and FS stages

I have liaised with two FS projects during the academic year 2017. Murayama project on 'living space' attempted to combine local history, transdisciplinary research and mathematical- geographical modelling, with a wide geographical coverage (Japan, Asia and Europe). I spent some time to think about the utility of living space as a concept for the transdisciplinary project. But this project was not accepted by the Evaluation Committee in November 2017. Hayashida project proposed an interdisciplinary research on the mitigation strategy of SLCPs emissions arising from rural areas in the environs of New Delhi, and was accepted by the November Committee. But it was not accepted by EREC and post-EREC committee. Among the IS projects, Wakimura project, which proposed to compare the tropical regions of South Asia, Southeast Asia and Sub-Saharan Africa from a global historical perspective, had a most ambitious research program. In my opinion, this was by far the most promising project for Program 1, but it was not successful in moving to FS.

Research directives

In my own research, I worked for the completion of two JSPS projects (both had been mainly conducted at GRIPS, my previous affiliation) this year, one on the emerging states in Asia and Africa, the other on the trade statistics of colonial India. Since I became associated with RIHN two years ago, I gradually brought in aspects of resource history into the research purview of these projects. On the emerging state project, I began a study of the development of "resource nexus", and had intense conversations with members of RIHN. The smaller project on colonial India is largely a statistical study, but has methodological links with the role of intra-regional trade in the mitigation of resources and its environmental consequences. I moved all the statistical materials from GRIPS to RIHN, and held a series of 'wrap-up' meetings for these projects in February to March 2018, both at GRIPS and RIHN.

I describe my thinking on resource nexus below, as this relates to the ways in which I see themes of the projects of Program 1 may be linked to each other in the coming years. The speed of the growth of cities (including megacities and megalopolis) of emerging states, especially in Asia and Africa has been very rapid, causing poverty and inequality as well as congestion, pollution and the deterioration of the quality of water etc. The first question is to identify how resources were imported into cities and combined with local ones to support production and consumption. In addition to capital, labour, and perhaps fossil energy, the local supply of land, water and biomass energy must be considered, and the synergies and trade-offs between these resources must be analyzed and a better combination sought. Cities are also a place for livelihood, so the 'water-food-energy nexus' is highlighted as a key concern for livelihood security as well.

Global urbanization also implies increasing needs for resource management in non-urban areas and uninhabited parts of the world, as the relative share of non-urban population decreases while human

intervention in them though climate change, tourism etc. increases. A coordinated governance of ecosystem services and non-urban society at local, regional and global levels is needed, involving latest technology and information through urban systems. Thus the second question is to identify what is required for the management of resources in non-urban areas on a global scale.

In many respects, the two questions are driven by urbanization and globalization, so they are the two sides of the same coin. Thus we should reformulate the traditional concept of the 'urban-rural nexus', which did not include the themes relating to the Anthropocene, and create the new terms of reference, which suit the analysis of global environmental sustainability.

My thinking on resource nexus was naturally reflected in my presentations at the public domain. They included a keynote lecture at the opening ceremony of the (newly merged) Center for Southeast Asian Studies at Kyoto University in May 2017, and panel presentation at the annual meeting of the Society for Environmental and Policy Studies in September 2017. An academic forum was organized by the Science Council of Japan in July 2017, involving some RIHN members, from which essays were published in February 2018. I also organized a research meeting on land use among the members of Program 1 in January 2018, involving Nakatsuka, Mizuno and Yoshida project members. With the arrival of Dr. Masuhara, further meetings are scheduled.

○Project Members

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

○ Future Themes

International Publication Unit

In April 2017 I proposed to activate discussion on internationalization, and we invited Dr Paul Kratoska, managing director of NUS (National University of Singapore) Press to discuss the publication strategies of RIHN. Partly inspired by this, an informal working group was set up to discuss the possibility of publishing an independent RIHN journal. The group drafted the scope of the journal, but eventually opted for joining Global Sustainability, a new journal from Cambridge University Press, on the invitation of Dr. Johan Rockström, editor-in-chief. We will be running a collection called 'humanity and global sustainability' for it. Professor Yasunari and I became section editors of the journal. Together with the promotion of existing RIHN series (from Springer) and other publications, RIHN decided to set up an 'International Publication Unit', which will commerce its activities in 2018. I will be heading the Unit.

World Social Science Forum

The Fourth World Social Science Forum (WSSF) will take place at Fukuoka in September 2018. I have been involved in the Japanese bid for this international conference as the chairman for the International Collaboration Sub-committee for Humanities and Social Sciences at the Science Council of Japan, and remain a member of the Forum Executive Committee. RIHN has agreed to be a member of the Consortium to support the Forum. Its main theme is security (including environmental security) and equality, and several RIHN applications were accepted at the Scientific Program Committee. Since this is to become 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 has become internationally visible, and more interdisciplinary. We expect a significant presence of RIHN there.

●Achievements

○Papers

【Original Articles】

- Sugihara, K. 2017 “Monsoon Asia, Intra-Regional Trade and Fossil-Fuel-Driven Industrialization”. Gareth Austin (ed.) Economic Development and Environmental History in the Anthropocene: Perspectives on Asia and Africa. Bloomsbury Academic, London, pp.119-144.
- Sugihara, K. 2017 “Monsoon Asia, Industrialization and Urbanization: The Making and Unmaking of the Regional Nexus”. RIHN (ed.) RIHN 11th International Symposium Proceedings ‘Asia’s Transformations to Sustainability: Past, Present and Future of the Anthropocene’. pp.67-99.

○Research Presentations

【Oral Presentation】

- Sugihara, K. “Intra-regional Trade and Labour-intensive Industrialization: A General Discussion”. Workshop on Emerging States in Global Economic History (Part 2), 2018.03.26, RIHN, Kyoto.
- Sugihara, K. “Emerging States in Global Economic History”. Workshop on Emerging States in Global Economic History (Part 1), 2018.03.24, GRIPS, Tokyo.
- Sugihara, K. “Intra-regional Trade and Labour-intensive Industrialization: A Regional Comparative Perspective and its Implications for the Emerging States”. Workshop for the Emerging States Project (Vol.2), 2018.03.09, GRIPS, Tokyo.
- Sugihara, K. “Transition to the Emerging State in History and the Developing World”. Workshop for the Emerging States Project, 2018.02.03, GRIPS, Tokyo. (General meeting with Professors Roy Bin Wong and Dr Chris Baker)
- Sugihara, K . “Intra-regional Trade and Labour-intensive Industrialization: A Regional Comparative Perspective and its Implications for the Emerging States”. Workshop for the Emerging States Project, 2018.01.12, GRIPS, Tokyo. (General meeting with Professor Sugata Bose)
- Sugihara, K. “Comments on Multiple Payment Systems in Globalizing Economies”. Pre-Conference of the World Economic History Congress 2018 Boston, 2017.12.15-2017.12.16, Kansai University, Osaka.
- Sugihara, K. “Urban Living Space as a Factor Endowment: A Note on Asia’s Long-term Development Path”. Workshop on ‘Learning from Historical Tokyo: Implications for Developing Cities’, 2017.06.05, GRIPS, Tokyo.

【Invited Lecture / Honorary Lecture / Panelist】

- Sugihara, K. (Organizer, Panelist and Chair) ″Roundtable on South Asia, Asia and Global History (with Professor Sugata Bose)”. , 2018.01.14, Center for South Asian Studies, Ryukoku University, Kyoto.
- Sugihara, K. (Chair of Session 3 and roundtable discussant) ″Trans-scale Solutions for Sustainability″. RIHN 12th International Symposium, 2017.12.21-2017.12.22, Kyoto International Conference Hall, Kyoto.

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 2017

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

◎ NAKATSUKA, Takeshi (Research Institute for Humanity and Nature,Professor,Project Leader)
○ KAMATANI, Kaoru (Research Institute for Humanity and Nature,Specially Appointed Assistant Professor,Project Sub-leader)

Paleoclimatology Group

○ YASUE, Koh (Shinshu University,Associate Professor,Dendroclimatological and wood anatomical analyses in Japan and Asia)
○ ABE, Osamu (Graduate School of Environmental Studies, Nagoya University,Assistant Professor,Coral analyses in Southwest Japan)
○ SANO, Masaki (Faculty of Human Sciences, Waseda University,Assistant Professor,Tree-ring analyses in Japan and subtropical Asia)
MITSUTANI, Takumi (Nara National Research Institute for Cultural Properties,Visiting Researcher,Age determination of cultural properties in Japan using tree ring width)
SAKAMOTO, Minoru (National Museum of Japanese History,Professor,Age determination of paleoclimate proxy materials using radiocarbon)
KAGAWA, Akira (Forest and Forest Products Research Institute,Researcher,Development of analytical methods for isotopic ratios of tree-ring samples)
FUJITA, Koji (Graduate School of Environmental Studies, Nagoya University,Associate Professor,Analysis of ice cores in Central Asia)
XU, Chenxi (Institute of Geology and Geophysics Chinese Academy of Sciences,Associate Professor,Dendroclimatological and dendroarchaeological analyses using isotopes in Japan and Southeast Asia)
MORIMOTO, Maki (Faculty of Education, Gifu University,Associate Professorer,Coral analyses in Southwest Japan)
KIMURA, Katsuhiko (Faculty of Symbiosis Systems Science, Fukushima University,Professor,Dating of excavated wooden samples during Jomon, Yayoi, and Kofun Eras)
YOKOYAMA, Yusuke (Atmosphere and Ocean Research Institute, University of Tokyo,Professor,Coral, tree ring and varve sediment analyses in Japan and Asia)
TADA, Ryuji (Graduate School of Science, University of Tokyo,Professor,Analysis of varve sediments from Lake Suigetsu, central Japan)
KUBOTA, Yoshimi (National Museum of Nature and Science,Researcher,Paleoceanographic analyses around Japan using ocean sediment records)
TAGAMI, Takahiro (Graduate School of Science, Kyoto University,Professor,Tree-ring and speleothem analyses in Japan and Southeast Asia)
WATANABE, Yumiko (Graduate School of Science, Kyoto University,Assistant Professor,Speleothem analyses in Japan and Southeast Asia)
TAKEUCHI, Nozomi (Graduate School of Science, Chiba University,Professor,Analysis of ice cores in Central Asia)
ZAIKI, Masumi (Faculty of Economics, Seikei University,Associate Professor,Analysis of climate change in Japan using old documentary records)
HIRANO, Jumpei (Teikyo University,Lecturer,Analysis of climate change in Japan using old documentary records)
TAIRA, Hideaki (Tateyamasugi Research Institute,Director,Analysis of human-forest relationship during last two millennia in mountainous areas)
SHO, Kenjiro (Social Engineering, Nagoya Institute of Technology,Assistant Professor,Assessment of hydrological impacts of past climate change)

LI, Zhen	(Research Institute for Humanity and Nature,Project Researcher,Reconstruction of past hydroclimate in Japan using tree-ring oxygen isotope ratios)
HAKOZAKI, Masataka	(National Museum of Japanese History,Specially Appointed Assistant Professor,Reconstruction of past climate in Japan using tree-ring width, density and oxygen isotope ratios)
LI, Qiang	(Institute of Earth Environment, Chinese Academy of Science,Associate Professor,Reconstruction of past climate in China using tree-ring width, density and oxygen isotope ratios)
KAWAHATA, Hodaka	(Atmosphere and Ocean Research Institute, University of Tokyo,Professor,Reconstruction of past climate in Japan using inland sediment cores)
SAKASHITA, Wataru	(Faculty of Life and Environment Sciences, University of Tsukuba,Researcher,Reconstruction of past climate in Japan using tree-ring oxygen isotope ratios)
HISAMOCHI, Ryo	(Graduate School of Science, Kyoto University,Graduate Student,Reconstruction of past climate in Japan using stalactite carbon and oxygen isotope ratios)
TSUSHIMA, Akane	(Research Institute for Humanity and Nature,Project Researcher,Reconstruction of past climate in Japan using tree-ring oxygen isotope ratios and Analysis of ice cores in Central Asia)
SHIGEOKA, Yuki	(Graduate School of Environmental Studies, Nagoya University,Graduate Student,Reconstruction of past climate in Japan using tree-ring width, density and oxygen isotope ratios)
SAWADA, Keito	(Graduate School of Environmental Studies, Nagoya University,Graduate Student,Reconstruction of past climate using coral ring)

Climatology Group

○ YOSHIMURA, Kei	(Institute of Industrial Science, The University of Tokyo,Associate Professor,Evaluation of proxy isotope data using general circulation models with isotope dynamics)
KURITA, Naoyuki	(Graduate School of Environmental Studies, Nagoya University,Associate Professor,Climatological assessment of proxy oxygen isotope data)
UEMURA, Ryu	(Faculty of Science, Ryukyu University,Associate Professor,Observation of spatial and temporal variability of precipitation isotope ratios)
WATANABE, Masahiro	(Atmosphere and Ocean Research Institute, University of Tokyo,Professor,Climatological evaluation of past climate variations based on proxy records)
ICHINO, Mika	(Center for Open Data in the Humanities,Researcher,Database construction and utilization of old diary weather records)
OKAZAKI, Atsushi	(RIKEN Advanced Institute for Computational Science,Researcher,Evaluation of proxy isotope data using general circulation models with isotope dynamics)
MIZUTANI, Tsukasa	(Institute of Industrial Science, The University of Tokyo,Lecturer,Time-series analyses of paleoclimatological data)
TORIDE, Kinya	(University of California, Davis,Graduate Student,General circulation modeling with assimilation of weather records in old diaries)
PANDUKA, Neluwala	(School of Engineering, The University of Tokyo,Graduate Student)

Prehistory/Ancient History Group

○ WAKABAYASHI, Kunihiko	(History Museum, Doshisha University,Associate Professor,Analysis of social adaptations to climate changes during Yayoi Era)
○ HIGAMI, Noboru	(Aichi Prefectural Center for Archaeological Operations,Investigator,Analysis of excavated wooden properties during Yayoi and Kofun Eras)
MURAKAMI, Yumiko	(The Kyoto University Museum,Associate Professor,Analysis of excavated wooden samples during Yayoi and Kofun Eras)
MATSUGI, Takehiko	(National Museum of Japanese History,Professor,Analysis of social responses to climate changes during Yayoi and Kofun Eras, focusing on human population dynamics)
AKATSUKA, Jiro	(Ancient Niwanosato Cultural Heritage Network,President,Analysis of social adaptations to climate changes during Yayoi Era)
IMAZU, Katsunori	(Graduate School of Humanities and Social Sciences,Okayama University,Professor,Analysis of population responses to climate changes in ancient period using document records)
FUJIO, Shin-ichiro	(National Museum of Japanese History,Professor,Analysis of social responses to climate changes during Jomon and Yayoi Eras)

YAMADA, Masahisa	(Graduate School of Humanity, Tokyo Metropolitan University,Professor,Analysis of excavated wooden properties during Jomon, Yayoi, and Kofun Eras)
INOUE, Tomohiro	(Osaka Center for Cultural Heritage,Investigator,Analysis of social responses to climate changes during the Yayoi and medieval Eras)
KANEDA, Akihiro	(Nara National Research Institute for Cultural Properties,Chief Researcher,Analysis of social responses to climate changes during the ancient period)
MURAKAMI, Mayuko	(Graduate School of Arts and Letters, Tohoku University,Researcher,Analysis of social responses to climate changes during the ancient period)
BATTEN, Bruce	(Graduate School of International Studies, J. F. Oberlin University,Dean,Analysis of social responses to climate changes during Japanese History)
KOBAYASHI, Kenichi	(Faculty of Letters, Chuo University,Professor,Dating of excavated wooden properties during Jomon, Yayoi, and Kofun Eras)
ONBE, Shin	(Kumakogen Town Board of Education,Curator,Analysis of archaeological remains in the Seto Inland Sea during Jomon Era)
IKUTA, Atsushi	(Division of Academic Affairs, Ryukoku University,Part-time Lecturer,Comparison between descriptions in Nihon shoki, the oldest Japanese historical chronicle, and proxy-based paleoclimate records)

Medieval History Group

○ TAMURA, Noriyoshi	(Faculty of Humanities, Beppu University,Professor,Analysis of social responses to severe events of flood and drought during Muromachi and Warring States periods)
○ MIZUNO, Shoji	(School of Human Culture, The University of Shiga Prefecture,Professor,Analysis of social adaptation to hydroclimate variability during Kamakura and Muromachi periods)
ITO, Keisuke	(Research Institute for Humanity and Nature,Project Researcher,Relationship between economy and climate during the medieval period)
NISHIYACHI, Seibi	(Faculty of Letters Nara Women's University,Professor,Analysis of agricultural adaptation to climate change during the medieval warm period)
TAKAGI, Tokuroh	(Faculty of Education, Waseda University,Professor,Analysis of environmental adaptation in estates and villages)
ITO, Toshikazu	(Faculty of Human Studies, Meijo University,Professor,Analysis of societal responses to climate variation in Japan during the medieval period)
SASO, Mamoru	(Faculty of Shinto Studies, Kokugakuin University,Professor,Relationship between climate variations and spatio-temporal distribution of archaeological remains)
TSUCHIYAMA, Yushi	(Graduate School of Letters, Arts and Sciences, Waseda University,Graduate Student,Analysis of impact of climate disasters on medieval estates)

Early Modern History Group

○ SATO, Daisuke	(International Research Institute of Disaster Science, Tohoku University,Associate Professor,Historical Analysis of social responses to natural disasters)
○ WATANABE, Koichi	(National Institute of Japanese Literature,Professor,Urban adaptation to heavy flood events in Edo during the early modern period)
KIKUCHI, Isao	(Miyagi Gakuin Women's University,Professor,Social responses to great famines in Northeast Japan during the early modern period)
NAKAYAMA, Tomihiro	(Graduate School of Letters, Hiroshima University,Professor,Changes in livelihood pattern during the early modern period in Southwest Japan)
HIRANO, Tetsuya	(Tokiwa University,Associate Professor,Societal responses to climate change during the early modern period in local villages in East Japan)
SATO, Hiroyuki	(Faculty of Education, Kagoshima University,Associate Professor,Societal responses to climate change during the early modern period in Southernmost Japan)
OGI, Shinichiro	(Faculty of Humanities, Kochi University,Professor,Societal responses to climate change during the early modern period in Southern Japan)
TAKEI, Koichi	(Faculty of Law and Letters, University of the Ryukyus,Associate Professor,Societal responses to climate change during the early modern period in Northern Japan)
TAKAHASHI, Miyuki	(Faculty of Economics, Rissho University,Associate Professor,Analysis of population dynamics in northeast Japan during the early modern period)
YAMADA, Kosei	(Okinawa International University,Part-time Lecturer,Societal responses to climate change during the early modern period in southwest islands of Japan)

TAKATSUKI, Yasuo	(Research Institute for Economics and Business Administration, Kobe University,Associate Professor,Analysis of market pricing in early modern Japan)
MURA, Kazuaki	(Mitsui Bunko,Chief Researcher,Analysis of market pricing in early modern Japan)
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

○Books

【Chapters/Sections】

・Bruce L. Batten, Philip C. Brown 2015,04 Introduction: Green Perspectives on the Japanese Past. Bruce L. Batten, Philip C. Brown (ed.) Environment and Society in the Japanese Islands: From Prehistory to the Present. Oregon State University Press, Oregon, U.S.A., pp.1-18.

・T.Mikami, M. Zaiki, J. Hirano 2015,04 Chapter 10 A history of climatic change: a reconstruction of meteorological trends from documentary evidence. Bruce L. Batten, Philip C. Brown (ed.) Environment and Society in the Japanese Islands: From Prehistory to the Present. Oregon State University Press, Oregon, U.S.A., pp.191-212.

・Bruce L. Batten, Philip C. Brown 2015,04 Concluding Thoughts: In the Shadow of 3.11. Bruce L. Batten, Philip C. Brown (ed.) Environment and Society in the Japanese Islands: From Prehistory to the Present. Oregon State University Press, Oregon, U.S.A., pp.246-252.

○Editing

【Editing / Co-editing】

・David Wittner・Philip C. Brown (ed.) 2016,04 . Routledge Studies in the Modern History of Asia. Routledge, UK, 290pp.

・Bruce L. Batten, Philip C. Brown (ed.) 2015,04 Environment and Society in the Japanese Islands: From Prehistory to the Present. Oregon State University Press, Oregon, U.S.A.,

○Papers

【Original Articles】

・Yamada, R., Kariya, Y., Kimura, T., Sano, M., Li, Z., and Nakatsuka, T. 2017 Age determination on a catastrophic rock avalanche using tree-ring oxygen isotope ratios - The scar of a historical gigantic earthquake in the Southern Alps, central Japan. . Quaternary Geochronology 44.0:47.0-54.0. DOI:10.1016/j.quageo.2017.12.004. (reviewed).

・Sakamoto M, Hakozaki M, Nakao N, Nakatsuka T 2017 Fine structure and reproducibility of radiocarbon ages of middle to early modern Japanese tree rings. Radiocarbon 59:1907-1917. (reviewed).

・Xu, C., Zhu, H., Nakatsuka,T.,Sano, M., Li, Z., Shi, F., Liang, E., and Guo, Z. 2017 Sampling strategy and climatic implication of tree-ring cellulose oxygen isotopes of Hippophae tibetana and Abies georgei on the southeastern Tibetan Plateau. . International Journal of Biometeorology. DOI: 10.1007/s00484-017-1365-6. (reviewed).

・Shirai K, Kubota K, Murakami-Sugihara N, Seike K, Hakozaki M, Tanabe K 2017 Stimpson's hard clam Mercenaria stimpsoni; a multi-decadal climate recorder for the northwest Pacific coast, . Marine Environmental Research. DOI:10.1016/j.marenvres.2017.10.009 (reviewed).

・Seo, J.-W. Jeong, H.-M. Sano, M., Choi, E.-B. Park, J.-H., Lee, K.-H., Kim, Y.-J., and Park, H 2017 Establishing tree ring δ18O chronologies for principle tree species (T. cuspidata, P. koraiensis, A. koreana, Q. mongolica) at subalpine zone in Mt. Jiri national park and their correlations with the corresponding climate.. Journal of the Korean Wood Science and Technology 45.0:661.0-670.0. DOI: 10.5658/WOOD.2017.45.5.661. (in Korean) (reviewed).

・Sano, M., Dimri, A.P., Ramesh, R., Xu, C., Li, Z., and Nakatsuka, T. 2017 Moisture source signals preserved in a 242-year tree-ring δ18O chronology in the western Himalaya.. Global and Planetary Change. DOI:10.1016/j.gloplacha.2017.08.009. (reviewed).

・Salerno F, Thakuri S, Tartari G, Nuimura T, Sunako S, Sakai A, Fujita K 2017 Debris-covered glacier anomaly? Morphological factors controlling changes in the mass balance, surface area, terminus position, and snow line altitude of Himalayan glaciers.. Earth and Planetary Science Letters(471.0): 19.0-31.0. DOI:10.1016/j.epsl.2017.04.039. (reviewed).

・Nuimura T, Fujita K, Sakai A 2017 Downwasting of the debris-covered area of Lirung Glacier in Langtang Valley, Nepal Himalaya, from 1974 to 2010.. Quaternary International(455.0):93.0-101.0. DOI:10.1016/j.quaint.2017.06.066 (reviewed).

・Lamsal D, Fujita K, Sakai A 2017 Surface lowering of the debris-covered area of Kanchenjunga Glacier in the eastern Nepal Himalaya since 1975, as revealed by Hexagon KH-9 and ALOS satellite observations.. The Cryosphere 11.0(6.0):2815.0-2827.0. DOI:10.5194/tc-11-2815-2017 (reviewed).

・Katsuta N., G. I. Matsumoto, Y. Tani, E. Tani, T. Murakami, S. Kawakami, T. Nakamura, M. Takano, E. Matsumoto, O. Abe, M. Morimoto, T. Okuda, S. K. Krivonogov, and T. Kawai 2017 A higher moisture level in the early Holocene in northern Mongolia as evidenced from sediment records of Lake Hovsgol and Lake Erhel.. Quaternary International.

・Kagawa, A. & Fujiwara, 2017 Smart increment borer: a portable device for automated sampling of tree-ring cores.. Journal of Wood Science 63.0(7.0). DOI:10.1007/s10086-017-1668-6.

・Iizuka Y, Miyamoto A, Hori A, Matoba S, Furukawa R, Saito T, Fujita S, Hirabayashi M, Yamaguchi S, Fujita K, Takeuchi N 2017 A firn densification process in the high accumulation dome of southeastern Greenland. . Arctic, Antarctic, and Alpine Research 49.0(1.0):13.0-27.0. DOI:10.1657/AAAR0016-034 (reviewed).

・Honda M C, 21 authors, O. Abe, and T. Saino 2017 Comparison of carbon cycle between the western Pacific subarctic and subtropical time-series stations: highlights of the K2S1 project.. Journal of Oceanography(73):647-666. (reviewed).

・Brown, P.C. 2017 Environmental History. The Routledge Handbook of Modern Japanese History. Ch28

・Debo Zhao, Shiming Wan, Samuel Toucanne, Peter D. Clift, Ryuji Tada, Sidonie Révillon, Yoshimi Kubota, Xufeng Zheng, Zhaojie Yu, Jie Huang, Hanchao Jiang, Zhaokai Xu, Xuefa Shi, Anchun Li 2017 Distinct control mechanism of fine‐grained sediments from Yellow River and Kyushu supply in the northern Okinawa Trough since the last glacial. Geophysics, Geosystems.

・Yoshimi Kubota, Nozomi Suzuki, Katsunori Kimoto, Masao Uchida, Takuya Itaki, Ken Ikehara, Ryoung Ah Kim, Kyung Eun Lee 2017 Variation in subsurface water temperature and its link to the Kuroshio Current in the Okinawa Trough during the last 38.5 kyr. Quaternary International. DOI:10.1016/j.quaint.2017.06.021

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○Research Presentations

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Stage: Full Research

Project Name: Toward the Regeneration of Tropical Peatland Societies: Transformability of Environmentally Vulnerable Societies and Establishment of an International Research Network.

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 objective

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 and oil palm trees has led to a decrease in groundwater table levels and the drying of peat swamp forest.

This has in turn 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 - were burned in 2015 (Fig.1). The resultant haze caused incalculable damage to the local economy and has impacted the health of not only local people, but also those in Malaysia and Singapore. In 2015, 0.5 million people in the region were diagnosed with upper respiratory infections. Haze has become a trans-boundary 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. (10, 20, 54, 55, 56, 57)

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 methodology of the project is characterized by a deep commitment to local communities and policy processes that attempt to reach solutions. (Fig. 2) We try to obtain concrete and detailed data of the transformation of peat environment and peatland communities in the villages of Tanjung Leban (Bengkalis district) and Kapau Baru (Meranti Islands district), Riau province, Indonesia. The research includes transdisciplinary approaches: surveying the socio-economic conditions of each household, investigating the socio-economic history of the peatland societies, establishing the institutions and organizations that promote participation in peatland restoration activities amongst villagers, arranging the application of paludiculture (Sustainable peatland livelihood activities, Fig. 3-1, 3-2), monitoring water levels, CO2 emissions and biodiversity in peat environment, examining

the governance of peatland at the level of local and central governance, suggesting effective policy to administrators, and investigating the influence of haze. In terms of the schedule, please see Fig. 4.

c) Expected results

Through our research activities based around peatland restoration in the two main research villages, we will draw an integrated map of the peatland ecosystem, and establish a reliable management plan that can be applied to peatland restoration in other areas. In addition, comparing the situations of

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

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d) Project organization and membership

The project is composed of three work groups, consisting of researchers, officials and NGO members of Japanese and Indonesian origin, amongst other nationalities (Fig. 5).

1) The Community, Corporate and Governance Group deals with the socio-economic matters of peatland societies. Study will focus on livelihood strategies, land tenure, and resource use to identify factors that cause peat degradation. They will work with local institutions and organizations at the village level to establish mitigation and adaptation practices. This group consists of economists, anthropologists, sociologists, political scientists, experts on company management, and experts on administration/governance.

2) The Material Cycling Group conducts intensive multi-disciplinary research, particularly on water and material cycles, in several representative peatlands in Southeast Asia for the integration of natural and social scientific mapping to better understand peatland ecosystems. The group also investigates the influence of peatland haze and fires, and assesses the health hazards associated with them (Fig. 7). 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. This group organizes international workshops and seminars to promote communications between academic institutions. 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 project has always paid special attention to the motives of the stakeholders; the conservation efforts carried out by governments and NGOs, the livelihood of the local people, and the profit-making of the companies involved, in order to look for solutions that can satisfy all parties and promote fruitful entanglements and interactions between them. These explorations are in accordance with the motivations that were addressed in the Program Statement. In addition, the attempt to consider the transformation of peatland societies provides a case for the social and economic development in response to environmental change in Asia.

CONTRIBUTION TO THE PROGRAM

Our study on the motives of stakeholders, the conservation efforts of the government and NGOs, community practices, and company investments, has been quite useful, providing an important contribution to the program. Throughout the peatland rehabilitation and utilization attempts in Indonesia, the conservation efforts of the government have been a crucial factor in transforming the peatland situation. In November 2014, the government issued the Government Regulation No. 71, year 2014 on the Protection and Management of Peatland Ecosystem. The government now enforces the regulation of peatland according to the Peatland Hydrological Unit, with 70% of the unit being designated as the cultivation area, whilst the remaining 30% being designated as the protection area. Within the cultivation area, the ground water table level should be less than 0.4 meters high. The regulations issued in 2016 and 2017, such as Government Regulation No.56, Year 2016, and the Decision of the Minister of the Environment and Forestry No, 14, 15, 16 and 17 on the Guideline of the Maintenance relating to the implementation of Government Regulation No.71 Year 214 and No.45, Year 2016 stipulated that all areas within the peat-dome are designated as a protection area, and that companies can reap the harvest for the standing trees. However, companies are prohibited from replanting on top of the peat-dome, and are obliged to leave the land to carry out its natural ecological cycle so that it can be rehabilitated.

These stipulations largely impact the operations of companies invested in the area who have reacted negatively to these stipulations, namely the rule that the ground water level must remain at 0.4 meters within the cultivation area. Many researchers who have collaborated with these companies are also critical of the government regulations. There is a clear division between those who support and those

who oppose these government policies. (10) The trade unions with connections to the latter companies have already sued the government at the level of supreme court, arguing that some of these regulations violating upper level laws. Policies have not yet reached the community level for the time being.

The International Peat Society, the Norwegian Government and the EU support the government policy, but there is opposition amongst associations of forestry companies, oil palm companies, and the Indonesian Peat Society. (10) We will conduct an analysis of the impact of these policies on stakeholders and companies, as well as the mutual relations amongst companies, ministries, researchers, and NGOs that follow political-economic and ecological approaches. We will study further how environmental improvements can achieve business continuity and produce the enhancement of community livelihood.

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. Further extraction of resources may be beneficial for countries like Japan and South Korea, but Indonesia cannot follow the wider scheme of Asian economic development, being a country that is comparatively richer in natural resources but weaker in industry.

○ Progress and Results in 2017

PROJECT PROGRESS DURING THE FR PERIOD TO DATE

Our transdisciplinary project conducted the research to demonstrate the rehabilitation models of degraded peatland from various scientific fields with special attention to the vulnerability and transformability of the degraded peatland. (Fig. 2) Due to our contribution, as well as those of many other parties' commitment to locate solutions that can improve the degraded peatlands, including the Peatland Restoration Agency (BRG), a consensus regarding the rewetting of peatlands and the application of paludiculture as a solution to the issues at hand was reached by many parties. (45, 46, 47, 50) As a result, many small-scale dams have been constructed in many places. However, many small-scale dams have already destroyed. The construction of many dams within particular areas show the lack of people's participation to the program. This project aims to encourage the people to take part in the program actively with reaching the consensus, and secure the participation of people to the program. One of the way to obtain the participation of the people is to secure the land rights to the people who join the programs.

Our previous study has shown that the stronger the land rights, the better the management even after the burning of the peatlands (Fig. 6). Much of the burning is the result of fire spreading from outside of respective community borders, so the prevention of fire has been a difficult task for local people to enact. Crucially, there are significant differences in how people treat affected land following widespread fires. Some people would continue to care for the land, whilst others may abandon the land. One of the most important factors is the issue of land rights. (10, 12, 20) We intend to look for the solution to the matter, so that we can attempt to establish institutional and organizational bodies that allow people to join rehabilitation programs while people would obtain stronger land rights within state-owned land. As mentioned above, the majority of peatland is considered state land, and so its rehabilitation must necessary take place under the conditions of state jurisdiction.

We have proposed the idea that the people who join the rehabilitation program will be given the property rights to the land that they have cultivated. Our idea was supported by the Peatland Restoration Agency, and also the Forest Department of the Bengkalis district, however the Ministry of Environment and Forestry strongly opposed this suggestion. (45) We continued to discuss with the people concerned, and reached the conclusion that the implementation of social forestry programs would be the way forward. (50) One of the social forestry programs is that of the village forest status (Hutan Desa) which allows people the right to use the land for 35 years. The land right on the particular land would be made clear based on the Decision of the Minister of the Environment and Forestry. We will continue to discuss with local people and departments concerned so that people would obtain stronger land rights, and would join the peatland rehabilitation program.

A group centered on the welfare of local people, community and local history has conducted a household survey at Tanjung Leban village of the Bengkalis Disgrict, and Kapau Baru village of the Meranti Islands district to understand the livelihood conditions at stake.

We have conducted the rehabilitation program at Tanjung Leban village since 2010, which has carried out the rewetting of peatland and its reforestation with trees indigenous to the peat swamp in collaboration with local people. We reached the consensus with local people regarding the rewetting and reforestation of the peatland, so that the dam that we constructed can be continually improved by the villagers.

The Meranti Islands district study team has conducted a field survey to examine local water conditions and has built wooden canal blockings in Kepau Baru Village. We placed several pieces of equipment to monitor rainfall, groundwater level, and the pressure of ground water in the degraded peatland. The ground water level was approximately 40-70 cm and will be monitored further to examine the effect of canal blockings in peatland restoration. (26)

The team focused on local politics and governance has conducted a survey on the village-level peatland rehabilitation program (Desa Peduli Gambut, Peatland Care Village program) implemented by the Peatland Restoration Agency at Riau Province. The team collected the data on the heads of the Province, Districts and sub-districts within the Riau Province in order to build a database concerning the region.

The Material Cycling group has conducted the systematic basic data collection in order to build the model of peatland rehabilitation based on rewetting and reforestation. Basic data on tropical peatlands, such as physical, chemical and biological data on the peat soils are urgently needed because the data is so acutely lacking. So we have laid out 53 study plots across the peat dome at increasing distance from the Sabangau river and Kahayan river, respectively. Within each study plot we have conducted a tree census, settled litter traps, settled litter bags to measure decomposition and collected peat samples. We are collecting litter fall samples monthly and measuring the physical and chemical properties of the peat in the laboratory.

The Material Cycling group has studied the haze caused by peatland fire and its resultant heath impact on the people affected. Smoke haze from forest and peatland fires in the Sumatra and Kalimantan Islands of Indonesia has repeatedly affected the air quality of nearby areas and the neighboring countries. We have been studying haze-related deaths and respiratory diseases during the haze episode. (2,3, 5, 9) (Fig. 7)

We relied on the air pollution data from the Environment Department of Pekanbaru City for four years (2013-2015). There is strong correlation during several periods of fire, between 2013.06, 2014.02, 2014.09, 2015.02, & 2015.09, in total measuring five different periods. When considering other periods, CO and PM10 come from automobile exhaustion, hence correlation should be weak. Palm-sized PM2.5, NO, O3, CO and NO2 sensors have been installed at the BMKG Pekanbaru office and the Pekanbaru City Hall since October 2017. Aerosol particles have important roles in the earth's climate and air quality, and thus should be considered accordingly. It has been recognized that fine particulate matter, such as PM2.5 (airborne particles with aerodynamic diameters less than 2.5 mm), negatively impacts human health through heart disease, stroke, lung cancer and chronic obstructive pulmonary disease, and this results in the premature mortality of many people. One of the results of these study has been published by a leading international journal.

The international research group has developed collaborative ties with the Russian Science Academy, and the Far East Asian Branch in order to carry out collaborative study on peatlands. We have now discussed the prospects of a joint research program, especially concerned with the ecological, social and epidemiological studies on peatland fire. We will conduct the comparative studies on peatlands among the regions, and among the areas affected by burning and the areas not affected by burning. The discussions took place at Khabarovsk, Russia.

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○Project Members

The Community, Corporate, and Governance Group

◎ MIZUNO, Kosuke	(Research Institute for Humanity and Nature/Center for Southeast Asian Studies, Kyoto University,Professor)
□ SUGIHARA, Kaoru	(Research Institute for Humanity and Nature,Professor)
○ OKAMOTO, Masaaki	(Center for Southeast Asian Studies, Kyoto University,Professor)
○ SUZUKI, Haruka	(Research Institute for Humanity and Nature/Center for Southeast Asian Studies, Kyoto University,Researcher)
○ OSAWA, Takamasa	(Research Institute for Humanity and Nature,Researcher)
○ KAJITA, Ryosuke	(Research Institute for Humanity and Nature,Researcher)
ABE, Ryuichiro	(Japan Indonesia NGO Network)
ADIATI, Hanni	(Indonesian Government, Department of Environment and Forestry,Government Official)
AMINAH MEUTIA, Ami	(Doshisha University,Researcher)

DEWI, Kurniawati Hastuti (Indonesian Institute of Science,Researcher)
DHENY, Trie Wahyu Sampurno (Geospatioal Information Agency Indonesia,Researcher)
DIANTO, Bachriadi (Agrarian Resource Center,Researcher)
DUDI, Caudra (Perkempulan Elang)
FATIMAH, Yuti Ariani (Bandung Institute of Technology)
GERBEN, Nooteboom (University of Amsterdam,Professor)
GRAHAM, Laura (Borneo Oranghutan Survival Foundation,Project Adviser)
HASEGAWA, Takuya (Tsukuba University,Researcher)
HAYASHIDA, Hideki (Institute for Humanity and Social Sciences, Doshisha University,Associate Professor)
HEIN, Lars (Wageningen University)
HONNA, Jun (Collage of International Relation, Ritsumeikan University,Professor)
HOSOBUCHI, Michiko (Tokyo Metropolitan University)
ISNAINI, Zuli Laili (Riau University,Lecturer)
KAMEDA, Akihiro (Center for Southeast Asian Studies, Kyoto University,Assistant Professor)
KANO, Hiroyoshi (Center for Southeast Asian Studies, Kyoto University,Professor)
KONO, Yasuyuki (Center for Southeast Asian Studies, Kyoto University,Director)
MASUDA, Kazuya (Faculty of Agriculture and Marine Science, Kochi University,Associate Professor)
PRASETYAWAN, Wahyu (Syarif Hidayatullah Jakarta, Islamic State University,Senior Lecturer)
PURNOMO, Herry (Center for International Forestry Research,Professor)
TERAUCHI, Daisuke (Faculty of Sociology, Toyo University,Assistant Professor)
TOJO, Bunpei (Center for Spatial Information Science at the University of Tokyo,Researcher)
SAMBUAGA, Adlin (Faculty of Social and Political Sciences, Riau University)
SATO, Yuri (Institute of Developing Economies,Commissioner)
TARIGAN, Abetnego (WALHI, NGO)
VAN SCHAIK, Arthur (Center for Southeast Asian Studies, Kyoto University,Researcher)
WIDJAYA, Putri (Center for Southeast Asian Studies, Kyoto University,Researcher)
YOSHIDA, Koshi (Collage of Agriculture, Ibaraki University,Associate Professor)

The Material Cycling and Ecosystem Group

○ KOZAN, Osamu (Center for Southeast Asian Studies, Kyoto University/Research Institute for Humanity and Nature,Associate Professor)
○ SHIMAMURA, Tetsuya (Graduate School of Agriculture, Ehime University,Associate Professor)
○ KAWASAKI, Masahiro (Research Institute for Humanity and Nature / Center for Southeast Asian Studies, Kyoto University,Professor)
○ YAMANAKA, Manabu (Japan Agency for Marine-Earth Science and Technology,Senior Staff)
○ ITOH, Masayuki (Center for Southeast Asian Studies, Kyoto University,Assistant Professor)
○ SHIODERA, Satomi (Center for Southeast Asian Studies, Kyoto University,Researcher)
○ SAMEJIMA, Hiromitsu (IGES,Researcher)
○ GUNAWAN, Haris (Peatland Restoration Agency, Indonesia,Vice Minister)
○ PAGE, Susan (Leicester University,Professor)
○ SETIADI, Bambang (Agency for the Assessment and Application of Technology Indonesia,Senior Researcher)
○ SUPIANDI, Sabiham (Bogor Agricultural University,Professor)
HAYAKAWA, Atsushi (Akita Prefectural University,Associate Professor)
HERO, Bambang (Bogor Agricultural University,Professor)
HIRANO, Takashi (Research Faculty of Agriculture, Hokkaido University,Professor)
HOOIJER, Aljosja (Deltares,Professor)
IIZUKA, Kotaro (Center for Spatial Information Science at the University of Tokyo,Researcher)
IRIANA, Windy (Graduate School of Frontier Sciences, University of Tokyo)
KOBAYASHI, Shigeo (Center for Southeast Asian Studies, Kyoto University,Professor)
KOK-BOON, Neoh (National Chung Hsing University,Assistant Professor)

KUME, Takashi (Graduate School of Agriculture, Ehime University,Associate Professor)
KULU, Ici Pieter (Palangkaraya University,Lecturer)
KUWATA, Mikinori (Asian School of the Environment, Nanyang Technological University,Assistant Professor)
LESTARI, Vera Budi (Indonesian Institute of Science,Researcher)
MAAS, Azwal (Gadjah Mada University,Professor)
MATSUMI, Yutaka (Institute for Space-Earth Environmental Research, Nagoya University,Professor)
MIZUNO, Kei (Center for Southeast Asian Studies, Kyoto University,Affiliated Associate Professor)
MUHAMMAD, Ahmad (Riau University,Lecturer)
SUSANTO, Robiyanto (Sriwijaya University,Professor)
SUWOGNOYO, Rujito Agus (Sriwijaya University,Professor)
TONOKURA, Kenichi (Graduate School of Frontier Sciences, University of Tokyo,Professor)
UEDA, Kayo (Graduate School of Engineering, Kyoto University,Associate Professor)
WAHYU, Dhenny Trie (BIG,Researcher)
WATANABE, Kazuo (Center for Southeast Asian Studies, Kyoto University,Affiliated Associate Professor)

The International Research Group

○ NAITO, Daisuke (Center for Southeast Asian Studies, Kyoto University,Researcher)
○ ABE, Kennichi (Research Institute for Humanity and Nature,Professor)
DE JONG, Wil (Center for Southeast Asian Studies, Kyoto University,Professor)
ISHIKAWA, Noboru (Center for Southeast Asian Studies, Kyoto University,Professor)
OSAKI, Mitsuru (Hokkaido University,Professor)
RIELEY, Jack (International Peatland Society Convention,Commissioner)
SASAKI, Katsunori (FoE Japan)
UBUKATA, Fumikazu (Graduate School of Environmental and Life Science, Okayama University,Associate Professor)

○ Future Themes

RESEARCH PLAN

(a) Studies into the institutions and organizations that have the potential to encourage communities to join the peatland restoration program, as well as the rewetting of peatland and the maintenance of paludiculture for the sake of the local people's livelihood. We will study the socio-economic conditions, and the material conditions that make up the livelihood of the people within the communities based around peatlands. We are attempting to improve the operativity of institutions, and improve upon or create new organizations that will entice people to willingly join the restoration programs. Institutions that we will engage with and consider important for local people are those that can potentially grant land rights and access to credits. Organizations that we engage with are those relating to social forestry and farmers' groups. These studies will be done in collaboration with the Ministry of Environment and Forestry, the Peatland Restoration Agency, Riau University, and the NGO Agrarian Resource Center.

(b) Studies concerning the political, economic and governmental aspect of peatland conservation and peatland utilization. We will study the implementation of the government program, and especially how the program grapples with conservation. We will also study the reasons, legitimizations and implementations of the policies both at level of central government and local government. Furthermore, we will study the response of the relevant companies, researchers, NGOs and donors to the Government programs. We will investigate the strategies of the companies involved, as well as the financial and operational conditions of those companies. Our counterparts are UIN Jakarta, LIPI, Riau University, and the Corruption Eradication Committee.

(c) Taking aerial photographs with a drone and creating a base map of peatland distribution and land titles in Tanjung Leban. One of the final objectives in this project is to create an integrated map that deals with the depth of peat layer and hydrology, land titles, and the connection between land use

and fire. We will begin the research for the base map this year. This research is conducted by the Material Cycling Group and Community, Corporate and Governance Work Group in cooperation with technical officers in Riau University.

(d) Continually monitoring the material cycling of peat environment, especially carbon and nutrient cycling, water quality within groundwater and river water, and greenhouse gas (CO2 and CH4) dynamics in Riau and Kalimantan. We have placed measuring devices within the two main research villages in Riau and three villages in Kalimantan for comparison. The Material Cycling Group collaborates with Riau, Sriwijaya, Palangkaraya, Hokkaido, Nanyang Technological universities.

e) Continually monitoring the level of water table and assessing the effects of canal blockage constructed for rewetting peatlands. In the two main research villages in Riau, we have several measuring devices in place to measure water table levels and to monitor the effects of canal blockages that were constructed by various institutions. Through such monitoring, we aim to create a guideline for the effective construction of canal blockages. The Material Cycling Work Group is in charge of this research in collaboration with Hokkaido, Utsunomiya and Ibaraki universities in Japan.

(f) Studying the historical, social and environmental formations of the trading system of sago palm in Kapau Baru and seeking potential in alternative systems. Sago palm is one of the most promising products of paludicluture in tropical peatland, with sago production being the main source of livelihood in the Kapau Baru village. The trading system is characterized by payment in advance, with individual farmers selling the product to particular middlemen at a lower price. We are considering this system and trying to seek potential in an alternative system. Community, Corporate and Governance Group conduct this research.

(g) Measuring the balance between organic matter inputs to soils and decomposition which are affected by the growth and death of trees, and determining the physical properties of peat, such as their bulk densities, soil moisture retention curve, and so on. Characteristics of these variables have not been well understood due to methodological problems. We will determine organic matter dynamics (litter traps, decomposition experimentation and ingrowth cores) and the physical and chemical properties of peat. The deeper understanding of soil contributes to the establishment of an integrated guideline for sustainable peatland management. This study is conducted by Material Cycling Group collaborating with Ehime University in Japan and Palangkaraya University.

(h) Accumulating the basic data of peatlands in Russia, Malaysia, Peru, and Central Kalimantan, and conducting fieldwork in these areas. The International Research Group tried to construct research networks by holding and joining seminars and workshops in the last year. Based on this network, we will conduct fieldwork in Russia and Peru within the next year, focusing particularly on the institutionalization and governance of the prevention of peatland fire. With regards to research in Russia, we are arranging an MOU with Russian Academy of Science.

(i) Surveying the vegetation of natural and rewetted peatland forests in Riau and Palangkaraya and comparing them. This study attempts to assess the influence of human disturbance in peatland and the potentiality of its restoration, which contributes to the guideline of sustainable peatland management.

The Material Cycling Work Group conducts this research in collaboration with the botanists and ecologists of the Indonesian Institute of Science (LIPI).

●Achievements

○Papers

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Research Program2: Fair Use and Management of Diverse Resources

Program Director: 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 2017

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.

○ 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

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○Research Presentations

【Oral Presentation】

・Tohru Nakashizuka Assessing ecosystem service in Asian region by using biodiversity observation date. GEOSS Asia-Pacific Symposium, 2017.09.18-2017.09.20, Hanoi Vietnam.

Stage: Full Research

Project Name: Human-Environmental Security in Asia-Pacific Ring of Fire: Water-Energy-Food Nexus

Abbreviated Title: WEF Nexus Project

Project Leader: Aiko Endo

Program 2: Fair Use and Management of Diverse Resources

URL: http://www.chikyu.ac.jp/wefn/index.html

Key Words: Water-Energy-Food Nexus

○ Research Subject and Objectives

Problem, background, and objectives

The nexus approach emerged in the international community on the premise that: 1) social and climate change put pressure on water, energy, food resources; 2) demands for water, energy and food are estimated to increase by 40%, 50%, 35%, respectively by 2030; 3) increases in the number of tradeoffs and potential conflicts among these resources that have complex interactions. For example, change in global water demand between 2000 and 2050 shows that water demand for irrigation is highest in both 2000 and 2050. Moreover, water demand for electricity is expected to rise in 2050. This would lead to serious trade-offs in water resources among irrigation, domestic, manufacturing and electricity in 2050. The global risks interconnections map published by the World Economic Forum at the beginning of this year demonstrates that food crises, water crises and energy price shocks are interconnected global risks. To address these issues, the nexus approach could enhance water, energy and food security by increasing efficiency, reducing trade-offs, building synergies and improving governance across sectors.

Under such global trends, the objectives of the project are to understand the complexity of the water-energy-food (WEF) nexus system, and to create policy options to reduce trade-offs among resources, and to alleviate conflicts of resource users using scientific evidence and under assumptions of uncertainty to maximize human-environmental security. We examine surface and groundwater use for energy production including small-hydropower, geothermal, hot spring and shale gas. Conversely, we focus on energy use for pumping and heating water. In addition, we address water use for fishery and agricultural production, acknowledging that the water cycle is essential for the ecosystem. We also suggest that water use for producing or consuming food or energy on land might affect fisheries production in coastal areas, inasmuch as the flow of nutrients from land to ocean affects the coastal ecosystem. It suggests there is a trade-off in water resources between land and coastal areas.

Methodology, structure and schedule, Project organization and membership

60 researchers in different disciplines from 5 countries including Indonesia, the Philippines, Canada, Japan and the USA are involved in the project consisting of five groups that carried out the following: 1) Biophysical measurements and analyses using space satellites, geothermic, and hydrogeological techniques (the water-energy nexus group); 2) Biophysical measurements and analyses using geochemical, coastal oceanographic, geophysical, hydrologic, and ecological methods including isotopic tracers (the water-food nexus group); 3) Stakeholder analyses, social network analyses, community surveys, and scenario planning based on sociology, economics, and behavioral science approaches (the stakeholder analysis group); 4) Socio-cultural study group examined the roles of a science-policy interface, and studied the socio-cultural history of groundwater use (the science in/for society team); and 5) The interdisciplinary group conducted research with a mission to: i) identify appropriate research questions; and ii) determine methods and/or create new discipline-free methods based on synthesizing and harmonizing team-based production, collected from individual scientists in different disciplines from each team in order to assess human environmental security. In addition, the team further developed these approaches to incorporate non-scientific/-disciplinary views on the analyses; and iii) design a nexus system.

Expected results

To address the water-energy nexus, we 1) created three-dimensional geological models, groundwater flow models and hydrothermal models to understand the underground environmental system and 2) analysed effective potential energy production using water, 3) diversified renewable energy sources such as

small hydropower generation, hydrothermal energy and shallow subsurface heat energy development, 4) established a water balance model for energy production, and 5) created awater security vulnerability map.

To approach the water-food nexus, we 1) examined the interlinkages between submarine groundwater discharge (SGD), nutrients, primary production and fishery production, and 2) conducted cost-benefit analysis (CBA) for food production.

Regarding the water-energy-food nexus, we 1) observed the impacts of hydrothermal energy development on ecosystems, 2) conducted CBA of cascade use of hydrothermal energy for food production.

We also took a social science approach to 1) study the socio-cultural history of groundwater, 2) reviewed institutions for groundwater management, and 3) evaluated the economic value of local resources such as groundwater and ecosystems.

The stakeholder analysis group 1) identified stakeholders and their interests based on a questionnaire survey at a local scale, 2) conducted an online survey to clarify differences in public attitudes toward energy production at a regional scale, 3) developed a method to develop governance for coexistence between energy development and conservation, 4) visualized a social network of stakeholders using network analysis tools, and 5) analysed social acceptability on energy development such as micro-hydropower and geothermal energy development.

And the interdisciplinary group developed 1) integrated methods for interdisciplinary and transdisciplinary approaches and designed and visualised the nexus system.

One of the characteristics and challenges of our project was to take an integrated approach based on the framework of holistic thinking, system thinking and the nexus approach. We created integrated models and future scenarios based on co-production activities.

Contribution to the program

The goals of the Programme 2 are to provide 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. Since the objectives of the nexus project are to understand the connections of natural and social events focusing on water-energy-food resources and to create policy options to reduce trade-offs among resources and to alleviate conflicts of resource users, the achievements of the project contributed to the goals of the Programme 2.

○ Progress and Results in 2017

1. PROJECT PROGRESS DURING FULL RESEARCH

We address two primary objectives; A) to understand the complexity of the Water-Energy-Food (WEF) nexus system, and B) to create policy options to reduce trade-offs among resources and to alleviate conflicts of resource users using scientific evidence under assumptions of uncertainty to maximize human-environmental security. The Water-Energy and Water-Food Nexus Groups pursue objective A; and the Socio-culture of Resource Usage Group, the Stakeholder Analysis and Interdisciplinary Groups focus on objective B. The research results of all groups will be published in Apr. 2018 in an edited volume by Springer, while a book published in Japanese will focus on WEF nexus issues and local studies on Water-Energy next summer.

During five research years, to address objective A, the Water-Energy Nexus Group conducted biophysical measurements and analysis using space satellites, geothermic, and hydrogeological techniques, examined the changes in river and coastal ecosystems caused by changes in the heat environment, and examined how to diversify among renewable energy sources. To approach the water-food nexus, the Water-Food Nexus Group examined the interlinkages between groundwater and fishery production quantitatively.

To address objective B, the Socio-culture of Resource Usage Group developed a science-policy interface based on its examination of the socio-cultural history of groundwater use; the Stakeholder Analysis Group developed a model of governance for coexistence between hot spring energy development & conservation, visualized a social network of hot spring stakeholders, and conducted a scenario planning process. And the Interdisciplinary Group developed integrated methods for interdisciplinary and transdisciplinary approaches and designed a nexus system.

【Water-Energy Nexus】

We analysed the underground geological structures using microtremor array measurements, and explored gravity basement structures to understand groundwater storage and flow direction. We conducted a quantitative analysis of how much energy it is possible to produce per kg of water, among small hydropower in Beppu, shale gas in Canada, and hot spring drainage water in Beppu.

We found that shale gas most effectively uses water to produce energy. However, we should also consider social and environmental aspects of shale gas development. To diversify renewable energy sources, the potential of electricity generated by small hydropower was calculated in Otsuchi town; and it was about 2,000 Megawatt-hours, which accounts for 4% of all electric power consumption in the town. We also could reduce about 2,000 tons of CO_2 emissions. Regarding the ground heat exchange system, soil temperature readings in Obama and Otsuchi revealed that the soil temperature in Obama is higher than in Otsuchi. While previous studies show ground warming, further research is needed to utilize the energy from ground heat for application of heat pumps. In Beppu, another finding shows that changes in the heat environment caused by drainage water from hot spring resorts and hot spring power generation affect river ecosystems. Hot spring drainage creates a more suitable habitat for Nile Tilapia, a foreign species. If new power generation facilities increase the amount of hot spring drainage, then the possibility exists that other rivers will show similar environmental conditions as in the Hirata River. Furthermore, we examined and found that the thermal energy of SGD affected the coastal environment

【Water-Food Nexus】

We examined interlinkages between groundwater and fishery production. Specifically, changes in SGD rates cause changes in nutrient flux, which results in changes in primary production, leading to changes in fishery resources. We found that there was a positive correlation between phytoplankton primary production and radon concentration, as a groundwater tracer of SGD in several bays including Obama Bay. Regarding the relationship between SGD and nutrient flux, we found nutrients supplied from SGD have a high contribution to primary production. As a result of addressing SGD and fisheries production, we discovered that more fishes were found near SGD.

【Socio-culture of Resource Usage】

We clarified the change in groundwater use including users, purposes and socio-cultural values of groundwater in Obama based on onsite surveys. To help the general public including children understand nexus concepts, a new board game that describes the relationship between fisheries (food) and fuel (energy) was developed by the group. We plan to use this game as environmental education material for high school and university lectures or active learning worldwide.

【Stakeholder Analysis】

The Stakeholder Analysis Group identified governance issues towards the coexistence between hot spring energy development and hot spring resource conservation. We also visualized the result of social network analysis regarding hot spring stakeholders including owners of hot springs, power generation businesses, and local banks and consultants, who shared the same interests in Beppu. As for the scenario planning process, we identified each stakeholder's interests, held stakeholder meetings and expert meetings in Beppu. We provided many scenarios and developed future possible stories by collaborating with stakeholders, the general public and experts.

【Interdisciplinary】

We developed and implemented various integrated methods to address WEF nexus issues. We classified integrated methods as qualitative and quantitative, and each contribute to both interdisciplinary and transdisciplinary research. The qualitative methods that we analysed consisted of questionnaire surveys, ontology engineering and integrated mapping. The quantitative methods included physical models, benefit-cost analysis, integrated indices, and optimization management models. As a result, we identified the pros and cons of each method. To address the temporal scale, we determined if we could use each method to address the nexus during the initial stage, developing stage and policy planning stage to design future scenarios.

We recapitulated terrestrial, especially underground, marine and social systems, which we addressed in Beppu. The group also developed methods to link terrestrial and marine systems. While the Stakeholder Analysis Group is in charge of addressing social system including stakeholders such as allocators, distributors, and hot spring inns, the Socio-culture of Resource Usage Group examines cultural significance of nexus resources in hot spring resort areas. The challenge of our project was

to understand these linked terrestrial and marine systems. The Interdisciplinary Group challenge was to design a framework to understand the complexities of these nexus systems using an ontology methodology. The purpose of designing nexus systems is to visualize the linkages between events using ontology engineering, to identify trade-offs and to find efficient resource use, in order to define the academic concepts of nexus and to contribute to scenario planning process in Beppu.

2. PROJECT ORGANIZATION AND MEMBERS

The project is designed consisting of 5 groups including the Water-Energy Nexus Group (G2), the Water-Food Nexus Group (G3), the Stakeholder Analysis Group (G4), the Socio-culture of Resource Usage Group (G1), and the Interdisciplinary Group (G5).

The target of G2 is to examine the water-energy nexus and its linkages to the surrounding environment towards more efficient energy production and the diversification of renewable energy sources. Major research agendas include 1) the evaluation of geothermal energy potential by Dr. Jun Nishijima (Kyushu University), 2) the effect of hot spring use to river ecosystems by Dr. Makoto Yamada (Ryukoku University), 3) the assessment of potential small hydropower generation by Dr. Masahiko Fujii (Hokkaido University), 4) the examination of underground geological structure and groundwater flow by Dr. Yuji Miyashita (Kanagawa Hot Springs Research Institute) and Dr. Hideki Hamamoto (Center for Environmental Science in Saitama), 5) Dr. Hideki Hamamoto constructed of shallow geothermal potential map. Dr. Masahiko Fujii (Hokkaido University) is a leader of G2.

G3 examines the interlinkages between groundwater and fishery production focusing on the supply of nutrients by groundwater at Obama, Otsuchi, and Beppu bays. The group's major goal is to examine the influence of submarine groundwater discharge on primary production and coastal fisheries. Contributors include Professor Osamu Tominaga and Dr. Ryo Sugimoto from Fukui Prefectural University, Ms. Hisami Honda (RIHN), Dr. Shiho Kobayashi (Kyoto University) and Dr. Jun Shoji (Hiroshima University), the leader of G3.

The role of G4 is to conduct stakeholder and social network analyses and scenario planning for avoiding conflicts on resource use among a diverse set of purposes and stakeholders. The research agendas include 1) visualization of social networks on groundwater resources by Dr. Michinori Kimura (Lake Biwa Environmental Research Institute), 2) stakeholder analysis and co-production of local scenarios on WEF Nexus by Dr. Naoki Masuhara (RIHN) and the group leader, Professor Kenshi Baba (Tokyo City University).

The objective of G1 is to examine 1) the history of resource use (Dr. Tomohiro Oh, RIHN), 2) the institution of resource governance (Dr. Takahiro Endo, Osaka Prefecture University), 3) the local ecological and socio-cultural significance of natural resources (Professor SeiichiMori, Gifu Keizai University), and 4) to develop a science-policy interface in society with collaboration of all groups. Dr. Tomohiro Oh (RIHN) is the leader of G1.

The major target of G5 is to determine methods and/or create new discipline-free methods based on synthesizing and harmonizing team-based production, collected from individual scientists in different disciplines from each team. The group's research agendas include 1) the influence of disaster on recognition of local resources by Dr. Takaaki Kato (The University of Kitakyushu), 2) cost-benefit analyses on WEF nexus by Dr. Kimberly Burnett (University of Hawaii), 3) assessment of the collaboration process in interdisciplinary research by Terukazu Kumazawa (RIHN), and 4) framing the nexus concept and building a systematic framework by Dr. Aiko Endo (RIHN) as the leader of G5, and also the leader of the project.

One RIHN project researcher and one research assistant are allocated to each group working under each group leader as project secretariat members. Ms Hisami Honda is in G2 and G3, Dr. Naoki Masuhara is in G4. The roles are to conduct research for the group, to support the group leader as secretariat members, and to work for the leader of the project directly as a secretariat member. There are other 2 secretariat members, Ms. Takako Okamoto, who is in charge of administrative work, and Mr. Teramoto, who is a design expert whose role is to visualize project results and achievement for society such as creating posters, leaflets and films. Each group leader and secretariat member make significant contributions to the project directly from both academic and administrative perspectives.

There are three primary project sites in Japan including Otsuchi town of Iwate prefecture, Obama city of Fukui prefecture, and Beppu city of Oita prefecture. We appointed local scientists as coordinators in each project site, including Professor Tomohiro Kawamura (University of Tokyo) in Otsuchi, Dr.

Daisuke Tahara (Fukui Prefectural University) in Obama, and Professor Shinji Osawa (Kyoto University). Their main role for the project is to provide a link between project members and local stakeholders, and they make great contributions to the local events co-organised by the RIHN project and local governments, since they have strong connections with local governments.

In addition, we also have research members and project sites abroad in 4 different countries including the US, Canada, the Philippines and Indonesia. Each country has a group leader and follows the Japanese structure of the project. Dr. Jason Gurdak (California State University) is the leader of the U.S. group. The major objectives of the group are to examine 1) the implications of water-energy-food nexus for Pajaro valley and California's Sustainable Groundwater Management Act, 2) to develop integrated hydrologic modeling in Pajaro Valley.

Professor Diana Allen (Simon Frazer University) is the leader of the Canada group. The major target of this group is to assess hazard-specific vulnerability and future water demand and availability in the context of shale gas development in Canada. The objectives of the Philippines group, with Professor Fernando Siringan (University of the Philippines) as the leader, is mainly to examine 1) lacustrine groundwater discharge in Southern Lanuna de Bay as the case of water-food nexus, and 2) potential and social acceptability of micro hydropower in Laguna de Bay. Dr. Robert Delinom of the Indonesian Institute of Sciences (LIPI) is the leader of the Indonesia group. His group's objectives include examining 1) the socio-economic vulnerability and benefits of floating fish cages in the Jatiluhur reservoir as the case of water-energy-energy nexus, and 2) the assessment of submarine groundwater discharge at Citarum River Estuary.

The leaders from each country have online meetings with Japanese group leaders regularly to share their methodologies toward common goals of the projects. Dr. Kimberly Burnett (University of Hawaii) is a member of Group5 and US team, and retains an active role in the project. Furthermore, we have advisory members in Japan, who give project members advice at the international and domestic project meetings. The names of active advisory members are Professor Makoto Taniguchi (RIHN), Emeritus Professors Tomoya Akimichi, Masaru Tanaka, Kazuo Matsushita, and Professor Joji Morishita.

○Project Members

◎ Aiko Endo	(Research Institute for Humanity and Nature,Associate Professor,Project leader,Group 5 leader)
○ Tomohiro Oh	(Research Institute for Humanity and Nature,Researcher,Group 1 leader,Resource Governance)
Naoki Masuhara	(Research Institute for Humanity and Nature,Researcher,Group 4,Environmental Energy Policy)
Hisami Honda	(Research Institute for Humanity and Nature,Research Associate,Group 3,Coastal Oceanography)
Takako Okamoto	(Research Institute for Humanity and Nature,Research Associate,Secretariat)
Shun Teramoto	(Research Institute for Humanity and Nature,Research Associate,Secretariat)

– Group 1 Society, Culture and Natural Resources –

Takahiro Endo	(Osaka Prefecture University,Associate Professor,Environmental Governance)
Seiichi Mori	(Gifu Keizai University,Professor,Social Behaviour)
Takeo Ohnishi	(Gifu University,Associate Professor,Modelling of Land ? Ocean Interaction)
Aysun Uyar Makibayashi	(Doshisha University,Associate Professor,International Relations)

– Group 2 Water and Energy nexus –

○ Masahiko Fujii	(Hokkaido University,Associate Professor,Group 2 leader,Environmental Earth Science)
Hajime Araki	(Hokkaido University,Professor,Energy Science)
Makoto Yamada	(Ryukoku University,Lecturer,Hydrology)
Hideki Hamamoto	(Center for Environmental Science in Saitama,Chief,Geothermic)
Yuji Miyashita	(Kanagawa Hot Springs Res. Ins,Senior Researcher,Geothermal Spring Studies)
Kazuhiro Itadera	(Kanagawa Hot Springs Res. Ins,Senior Researcher,Geohydrology)
Jun Nishijima	(Kyushu University,Associate Professor,Geothermal Energy)

Hisashi Kobayashi	(Ibaraki University College of Agriculture,Professor,Agricultural Water Utilization)
Seiichiro Ioka	(North Japan Research Institute for Sustainable Energy,Associate Professor,Geothermal Energy)
Shigeki Senna	(National Rsearch Institute for Earth Science and Disaster Prevention,Senior Researcher,Seismology)
Masakatsu Sasada	(Geo-Heat Promotion Association of Japan,Chairman of board of directors,Environmental Policy)
Kensho Ota	(Kyushu University,Graduate School Student,Geothermal Energy)
Yayan Sofyan	(West Japan Engineering Consultants, Inc.,Chief Representative Jakarta Office,Geothermal Energy)

- Group 3 Water and Food nexus -

○ Jun Shoji	(Hiroshima University,Associate Professor,Group 3 leader,Costal Aquatic Bioscience)
Osamu Tominaga	(Fukui Prefectural University,Professor,Aquatic Resource Biology)
Ryo Sugimoto	(Fukui Prefectural University,Assistant Professor,Coastal Fisheries)
Shiho Kobayashi	(Kyoto University,Assistant Professor,Secondary Producer Analysis)
Takuya Hasegawa	(Hiroshima University,Graduate School Student,Costal Aquatic Bioscience)
Yuji Terada	(Hiroshima University,Graduate School Student,Costal Aquatic Bioscience)
Koji Fujita	(Hiroshima University,Graduate School Student,Costal Aquatic Bioscience)
Tatsuhiro Ishida	(Fukui Prefectural University,Graduate School Student,Production Ecology)
Masaru Takeuchi	(Fukui Prefectural University,Graduate School Student,Production Ecology)

- Group 4 Stakeholder analysis -

○ Kenshi Baba	(Tokyo City University ,Professor,Group 4 leader,Policy Process Theory)
Michinori Kimura	(Lake Biwa Environmental Research Institute,Researcher,Social Network Theory)

- Group 5 Interdisciplinary -

Terukazu Kumazawa	(Research Institute for Humanity and Nature,Associate Professor,Environmental Planning,Regional Informatics)
Takaaki Kato	(The University of Kitakyushu,Professor,Environment Economic Assessment)
Akira Ishii	(Yachiyo Engineering Co., Ltd.,Researcher,Physical Modelling)
Kimbaly Burnett	(University of Hawaii,Researcher,Environmental Economics)
Pedcris Miralles Orencio	(Catholic Relief Services,Deputy Program Manager,Socio- Environmental Planning and Management)

- Obama -

○ Daisuke Tahara	(Fukui Prefectural University,Associate Professor,Site Leader,Environmental Policy)
Yasuyuki Kosaka	(Fukui prefectural Wakasa high school,Teacher,Coastal Protection)

- Beppu -

○ Shinji Ohsawa	(Institute For Geothermal Sciences,Kyoto University,Professor,Site Leader,Group 2,Geothermic)
Tomoo Shibata	(Institute For Geothermal Sciences,Kyoto University,Associate Professor,Limnology)
Masaki Saito	(Tokai University,Professor,Hot Spring Science)
Yoshinobu Kamijo	(Hiji Town municipality,Oita prefecture,Fellow,Fishery)

- Otsuchi -

○ Tomohiko Kawamura	(International Coastal Research Center,Professor,Site Leader,Aquatic Resource Biology)
Ken Sasaki	(Otsuchi Town Office,Officer,Local Community)

- Domestic secondary site -

Minoru Tokumasu	(Saijyo City Office,Officer,Saijo,Ehime Team)
Yoshiko Sugawara	(Yuza Town Hall,Officer,Yuza,Yamagata Team)

– Advisory –

○ Makoto Taniguchi	(Research Institute for Humanity and Nature,Professor,Supervisor,Hydrology)
□ Tomoya Akimichi	(Research Institute for Humanity and Nature,Emeritus Professor,Integrated Area Study)
□ Kazuo Matsushita	(Institute for Global Environmental Strategies,Senior Fellow,Global Environmental Policy)

– Philippines –

○ Fernando P. Siringan	(University of the Philippines Marine Science Institute,Professor,Site Leader,Marine & Coastal Geology)
Karen A. B. Jago-On	(University of the Philippines School of Urban and Regional Planning,Associate Professor,Urban & Regional Planning)
Maria Ines Rosana Balangue-Tarriela	(University of the Philippines National Institute of Geological Sciences,Associate Professor,Geochemistry)
Sevillo David	(National Water Resources Board,Executive Director,Earth Science)

– Indonesia –

○ Robert M. Delinom	(Indonesia Institute of Sciences,Professor,Site Leader,Geology)
Rachmat Fajar Lubis	(Indonesia Institute of Sciences,Researcher,Hydrogeology)
Deny Hidayati	(Indonesia Institute of Sciences,Researcher,Human Ecology)
Johanis Haba	(Indonesia Institute of Sciences,Professor,Anthropology)
Hidayat Pawitan	(Bogor Agricultural University (IPB-Bogor),Professor,Hydrological System Analysis)
Andy Purnama Roesli	(PT. Matlamat Cakera Canggih,Director,Geothermal Energy Policy)

– Canada –

○ Diana M. Allen	(Simon Fraser University,Professor,Site Leader,Water Energy Cycles)
Dirk Kirste	(Simon Fraser University,Associate Professor,Hydrology)
Nancy Olewiler	(Simon Fraser University,Professor,Public Policy)
Deborah Harford	(Adaptation to Climate Change Team (ACT), Simon Fraser University,Executive Director,Climate Change Policy)
Chelton van Geloven	(BC Ministry of Forests, Lands and Natural Resource Operations,Water Management,Hydrology)
Laurie Welch	(BC Oil and Gas Commission,Water Management,Hydrogeology)

– U.S.A. –

○ Jason J. Gurdak	(San Francisco State University,Associate Professor,Site Leader,Hydrology)
Leora Nanus	(San Francisco State University,Assistant Professor,Hydrology,Water Quality)
Andrew Fisher	(University of California, Santa Cruz,Professor,Marine Aquifer Reserve Research)
Samuel Sandoval Solis	(University of California, Davis,Assistant Professor,Water Management)
Ellen Hanak	(Public Policy Institute of California,Senior Fellow,Environmental Policy)
Peter Swarzenski	(United States Geological Survey,Professor,Coastal Oceanography)

○ Future Themes

1. To define the academic nexus concept.
2. To understand the complexity of the water-food-energy nexus system, and create visualizations of the linkages between events using ontology-based systems; to identify trade-offs and efficient resource uses; to define the academic concept of nexus, contribute to scenario planning, and design a nexus system.
3. Preparation of policy-relevant future nexus-issue scenarios through collaboration with stakeholders.

4. Development of localized studies that can be up-scaled and produce policy-relevant results; improvement of networking with stakeholders and researchers addressing nexus issue nationally and internationally.

●Achievements

○Papers

【Original Articles】

- Manabu Kume, Seiichi Mori, Jun Kitano, Tetsuya Sumi & Shotaro Nishida 2018,01 Impact of the huge 2011 Tohoku-oki tsunami on the phenotypes and genotypes of Japanese coastal threespine stickleback populations. Scientific Reports 8. DOI:10.1038/s41598-018-20075-z
- Taniguchi, M., Endo, A., Gurdak, J.J., Swarzenski, P. 2017,07 Water-Energy-Food Nexus in the Asia-Pacific Region. J. Hydrol. Reg. Stud. 11:1-8. (reviewed).

○Research Presentations

【Oral Presentation】

- Taniguchi, M. Groundwater-energy-food nexus for sustainability. 44th Conference of International Association of Hydrogeologists, 2017.09.26, Croacia.
- Taniguchi, M. Alternative use of subsurface energy as heat pump or groundwater. IASPEI, 2017.08.04, Kobe.
- J. Nishijima, K. Naritomi and S. Ohsawa Reservoir monitoring using repeat precise gravity measurements in Beppu hot spring area. annual meeting of Society of Environmental Science, 2017, Oita prefecture, Japan.

【Poster Presentation】

- Aiko Endo, Masahiko Fujii, Jun Shoji, Kenshi Baba, Tomohiro Oh, Makoto Yamada, Hisami Honda, Naoki Masuhara, Jason Gurdak, Diana Allen, Robert Delinom, Fernando Siringan, Makoto Taniguchi Human-Environmental Security in Asia-Pacific Ring of Fire: Water-Energy-Food Nexus. JpGU-AGU Joint Meeting 2017, 2017.05.20-2017.05.25, 幕張メッセ、千葉市.

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

Technological innovation in energy and food production resulted in population growth, increase in life expectancy and economic prosperity. However, over exploitation of the resources leads to disturbance of natural biogeochemical cycles of many elements, and in particular the carbon cycle and those of macro nutrients, such as nitrogen and phosphorus (Sutton et al. 2013). Such nutrient imbalances have caused serious environmental problems, contributing to global warming due to increased CO2 and water pollution due to increased nitrogen and phosphorus loadings. These anthropogenic disturbances in the carbon and nutrient cycling are also the main driver of biodiversity loss on a global scale. At present, it has been recognized that nutrient loadings and biodiversity loss are so common and prevalent throughout the planet, posing a risk to sustainable human development (Rockström et al. 2009).

When considering the nutrient balance, phosphorus plays a key role in controlling terrestrial ecosystem processes, presenting a “too much too little” problem in the environmental and social contexts (Elser & Bennett 2011). Because of its scarcity relative to other macro nutrients, on one hand, phosphorus determines ecosystem functioning and thus the quality and quantity of ecosystem services. On the other hand, over exploitation of phosphorus resources threatens our sustainability because phosphorus resources are consumed many orders of magnitude faster than they are replenished (Vaccari 2009). To solve these nutrient imbalance-associated issues and ultimately construct sustainable social-ecological systems, we have to enhance nutrient recycling on watershed scales.

Under such a background, we aim to facilitate cross-linkage of the multi-level governance, in which governments and researchers with systemic view tend to manage nutrient loadings and sustainable use on the regional and global scales, while most of citizens want to solve social and environmental issues in the context of their life and livelihood. For such watershed governance to be successful, local and scientific knowledge must be shared and integrated by a variety of stakeholders to reconcile conflicting issues on different scales.Here we will develop a framework of the adaptive watershed governance, in which social involvement in community activities for biodiversity conservation enhances human well-being through accumulation of social capitals, which in turn enhances nutrient recycling through an increase in the biodiversity-dependent ecosystem functions. Through social evaluation of scientific knowledge on how the biodiversity provides public values, the community activities will be fed back to the well-being for the community member through a shift from bonding to bridging social capitals. Following transdisciplinary science (Brunner 2005, Mauser et al. 2013), our governance approach is improved in the adaptive way to increase all of the biodiversity, nutrient recycling and well-being based on the PDCA cycle.

○ Progress and Results in 2017

We launched action researches in three of four local communities from the upstream,middle-stream, downstream and the coastal area of Yasu River sub-watershed, the largest tributary of Lake Biwa. Our field and experimental researches demonstrated that some of local knowledge-based activities are likely to be useful in enhancement of biodiversity and nutrient recycling. We also started to evaluate human well-being through questionnaire and inquiry surveys,associating with social and natural capitals.

We also started the basic research on biodiversity, nutrient and human dimension in Silang-Santa Rosa sub-watershed of Laguna de Bay, the Philippines, to compare the watershed governance between two contrasting watershed societies (i.e., infrastructure-oriented vs.high-loading societies). In this sub-watershed, river waters were overwhelmingly rich in phosphate because of drastic population increase under the recent economic development and incomplete sewage treatment systems, resulting in the extreme nutrient imbalance and biodiversity loss. Local communities used to utilize communal springs as commons decades ago. After establishment of tap water systems, however, most of them were degraded due to lack

of social norms and morality. The drinking waters are derived from the shallow groundwater, so that the groundwater pollution is the recent concern of matter. Our preliminary inquiry surveys revealed that environmental consciousness of local communities has been distant from the nature of springs and streams under the economic development.

○Project Members

【Leader】

◎ OKUDA Noboru (Research Institute for Humanity and Nature,Associate Professor,Ecological Science)

【River Research Working Group】

○ IWATA Tomoya (Department of Environmental Sciences, Faculty of Life and Environmental Sciences University of Yamanashi,Associate Professor,Professor Aquatic Ecology)

FUJINAGA Shohei (Center for Ecological Research, Kyoto University,Doctor's course student,Ecological Science)

ISHIKAWA Naoto (Japan Agency for Marine-Earth Science and Technology,Postdoctoral Fellow,Stream Ecology, Limnology)

ITOH Masayuki (Graduate School of Simulation Studies University of Hyogo,Associate Professor,Forest Hydrology)

KO Chia-Ying (Research Center for Environmental Changes, Academia Sinica,Assistant Professor,Spatial Statistics)

OHTE Nobuhito (Graduate School of Informatics, Kyoto University,Professor,Hydrology, Ecosystem Ecology)

OKANO Junichi (Center for Ecological Research, Kyoto University,Postdoctoral Fellow,Stream Ecology, Behavioural Ecology)

OSAKA Ken'ichi (School of Environmental Science, The University of Shiga Prefecture,Associate Professor,Forest Hydrology)

TOGASHI Hiroyuki (Tohoku National Fisheries Research Institute, Fisheries Research Agency,Researcher,Community Ecology)

【Lake Research Working Group】

○ BAN Syuhei (School of Environmental Science, The University of Shiga Prefecture,Professor,Plankton Ecology, Limnology)

INOUE Eiso (Lake Biwa Environmental Research Institute, Shiga Prefectural,Senior Researcher,Freshwater Biology, Aquatic Entomology)

ISHIKAWA Kanako (Lake Biwa Environmental Research Institute, Shiga Prefecture,Researcher,Environmental Microbiology. Limnology)

JIN Guangzhe (Guangdong Ocean Universty,Researcher,Limnology)

KAGAMI Maiko (Yokohama National University,Professor,Limnology, aquatic biology)

KAMIYA Hiroshi (Shimane Prefectural Institute of Public Health and Environmental Science,Division Chief,Analytical Chemistry)

KATO Toshikuni (Shimane Prefectural Institute of Public Health and Environmental Science,Researcher,Environmental Analytical Chemistry)

KUMAGAI Michio (Lake Biwa Sigma Research Center, Ritsumeikan University,Professor,Geophysics)

MIZUNO Katsunori (Underwater Technology Collaborative Research Center, IIS, The University of Tokyo,Assistant Professor,Underwater acoustic)

NAKANO Shin'ichi (Center for Ecological Research, Kyoto University,Professor,Ecological Science)

NISHIHIRO Jun (Department of Environmental Science, Faculty of Science, Toho University,Associate Professor,Conservation Ecology)

ONODERA Shin'ichi (Graduate School of Integrated Arts and Sciences, Hiroshima University,Professor,Hydrology)

SAITO Mitsuyo (Graduate School of Environmental and Life Science, Okayama University,Assistant Professor,Hydrology)

SAKAI Yoichiro (Lake Biwa Environmental Research Institute Shiga Prefecture,Researcher,Limnology)

SEIKE Yasushi (Interdisciplinary Faculty of Science and Engineering, Shimane University,Professor,Environmental Analysis)

SUGAHARA Shogo (Graduate School of Science and Engineering, Shimane University,Assistant Professor,Environmental analytical chemistry)

UCHII Kimiko	(School of Medicine, Osaka Ohtani University,Assistant Professor,Microbial Ecology)
YAMAMURO Masumi	(Graduate School of Frontier Sciences theTokyo of University ,Professor,Geography)
WANG Kunyang	(Graduate School of Integrated Arts and Sciences, Hiroshima University,Master’s course student,Limnology)
YI Rong	(School of Environmental Science, The University of Shiga Prefecture,Doctor’s course student,Plankton Ecology, Limnology)

【Terrestrial Research Working Group】

○ OSONO Takashi	(Center for Ecological Research, Kyoto University,Professor,Ecological Science)
HIROSE Dai	(School of Pharmacy, Nihon University,Assistant Professor,Mycology)
HOBARA Satoru	(College of Agriculture, Food and Environment Sciences, Rakuno Gakuen University,Professor,Biogeochemistry)
ISHIDA Atsushi	(Center for Ecological Research, Kyoto University,Professor,Plant Ecophysiogy)
MATSUOKA Shunsuke	(Graduate School of Simulation Studies University of Hyogo,Researcher,Ecological Science)
USHIO Masayuki	(Center for Ecological Research, Kyoto University,Rresearcher,Ecosystem Ecology, Microbial Ecology)

【Analytical Research Working Group】

○ TAYASU Ichiro	(Research Institute for Humanity and Nature,Professor,Ecological Science)
AMANO Yosuke	(Tohoku National Fisheries Research Institute, Fisheries Research Agency,Technical assistant,Fish Biology Ecological Science)
FUJIYOSHI Rei	(Research Institute for Humanity and Nature,Researcher,Stable Isotope Ecology)
HYODO Fujio	(Research Core for Interdisciplinary Sciences, Okayama University,Associate Professor,Forest Ecology)
IDE Jun’ichiro	(Institute of Decision Science for a Sustainable Society, Kyushu University,Assistant Professor,Forest Hydrology)
KITAZAWA Daisuke	(Institute of Industrial Science, The University of Tokyo,Associate Professor,Marine Ecosystem Engineering)
KOBAYASHI Yuki	(Graduate School of Medicine of Yamaguchi University,Lecturer,Health sciences)
KOKITA Tomoyuki	(Faculty of Marine Science and Technology, Fukui Prefectural University,Associate Professor,Ecology, Evolutionary Biology)
MARUO Masahiro	(School of Environmental Science, University of Shiga Prefecture,Professor,Analytic Chemistry)
MATSUBAE Kazuyo	(Graduate School of Engineering, Tohoku University,Professor,Industrial Ecology)
MANO Yuko	(Graduate School of Engineering, Tohoku University,Master’s course student,Industrial ecology)
MINAMOTO Toshifumi	(Graduate School of Human Development and Environment, Kobe University,Associate professor,Molecular Ecology)
OTAKE Tsuguo	(International Coastal Research Center, Atmosphere and Ocean Research Institute, The University of Tokyo,Professor,Fish Biology Ecological Science)
PAYTAN Adina	(IMS, University of California Santa Cruz,Professor,Biogeochemistry)
SONG Uhram	(College of Applied Life Sciences, Jeju National University,Assistant Professor,Ecological Science)
Wu Qianqian	(Graduate School of Human Development and Environment, Kobe University,Doctor’s course student,Evolutionary Ecology)
YAMANAKA Hiroki	(Department of Environmental Solution Technology, Ryukoku University,Lecturer,Fish Physiology)

【Network Research Working Group】

○ ASANO Satoshi	(Lake Biwa Environmental Research Institute, Shiga Prefecture,Researcher,Regional Planning)
ASAMI Masato	(Shiga Prefectural Government, Kotou Environmental office)
Okuda Kazuomi	(Shiga Prefectural Government,Lake Biwa Policy Division)
Fukui Haruo	(Omi Environmental Conservation Foundation)
SATO Yuichi	(Lake Biwa Environmental Research Institute,Researcher,Environmental Modelling)

KAWABATA Takahiro (Omi Environmental Conservation Foundation,Assistant Section Chief,Environmental Policy)
KATAOKA Yoshitaka (Fishery Experiment Station, Department of Agriculture and Fisheries, Shiga Perfecture,Assistant Section Chief,Fisheries Science)
KIKKO Takeshi (Fisheries Management Division, Department of Agriculture and Fisheries, Shiga Perfecture,Assistant Section Chief,Fisheries Science)
OHTSUKA Taisuke (Lake Biwa Museum,Curator,Algal biology)
KANAO Shigefumi (Lake Biwa Museum,Curator,Fish Ecology)

【Human Research Working Group】

○ WAKITA Kenichi (Faculty of Sociology and Social Welfare, Ryukoku University,Professor,Environmental Sociology)
FUKUSHIMA Shintaro (School of Cultural and Creative Studies, Aoyama Gakuin University,Assistant Professor,Social Science)
HIRATSUKA Junichi (NA,Former Director of Research Organizatio n of Nature and Humanity,Lake Science)
KAGOHASHI Kazuki (Institute for Social Ethics, Nanzan University,Researcher,Environmental Economics)
KASHIO Tamaki (Lake Biwa Museum,Researcher,Rural sociology)
KONDO Yasuhisa (Research Institute for Humanity and Nature,Associate Professor,Archaeology, GIS)
MATSUSHITA Kyohei (Shiga University,Associate Professor,Environmental Economics)
MITSUMATA Gaku (Faculty of Economics, University of Hyogo,Associate professor,Ecological Economics)
NONAMI Hiroshi (School of Sociology, Kwansei Gakuin University,Professor,Social Psychology)
OHNO Tomohiko (Institute of Human and Social Sciences, Kanazawa University,Associate Professor,Environmental Policy)
SAIZEN Izuru (Kyoto University,Associate Professor,Regional Planning)
SAKAGAMI Masaji (Faculty of Health Sciences, Nihon Fukushi University,Professor,Applied Economics)
SANO Shizuyo (Faculty of Letters, Doshisha University,Professor,Historical Geography)
TAKAHASHI Takuya (The University of Shiga Prefecture,Professor,Forest policy and planning; corporate environmentalism)
TAKEMURA Kosuke (Shiga University,Associate Professor,Social Psychology)
TANAKA Takuya (Environmental Partnership Office Kinki,Creative Director,Environmental Science & Technology)
TANIGUCHI Yoshimitsu (Department of Biological Environment, Akita Prefectural Universiy,Professor,Sociology)
UCHIDA Yukiko (Kokoro Research Center, Kyoto University,Associate Professor,Social Psychology)
○ YACHI Shigeo (Center for Ecological Research, Kyoto University,Associate Professor,Theoretical Ecology)
ZHENG Yuejun (Faculty of Cultural and Information Science, Doshisha University,Professor,Sociometrics)

【Nutrient Management Working Group】

○ SANTOS-BORJA Adelina (Office of the General Manager, Laguna Lake Development Authority,Division Chief III, Internationa l Linkages and Research Developme nt Unit,Limnology Environmental Science Integrated Lake Basin Management)
MAGBANUA Francis (Institute of Biology, College of Science, University of the Philippines Diliman,Assistant Professor,Zoobenthos Diversity)
MENDOZA Norman (Philippine Nuclear Research Institute,Researcher,Hydrology)
PAPA Rey Donne (Department of Biological Sciences and Research Center for the Natural Sciences, University of Santo Tomas,Assistant Professor,Plankton Ecology, Limnology)
SEVILLA Fortunato B III (Department of Chemistry and Research Center for the Natural and Applied Sciences, University of Santo Tomas,Professor,Instrumentation and Analytical Chemistry)

【Advisory Board】

□ FUJITA Noboru (Center for Restoration of Regional Nature,Director,Plant Community Ecology)

☐ ISHII Reiichiro	(Research Institute for Humanity and Nature,Associate Professor,Theoretical Ecology)
☐ KAWABATA Zen'ichiro	(Research Institute for Humanity and Nature,Emeritus Professor,Aquatic Ecosystem Ecology)
☐ NAGASAKA Akiko	(Hokkaido Research Organization Forestry Research Institute,assistant section chief,Watershed Conservation)
☐ NAKASHIZUKA Toru	(Research Institute for Humanity and Nature,Professor,Forest ecology, biodiversity)
☐ SAKAI Shoko	(Center for Ecological Research, Kyoto University,Associate Professor,Plant Ecology)
☐ KOBAYASHI Kunihiko	(Research Institute for Humanity and Nature,Researcher,International Environmental law)
☐ URABE Jotaro	(Graduate School of Life Sciences, Tohoku University,Professor,Aquatic Ecology)

【Secretariat】

IKEYA Toru	(Research Institute for Humanity and Nature,Researcher,Aquatic ecology, Environmental science)
ISHIBASHI Hiroyuki	(Research Institute for Humanity and Nature,Researcher,Area study and historical study on forested areas)
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

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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.

○ Progress and Results in 2017

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 and the Sanitation Value Chain project (The Sanitation Value Chain: Designing Sanitation Systems as Eco-Community-Value System) led by Naoyuki Funamizu. 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 ideas of members of other projects and research methods. This is one of the greatest achievements of this fiscal year.

2. Methodology and Fundamental Framework in Program 3

In this environment, we started focusing upon the methodology and/or fundamental framework beyond each project, and considering research framework of Research Institute for Humanity and Nature beyond program 3. I would like to summarize what we talked and considered this year in the following.

2-1. What have we been doing?

Studies of planetary boundaries such as Rockstrom et al. (Nature, 2009) can be regarded as the evaluation of natural science after the Industrial Revolution. Reduction in biodiversity has already passed the tipping point, and the circulation of nitrogen and phosphorous is almost beyond the tipping points. In addition, yellow signals are also associated with climate change.

Next, let us see the relationship between human development index (HDI) and ecological footprint (EFP) per capita in each country. The main constituent elements of HDI are the life expectancy of the country, the level of education, and income per capita, i.e., the wellbeing of the country. On the other hand, EFP is an indicator of sustainability, showing whether the country lives in less than one Earth. Developing countries have low HDI and EFP, whereas developed countries have high values of both indicators. The target should be low EFP and high HDI, but no countries are heading for the target area. This relationship is an evaluation of social sciences, and together with the evaluation of the planetary boundaries, we must say that we are threatening our own survival.

On the other hand, the debt outstanding of major countries is huge. The sovereign debt in Japan is over 200% of GDP, over 100% in the United States, and around 70% in Germany. We, current generation, deprive future generations’ various resources of without remorse. In the case of Japan, in order to resolve the outstanding debt, the consumption tax must be raised to 30% and this must continue for a hundred years (Hansen et al. (Rev. Econ. Dyn., 2016) , Keiichiro Kobayashi, Economics of Time, forthcoming). Which generation will proceed to do this?

2-2. Why did these happen?

Maggio et al. (Fuel, 2012) forecasts the peak of production of oil, coal and natural gas. We can read that this research shows past, present and future of fossil fuel. The amount of coal we will burn in the first half of the 21st century is about 1.7 times the amount of coal burned in the 20th century. This ratio is 1.5 for petroleum, and about 3 for natural gas. In other words, in the 20th century, fossil fuel is in the run-up period, which shows that this century is the heyday of fossil fuel.

Why can't we stop emitting greenhouse gases? Our starting point is our human nature. According to Sapolsky (SciAm, 2012), humans have three oddities. The first is contrast. Our five senses respond not to absolute values, but to their changes. When we hear loud noise or the outside gets dark suddenly, we respond naturally (or by default) to increase self-viability. This property can also be read as the principle of optimality in the sense that it does not react unless external factors change. The second is sociality. Humans dominate other animals by using cooperation among them, and then stand at the top of the pyramid of the food chain. However, sociality requires some education and experience, and we cannot learn instantaneously. The third is impulse. For example, we cannot restrain ourselves when presented with delicious food. I would like to add optimism to these. We are creatures who forget something awful in the past, pursue pleasure now, and consider the future optimistically in order to increase survival probabilities in the process of our evolution (Curr. Biol., Sharot (2011)).

It would be natural to think that our nature including these four properties is the background for our basic social systems such as market and democracy. Let us first consider the market. Market is "an excellent device to realize short-run desire of people," but not "a device to allocate resources with future generations in mind" (e.g., Krutilla (1967)). Future generations cannot participate in modern markets. Meanwhile, Democracy is "a device to realize benefit for currently living people", but not "a device to include future generations" (e.g., Pigou(1952)). Nobody will win an election proposing well-being of people in a century later.

After the industrial revolution, various innovations happened and we started using a large amount of fossil fuel, and this drastic change strengthened contrast, impulse, and optimism, and weakened sociality. The nature of such transfigured humans will further transform markets, democracy, and innovation. Our nature that has changed as such further changes the market, democracy, and innovation. Through these cycles, have we been changing our society oriented toward unlimited growth together with future failures? (See Figure 2). When we consider lifeworlds in projects, we must consider these trends and effects in their local sites.

2-3. Problems of methodology in Future Earth and Futurability

In 2012, Future Earth is organized as an international research platform that creates knowledge and actions to accelerate the transformation into a sustainable society, and has been in operation since 2015. One of the fundamental ideas of Future Earth is transdisciplinary research. Stakeholders and scientists co-design research projects, co-produce knowledge and co-deliver results. However, both stakeholders and scientists are the current generation and there is a possibility that future generations will be losers even if they become win-win by actions in line with their incentives. In other words, the stakeholders that should be included are future generations, and the target to be changed is the way of thinking and behavior of the present generation.

We say that an individual exhibits futurability when (s)he experiences an increase in happiness as a result of deciding and acting to forego current benefits as long as it enriches future generations (Saijo, ed., Future Design, forthcoming from Springer). Parents can reduce their own foods and make them happy by giving it to their children. The fundamental question is whether we can extend this concept to future generations without being related to blood. The background of this setting is that there is a deep concern for the concept of sustainable development in Our Common Future, which the Brundtland Commission summarized (meeting the needs of the currentgeneration without compromising future generations' needs) is there. For example, in resolving the aforementioned debt outstanding, it is impossible to reduce the burden of future generations without incurring a heavy burden on the current generation.

Even if we have futurability, it is not easy to activate it. Is it possible to build or design lifeworlds or society, that strengthens sociality and weakens contrast, impulse, and optimism? This line of research is important in each project although we have not been pursuing this avenue this year. Or, is it possible to change market and democracy toward futurability?(See Figure 3). This could be beyond Program 3, but we could find clues to change our fundamental social systems through designing local lifeworlds.

Both FEAST and Sanitation members shared the way of thinking described above. In other words, we in program 3 have a common ground for our research. Since this year is my first year at RIHN, this is a wonderful step forward for the members and me.

3. 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. In addition to this activity, I personally talked with leaders of the IS and FS projects.

○Project Members

Every member of
FEAST project and
Sanitation project

○ Future Themes

1. “Human” and “Future”

As I described in the previous section, Lifeworlds, Sustainability, Wellbeing, and Design are key words in program 3. The other two dimensions are “human” and “Future”. The human part includes human characteristics such as futurability, sociality, empathy and so on. Without considering human nature, we would not be able to find or design a path to sustainable lifeworlds. The future part is also important. In order to change “business as usual”, we must change and design our basic social systems for our future. That is, designing future will be a key element in the future projects in program 3.

2. What are the variables?

This point is related to the above. When we analyse our systems or societies, the first one is whether we consider the way of thinking of players or people as given or not. For example, keeping mobility using electric cars is one way, and the other way is to redesign cities themselves not to use personal mobility method such as cars. The second one is whether we consider the current social systems such as market and democracy as given or not. Figure 4 shows these two factors. Traditional social sciences regard both institutions and the way of thinking of people as given, and then find what have been happening.

Mechanism design in social science is an approach to attain social objectives such equity and efficiency designing or re-designing social systems given the way of thinking of people. So far as I know, Future Earth’s transformation approach seems that it implicitly treats market and democracy as given and then tries to change the way of thinking of people. On the other hand, Future Design uses both of them as variables. In order to find an avenue for sustainable future, we re-design social

systems to change the way of thinking of people. Program 3 will carefully choose proposals fitting into the green part in Figure 4.

●Achievements

○Papers

【Original Articles】

- Jun Feng, Tatsuyoshi Saijo, Junyi Shen and Xiangdong Qin 2018,02 "Instability in the Voluntary Contribution Mechanism with a Quasi-linear Payoff Function: An Experimental Analysis,". Journal of Behavioral and Experimental Economics 72:67-77. DOI:10.1016/j.socec.2017.12.002 (reviewed).
- Tatsuyoshi Saijo and Junyi Shen 2018,02 "Mate choice mechanism for solving a quasi-dilemma". Journal of Behavioral and Experimental Economics 72:1-8. DOI:10.1016/j.socec.2017.10.004 (reviewed).
- Tatsuyoshi Saijo, Takehiko Masuda, and Takafumi Yamakawa 2018,01 "Approval Mechanism to Solve Prisoner's Dilemma: Comparison with Varian's Compensation Mechanism". Social Choice and Welfare 51:65-77. DOI:10.1007/s00355-017-1107-z (reviewed).
- Saijo T., Feng J. and Kobayashi Y. 2017,11 "Common-Pool Resources are Intrinsically Unstable". International Journal of the Commons 11(2):597-620. (reviewed).
- Shahrier, S., Kotani, K. & Saijo, T. 2017,11 "Intergenerational Sustainability Dilemma and the Degree of Capitalism in the Society: A Field Experiment". Sustainability Science 12(6):957-967. DOI: 10.1007/s11625-017-0447-z (reviewed).
- Yoshio Kamijo, Asuka Komiya, Nobuhiro Mifune and Tatsuyoshi Saijo 2017,05 "Negotiating with the future: Incorporating imaginary future generations into negotiations". Sustainability Science 12:409-420. DOI:10.1007/s11625-016-0419-8 (reviewed).

○Research Presentations

【Oral Presentation】

- Tatsuyoshi Saijo "Future Design". RIHN/UCB 2017, 2017.11.07, University of California Berkeley, Berkeley, California.
- Tatsuyoshi Saijo "Future Design". Democratic Responsibilities and Future People, Twenty-First Annual Meeting of The International Association for Environmental Philosophy, 2017.10.22, Sheraton Memphis Downtown Hotel, Memphis, Tennessee.

【Invited Lecture / Honorary Lecture / Panelist】

- Tatsuyoshi Saijo "Future Design". School of Human Evolution and Social Change, 2017.10.26, Arizona State University, Tempe, Arizona.
- Tatsuyoshi Saijo "Future Design". HSI2017-3rd Hitotsubashi Summer Institute, 2017.08.05, Hitotsubashi University, Tokyo.
- Tatsuyoshi Saijo "Future Design". Research on Future Design, 2017.07.07, Graduate Program in Sustainability Science, University of Tokyo, Kashiwa Campus, Kashiwa.

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 composed of more processed food create 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 real 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. Horlings 2015, Shove et al. 2012, Spaargaren 2011), and economic arrangements in advancing sustainable transitions (D'Alisa et al. 2014, Infante & Gonzalez de Molina 2013).

In setting out to address these research gaps, 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, consumer-based agency to change deeply-held cultural notions and regional food systems, and food system mapping specific to national, regional, and local production, distribution, and consumption contexts. Building upon that work, we partner with stakeholders to vision 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, 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.

Through these processes, 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 will produce four types of knowledge relevant to catalyzing agrifood transitions: 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 municipal transition plans identifying research, education, and policy needs; 3) modeling and scenario-based knowledge to inform coinciding deliberation and planning processes; 4) and knowledge related to two intervention strategies – social learning and market transparency – on the execution and effectiveness of workshop-based consensus building toward collective action and market-oriented information-providing tools (eco-label, food LCA smartphone app). 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 – 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.

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○ Progress and Results in 2017

Each project working group (WG) has made progress on their research plans for FR2.

WG1: Food System Mapping & Modeling

WG1 produces statistical and spatial information on contemporary food systems and food consumption, how food production, distribution, and consumption impact the environment and society, and provides insight into how we might eat in the future for all of the research sites. WG1 used GIS data sets and public statistics to map "origins" and "destinations" of food flow at the regional/city level in Kyoto. Work on contemporary issues associated with Japanese wholesale food markets focused on vegetable supply chains between China and Japan. Satellite imagery was used to measure changes in agricultural land use in Kyoto city over time. Small-scale, informal food production in urban areas was studied by examining personal foodsheds, culinary mapping, and how tourists encounter different food "entanglements." The Ecological Footprint of food consumption in Japan was calculated for five regions among different age-

groups and income levels. The concept of holistic local food security as an assessment framework for local communities was further developed.

WG2: Collaborative Approaches for Food Ethics, Citizenship, and Behavioral Change

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. Multiple workshops were held in Kameoka city with local food actors and municipal government representatives on the "ideal meal" 30 years in the future. Visioning, backcasting, and role-playing workshops were held in Kyoto city focusing on desirable future food systems. Focus group workshops examining food-related practices (purchasing, home cooking, and eating out) were held in Bangkok with three sets of consumers (green, general, innovative). Following up on last year's activities in Noshiro city, WG2 researchers worked with local high school students to compile data and stories on food consumption and production.

WG3: Agroecological Production Strategies in Policy and Practice

WG3 is exploring elements of agrifood transitions toward agroecological production at various sites in Asia. Fieldwork and analysis on support structures for new farmers in Japan as well as a typology of pathways into farming was conducted. In addition, fieldwork and interviews with farmers and food producers practicing seed saving throughout Japan was performed. Socio-ecological analysis of bees and beekeeping in Japan began and a conceptual framework on human-wildlife coexistence was created. On the policy side, rich discussions were held with experts on food sovereignty and farmer's rights. A pilot survey on municipal level agricultural policy orientation in Japan was also performed.

WG4: Co-designing Agrifood Eco-Branding Tools for Supporting Sustainable Regions

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. Stakeholder meeting was held to incorporate their knowledge into the designing of an eco-branding tool-kit. Agricultural yield experiments were performed to gauge the effect of vegetable growing under solar-sharing cultivation conditions. Preparatory work was conducted to initiate field trials of biochar amended vegetables in Shanghai, as well as a survey to gauge receptivity of Chinese consumers to accept eco-friendly products versus products that are assured to have a high food safety standard. A method to evaluate the practical availability of biomass resources for use in making biochar was developed using aerial photos and open source databases.

WG5: Food Chain Transparency

WG5 strives to measure the environmental and social impacts of food products and disseminate this information to the public through a smartphone app. Multiple meetings were held with WG members and food retail representatives. LCA data set construction for the environmental impact of seafood, meat, dairy, vegetables, and fruits continued this year, along with work on processed food data. Social impact criteria were discussed and a review of consumer food purchasing behavior was conducted. Smartphone app design and data structuring were discussed with app designers.

Here is a brief overview of some of FEAST's 2017 research results.

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

－used satellite imagery to map both formal and informal agricultural land use change in Kyoto City. Found that Kyoto City has lost about 10% of its agricultural productive land in the last 10 years to parking lot and housing development. (published in Sustainability)

－completed comprehensive web survey (n=1300) of consumers eating habits and values related to food in Kyoto City, Nagano City, and Noshiro City (Akita). Found slight differences between shopping habits, diversity of food intake, community participation, and life satisfaction.

－conducted six multi-method workshops in Kyoto city (visioning, backcasting & role-playing x3), Kameoka city (visioning x3) with local food-related actors and government officials. Over fifty participants altogether. We argue that the interactions lead to new or extended imaginaries, which are the deep-seated modes of understanding that constitute the social and political space through which people perceive, judge and act towards the future.

－conducted three focus-group workshops in Bangkok on the future of food-related practices - purchasing, home cooking, and eating out - with "green," "general," and "innovative" consumer groups. Found that each group had very different ideas about desirable futures for each practice and that consensus building is needed to form concrete policy recommendations.

－surveyed 128 municipal agricultural policy plans in Akita, Nagano, and Kyoto to gauge orientation toward agroecological principles and "food as a commons" perspective. An intensive analysis of 14 plans found a significant gap in municipal and national government policy orientation.

－developed set of representative pathways for new farmers into agriculture in Japan, based on their farming background, orientations and motivations to farm, and formal agricultural training. Argue for the need to recognize the critical role local community plays in the progression of farmers along pathways into agriculture. (publication under review)

－organized five sessions on "Food system transitions:concepts, pathways, examples" at the American Association of Geographers Annual Meeting 2017. (developing special issue)

－A total of five MOUs have been signed or are in the process of being signed.

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 three 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)
○ AKITSU, Motoki	(Graduate School of Agriculture, Kyoto University,Professor,Sociology of Agriculture and Food)
○ SHIBATA, Akira	(Research Organization of Open Innovation & Collaboration, Ritsumeikan University,Professor,Policy Science)
○ TAMURA, Norie	(Research Institute for Humanity and Nature,Senior Researcher,Natural Resource Management)
○ SUDO, Shigeto	(National Agriculture and Food Research Organization,Principal Researcher,Soil Science, Irrigation and Water Management, Environmental Science)
○ INABA, Atsushi	(School of Advanced Engineering, Kougakuin University,Professor,Environmental Energy Science)
○ TACHIKAWA, Masashi	(Graduate School of Environmental Studies, Nagoya University,Professor,Sociology of Agriculture and Food)
○ TANIGUCHI, Yoshimitsu	(Dept. of Biological Environment, Akita Prefectural University,Professor,Environmental Sociology)
○ HARA, Yuji	(Faculty of Systems Engineering, Wakayama University,Associate Professor,Landscape Ecology)
○ TSUCHIYA, Kazuaki	(Graduate School of Agricultural and Life Sciences, The University of Tokyo,Assistant Professor,Urban Ecology, Social Ecological Systems)
○ TANAKA, Keiko	(College of Arts and Sciences, University of Kentucky,Professor,Sociology of Agriculture and Food)

○ KISHIMOTO-MO, Ayaka	(National Agriculture and Food Research Organization,Principal Researcher,Ecosystem Ecology, Agricultural Economics)
○ NAKAMURA, Mari	(Dept. of Food Business, Nagoya Bunri University,Professor,Sociology of Food)
IMAIZUMI, Aki	(Research Institute for Humanity and Nature,Researcher,Food Systems)
SPIEGELBERG, Maximilian	(Research Institute for Humanity and Nature,Researcher,Environmental Management)
RUPPRECHT, Christoph D.D.	(Research Institute for Humanity and Nature,Researcher,Geography)
KOBAYASHI, Mai	(Research Institute for Humanity and Nature,Researcher,Environmental Sociology, Environmental Studies)
OTA, Kazuhiko	(Research Institute for Humanity and Nature,Researcher,Japanese Environmental Ethics)
NILES, Daniel	(Research Institute for Humanity and Nature,Associate Professor,Geography)
KUMAZAWA, Terukazu	(Research Institute for Humanity and Nature,Associate Professor,Environmental Planning, Regional Informatics)
TERADA, Masahiro	(Research Institute for Humanity and Nature,Visiting Associate Professor,History, Metahistory)
YAGASAKI, Yasumi	(Fukushima Agricultural Technology Centre,Senior Researcher,Environmental Agriculture)
WATANABE, Kazuhito	(Agriculture, Forestry and Fisheries Policy Division, Miyagi Prefectural Government,Technical Manager,LCA)
SHIRATO, Yasuhito	(National Agriculture and Food Research Organization,Soil Biogeochemistry&Modeling Unit Leader,Agricultural Policy Science, Soil Science)
OSAWA, Takeshi	(National Agriculture and Food Research Organization,Principal Researcher,Biodiversity Informatics)
HAYASHI, Kiyotada	(National Agriculture and Food Research Organization,Principal Researcher,LCA)
TAHARA, Kiyotaka	(National Institute of Advanced Industrial Science and Technology,Laboratory Leader,LCA)
HORIGUCHI, Makoto	(Industry-Information Collaboration Research Center Corp,Principal Researcher,LCA)
NISHIYAMA, Mima	(Dept. of Agricultural Economies, Utsunomiya University,Associate Professor,Agrifood Systems)
OISHI, Takanori	(ASC African Studies Center, Tokyo University of Foreign Studies,Lecturer,Anthropology)
WATANABE, Manabu	(Dept. of Food Science and Technology, Tokyo University of Marine Science and Technology,Associate Professor,LCA)
HISANO, Shuji	(Graduate School of Economics, Kyoto University,Professor,International Political Economy of Agriculture)
HIRAGA, Midori	(Graduate School of Economics, Kyoto University,Ph.D. Student,Political Economy)
IWAHASHI, Ryo	(Graduate School of Agriculture, Kyoto University,Ph.D. Student,Sociology of Agriculture and Food)
ODA, Kimisato	(Graduate School of Agriculture, Kyoto University,Ph.D. Student,River Ecosystem)
NOMURA, Ayaka	(Graduate School of Advanced Integrated Studies in Human Survivability (Shishu-Kan), Kyoto University,Ph.D. Student,Food Waste Management)
ASHIDA, Yusuke	(Faculty of Regial Innovation, University of Miyazaki,Lecturer,Regional Sociology)
DOI, Yohei	(Faculty of Tourism and Community Studies, Atomi University,Associate Professor,Rural Sociology)
SHOBAYASHI, Mikitaro	(Dept. of Intercultural Communication, Gakushuin Women's University,Professor,Agricultural Policy)
TANABIKI, Yusuke	(Dept. of Sociology, Rikkyo Universiy,Assistant Professor,Social Statistics)
OGA, Momoe	(Graduate School of Policy and Management, Doshisha University,Ph.D. Student,Policy Science)
NI Hui	(Language Education Center, Ritsumeikan University,Lecturer,Agricultural Economics)
YOSHIKAWA, Naoki	(Dept. of Environmental Systems Engineering, Ritsumeikan University,Lecturer,LCA)
FUJIWARA, Natsumi	(Research Organization of Science and Technology, Ritsumeikan University,Assistant Researcher,Social Engineering)

HAMADA, Shingo	(Dept. of Life Planning, Osaka Shoin Women's University,Lecturer,Cultural Anthropology)
IHA, Katsunori	(Global Ecological Footprint Network,Researcher,Modelling)
SUMOTO, Edward	(RenEnergy Crossboarder,Innovation Studies)
KAWASHIMA, Yumie	(AEON Co., Ltd.)
NGUYEN, Philip	(Gochiso Inc.,CEO,App Design)
OZAWA, Fumihiro	(Coolvege Association,Director of General Affairs Division)
MATSUDAIRA, Naoya	(AM Net,Director,Organic Farming)
NISHIDA, Natsuyo	(NPO Ba to Tsunagari Lab home's vi,Coordinator,Facilitation)
KATANO, Naoko	(Kitchen Zukan,Childcare Worker,Childcare)
KANTAMATURAPOJ, Kanang	(International Health Policy Program, Mahidol University,Lecturer,Sociology)
WIBULPOLPRASERT, Suwit	(International Health Policy Program Foundation, Ministry of Public Health, Thailand,Vice President,Publich Health)
THAITAKOO, Danai	(Dept. of Landscape Architecture, Chulalongkorn University,Associate Professor,Landscape)
SRITHANYARAT, Suebsiri	(Dept. of Landscape Architecture, Chulalongkorn University,Lecturer,Landscape)
CHOW, Sungming	(Dept. of Applied Social Sciences, Hong Kong Polytechnic University,Senior Lecturer,Socioeconomics)
ZHOU, Sheng	(Shanghai Academy of Agricultural Sciences,Group Leader,Soil Studies)
MA, Jia	(Shanghai Academy of Agricultural Sciences,Associate Researcher,Land Resource Economics, Urban Agricultural Economic Management)
CHHETRI, Rekha	(College of Natural Resources, Royal University of Bhutan,Assistant Professor,Organic Farming)
Sonam Tashi	(College of Natural Resources, Royal University of Bhutan,Associate Professor,Organic Farming)
Katel Om	(College of Natural Resources, Royal University of Bhutan,Lecturer,Climate Change)
KAWAI, Ayako	(College of Medicine, Biology and Environment, Australian National University,Ph. D. Student,Sociobiology, Environmental Studies)
□ KOOHAFKAN, Abolghassem Parviz	(World Agricultural Heritage Foundation,President,Integrated Natural Resource Management)
□ JUSSAUME, Raymond	(Dept. of Sociology, Michigan State University,Professor,Urban/Rural Sociology, Sociological Theory)

○ Future Themes

Exploring innovative urban food security through serious games, food futures, scenarios: Plausible and desirable food future scenarios will be imagined through further deployment and development of serious games with stakeholder groups. The environmental and social impacts of these scenarios will be measured with various assessment techniques (EF, scaled-down planetary boundaries).

Regional food system and foodshed planning workshops:workshop 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.

Informal food lifeworlds: ethnographic research on consumers and food producers operating within "informal" food systems will begin with an emphasis on the significance of informal food practices on individual and cultural wellbeing and quality of life.

Transitions in agroecological practices, farmer livelihood, and traditional knowledge: fieldwork on changes in production practices, farmer livelihoods, and knowledge in Bhutan and GIAHS sites will be carried out under the frameworks of agroecology and “food as a commons.”

●Achievements

○Books

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・Hara, Yuji, Timon McPhearson, Yuki Sampei, Brian McGrath 2018,02 Assessing urban agriculture potential: a comparative study of Osaka, Japan and New York city, United States. Sustainability Science 13:1-16.

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・Kawai, Ayako 2017,10 Conserving local crop varieties-Cases from Iwaizumi-cho, Iwate Prefecture and Nanbu-cho, Aomori Prefecture. Journal of the Japanese Institute of Landscape Architecture 81(3): 272-273. (in Japanese)

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○Research Presentations

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・Kobayashi, Mai Bhutan's Changing Landscape of Food Production: an organic agriculture policy and the adaptation of peasant farmers in the Himalayan Kingdom. Association of American Geographers Annual Meeting 2017, 2017.04.05-2017.04.09, Boston, MA, USA.

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・Ota, Kazuhiko Benefits of relocalizing food and agriculture from an environmental ethics perspective. Association of American Geographers Annual Meeting 2017, 2017.04.05-2017.04.09, Boston, MA, USA.

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・Ota, Kazuhiko, Motoki Akitsu, Yoshimitsu Taniguchi, Mari Nakamura, Steven McGreevy, Hiraku Kumagai Integrating Participatory Backcasting and Transition to Sustainable Social System Research: Case Study from "Mirai no Risou no Shokutaku" Workshop. JpGU-AGU Joint Meeting 2017, 2017.05.20-2017.05.25, Makuhari Messe, Chiba. (in Japanese)

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・Rupprecht, C. D. D. Cross-cultural culinary mapping – How locals and tourists navigate the foodscape of Chiang Mai, Thailand. Japan Geoscience Union Meeting, 2017.05.20-2017.05.25, Makuhari Messe, Chiba.

【Invited Lecture / Honorary Lecture / Panelist】

・Kobayashi, Mai What we see from Bhutan and its relationship with 'organic' agriculture. RIHN/UCB International Workshop "Food, Agriculture and Human Impacts on the Environment: Japan, Asia and Beyond", 2017.11.06-2017.11.07, University of California, Berkeley, USA.

・McGreevy, Steven R. The Future of Food Game. International Youth Conference on the Environment in Nagano, 2017.06.30-2017.07.02, Otagiri, Nagano City Youth Training Center. (in Japanese)

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・McGreevy, Steven R. Creating food futures with farmers markets?. Transition to a Sustainable Society with Farmers Markets, 2017.11.23, Research Institute for Humanity and Nature. (in Japanese)

・McGreevy, Steven R. Food Policy Councils - Citizen power to catalyze transition (Shoku to nou no mirai kaigi - Shimin no chikara de transition [tenkan] wo okosu ni ha). Monthly seminar, Let's Begin Organic Life! Tsukaisute Jidai wo Kangaeru Kai, Anzen Nousan Kyokyu Senta, 2017.09.17, Patagonia Kyoto, Event Hall. (in Japanese)

・Niles, Daniel The return of nature: On the structure and aesthetics of environmental knowledge. , 2017.11.02, Clark University, MA, USA.

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・Tamura, Norie Towards a better, successful institutionalization in Japan. Agroecology now and into the future:On-the-ground realities and the institutionalization of agroecology, 2018.02.14, 京都府京都市.

Stage: Full Research

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

Abbreviated Title: Sanitation

Project Leader: Naoyuki FUNAMIZU

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

Problem, background, and objectives

Global environmental problem discussed in the project:

The word "Sanitation" is used for showing the provision of facilities and services for safe disposal and resources recovery of human urine, faeces and wastewater in the project. Sanitation is essential for promoting health, reventing environment pollution, conserving ecosystem, and recovering and recycling resources. Therefore, it can be said that sanitation is closely related to such current global issues as poverty, urban slum, conservation of ecosystem, and resources management. In developing world, population is growing rapidly especially in urban slums and they have still high under 5 mortality and poverty issues (see Supplement Fig.0-1). It also reported that 2.4 billion people are still using unimproved sanitation facilities, including 946 million people who are still practicing open defecation in 2015 (UN, 2015). On the other hand, depopulation and aging are progressing especially in rural area of developed world (see Supplement Fig.0-2), and the financial capability of municipality which is a management agency of sanitation system is becoming weaker and weaker.

Key question in the project:

Namely, the question, "How can we handle the waste from 10 billion people in future" and "how can we achieve water and sanitation target in SDGs?" are a global environmental problem to be solved.

Working hypothesis of the research:

Hypothesis-1: Current sanitation issues are caused by the dissociation between the value which is provided by the sanitation system and the values of the individual people and/or the community of the people.

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

Key concept - Sanitation Value chain:

The project is proposing Sanitation Value Chain, which has the following basic policies: 1) Put values of people and community in the centre of discussion, and prepare sanitation system to drive this value chain; 2) Design the sanitation system by focusing on direct incentive for individual users and community; 3) Recognize a sanitation system as an integrated system with social and technical units; 4) Design the sanitation system by making a good matching between social characteristics and prerequisites of technologies.

Why Value Chain? :

We are strongly thinking that 1) Planning and installation of infrastructures such as sanitation system is nothing but planning and installing value chain as shown in Supplement Fig.0-3; and 2) Because of weakening of municipalities, the prerequisites of current management model for water and sanitation system will be no longer satisfied in future.

b) Methodology

Four research topics to achieve the goal (Supplement Fig.5-1):

In Topic-1 (Life and Sanitation), field and literature surveys are performed 1)for analyzing values and Happiness of people; 2)for understanding norm to human excreta of current situation as well as historical change; 3)for re-evaluating the value of sanitation system; 4)for analyzing the mismatch

between prerequisites of sanitation technologies and regional specific characteristics of human and community by gathering failed cases; 5)for understanding historical change of sanitation system in target areas; and 6)for matching the values of people, community and value provided by sanitation system.

In Topic -2 (Technology), four research activities are planned:

1)summarizing prerequisites of sanitation technologies; 2)re-evaluating the value of sanitation system; 3) analyzing mismatch between prerequisites of sanitation technologies and regional specific characteristics of human and community by gathering failed cases; 4) developing required technologies. In Topic-3 (Co-creation of sanitation value chain), the following three steps will be adapted:1) identifying stake holders and understanding the structure of values of people and community by field survey;2) analyzing hierarchy and structure of stakeholders' value chain and evaluating their mutual affinity;3) developing the co-creation process. In Topic 4 (TD-visualization), main activity is to develop visualization methods of our concept and research results by using various media and techniques. We are strongly recognizing the importance of the visual images in TD approach.

Field study:

The project performs the field study at 1) the rural area in Ishikari River Basin; 2) the rural and urban area in Burkina Faso; 3) the urban slum in Indonesia; and 4)the urban slum in Zambia.

c) Goals and Expected results

The goals of this research project are to: 1) propose the concept of Sanitation Value Chain as relevant to both developing and developed countries; 2) design several pilot studies demonstrating 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 on sanitation. The examples of the sanitation value chain will be demonstrated and co-created at pilot study sites.

d) Project organization and membership

For project management, coordination group are organized. Four research teams are also organized as shown in Fig.8-1 (a) Project Organization and (b)Structure Matrix.

e) Current status of research on resource oriented sanitation

Research groups in Switzerland, Germany, Sweden, Norway and Finland are studying resource recovery type sanitation. Three specialist groups of the International Water Association (Specialist group on Small Water and Wastewater Systems, Resources Oriented Sanitation and Terra Preta Sanitation & Decentralized Wastewater System in IWA) jointly held an international conference (S2SMALL International IWA conference on sustainable solutions for small water and wastewater treatment systems) in October,2017. The sessions of the meeting are as follows: Aerobic Process; Greywater Treatment; Wetlands; Small wastewater treatment; Onsite Sanitation System; Phosphorous and Nitrogen treatment and recovery). Also, the topics of the 6th Dry Toilet conference to be held next year are as follows: research on 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 environment; ecosan meets water-food-energy nexus; promoting sustainable sanitation and nutrient recycling among different stakeholders; community engagement. The project leader is contributing to this dry toilet conference as a member of scientific committee. The four research topic performed in the project can make a big contribution to world 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 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.

Contribution to Program 3

In the mission statement of Program 3, there is the following message: "Through there construction of the lifeworld concept and by highlighting the reciprocal linkages between rural and urban spaces, Program 3 designs lifeworld of sustainability and wellbeing and co-creates concrete pathways for their realization." We are thinking that Sanitation is an essential system for lifeworld. The sanitation contributes to human public health, material/resource recycling of society, environmental pollution/ ecosystem management. In our project, sanitation value chains for not only rural area but also for urban area are discussing. Especially in sanitation value chain for urban area, we are designing material and value flow between rural and urban spaces.

Our Program 3 mission statement also is saying 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 to install the practical scale of sanitation system in Burkina Faso at SATREPS project, and we are thinking that the reason is the lack of analysis on human and social aspects. In our project, we are carefully examining values of people and community; norm to human excreta at our field sites.

The mission statement includes the following message that "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." Co-creation of "Sanitation Value Chain" is one of the important points in our Sanitation project.

We will contribute to the mission by aiming for the design of life world; showing solutions; proposing the transition of society, realizing co-creation of sanitation value chain with diverse stakeholders; founding academic bases on sanitation. Our program director, Dr. Saijo is proposing the concept of "Future Design" and he is stressing the importance of "virtual future generation" in design. Our sanitation project has started to discussion on how to include the "virtual future generation" in designing process of sanitation value chain.

○ Progress and Results in 2017

Project Progress during the FR Period to Date

(1) Achievement - 1: The launch of the International Journal on Sanitation:

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 organized the international editorial board by sanitation specialist from seven countries.

(2) Achievement-2: Holding and co-hosting 11 international and domestic conferences, workshops

We organized eleven meetings in 2017 as listed in Annex 2. The typical meetings include Zambia Water Forum and Exhibition, International Symposium on Green Technology for Value Chains in Jakarta, Workshop on Science Communication, Jakarta and Indonesia &Philippine & Japan Joint International Seminar on Water and Sanitation.

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

Research Implementation Agreement was concluded in accordance with the signing of MOU between Indonesian LIPI and RIHN, and MOU with Zambia University and RIHN was signed.

(4) Achievement -4: Toiletthat can concentrate urine1)-7)

In order to co-create sanitation value chain for managing human urine in urban area, transporting urine to rural farmland is essential. The technology required for transporting urine is volume reduction technology for cost reduction. As a technology to concentrate urine, we examined forward osmosis process this year. The results obtained are 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 the toilet bowl; 2) It was shown that 78.6% of ammonia, 97.8% of potassium and 99.6% of phosphate can be recovered. Output numbers in Annex 2 are 40, 42, 182, 184, 187, 189, 191.

(5) Achievement -5: Toiletthat can produce Phosphorus fertilizer8)-10)

It is confirmed that phosphorus in urine can be recovered directly from urine as calcium phosphate (DCPD) using shell as calcium source, and we clarified the reaction pathway and reaction rate of reaction. Thus, by installing a simple shell packed column in a urine collection pipe of a toilet, it has become possible to make a toilet for producing phosphorus fertilizer. We will set up a compost toilet with phosphorus recovery function at RIHN and plan to start demonstration experiments from March next year. Output numbers in Annex 2 are 182, 188, 190.

(6) Achievement-6:New method for analysing exposure pathways of pathogens by molecular biology11)-14)

We developed a new method to analyze the infection route from feces to new infected people. In this method, pathogenic Escherichia coli is separated and quantified by PCR method, and pathway is to be identified from the pathogenic Escherichia coli type. As a result of applying this method, it was found that the type of Escherichia coliin the drinking water and in feces was different as shown in supplement Fig.2-1, suggesting the importance of other sources of contamination such as live stocks. And three prioritized exposure pathways are identified: pond bathing, outdoor playing and drinking as shown in supplement Fig.2-2. Output numbers in Annex2 are 49, 193, 194, 195.

(7) Achievement-7: Evaluation of inactivation mechanism of virus during urine concentration15)

Real Time-qPCR method applied to target six genome regions for monitoring MS2 (indicator of virus) infectivity during urine concentration process, and we found that 1) Uncharged ammonia is the predominant factor for MS2 inactivation; 2) Genome damage is the main mechanism for MS2 infectivity loss; 3) MS2 infectivity loss in urine can be predicted by ion composition and speciation. Output number in Annex 2 is 46.

(8) Achievement - 8: Agricultural Technologyfor compost, urine and reclaimed gray water reuse16)-,18):

Salinity management of soil is essential when compost, urine and reclaimed gray water is reused in farm land. Mathematical simulation model has been developed for describing fate of salts in soil system, and the leaching requirement for removing salts is evaluated by the simulation. The fate of pathogen in soil system was evaluated, and health risk of worker at the farm land was estimated. Output numbers in Annex 2 are 36, 43, 45.

(9) Achievement-9: Acceptability of sanitation system was evaluated from technical side19)-21):

We conducted survey on new prototype model of composting type toilet at Indonesian Institute of Sciences (LIPI) and a mosque in Sapporo. The results are summaries as follows: 1)Half of the people answered that the bad smell is a point to be checked; 2)70% of respondents worried about excreta sticking to the toilet bowl; 3) The new type toilet is acceptable;4)70% was unsatisfied with its size; 40% felt discomfort in terms of the impression of sitting on the toilet seat, feeling like they might fall into the hole. We also conducted survey on dewatered digested sludge for soil conditioner in Iwamizawa, Japan. Output numbers in Annex 2 are 44, 50, 176.

(10) Achievement-10: Visualization of research

1) The video, “Samurai-kun Sanitation Value Chain” (Indonesian version) was produced and screened at Bandung City, Water Supply Corporation, Indonesia Science EXPO, Chiara Chon-Dong district residents. Japanese version was screened at the open house event at RIHN; 2)The video showing our sanitation

project produced and screened at Indonesia Science EXPO and Workshop on Science Communication; 3)The event video archive was carried out; 4) Participated in RIHN project on visualization of state-of-the-art research.

(11) Achivement-11: Questionnaire on customsand norms concerning excrement / excretion behaviour

Japanese version questionnaire has been prepared. In this questionnaire, we examine the following items: purification/ uncleanness, norms / preferences for excretion behaviour, norms / preferences for products used by compost, reclaimed wastewater.

(12) Achievement-12: Build relationship with actors onthe field site

Indonesia site: 1)We had meeting with local officials, leaders of neighbourhood association, staffs of elementary school of this district (See supplement Fig.2-4); 2)We conducted surveys on health and nutritional status, hygiene environment and behaviour, for elementary school children.

Ishikari site: 1)We designed the structure of water source management system coordinated with local high schools / local governments (supplementFig.2-5); 2) we made a meeting with user unions small-scale water supply; 3) We designed technology packages (membrane processing, sensoring, data handling)suitable for autonomous water supply.

Zambia site: 1) We established "Children's Club" to conduct action research with local youth group in Lusaka's peri-urban area and we organized the meeting of "Children's Club" (supplement Fig.2-6); 2) We discussed on the current sanitation situation with them.

Burkina Faso site: 1) We completed the negotiation with local NGO for conducting the questionnaire survey; 2) We confirmed the existence of a waste scraper and recognized the necessity of analyzing their actual situation.

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 andElectro chemical carbon based and novel metal electrode characterization foruse 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

External fund

3. 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)

New journal publication

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

Videos/Photographic Works

5. Sanitation Education Program: Free lecture series on You-Tube. (https://www.youtube.com/channel/UCcDLZXSBauZWQSGE29x7lYg).

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

6. The International Symposium on Green Technology for Value Chains. The first symposium: 3-5 October, 2016, the second symposium October23-24, 2017, Jakarta, Indonesia.

7. Zambia Water Forum and Exhibition (ZAWAFE) 2017, RIHN project session, Lusaka, 12 June 2017

Academic Papers

8. 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

9. 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

10. 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 .

11. B.C.W. Nikiema, R. Ito, Guizani Mokhtar and N. Funamizu (2017) Estimation of water flux and solute movement during the concentration process of hydrolysed urine by forward osmosis, Journal of Water and Environment Technology Vol.15N.5, pp163-173

12. Ryusei Ito, Mei Tanie, Ken Ushijima, Dewi Nilawati, Neni Sintawardani, Naoyuki Funamizu (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

13. Oishi W, Sano D, Decrey L, Kadoya S, Kohn T, Funamizu N (2017) Identification of the inactivating factors and mechanisms exerted on MS2 coliphage in concentrated synthetic urine, Science of the Total Environment, 598: 213-219 doi:org/10.1016/j.scitotenv.2017.04.088

14. Min Li Chua, Hidenori Harada, Shigeo Fujii, Michiya Kodera, Shotaro Goto, Md. Nazmul Ahsan, Shohagi Rani Saha, Akira Sakai (2017) Comparison in Fecal Exposure Assessment of Three Transmission Pathways in a Bangladeshi Urban Slum Community, Journal of Environment System and Engineering, JSCE, 31(3), 145-148.

15. Mayu Ikemi (2017) Sanitation and Income Improvement by Local Community as Sustainable Participatory Development, IOP Conference Series: Earth and Environmental Science, Vol.60, No. 012034

○Project Members

◎ FUNAMIZU Naoyuki	(Research Institute for Humanity and Nature,Professor,Sanitation Technology)
○ YAMAUCHI Taro	(Faculty of Engineering, Hokkaido University,Professor,Co-Creation of Value Chain)
○ IKEMI Mayu	(Graduate School of Economics and Business Administration, Hokkaido University,Assistant professor,Sanitation & Life)
○ ITO Ryusei	(Faculty of Engineering, Hokkaido University,Assistant professor,Sanitation Technology)
○ USHIJIMA Ken	(Hokkaido Research Organization,Research chief,Sanitation & Life)
○ SANO Daisuke	(School of Engineering, Tohoku University,Associate professor,Sanitation Technology)
○ NAKATANI Tomoaki	(Graduate School of Agriculture, Hokkaido University,Associate professor,Sanitation & Life)
○ NABESHIMA Takako	(Research Faculuty of Media and Communication, Hokkaido University,Associate professor,Sanitation & Life)
○ HARADA Hidenori	(Graduate School of Global Environmental Studies, Kyoto University,Assistant professor,Sanitation Technology)
○ FUJIWARA Taku	(Research and Education Faculty, Natural Sciences Cluster, Agriculture Unit, Kochi University,Professor,Sanitation Technology)
HAYASHI Koji	(Research Institute for Humanity and Nature,Researcher,Sanitation & Life)
NAKAO Seiji	(Research Institute for Humanity and Nature,Researcher,Sanitation & Life)
INOUE Takashi	(Graduate School of Agriculture, Hokkaido University,Professor,Sanitation Technology)
SHIMIZU Takao	(Center for the study of International Cooperation in Education, Hiroshima University,Researcher,Sanitation & Life)
HAKOYAMA Fumiko	(Fuji Women's University,Lecturer,Sanitation & Life)
FUKUI Junichi	(Hokkaido Research Organization,Research chief,Sanitation & Life)
ISHII Akira	(Hokkaido Research Organization,Research chief,Sanitation & Life)

OKOSHI Ango	(Hokkaido Research Organization,Research chief,Sanitation Technology)
KUSUDA Tetsuya	(Advanced Institute, Kyushu University,Senior Adviser,Sanitation Technology)
FUJII Shigeo	(Graduate School of Global Environmental Studies, Kyoto University,Professor,Sanitation Technology)
WATANABE Kazuo	(Enter for Southeast Asian Studies, Kyoto University,Affiliated Associate Professor,Sanitation Technology)
NISHI Makoto	(Graduate School of Asian and African Area Studies, Kyoto University,Associate Professor,Sanitation & Life)
KATAOKA Yoshimi	(Faculty of Engineering, Hokkaido University,Technical staff,TD visualization)
KAKUI Hironori	(Faculty of Engineering, Hokkaido University,Technical staff,TD visualization)
TOKUDA Kohei	(Faculty of Engineering, Hokkaido University,Technical staff,TD visualization)
SHIGEI Makoto	(Graduate School of Health Sciences, Hokkaido University,Master Student,Sanitation Technology)
OTSUKA Yumiko	(Graduate School of Health Sciences, Hokkaido University,Doctoral Student,Co-Creation of Value Chain)
MASUKI Yui	(Graduate School of Asian and African Area Studies, Kyoto University,JSPS Research Fellow,Sanitation & Life)
HASEGAWA Yoshiki	(Hokkaido Research Organization,Researcher,Co-Creation of Value Chain)
HAMIDAH Umi	(Research Unit for Clean Technology, LIPI,Researcher,Sanitation Technology)
AKAO Satoshi	(Faculty of Science and Engineering, Doshisha University,Associate Professor,Sanitation Technology)
Sikopo P Nyambe	(Graduate School of Health Sciences, Hokkaido University,Doctoral Student,Co-Creation of Value Chain)
HASHIMOTO Daisuke	(Graduate School of Agriculture, Hokkaido University,Doctoral Student,Sanitation & Life)
GUIZANI Mokhtar	(Faculty of Engineering, Hokkaido University,Assistant professor,Sanitation Technology)
Neni Sintawadani	(Lembaga Ilmu Pengetahuan Indonesia,Senior Researcher,Sanitation Technology)
Widyarani	(Lembaga Ilmu Pengetahuan Indonesia,Researcher,Sanitation Technology)
Aswatini Manaf	(Lembaga Ilmu Pengetahuan Indonesia,Professor,Sanitation & Life)
Carolina	(Lembaga Ilmu Pengetahuan Indonesia,Senior researcher,Sanitation Technology)
Syam Surya	(University of Surya,Lecturer,Sanitation & Life)
Rizkiana Restu Utami	(Polteknik Kesehatan Bandung,Research assistant,Sanitation & Life)
Imasiku Anayawa NYAMBE	(University of Zambia,Professor,Sanitation Technology)
Zulu	(University of Zambia,Lecturer,Sanitation Technology)
Amadou Hama MAIGA	(International Institute of Water and Environmental Engineering,Professor,Sanitation Technology)
Lopez Zavala Miguel Angel	(Instituto Tecnologico y de Estudios Superiores de Monterrey,Professor,Sanitation Technology)
Lina AGESTIKA	(Graduate School of Health Sciences, Hokkaido University,Grauduate student,Sanitation & Life)
Aileen ORBECIDO	(DE LA SALLE UNIVERSITY,Associate Professor,Sanitation Technology)
Marlon ERA	(DE LA SALLE UNIVERSITY,Associate Professor,Sanitation & Life)
Jonathan Jared IGNACIO	(DE LA SALLE UNIVERSITY,Graduate Student (Master)/Research Assistant,Sanitation Technology)
Diana Rahayuning WULAN	(Indonesian Institute of Sciences (LIPI),Researcher,Sanitation Technology)
Nilawati DEWI	(Indonesian Institute of Sciences (LIPI),Researcher,Sanitation Technology)
Joseph WETHE	(The University of Ouagadougou New Dawn,Professor,Sanitation Technology)
Benedicte NIKIEMA	(Sanitation Technology)
HOMNA Saki	(Research Institute for Humanity and Nature,Research assosiate,TD visualization)
KIMURA Ayako	(Research Institute for Humanity and Nature,Research assosiate,TD visualization)

○ Future Themes

(1) Four Research Topics to achieve the goals

The project is proposing new concept, Sanitation Value Chain, which has the following basic policies: 1) Put values of people and community in the centre of discussion, and prepare sanitation system to drive this value chain; 2) Design the sanitation system by focusing on direct incentive for individual users and community; 3) Recognize a sanitation system as an integrated system with social and technical units; 4) Design the sanitation system by making a good matching between social characteristics and prerequisites of technologies. Accordingly, the goals of this research project are to: 1) propose the concept of Sanitation Value Chain as relevant to both developing and developed countries; 2) design several pilot studies demonstrating 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 study from four points of views (Topics 1, 2, 3 and 4) as shown in Supplement Fig.5-1.

In Topic -1(Life and Sanitation), the following six research activities are planned: (1-1)Field survey for analyzing values and Happiness of people; (1-2)Field and literature survey on norm to human excreta of current situation as well as historical change; (1-3) Field and literature survey for re-evaluation of the value of sanitation system; (1-4) Field and literature survey for analyzing the mismatch between prerequisites of sanitation technologies and regional specific characteristics of human and community by gathering failed cases; (1-5) Field and literature survey on historical change of sanitation system in target areas; (1-6) Matching the values of people, community and value provided by sanitation system.

In Topic -2 (Technology), the following four research activities are planned: (2-1) Literature survey on prerequisites of sanitation technologies; (2-2) Field and literature survey on “Prerequisites of sanitation technologies by gathering success cases; (2-3) Field and literature survey for re-evaluation of the value of sanitation system; (2-4) Field and literature survey for analyzing the mismatch between prerequisites of sanitation technologies and regional specific characteristics of human and community by gathering failed cases.

In Topic-3 (Co-creation of sanitation value chain), the following four activities are planned: (3-1) Identifying stakeholders and understanding the structure of values of people and community; (3-2) Analyzing Hierarchy and structure of stakeholders’ value chain and evaluation of their affinity; (3-3)Developing the co-creation process; (3-4) Demonstrating co-creation of sanitation value chain.

In Topic-4 (TD visualization), we will develop a transmission method by various media and methods of our concept and research results. We are strongly recognizing the importance of the visual image as one of the expression methods of the outcome.

(2) Fields

The project performs the field study at 1) the rural area in Ishikari River Basin; 2) the rural area in Burkina Faso; 3) the urban slum in Indonesia; and 4) the urban slum in Zambia.

(3) Activities in 2018

T1 Life and Sanitation group:

1) Positioning of Excretion and toilet in the history of humanity (humanization, settlement). We will start field survey in Cameroon (hunter gatherer society, agricultural society, rural town, slum of the capital); 2) Field survey is conducted in Burkina Faso to discuss about ”mismatch between sanitation technology and values of local community during development assistance”; 3) By using Best & Worst scaling method, customs and norms on excrement and excretion behaviour is analyzed in Indonesia, Zambia, Burkina Faso.

T2Technology group:

1) Analysis of prerequisites and material flow of sanitation technologies; 2) Revaluation of value of sanitation system (Developing new methodology for identifying exposure pathways of pathogens);3) Analysis of Value Chain for wastewater treatment + sludge agriculture use at Ishikari; 4)Developing new sanitation technologies having a different prerequisites: disinfection method for solids; nutrient recovery from urine)

T3 Co-creation group:

1) Identifying actors related to sanitation and visualizing their value chain; 2) Analyzing hierarchy and affinity of their value chains at Indonesia and Ishikari; 3) Implementation of residents (children) participatory action research at Zambia, Indonesia, Ishikari.

T4 TD visualization group:

1) Prototyping short concept video using the characteristics of each image expression; 2) Archiving video of events for sharing information among researchers dotted in remote areas.

Indonesia team:

The previous study and FS study22) have given the tentative idea for installing sanitation system as shown in Supplement Fig.5-2. The field survey at the urban slum in Bandung, Indonesia and stakeholders' analysis including the interview to the Islam Leaders have shown that 1)organic production in agriculture is their tradition; 2) farmer would like to have organic fertilizer and organic products are traded in good price in the market; 3)reuse of recovered resources from human excreta is possible in the Islamic context if the excreta is treated adequately; 4) one idea is that users of sanitation system might be able to sell their excreta to farmers because of their fertilizing value; 5) collection system of solid waste system is working very well in the slum area currently, and this current collection system will be used for collecting urine and compost. Therefore, for co-creating sanitation value chain, we will continue to perform a trans-disciplinary approach with actors.

Ishikariteam:

Since the rural community in Ishikari is becoming impoverished because of depopulation and aging of the community. As a preliminary research toward co-creation of sanitation value chain, we will study the process of co-creation for the realization of a better mechanism for regional autonomous water supply. In2018, we will continue to work on 1) creating a water source management system by regional stakeholders; and 2) Studying technology package suitable for regional autonomous water supply. We will also start to preparation for expanding activities to sanitation values chain.

Burkina Fasoteam:

Supplement Fig.5-3 shows the possible sanitation value chain of people in rural area, Burkina Faso23). Sanitation value chain is connecting agricultural chain and finance chain. We will continue to work for co-creating sanitation value chain in rural area. As discussed in Chapter 2, we confirmed the existence of a waste scraper and recognized the necessity of analyzing their actual situation. Therefore we will start to work on sanitation value chain in urban area, Burkina Faso. The tentative idea of actors in the chain are 1) user of dry toilet (selling their excreta to collector); 2) collector of human excreta (scooping human excreta by vacuum tanker and transport to resources recovery facility); 3) energy supplier(recovering organic matter and producing heat energy); 4) fertilizer supplier(recovering P, K, N); 5) farmers in urban and rural area; 6) social capitalist for supporting collector of excreta, energy and fertilizer supplier. We will also try to consider the possibility to operate this value chain by private sector.

●Achievements

○Books

【Authored/Co-authored】

・Nakao S, Magane IK 2016 A props des 50 ans qui vont de la fondation de la section voltaïque de l'Union Culturelle Musulmane à la Communauté Musulmane, Burkina Faso (Bobo-Dioulasso, 1962-2012). RIHN, Kyoto, 184pp. (in French) (in Japanese)

【Chapters/Sections】

・Takao SHIIZU, Seiji NAKAO, Hirohide KOBAYASHI, Miku ITO 2017,08 Transformation in the Kasena's large earthen compound houses in Burkina Faso.. C. Mileto, F. Vegas Lopez-Manzanares, L. Garcia-Soriano & V. Cristini (ed.) (ed.) Vernacular and Earthen Architecture: Conservation and Sustainability.. CRC Press, Boca Raton, pp.343-348.

・Kobayashi, H., Shimizu, T., Ito, M. and Nakao, S. 2017,08 Transforming Kasena houses and indigenous building technology in Burkina Faso.. Camilla Mileto・Fernando Vegas López-Manzanares・Lidia García-Soriano・ Valentina Cristini (ed.) (ed.) Vernacular and Earthen Architecture: Conservation and Sustainability. CRC Press, Boca Raton, pp.147-152.

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○Editing

【Editing / Co-editing】

・Funamizu N (ed.) 2018,07 Resource-Oriented Agro-sanitation Systems: Concept, Business Model, and Technology. Springer Japan, Tokyo, 314pp.

・Yamauchi T et. al. (ed.) 2017,11 . Sanitation Value Chain, 1(1). Research Institute for Humanity and Nature, Kyoto, 70pp.

○Papers

【Original Articles】

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・Taisuke Takayama, Atsushi Horibe and Tomoaki Nakatani 2018,09 Women and farmland preservation: The impact of women's participation in farmland management governance in Japan. Land Use Policy(77): 116-125.

・Taisuke Takayama, Hirotaka Matsuda and Tomoaki Nakatani 2018,07 The determinants of collective action in irrigation management systems: Evidence from rural communities in Japan. Agricultural Water Management(206):113-123.

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・Min Li Chua, Hidenori Harada, Shigeo Fujii, Md. Nazmul Ahsan, Akira Sakai, Michiya Kodera, Shotaro Goto, Shohagi Rani Saha 2018,07 Multi-pathway fecal exposure assessment on total and human specific E. coli in a Bangladeshi slum. Proceedings of the 27th Joint KAIST-KU-NTU-NUS Symposium on Environmental Engineering(27):110-117.

・Hidenori Harada, Yuji Fujimori, Ryota Gomi, Md. Nazmul Ahsan, Shigeo Fujii, Akira Sakai, Tomonari Matsuda 2018,06 Pathotyping of Escherichia coli isolated from community toilet wastewater and stored drinking water in a slum in Bangladesh. Letters in Applied Microbiology. DOI:10.1111/lam.12878 (reviewed).

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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).

・Andri Taruna Rachmadi, Masaaki Kitajima, Kozo Watanabe, Sakiko Yaegashi, Joeselle Serrana, Arata Nakamura, Toyoko Nakagomi, Osamu Nakagomi, Kazuhiko Katayama, Satoshi Okabe, Daisuke Sano 2018 Free chlorine disinfection as a selection pressure on norovirus. Applied and Environmental Microbiology. DOI:10.1128/AEM.00244-18 (reviewed). (accepted)

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・Hakoyama Fumiko 2017,11 Land Utilization System in Burkina Faso: A Case Study in Ziniaré. Sanitation Value Chain 1(1):45-50. (reviewed).

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・Gold, M., Harada, H., Therrien, J.-D., Nishida, T., Cunningham, M., Semiyaga, S., Fujii, S., Dorea, C., Nguyen, V.A., Strande, L. 2017,09 Cross-country analysis of faecal sludge dewatering. Environmental Technology:1-11. DOI:http://www.tandfonline.com/doi/full/10.1080/09593330.2017.1374472 (reviewed).

・Hasegawa J, Ito MY, Yamauchi T 2017,07 Development of screening tool to predict malnutrition among children under two years old in Zambia. Global Health Action 10(1):1339981. DOI:doi: 10.1080/16549716.2017.1339981.

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・Ito R. Funamizu N Design of composting toilet for middle and low income countries -Survey in Indonesia and Zambia-. 5th International Dry Toilet Conference, 2015.08.19-2015.08.22, Tampere, Finland.

【Poster Presentation】

・Hakoyama Fumiko Community led total sanitation - farmers' reactions in the central-east region in Burkina Faso. Kick - Off Meeting : Sanitation and Value Chains, A Collaboration Research between LPTB - LIPI and RIHN Japan, 2017.10.22, Jakarta, Indonesia.

・Ushijima Ken Community-based water management system in Japan. Kick - Off Meeting : Sanitation and Value Chains, A Collaboration Research between LPTB - LIPI and RIHN Japan, 2017.10.22, Jakarta, Indonesia.

・Ushijima K, Ishii A, Yamauchi T, Funamizu N, Fujiwara T, Fukui J, Matsumura H Design of water infrastructure for the future, Lessons and learned from depopulating area in Hokkaido, Japan. 14th IWA specialist conference on watershed and river basin management, 2017.10.09-2017.10.10, Skukuza camp, Kruger National Park, South Africa.

・Ikemi Mayu Water infrastructure management and rural development in Africa. The 3rd Academic Workshop 2017, Center for Regional Economic and Business Networks, Faculty of Economics and Business, Hokkaido University, 2017.07.19, Sapporo.

・Nyambe S, Hayashi K, Zulu J, Yamauchi T A Glimpse into Peri-Urban Lusaka: Findings of a 2016 preliminary assessment on the sanitation of peri-urban Lusaka, Zambia. Zambia Water Forum and Exhibition (ZAWAFE) 2017, 2017.06.12-2017.06.13, Lusaka, Zambia.

・Yamauchi T, Funamizu N: The Sanitation Value Chain: Designing Sanitation Systems as Eco-Community-Value Systems. Zambia Water Forum and Exhibition (ZAWAFE) 2017, 2017.06.12-2017.06.13, Lusaka, Zambia.

・Nyambe S., Zulu J., Hayashi K., Yamauchi T. Gauging the sanitation and health challenge for children and youth in the urban slums of Lusaka, Zambia. 54th Annual Conference for Japan Association of African Studies, 2017.05.20-2017.05.21, Shinshu University, Nagano.

【Invited Lecture / Honorary Lecture / Panelist】

・Funamizu N Sanitation Value Chain. 5th Annual research symposium, JSPS Alumni Association in Philippine, 2017.07.12, Manila.

・Hidenori Harada Fecal exposure and pathogenic Escherichia coli in developing contexts: cases from a Vietnamese village and a Bangladeshi slum. Life Science Talk, Life Science Discipline, 2017.01.08, Khulna University.

・Hidenori Harada Pathotyping of Escherichia coli isolated from community toilet excreta and stored drinking water in a slum in Bangladesh. Sandec Seminar, 2016.10.18, .

・Funamizu N The sanitation value chain: Its concept and new research collaboration project. International Symposium on Green Technology for Value Chains 2016, 2016.10.04, Banten, Indonesia.

・Funamizu N Improving Sustainable water and sanitation systems in Sahel Region in Africa. Global expansion of smart water treatment system for sustainable water management, Locally-fitted, compact and decentralized water treatment and management technologies for Asia and Africa, 2015.12.05, Lalitpur, Nepal.

・Funamizu N Agro-Sanitation: Its element technologies and business model - Our Experiences in Burkina Faso. 5th International Dry Toilet Conference, 2015.08.19-2015.08.22, Tampere, Finland.

・Funamizu N Sustainable Water and Wastewater Technologies. World Water Day, 2015.03.15, Amman, Saudi Arabia.

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 2017

The Core Program affiliates one Core Project, “Environmental traceability project (FR1-PI: Ichiro Tayasu)”, and two Core FSs, “Knowledge binding to overcome gaps in the problem perception in collaborative research on socio-environmental interaction (FS-leader: Yasuhisa Kondo)” and “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.

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 “NEXUS (program 2, PI: Endo)” 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 FR1 stage, therefore the final results of the Core Project are currently in progress.

Other activities of the Core Program are **research developments,** including Core FSs developments. The Core Program organized six core program seminars for research developments through discussion of comprehensive and systematic concepts and methodologies, including “Open science and knowledge transfer (10th core program seminar)”, “Co-design and transdisciplinary (11th core program seminar)”, and “Development of questionary for stakeholder analyses (12th core program seminar)”.

One of the **challenges for the Core Program** is how to collaborate with stakeholders (7th seminar) because some stakeholders are related indirectly through Research Projects, and others are directly related to Core Projects. Another challenge is how to extend the Core Program/Projects research activities to an international framework, such as Future Earth, affiliated university/institutions such as the Stockholm Resilience Center, Arizona State University, and IIASA (8th seminar). The Core Program will organize more relevant seminars in the next year.

○Project Members

Makoto TANIGUCHI (RIHN, Professor)
Ichiro TAYASU (RIHN, 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 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

○Research Presentations

【Oral Presentation】

- Ichiro Tayasu (RIHN), Rei Fujiyoshi (RIHN) Summary of the Environmental Traceability Core Project and a study proposal of questionnaire method. The 12th Core Program Seminar, 2017.10.05-2017.10.05, RIHN, Kyoto.
- Takeshi Nishimura (Sanyo-Gakuin Univ.) Segmentation of consumers by questionnaire. The 12th Core program Seminar, 2017.10.05-2017.10.05, RIHN, Kyoto.
- Kato Takaaki (Univ. Kitakyushu) Human choice and willingness to pay. The 12th Core Program Seminar , 2017.10.05-2017.10.05, RIHN, Kyoto.
- Yuko Onishi (RIHN) Co-design and stakeholder engagement according to geographical scales. The 11th Core Program Seminar, 2017.08.02-2017.08.02, RIHN, Kyoto.
- Naoki Kikuchi (RIHN) Methodology and multi-faceted role of residential researchers : Local TD's approach. The 11th Core Program Seminar, 2017.08.02-2017.08.02, RIHN, Kyoto.
- Shin-ichiro Asayama (Waseda Univ.) Two faces of engagement in transdisciplinarity: A case of co-designing geoengineering research agendas. The 11th Core Program Seminar, 2017.08.02-2017.08.02, RIHN, Kyoto.
- Masahiro Sugiyama (Univ. Tokyo) Attempting global co-production: A case of climate engineering. The 11th Core Program Seminar, 2017.08.02-2017.08.02, RIHN, Kyoto.
- Yasuhisa Kondo(RIHN) Gaps, closing, and diversion of the Core Project. The 10th Core Program Seminar , 2017.06.26-2017.06.26, RIHN, Kyoto.
- Mayumi Fukunaga (Univ. Tokyo) Why Closing Down is Mattered: For Producing the Post-industrial Social-ecological System to Achieve Just Sustainability. The 10th Core Program Seminar, 2017.06.26-2017.06.26, RIHN, Kyoto.
- Hideyuki Onishi (Doshisha Wemen Univ.) Issues and possibilities of socio-scientific cognitive gaps over global environmental problems. The 10th Core Program Seminar, 2017.06.26-2017.06.26, RIHN, Kyoto.
- Yoshihide Wada (IIASA) IIASA's Water Program: Water Futures and Solutions (WFaS) Initiative . The 9th Core Program Seminar , 2017.05.25-2017.05.25, RIHN, Kyoto.
- Reiichiro Ishii (RIHN) and Tohru Nakashizuka (RIHN) New perspectives on modeling for sustainable use of ecosystem services in Asia: Focusing on the importance of ecosystem types. . The 9th Core Program Seminar, 2017.05.25-2017.05.25, RIHN, Kyoto.

- Yusuke Satoh (IIASA) The Community Water Model (CWATM) - Development of a community driven platform for global water studies. The 9th Core Program Seminar , 2017.05.25-2017.05.25, RIHN, Kyoto.
- Taher Kahil (IIASA) IIASA global hydro-economic modeling framework . The 9th Core Program Seminar , 2017.05.25-2017.05.25, RIHN, Kyoto.
- Makoto Taniguchi (Core program director), Ichiro Tayasu (FR1-PI), Akihisa Kondo (FS- leader), Yuko Onishi (FS-leader) “Objectives of core program/projects and collaborations with research projects and RIHN center”. 8th Core Program Seminar, 2017.04.25-2017.04.25, RIHN, Kyoto. (in Japanese)

Stage: Full Research

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

Project Leader: Ichiro Tayasu

Core Program

○ 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 2017

We determined basic structure of the questionnaire to be used to evaluate the validity of the use of environmental traceability methodology, and applied the questionnaire in a symposium in Oshino Village, Yamanashi on 20 January 2018. Also, in collaboration with FEAST project, we took an online survey related to food traceability among three countries (Japan, USA, Germany).

(1) Basic structure of the questionnaire

We propose that the validity of the use of environmental traceability methodology consists of two steps: validity of the analytical tool for the environmental traceability methodology (Step 1) and effectiveness of the environmental traceability methodology to the environmental problem (Step 2). Based on this idea, the structure of the questionnaire is composed of questions about Step 1, Step 2, and personal questions such as age, living area, and interest or attitude toward environmental problem. The relationships among Step1, Step2, personal information, and attitude or interest to environmental problem will be tested by regression analysis. The concept of willingness to pay (WTP) is included in the questions for Step 2, so will be also tested to evaluate the validity of the use of environmental traceability methodology.

(2) Symposium and the questionnaire in Oshino Village, Yamanashi

On the 20th January 2018, we held a symposium entitled “Spring water on the Mt Fuji and the culture: Oshino-Hakkai ponds: Where does the spring water in Oshino Village come from?” in Oshino Village, Yamanashi cosponsored by Oshino Village and RIHN. In this symposium, we showed the origin and movement of groundwater using oxygen and hydrogen isotope ratios of water, and evaluated the validity of the use of environmental traceability methodology by a questionnaire. We distributed the questionnaire to 264 persons, and 162 sheets were recovered, consisting the recovery rate of 61%. We will analyze the results in 2018.

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

We carried out online survey related to food traceability among three countries (Japan, USA, and Germany) in collaboration with the FEAST project. 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 studied the origin and dynamics of dissolved ions (nitrate and sulfate) in Chikusa river watershed, Hyogo. In collaboration with the e-REC project, we performed a field campaign to study the origin of nitrate in the sub-watershed of Laguna de Bay in the Philippines on 1-9 March, 2018, and we assisted sampling groundwater and river water, and analysis in the laboratory.

○Project Members

◎ TAYASU Ichiro	(Research Institute for Humanity and Nature,Professor,Developing environmental traceability methodology)
FUJIYOSHI Lei	(Research Institute for Humanity and Nature,Project Researcher)
TANIGUCHI Makoto	(Research Institute for Humanity and Nature,Professor)
YABUSAKI Shiho	(Research Institute for Humanity and Nature,Center Researcher)
NAKANO Takanori	(Research Institute for Humanity and Nature / Faculty of Science and Engineering, Waseda University,,Professor Emeritus / Visiting Professor,Developing environmental traceability methodology)
SHIN Ki-Cheol	(Research Institute for Humanity and Nature,Assistant Professor,Developing environmental traceability methodology)
KONDO Yasuhisa	(Research Institute for Humanity and Nature,Associate Professor,Developing GIS platform for environmental traceability methodology)
ENDO Aiko	(Research Institute for Humanity and Nature,Associate Professor)
MASUHARA Naoki	(Research Institute for Humanity and Nature,Project Researcher)
OKUDA Noboru	(Research Institute for Humanity and Nature,Professor)
UEHARA Yoshitoshi	(Research Institute for Humanity and Nature,Researcher)
MCGREEVY Steven R	(Research Institute for Humanity and Nature,Associate Professor)
RUPPRECHT Christoph DD	(Research Institute for Humanity and Nature,Project Researcher)
NAKATSUKA Takeshi	(Research Institute for Humanity and Nature,Professor)
MORI Seiichi	(Gifu-Keizai University,Professor)
YOKOO Yoriko	(Doshisha University,Professor)
YAMADA Yoshihiro	(Kagawa University,Professor)
AKIMICHI Tomoya	(Fujisan World Heritage Center/ Research Institute for Humanity and Nature,Director/ Emeritus Professor)
NISHIMURA Takeshi	(Sanyo Gakuen University,Lecturer)
KATO Takaaki	(The University of Kitakyushu,Professor)
FUKUSHIMA Shintaro	(Aoyama Gakuen University,Assistant Professor)
KAERIYAMA Toshiaki	(Ono City Office,Manager)
TOKUMASU Minoru	(Saijo City Office,Senior Official Staff)
OOMORI Noboru	(Oshino village Office,Section Chief)
GOTOH Ken	(Oshino village Office,Senior Manager)

WATANABE Soichiro (Oshino village Office,Senior Staff)
YOKOYAMA Tadashi (Hyogo prefectural Ako School for Students with Special Needs,Teacher)
MITSUHASHI Hiromune (University of Hyogo / Museum of Nature and Human Activities, Hyogo,Lecturer)
OHKUSHI Ken'ich (Kobe University,Associate professor)
ITOH Masayuki (Kobe University,Professor)

○ Future Themes

To verify the validity of the isotope environmental traceability methodology in environmental studies, we need to collect data from each study site. We will make more clear plans about a symposium and questionnaire at the study sites where the researches expanded from the decision makers' initiative (Ono City, Fukui; Otsuchi Town, Iwate, Saijo City, Ehime) and at the study sites where the researches expanded from the researchers' initiative (The Lake Biwa and the watershed, Shiga, Laguna de Bay in the Philippines and the watershed.). At a study site where the researches expanded from the citizens' initiative (Chikusa river watershed, Hyogo), they hold a symposium in 2018 and we will carry out a questionnaire on that occasion. In collaboration with the FEAST project, we will spread the online survey mentioned above to other countries. Furthermore, our project aims to use the isotope environmental traceability methodology for interdisciplinary and beyond interdisciplinary studies. Considering this aim, we will progress to make a webpage about the isotope environmental traceability methodology.

●Achievements

○Papers

【Original Articles】

・Ishikawa NF, Chikaraishi Y, Ohkouchi N, Murakami AR, Tayasu I, Togashi H, Okano J, Sakai Y, Iwata T, Kondoh M, Okuda N 2017,04 Integrated trophic position decreases in more diverse communities of stream food webs. Scientific Reports(7):2130. (reviewed).

・Matsubayashi J, Saitoh, Y, Uehara Y, Osada Y, Habu J, Sasaki T, Tayasu I 2017,04 Incremental analysis of vertebral centra can reconstruct the stable isotope chronology of teleost fishes.. Incremental analysis of vertebral centra can reconstruct the stable isotope chronology of teleost fishes.(8):1755-1763. (reviewed).

・Aoyama K, Nakano T, Shin K-C, Izawa A, Morita S 2017,04 Variation of strontium stable isotope ratios and origins of strontium in Japanese vegetables and comparison with Chinese vegetables.. Food Chemistry(237):1186-1195. (reviewed).

・Shinozuka K, Chiwa M, Tayasu I, Yoshimizu C, Otsuki K, Kume A 2017,04 Differences in stream water nitrate concentrations between a nitrogen-saturated upland forest and a downstream mixed land use river basin.. Hydrology(4):43. (reviewed).

・Kamitani T, Watanabe M, Muranaka Y, Shin K-C, Nakano T 2017,04 Geographical characteristics and sources of dissolved ions in groundwater at the southern part of Mt. Fuji.. Journal of Geography (Chigaku Zasshi)(126):43-71. (reviewed).

・Okuda N, Sakai Y, Fukumori K, Yang S-M, Hsieh C, Shiah F-K 2017,04 Food web properties of the recently constructed, deep subtropical Fei-Tsui Reservoir in comparison with the ancient Lake Biwa.. Hydrobiologia(802):199-210. (reviewed).

○Research Presentations

【Oral Presentation】

・Lei Fujiyoshi, Kenichi Ohkushi, Yudai Yamamoto, Ichiro Tayasu, Tadashi Yokoyama, Hiromune Mitsuhashi, Fumiko Furukawa, Masayuki Itoh "Spatial variation of stable sulfur isotope ratios of sulfate in Chikusa River". 7th Symposium on Environmental Isotope Study, 2017.12.27, RIHN, Kyoto.

・Ichiro Tayasu "Current topics of Environmental Isotope Study in RIHN". 7th Symposium on Environmental Isotope Study, 2017.12.22, 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 2. Comparing the result of observation between January and August”. 7th Symposium on Environmental Isotope Study, 2017.12.22, RIHN, Kyoto.
- Ken’ichi Ohkushi, Ichiro Tayasu, Lei Fujiyoshi, Shiho Yabusaki, Ki-Cheol Shin, Tadashi Yokoyama, Hiromune Mitsuhashi, Fumiko Furukawa, Masayuki Itoh “δ2H and δ18O results in the Chikusa River in August, 2017”. 7th Symposium on Environmental Isotope Study, 2017.12.22.
- Takanori Nakano, Ryota Honda, Toshiki Sugo, Suzumi Nishimura, Hiroshi Ohkouchi, Yoshihiro Yamada, Naoya Katsumi, Masaru Yamanaka, Shiho Yabusaki, Ki-Cheol Shin, Lei Fujiyorhi, Ichiro Tayasu, Akihiro Yamada, Tatsunari Ishimoto, Toshiaki Kaeriyama “Water quality environment of groundwater recharge area of Ohno city”. 7th Symposium on Environmental Isotope Study, 2017.12.22, RIHN, Kyoto.
- Yusuke Ii, Yunosuke Goto, Ki-Cheol Shin, Ichiro Tayasu “Strontium stable isotope analysis for discriminating the geographical origin of radish (dried radish strips)”. 7th Symposium on Environmental Isotope Study, 2017.12.22, RIHN, Kyoto,.
- Yunosuke Goto, Yusuke Ii, Kazuhisa Matsuno, Ki-Cheol Shin, Ichiro Tayasu “Method for discriminating the geographical origin of ginger by Sr stable isotope ratio”. 7th Symposium on Environmental Isotope Study, 2017.12.22, RIHN, Kyoto.
- Takuya Ishida, Yoshitoshi Uehara, Tomoya Iwata, Osbert Leo A. Privaldos, Satoshi Asano, Tohru Ikeya, Ken’ichi Osaka, Jun’ichiro Ide, Ichiro Tayasu, Noboru Okuda “Estimation of non-point source phosphorous in river ecosystems: Insight from oxygen isotope of phosphate”. 7th Symposium on Environmental Isotope Study, 2017.12.22, RIHN, Kyoto,.
- Ichiro Tayasu “Use of multi-elemental isotopes in ecological and environmental research”. Observation, analysis and theory in ecology for next generations-What we have achieved in global environment studies-”, 2017.11.01, RIHN, Kyoto.
- Ichiro Tayasu and Lei Fujiyoshi “Summary of the Environmental Traceability Core Project and a study proposal of questionnaire method”. 12th Core Program Workshop, 2017.10.05, RIHN, Kyoto. (in Japanese)
- Takaaki Kato “Human choice and willingness to pay”. 12th Core Program Workshop, 2017.10.05, RIHN, Kyoto,.
- Takeshi Nishimura “Segmentation of consumers by questionnaire”. 12th Core Program Workshop, 2017.10.05, RIHN, Kyoto.
- Shiho Yabusaki, Makoto Taniguchi, Ichiro Tayasu, Tomoya Akimichi, Noboru Ohomori, Ken Gotou, Syuichi Furuya, Souichirou Watanabe “Study on groundwater flow system at Oshino Village in Yamanashi Prefecture - Report 1. Characteristics of water quality and stable isotopes of shallow and deep groundwater at Oshino Village”. JpGU-AGU Joint Meeting 2017, 2017.05.23, Makuhari, Chiba.
- Yasuhisa Kondo, Terukazu Kumazawa, Ichiro Tayasu, Takanori Nakano “Information visualization for participatory multi-isoscape mapping”. JpGU-AGU Joint Meeting 2017, 2017.05.23, Makuhari, Chiba.
- Yudai Yamamoto, Ichiro Tayasu, Takanori Nakano, Urumu Tsunogai, Fumiko Nakagawa, Tadashi Yokoyama, Hiromune Mitsuhashi, Ki-Cheol Shin, Shiho Yabusaki, Tamihisa Ohta, Ken’ichi Ohkushi “The geochemical study about the aqueous environment of Chikusa River in Hyogo prefecture”. JpGU-AGU Joint Meeting 2017, 2017.05.23, Makuhari, Chiba.
- Takuya Ishida, Yoshitoshi Uehara, Tomoya Iwata, Osberet Leo A. Privaldos, Satoshi Asano, Toru Ikeya, Kenichi Osaka, Junichiro Ide, Ichiro Tayasu, Noboru Okuda “Biogeochimical cycling of phosphate in the Yasu River Watershed: Insight from oxygen isotope of phosphate”. JpGU-AGU Joint Meeting 2017, 2017.05.21, Makuhari, Chiba.
- Chia-Ying Ko, Tomoya Iwata, Jun-Yi Lee, Aya Murakami, Junichi Okano, Naoto Ishikawa, Yoichiro Sakai, Ichiro Tayasu, Masayuki Itoh, Uhram Song, Hiroyuki Togashi, Shinich Nakano, Nobuhito Ohte, Noboru Okuda “Alpha and beta diversity of benthic macroinvertebrates in natural and disturbed river watersheds and their environmental driver”. JpGU-AGU Joint Meeting 2017, 2017.05.21, Makuhari, Chiba.

・Jun'ichiro Ide, Abigail P. Cid-Andres, Takuya Ishida, Ken'ichi Osaka, Tomoya Iwata, Takuya Hayashi, Masanori Akashi, Ichiro Tayasu, Noboru Okuda “Comparisons of oxygen isotope ratio of phosphate in river water and rocks between two watersheds in central Japan” . JpGU-AGU Joint Meeting 2017, 2017.05.21, Makuhari, Chiba,.

・Tohru Ikeya, Chia-Ying Ko, Elfritzson Martin Peralta, Takuya Ishida, Yoshitoshi Uehara, Satoshi Asano, Noboru Okuda, Masayuki Ushio, Shohei Fujinaga, Ichiro Tayasu, Tomoya Iwata “The community composition and diversity of epilithic bacterium and microalgae in a Japanese river system during irrigation season” . JpGU-AGU Joint Meeting 2017, 2017.05.20, Makuhari, Chiba.

・Takanori Nakano “Traceability research on global environment by isotope approach”. Faculty of Science and Engineering, Waseda University, 2017.

【Invited Lecture / Honorary Lecture / Panelist】

・Takanori Nakano “Water Isoscape Studies for Food and Environmental Traceability”. Association of Official Analytical Communities, Taiwan section (Invited), November 2017, .

Stage: Pre 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. 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 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 and land use. The model will be used for evaluating the ecosystem services for different land use scenarios to assess 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 platform.

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 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. Thetotal number of project members now count about eighty.

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 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 in the transdisciplinary platform. 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 is starting the discussion forum on land use and land ownership, and we would like to contribute to it.

○ Progress and Results in 2017

Project organization and research sites

After our PR started in June 2017, the organization of the project was more developed by having additional members joined the research team, and the total number of project members now count about 80. Three research assistants (one in full time and two in part time) are hired and joined as in-house project members to support the project leader and the core members in the headquarter function of the project. Also, one or two postdocs will be hired in the spring of 2018 and they are expected to play a central role in conducting the research components described below.

In September 2017, we had a kick-off meeting among the all members of the project to share the project outlines and discuss the research plans in more details. The project organization was almost fixed by December 2017, and since then, we have been having or planning meetings for each research group and sub-group to discuss ongoing research activities and future research plans in more details.

The local research sites of the project were decided to be 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. At each local site, the transdisciplinary platform that diverse local stakeholders are involved is being developed or prepared to develop, although more time and efforts are needed for the full development.

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 and applied to a local research site in Fukui. The results revealed that the present natural disaster risk is distributed heterogeneously in the area, and the risk has substantially increased over the last ninety years as the population and the number of households increased in the earlier and later phases, respectively. Future challenges exist in applying the method to multiple types of natural disasters, improving the evaluation of potential socio-economic loss and damages, applying the method to other local research sites and larger spatial scales (prefectural and national levels), 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 will be used for this project. Also, parameters and land use data have been reviewed and collected to be used for our analysis. The preliminary version of the methodology was applied to the local research site in Fukui to evaluate multiple ecosystem services. Future challenges exist in evaluating as diverse ecosystem services as possible using existing and developing methodologies,

validating the values of ecosystem services in collaboration with diverse stakeholders in local research sites, setting multiple scenarios to be used in this analysis, evaluating the potential benefits and costs of Eco-DRR for each scenario, etc.

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

Transdisciplinary platforms are being formed in the research sites of Fukui and Shiga. The platform in Fukui is based on the existing Mikatagoko Nature Restoration Committee, in which one of the several working groups aims at achieving ecological restoration of lakeshore and river and flood risk reduction at the same time using Eco-DRR approaches. The trial research results of the research components 1 and 2 (described above) are prepared to be shared in the platform to foster the understanding and discussion among the stakeholders. The platform in Shiga is based on the existing regional association, in which the risk of rainfall-induced landslides has been discussed since an evacuation order of the district was issued and then some difficulties happened in 2015. For the Chiba research site, preparation to form a platform with diverse stakeholders started. The transdisciplinary scenario analysis is expected to be conducted in the later phase of the project after research outcomes from the research components 1 and 2 accumulate to some extent.

In these local research sites, we also started to collect the traditional and local knowledge of Eco-DRR including the history of land use management, flood control measures built in the Edo period, etc., but obviously more efforts are needed and planned in the following years of FR.

As for the natural disaster insurance, we started the collaboration with an insurance company, and the research forum among insurance industry, academia and government officials is being formed to discuss the possibility and feasibility of economic incentives to promote Eco-DRR. Laws and institutions related to disaster risk reduction will also be discussed in the research forum, but the progress in this aspect is still limited and more efforts are needed and planned in the following years of FR.

Most notable outputs to date

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Project organization and members

The above-mentioned research components 1 to 3 will be conducted by corresponding three (main) groups 1 to 3 as described below. The group 3 has two sub-groups on specific research subjects and three sub-groups for local research sites. In addition, the international affairs sub-group is affiliated with the core (project steering) group. The research outcomes of the groups and sub-groups will contribute to the two goals of our project, which will be coordinated by the core group consisting of group leaders and core members with taking advice from external advisors and program directors. The goal 1 will be achieved mainly by the groups 1 and 2, and the goal 2 mainly by the group 3 and the associated sub-groups. The international affairs sub-group will contribute to discussions and negotiations relating to Eco-DRR in various international organizations and platforms by providing the research outcomes of the entire project.

○Project Members

◎ YOSHIDA, Takehito (Research Institute for Humanity and Nature (RIHN) & Department of General Systems Studies, University of Tokyo,Associate Professor,Project management, Transdisciplinary platforms, TLK research)

Group 1 (Natural disaster risk assessment)

○ ICHINOSE, Tomohiro (Faculty of Environment and Information Studies, Keio University,Professor,Visualizing and modelling risks of natural disasters, Transdisciplinary platforms)

○ SHIBASAKI, Ryosuke (Center for Spatial Information Science, University of Tokyo,Professor,Visualizing and modelling risks of natural disasters)

○ UEHARA, Misato (Shinshu University,Associate Professor,Visualizing and modelling risks of natural disasters)

AKASAKA, Takumi (Department of Life Science and Agriculture, Obihiro University of Agriculture and Veterinary Medicine,Assistant Professor,Visualizing and modelling risks of natural disasters)

AKIYAMA, Yuki (Center for Spatial Information Science, University of Tokyo,Assistant Professor,Visualizing and modelling risks of natural disasters)

ITAGAWA, Satoru (Faculty of Environment and Information Studies, Keio University,Project Researcher,Visualizing and modelling risks of natural disasters)

IMAI, Yota (Tokushima University,Graduate Student,Visualizing and modelling risks of natural disasters, Transdisciplinary platforms)

IMOTO, Ikuko (Keio Research Intsitute at SFC,Senior Researcher,Visualizing and modelling risks of natural disasters)

KAMADA, Mahito (Tokushima University,Professor,Transdisciplinary platforms)

HUANG, Wanhui (Research Institute for Humanity and Nature,Researcher,Regional Environmental Studies, GIS)

TAKAHASHI, Seiichiro (LPD Landscape Planning & Design inc.,Technical advisor,Landscape architecture)

TAKI, Kentaro (The University of Shiga Prefecture,Associate Professor,Transdisciplinary platforms, Visualizing and modelling risks of natural disasters, Developing incentives and institutions)

NAGAI, Masahiko (Center for Spatial Information Science, University of Tokyo,Project Associate Professor,Evaluating and modelling multi-functionality, Developing incentives and institutions)

NAKAMURA, Futoshi (Hokkaido University,Professor,External advisor)

FURUTANI, Tomoyuki (Faculty of Policy Management, Keio University,Professor,Visualizing and modelling risks of natural disasters)

FURUMAI, Hiroaki (Graduate School of Engineering, University of Tokyo,Professor,Visualizing and modelling risks of natural disasters)

MUTO, Yasunori (Tokushima University,Professor,Visualizing and modelling risks of natural disasters, Transdisciplinary platforms)

MURAKAMI, Akinobu (Faculty of Engineering, Information and Systems, University of Tsukuba,Associate Professor,Visualizing and modelling risks of natural disasters, Developing incentives and institutions)

MORISAKI, Michiya (Faculty of Environment and Information Studies, Keio University,Graduate Student,Visualizing and modelling risks of natural disasters, Transdisciplinary platforms)

YAMADA, Yumi (Keio University,Extraordinary scientist,Visualizing and modelling risks of natural disasters, Transdisciplinary platforms)

Group 2 (Multifunctionality evaluation)

○ SAITO, Osamu (United Nations University, Institute for the Advanced Study of Sustainability (UNU-IAS); Graduate School of Agricultural and Life Sciences, University of Tokyo,Academic Director, Academic Program Officer; Visiting Associate Professor,Evaluating and modelling multi-functionality)

○ HASHIMOTO, Shizuka (Graduate School of Agricultural and Life Sciences, University of Tokyo,Associate Professor,Evaluating and modelling multi-functionality)

ITO, Motomi (Graduate School of Arts and Sciences, University of Tokyo,Professor,Evaluating and modelling multi-functionality)

KURASHIMA, Osamu (Graduate School of Arts and Sciences, University of Tokyo,Project Researcher,Evaluating and modelling multi-functionality)

HUANG, Wanhui (Research Institute for Humanity and Nature,Researcher,Regional Environmental Studies, GIS)

TSUCHIYA, Kazuaki (Graduate School of Agricultural and Life Sciences, University of Tokyo,Assistant Professor,Evaluating and modelling multi-functionality)

HARASHINA, Koji (Faculty of Agriculture, Iwate University,Associate Professor,Evaluating and modelling multi-functionality)

HORI, Keiko (United Nations University, Institute for the Advanced Study of Sustainability (UNU-IAS),Research Asistant,Environment creation studies, Sustainability science)

MATSUI, Takanori (Osaka University,Assistant Professor,Evaluating and modelling multi-functionality)

MANAGI, Shunsuke (Faculty of Engineering, Kyushu University,Professor,Transdisciplinary platforms, Developing incentives and institutions)

MIYASHITA, Tadashi (Graduate School of Agricultural and Life Sciences, University of Tokyo,Professor,Evaluating and modelling multi-functionality)

MORI, Akira (Yokohama National University,Associate Professor,Evaluating and modelling multi-functionality, International affairs)

YAGI, Hironori (Graduate School of Agricultural and Life Sciences, University of Tokyo,Associate Professor,Evaluating and modelling multi-functionality)

YAGI, Nobuyuki (Graduate School of Agricultural and Life Sciences, University of Tokyo,Associate Professor,Evaluating and modelling multi-functionality)

YAMAJI, Eiji (Graduate School of Frontier Sciences, University of Tokyo,Professor,Evaluating and modelling multi-functionality)

Group 3 (Social implementation)・FUKUI subgroup

◎ YOSHIDA, Takehito (Research Institute for Humanity and Nature (RIHN) & Department of General Systems Studies, University of Tokyo,Associate Professor,Project management, Transdisciplinary platforms, TLK research)

ISHII, Jun (Fukui Prefectural Satoyama-Satoumi Research Institute,Researcher,Transdisciplinary platforms)

ICHINOSE, Tomohiro (Faculty of Environment and Information Studies, Keio University,Professor,Visualizing and modelling risks of natural disasters, Transdisciplinary platforms)

UCHIDA, Kei (Graduate School of Arts and Sciences, University of Tokyo,Project Researcher,Visualizing and modelling risks of natural disasters)

KASADA, Minoru (Graduate School of Arts and Sciences, University of Tokyo,Project Researcher,Transdisciplinary platforms)

KITAGAWA, Junko (Fukui Prefectural Satoyama-Satoumi Research Institute,Chief Scientist,Transdisciplinary platforms)

KOJIMA, Hideaki (Wakasa Mikata Museum of Jomon Period,Curator,Transdisciplinary platforms)

SHINOHARA, Naoto (Graduate School of Agricultural and Life Sciences, University of Tokyo,Graduate Student,Transdisciplinary platforms)

NAKAMURA, Ryo (Fukui Prefectural Satoyama-Satoumi Research Institute,Researcher,Transdisciplinary platforms)

FUKUSHIMA, Mariko (University of Tokyo,Graduate Student,Transdisciplinary platforms)

MIYAMOTO, Yasushi (Fukui Prefectural Satoyama-Satoumi Research Institute,Researcher,Transdisciplinary platforms)

MORISAKI, Michiya (Faculty of Environment and Information Studies, Keio University,Graduate Student,Visualizing and modelling risks of natural disasters, Transdisciplinary platforms)

YAMADA, Yumi (Keio University,Extraordinary scientist,Visualizing and modelling risks of natural disasters, Transdisciplinary platforms)

Group 3 (Social implementation)・SHIGA subgroup

○ FUKAMACHI, Katsue (Graduate School of Global Environmental Studies, Kyoto University,Associate Professor,Transdisciplinary platforms, TLK research)

○ MIYOSHI, Iwao (Kyoto Prefectural University,Assistant Professor,Transdisciplinary platforms)

○ TAKI, Kentaro (The University of Shiga Prefecture,Associate Professor,Transdisciplinary platforms, Visualizing and modelling risks of natural disasters, Developing incentives and institutions)

AZUMA, Sachiyo (The University of Shiga Prefecture,Associate Professor,Transdisciplinary platforms)

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)

ONITSUKA, Kenichiro (Graduate School of Global Environmental Studies, Kyoto University,Assistant Professor,Rural planning studies, Rural informationization)

KATOH, Sadahisa (Center for Global Partnerships and Education, Okayama University,Associate Professor,Transdisciplinary platforms)

KAMATANI, Kaoru (College of Gastronomy Management, Ritsumeikan University,Associate Professor,Japanese history)

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)

TAKAMURA, Noriko (National Institute for Environmental Studies,Fellow,Transdisciplinary platforms)

ZHANG, Pingxing (Kyoto Prefectural University,Postdoctoral fellow,Landscape architecture)

TSAI, Sunglun (Graduate School of Global Environmental Studies, Kyoto University,Graduate Student,Architecture)

NINOMIYA, Kento (Gurauate School of Agriculture, Kyoto University,Graduate Student,Rural planning studies, Rural informationization)

HASHIMOTO, Shizuka (Graduate School of Agricultural and Life Sciences, University of Tokyo,Associate Professor,Evaluating and modelling multi-functionality)

MIZUTANI, Shusuke (Graduate School of Global Environmental Studies, Kyoto University,Graduate Student,Landscape architecture)

MURAKAMI, Shuichi (The University of Shiga Prefecture,Professor,Transdisciplinary platforms)

MORISAKI, Michiya (Faculty of Environment and Information Studies, Keio University,Graduate Student,Visualizing and modelling risks of natural disasters, Transdisciplinary platforms)

YAMAMOTO, Akiko (Takashima city board of education,Supervisor,Regional history)

YAMAMOTO, Kiyotatsu (University of Tokyo,Associate Professor,Transdisciplinary platforms)

WATANABE, Keiichi (Lake Biwa Museum, Shiga Prefecture,Curator,Folkloristics)

Group 3 (Social implementation)・CHIBA subgroup

○ NISHIHIRO, Jun (Toho University,Associate Professor,Transdisciplinary platforms)

○ SHOJI, Taro (Toho University,Visiting Researcher,Transdisciplinary platforms)

ONUMA, Ayumi (Faculty of Economics, Keio University,Professor,Transdisciplinary platforms, Forum for natural disaster insurance)

SHIBATA, Yuki (Toho University,Associate Professor,Environpolitics)

TSUGE, Takahiro (Konan University,Professor,Transdisciplinary platforms, Developing incentives and institutions)

HASEGAWA, Masami (Toho University,Professor,Transdisciplinary platforms)

Group 3 (Social implementation)・Incentive & Institution subgroup

○ URASHIMA, Hiroko	(Corporate Social Responsibility Section, Corporate Planning Department, MS&AD Insurance Group Holdings, Inc.,Section Head,Transdisciplinary platforms, Developing incentives and institutions)
○ NISHIDA, Takaaki	(Mitsubishi UFJ Research and Consulting Co., Ltd.,Deputy Chief Scientist,Developing incentives and institutions)
IIDA, Akiko	(University of Tokyo,Assistant Professor,Transdisciplinary platforms, Developing incentives and institutions)
ICHINOSE, Tomohiro	(Faculty of Environment and Information Studies, Keio University,Professor,Visualizing and modelling risks of natural disasters, Transdisciplinary platforms)
ONUMA, Ayumi	(Faculty of Economics, Keio University,Professor,Transdisciplinary platforms, Forum for natural disaster insurance)
OKANO, Takahiro	(Ministry of the Environment,Environment policy,Developing incentives and institutions)
KANIE, Yasumasa	(MS & AD Insurance Group Holdings, Inc.,Section Head,Transdisciplinary platforms, Developing incentives and institutions)
TAKI, Kentaro	(The University of Shiga Prefecture,Associate Professor,Transdisciplinary platforms, Visualizing and modelling risks of natural disasters, Developing incentives and institutions)
TAKEYA, Takako	(Mitsubishi UFJ Research and Consulting Co., Ltd.,Researcher,Developing incentives and institutions)
TSUGE, Takahiro	(Konan University,Professor,Transdisciplinary platforms, Developing incentives and institutions)
TSUCHIYA, Kazuaki	(Graduate School of Agricultural and Life Sciences, University of Tokyo,Assistant Professor,Evaluating and modelling multi-functionality)
HARAGUCHI, Makoto	(InterRisk Research Institute & Consulting, Inc.,Manager, Senior consultant,Developing incentives and institutions)
FUKAMACHI, Katsue	(Graduate School of Global Environmental Studies, Kyoto University,Associate Professor,Transdisciplinary platforms, TLK research)
MANAGI, Shunsuke	(Faculty of Engineering, Kyushu University,Professor,Transdisciplinary platforms, Developing incentives and institutions)
MURAKAMI, Akinobu	(Faculty of Engineering, Information and Systems, University of Tsukuba,Associate Professor,Visualizing and modelling risks of natural disasters, Developing incentives and institutions)
YOSHIDA, Takehito	(Research Institute for Humanity and Nature (RIHN) & Department of General Systems Studies, University of Tokyo,Associate Professor,Project management, Transdisciplinary platforms, TLK research)

Group 3 (Social implementation)・Traditional Local Knowledge subgroup

○ FUKAMACHI, Katsue	(Graduate School of Global Environmental Studies, Kyoto University,Associate Professor,Transdisciplinary platforms, TLK research)
AZUMA, Sachiyo	(The University of Shiga Prefecture,Associate Professor,Transdisciplinary platforms)
UCHIYAMA, Yuta	(Tohoku University,Researcher,Transdisciplinary platforms, TLK research, International affairs)
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)
OKU, Hirokazu	(University of Toyama Faculty of Art and Design,Associate Professor,Landscape architecture)
OCHIAI, Chiho	(Graduate School of Global Environmental Studies, Kyoto University,Assistant Professor,Community disaster prevention, Community participation type disaster reconstruction)
KAKINUMA, Kaoru	(Frontier Research Institute for Interdisciplinary Sciences, Tohoku University,Assistant Professor,Environmentology)
KAJIMA, Syuichiri	(Graduate School of Environmental Studies, Tohoku University,Graduate Student,Environpolitics, Environmental economics)
KAMATANI, Kaoru	(College of Gastronomy Management, Ritsumeikan University,Associate Professor,Japanese history)

LUKMAN, Kevin M	(Graduate School of Environmental Studies, Tohoku University,Graduate Student,Forest community)
KOHSAKA, Ryo	(Graduate School of Environmental Studies, Tohoku University,Professor,Evaluating and modelling multi-functionality, International affairs)
KOBAYASHI, Hirohide	(Kyoto University,Associate Professor,Transdisciplinary platforms)
SAITO, Haruo	(University of Tokyo,Assistant Professor,TLK research)
SHIMADA, Kazuhisa	(The University of Shiga Prefecture,Associate Professor,Transdisciplinary platforms)
JAMIN, Celine	(Graduate School of Global Environmental Studies, Kyoto University,Graduate Student,Architecture)
TAKAHASHI, Hiroki	(Otsu City Museum of History,Curator,Japanese history)
TASHIRO, Ai	(Graduate School of Environmental Studies, Tohoku University,Researcher,Environmental epidemiology)
TSAI, Sunglun	(Graduate School of Global Environmental Studies, Kyoto University,Graduate Student,Architecture)
FUNAHASHI, Tomomi	(Graduate School of Global Environmental Studies, Kyoto University,Graduate Student,Ecosystem Conservation)
FURUTA, Naoya	(Taisho University; International Union for Conservation of Nature and Natural Resources(IUCN),Professor; Coordinator,International affairs, Developing incentives and institutions)
MIYAJI, Mari	(Graduate School of Global Environmental Studies, Kyoto University,Graduate Student,Architecture)
YAMAMOTO, Akiko	(Takashima city board of education,Supervisor,Regional history)
YOSHIDA, Takehito	(Research Institute for Humanity and Nature (RIHN) & Department of General Systems Studies, University of Tokyo,Associate Professor,Project management, Transdisciplinary platforms, TLK research)
WATANABE, Keiichi	(Lake Biwa Museum, Shiga Prefecture,Curator,Folkloristics)

International Address subgroup

○ FURUTA Naoya	(Taisho University; International Union for Conservation of Nature and Natural Resources(IUCN),Professor; Coordinator,International affairs, Developing incentives and institutions)
UCHIYAMA, Yuta	(Tohoku University,Researcher,Transdisciplinary platforms, TLK research, International affairs)
KAWASHIMA, Yutaka	(Japan International Cooperation Agency,Government Office,International affairs)
KOHSAKA, Ryo	(Graduate School of Environmental Studies, Tohoku University,Professor,Evaluating and modelling multi-functionality, International affairs)
MIYAZAKI, Hiroyuki	(Center for Spatial Information Science, University of Tokyo; School of Engineering and Technology, Asian Institute of Technology,Project Assistant Professor; Visiting Associate Professor,Visualizing and modelling risks of natural disasters, International affairs)
MORI, Akira	(Yokohama National University,Associate Professor,Evaluating and modelling multi-functionality, International affairs)
YAMAZAKI , Takashi	(JICA,Adviser,Forest policy)

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)
□ WASHITANI, Izumi	(Department of Integrated Science and Engineering for Sustainable Society, Chuo University,Professor,External advisor)
KIKUCHI, Naoki	(Research Institute for Humanity and Nature,Associate Professor,Transdisciplinary platforms)
MARUYAMA, Yasushi	(Graduate School of Environmental Studies, Nagoya University,Professor,Transdisciplinary platforms)
MIYAUCHI, Taisuke	(Graduate School of Letters, Hokkaido University,Professor,Transdisciplinary platforms)

MORI, Terutaka (Graduate School of Arts and Sciences, University of Tokyo,Project Researcher,Transdisciplinary platforms)
TANAKA, Kenta (Faculty of Environmental Sciences, University of Tsukuba,Associate Professor,Transdisciplinary platforms)

○ 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) 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 cases of exposure (e.g. changing disaster-prone residential area to natural wetland or paddy) to be used in the transdisciplinary scenario analysis (see below).

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 scenario cases of land use to assess Eco-DRR options in the transdisciplinary scenario analysis (see below). The spatial scale of this research ranges from the local research sites of this project to the all area of Japan, and will be matched to the results of Research component 1 (see above) to evaluate the multi-functionality of Eco-DRR at various spatial scales.

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 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 platform will function 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 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.

In addition, traditional and local knowledge of Eco-DRR will be inventoried, evaluated for the multi-functionality using the methodology of the research components 1 and 2, and then shared in the transdisciplinary 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.

Another economic incentive of Eco-DRR we consider in the project is natural disaster insurance. 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. Reforming natural disaster insurance for households and businesses, improved risk hedge in insurance

industry, and better information sharing of the natural disaster risks with customers can be options but not limited to. Also, various laws and institutions in national and local governments related to disaster risk reduction and land use will be 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.

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, some research components will be conducted at a national level 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

○Books

【Chapters/Sections】

- Uehara M 2017 The Long Term Economic Value of Holistic Ecological Planning for Disaster Risk. Yan W, Galloway W (ed.) Rethinking Resilience, Adaptation and Transformation in a Time of Change. Springer, Cham, pp.267-289. DOI:10.1007/978-3-319-50171-0_18
- Uehara M, Yan W 2017 The Lessons Derived from 2011 Tohoku Earthquake and the Repercussion of the Myopic Decision-Making Structures. Roggema R, Yan W (ed.) Tsunami and Fukushima Disaster: Design for Reconstruction. Springer, Cham, pp.19-37. DOI:10.1007/978-3-319-56742-6_3
- Ichinose T 2017 Green Infrastructure in Reconstruction After the 2011 Earthquake and Tsunami: A Case Study of Historical Change on Awaji Island in Japan. Yan W, Galloway W (ed.) Rethinking Resilience, Adaptation and Transformation in a Time of Change. Springer, Cham, pp.253-265. DOI: 10.1007/978-3-319-50171-0_17
- Robles LR, Ichinose T 2017 Empowering Migrant Communities: a step towards Inclusive disaster risk reduction and recovery. Guadagno L, Fuhrer M, Twigg J (ed.) Migrants in Disaster Risk Reduction: Practices for Inclusion. International Organization for Migration, Council of Europe, pp.101-104.

○Editing

【Editing / Co-editing】

- Yokohari M, Murakami A, Hara Y, Tsuchiya K (ed.) 2017 Sustainable Landscape Planning in Selected Urban Regions. Science for Sustainable Societies book series (SFSS), XV. Springer Japan, Tokyo, 265pp.

○Papers

【Original Articles】

- Chen IC, Hsieh C, Kondoh K et al. 2017 Filling the gaps in ecological studies of socio-ecological systems. Ecological Research 32(6):873-885. DOI:10.1007/s11284-017-1521-9 (reviewed).
- Fukamachi K 2017 Sustainability of terraced paddy fields in traditional satoyama landscapes of Japan. Journal of Environmental Management 202(3):543-549. DOI:10.1016/j.jenvman.2016.11.061 (reviewed).
- Guillen VP, Murakami A 2017 Dynamics of house state consolidation in Lima Metropolitan area: a cellular automata approach. Journal of the Japanese Institute of Landscape Architecture 80(5): 657-662. DOI:10.5632/jila.80.657 (reviewed).

・Imamura K, Managi S, Saito S, Nakashizuka T 2017 Abandoned forest ecosystem: Implications for Japan's Oak Wilt disease. Journal of Forest Economics 29(A):56-61. DOI:10.1016/j.jfe.2017.08.005 (reviewed).

・Karanja JM, Saito O 2017 Cost-benefit analysis of mangrove ecosystems in flood risk reduction: a case study of the Tana Delta, Kenya. Sustainability Science 03 March 2017. DOI:10.1007/s11625-017-0427-3 (reviewed).

・Kobayashi Y, Mori AS 2017 The Potential Role of Tree Diversity in Reducing Shallow Landslide Risk. Environmental Management 59(5):807-815. DOI:10.1007/s00267-017-0820-9 (reviewed).

・Kohsaka R, Uchiyama Y 2017 Motivation, Strategy and Challenges of Conserving Urban Biodiversity in Local Contexts: Cases of 12 Municipalities in Ishikawa, Japan. Procedia Engineering 198:212-218. DOI:10.1016/j.proeng.2017.07.085 (reviewed).

・Managi S, Guan D 2017 Multiple disasters management: Lessons from the Fukushima triple events. Economic Analysis and Policy 53:114-122. DOI:10.1016/j.eap.2016.12.002 (reviewed).

・Plieninger T, Kohsaka R, Bieling C et al. 2017 Fostering biocultural diversity in landscapes through place-based food networks: a "solution scan" of European and Japanese models. Sustainability Science 11 July 2017. DOI:10.1007/s11625-017-0455-z (reviewed).

・Uchiyama Y, Kohsaka R 2017 Spatio-temporal Analysis of Biodiversity, Land-use Mix and Human Population in a Socio-ecological Production Landscape: A Case Study in the Hokuriku Region, Japan. Procedia Engineering 198:219-226. DOI:10.1016/j.proeng.2017.07.086 (reviewed).

○Research Presentations

【Oral Presentation】

・Kato S, Hishiyama K Conservation and Reinterpretation of Traditional Small Urban Green Spaces (Telajakan) in Bali, Indonesia. Resilience Conference 2017, 2017.08.21, Stockholm, Sweden.

・Muto Y, Murata Y, Miyoshi M, Tamura T Retarding Effect Evaluation of Paddy Fields and their Land-use Change. International Association for Hydro-Environment Engineering and Research 2017, 2017.08.13-2017.08.18, Kuala Lumpur, Malaysia.

・Otake F, Yamamoto K, Shimomura A Intention to Use the National Park and Geopark for Disaster Risk Reduction: A Case Study of Sanriku Tsunami-hit Area. Japan Geoscience Union Meeting 2017, 2017.05.23, Chiba, Japan.

・Yamamoto K Discovering Tourism Resources in the Two Fishing Villages of the Ozaki Peninsula in Kamaishi City, Iwate, Japan. Japan Geoscience Union Meeting 2017, 2017.05.23, Chiba, Japan.

Stage: Feasibility Study

Project Name: Knowledge binding to overcome perception gaps in collaborative research on socio-environmental interaction

Project Leader: KONDO Yasuhisa

Core Program

○ Research Subject and Objectives

This Core Project develops a methodology to reduce information asymmetry through a combination of (1) diversion (an adaptive governance approach to divert a wicked problem between stakeholders to a sharable object or goal toward which all actors can work together); (2) encouraged participation and empowerment of marginalized people; (3) fair data visualization; and (4) dialogue. These approaches release domination. Civic tech is applied as a holistic method for diversion to co-produce solutions for a local issue by using open data and involving residents.

Effects of diversion to projects' performance and participants' perceptual transformation are measured through participatory observation, semi-structured interviews, and/or periodical questionnaire surveys. Based on these assessments, the working hypothesis is improved and tested again. This Hypothesis-Practice-Assessment cycle is repeated flexibly.

A cookbook and portal website for this methodology will be published for early career researchers and practitioners, in addition to peer-reviewed articles in international journals. These publications are released with the open-source license. This methodology will be implemented in upcoming RIHN Research Projects, and will become a standard for transdisciplinary team science based on the open science paradigm.

○ Progress and Results in 2017

Membership Reinforcement

This Core Project has, virtually, spent three fiscal years in the Feasibility Study phase. The research organisation has been restructured and reinforced in accordance with the revision of the research plan (see Section 3-2). The current organisation involves 28 members, including 19 members from outside RIHN. The members are working in the Theory Development and Case Study Groups (see Section 2-3). Seven core members are specialised in open science, science communication, social psychology, anthropology, ecology, regional planning, and digital humanities (see Annex 1). The project is advised by Professors Hisae Nakanishi (former EREC chair) and Makoto Taniguchi (Core Program Director) to prepare for the Full Research. Other RIHN colleagues also occasionally joined the seminars and workshops to offer suggestions for the project.

Relationship with RIHN's Research Projects

The relationship with current Research Projects has also been reinforced.

● Discussion with the Climate Adaptation Project has revealed the asymmetry between climatologists and archaeologists in understanding of the settlement dynamics in relation to the climate change or social transformation. This asymmetry is derived from the difference in research thoughts. It can be reduced by mutual learning, for which GIS-based visualisation of the settlement dynamics is ongoing with the technical aid from the sub-group T-4.

● In tight collaboration with the Nutrient Cycling Project, the sub-group C-2 is working to develop a new, sustainable community for the reuse of waterweed in the Lake Biwa catchment, with financial support from the Mitsui & Co. Environment Fund. The current situation and local understanding of the issue has been grasped through two workshop sessions [Annex 2-90, 91] and a series of visits to local municipality offices. A mail-in survey on the living environment in the Lake Biwa area is scheduled to be sent to 30,200 households in the study area in January 2018[Annex 2-47].

● In liaison with the Sanitation Project, this Core Project has an opportunity to conduct participatory observation of the community-based replacement of Furano's water supply system. The technical implementation is being conducted by the SIP project, for which the intellectual property matters. To avoid conflict, this Core Project and the SIP are in discussion to enter in a memorandum on the outputs.

● From the FEAST Project, Kazuhiko Ota (environmental ethics) joined the sub-group T-3 (diversion for local-scale team science) and the T-6 (periodic questionnaire survey). Steven McGreevy (PI) also offered advices on the English wording.

Results

In response to the comments from the last EREC, the research objectives have been restructured as follows through five open workshops and two Core Program seminars conducted between May and October 2017.

An extensive review of team science and TD literature have revealed that the TD theories hold a close historical relevance with action research (Greenwood & Lewin 2007), and firstly appeared in the 1970s. Aspects of team science have been emphasised in the context of the WHO and particularly in medical and health sciences in the United States (Kessel & Rosenfield 2008). Since 2006, the SciTS community has been developing in the United States. In contrast, aspects of collaboration with society have been emphasised in the context of the OECD and in Europe (Klein 2008).

This literature survey has also revealed that the social aspects of the open science, particularly theoretical connection of the open science to TD, still remains to be explored. Our discussions yielded an idea for the connection. Given that the open science is a movement of open scientific knowledge and connection to the society, there are still mental barriers at opening research data to public and equal partnership between research experts and societal actors. To reduce these barriers, the FAIR data principle is introduced as an alternative to open data in sensu stricto, and special attention is paid to encouraged participation and empowerment in citizen science. Civic tech can be applied to achieve this barrier reduction.

An online questionnaire survey to RIHN staff members was conducted to collect buzzwords that were used in socio-environmental research. These were important-sounding, usually technical words or phrases that are often of little meaning, used chiefly to impress laymen (Webster English Dictionary). Forty-one words were collected. These words were classified into words from the research origin (e.g. resilience, DNA, TEK), socio-political origin (e.g. biodiversity, governance, development), and general language origin (e.g. culture, environment, fūdo, information). Words from research have a clear original definition, although the meaning has been amended in the context of socio-politics (e.g. DNA). It has been noted through the discussion that such buzzwords can be used to establish a diversionof the understanding.

It has been noted through the review and discussion that the knowledge information gap in the previous proposal is relevant to information asymmetry. The previous proposal focused on the role of bridging agents (translators or catalysts) who fix information gaps (or asymmetry) between actors. However, it has been noted, through the participatory observations of the above-mentioned socio-environmental cases, that bridging agents are present in every case and their role is diverse and transformable. This means that anyone in the collaborative works for socio-environmental case can be such an agent. Therefore, in the revised proposal, the presence of bridging agents is taken as given, and the focus is placed on qualitative and quantitative measurements of the effects of information asymmetry reduction and participants' perceptual transformation (including bridging agents).

○Project Members

◎ KONDO, Yasuhisa	(Research Institute for Humanity and Nature, Associate Professor, 1-Coordination; 2-Theory (open science and TD); 4-Visualization (participatory GIS) ; 5-Case study (Lake Biwa; Furano; Oman; settlement dynamics and climate change; Culture as a buzzword))
○ OSAWA, Tsuyoshi	(Institute for Agro-Environmental Sciences, Senior Researcher, 1-Coordination; 2-Theory (research-implementation gap); 5-Case study (open data in ecology))
○ ONISHI, Hideyuki	(Doshisha Women's College of Liberal Arts, Professor, 1-Coordination; 2-Theory (anthropology); 5-Case study (Culture as a buzzword))
○ KANO, Kei	(Shiga University, Associate Professor, 1-Coordination; 3-Dialogue (participatory public comment); 5-Case study (Lake Biwa); 6-Assessment)
○ KUMAZAWA, Terukazu	(Research Institute for Humanity and Nature, Associate Professor, 1-Coordination; 3-Dialogu (design thinking workshop); 4-visulaization (ontology))
○ SEKINO, Tasuki	(Research Institute for Humanity and Nature, Professor, 1-Coordination; 4-visulaization (object-activity diagram))

○ NAKASHIMA, Ken'ichiro	(Hiroshima University,Associate Professor,1-Coordination; 2-Theory (social psychology); 6-Assessment)
ABE, Hiroshi	(Kyoto University,Professor,2-Theory (philosophy))
ASANO, Satoshi	(Lake Biwa Enviromental Research Institute,Researcher,5-Case study (Lake Biwa))
IKEUCHI, Ui	(University of Tsukuba,PhD student,2-Theory (open science))
USHIJIMA, Ken	(Northern Regional Building Research Institute,Chief,5-Case study (Furano))
WANG Ge	(Research Institute of Science and Technology for Society, Japan Science and Technology Agency,Associate fellow,2-Theory (team science))
OHTA Kazuhiko	(Research Institute for Humanity and Nature,Researcher,2-Theory (TD))
KAMATANI, Kaoru	(Research Institute for Humanity and Nature,Specially appointed assistant professor,5-Case study (Lake Biwa))
KITAMOTO, Asanobu	(National Institute of Infirmatics,Associate Professor,2-Theory (Open science))
SATO Ken`ichi	(Faculty of Life Science, Kyoto Sangyo University NPO Hatenathon co-creative lab,Professor President,3-Dialogue (questioning workshop))
SHIMOYAMA Sayoko	(LinkDate.org,Representative director,5-Case study (Lake Biwa))
TAYASU, Ichiro	(Research Institute for Humanity and Nature,Professor,6-Assessment)
NAKATSUKA Takeshi	(Research Institute for Humanity and Nature,Professor,5-Case study (settlement dynamics and climate change))
HAYASHI Kengo	(Institute of Industrial Science, the University of Tokyo,Lecturer,5-Case study (Oman))
HAYASHI Koji	(Research Institute for Humanity and Nature,Researcher,5-Case study (Furano))
HAYASHI, Kazuhiro	(National Institute of Science and Technology Policy,Senior Research Fellow,2-Theory (open science))
FUKUNAGA Mayumi	(Graduate School of Frontier Sciences, the University of Tokyo,Associate professor,2-Theory (environmental ethics); 4-Visualization (illusrated map))
FUJISAWA Eiichi	(Ohmi DI Corporation Code for Shiga/Biwako,CEO and President Representative,5-Case study (Lake BIwa))
FUNAMIZU, Naoyuki	(Research Institute for Humanity and Nature,Professor,5-Case study (Furano))
BENKARI, Naima	(College of Engineering, Sultan Qaboos University,Assistant Professor,5-Case study (Oman))
MURAYAMA, Yasuhiro	(National Institute of Information and Communications Technology,Director,2-Theory (open science))

○ 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】

・Kondo, Yasuhisa, Katsuhiro Sano, Takayuki Omori, Ayako Abe-Ouchi, Wing-Le Chan, Seiji Kadowaki, Masaki Naganuma, Ryouta O'ishi, Takashi Oguchi, Yoshihiro Nishiaki, Minoru Yoneda 2017,12 Ecological niche and least-cost path analyses to estimate optimal migration routes of Initial Upper Palaeolithic populations to Eurasia. Yoshihiro Nishiaki, Takeru Akazawa (ed.) The Middle and Upper Paleolithic Archaeology of the Levant and Beyond. . DOI:10.1007/978-981-10-6826-3_13

○Papers

【Original Articles】

・Toya, Akihiro, Ken'ichiro Nakashima 2017,12 Reconsidering the affect-free claim in terror management theory: The effects of threat of inevitable death on mood. The Japanese Journal of Social Psychology 33(2):84-92. (in Japanese) (reviewed).

・Osawa, Takeshi, Kumiko Totsu 2017,11 Darwin Core Archive, the standard data format for biodiversity information, and its extension "Sample-based Data" for ecological data. Japanese Journal of Conservation Ecology(22):371-381. (in Japanese) (reviewed).

・Benkari, Naima 2017,07 The defensive vernacular settlements in Oman, A Contextual Study. International Journal of Heritage Architecture 1(2):175-184. DOI:10.2495/HA-V1-N2-175-184 (reviewed).

・Ikeuchi, Ui 2017,07 Prospects for Open Science: Utilization of open research data and efforts to solve problems. Pharmaceutical library 62(4):211-217. (in Japanese)

・Osawa, Takeshi, Yuki G. Baba, Tatsumi Suguro, Noriaki Naya, Takeo Yamauchi 2017,07 Specimen records of spiders (Arachnida: Araneae) by monthly census for 3 years in forest areas of Yakushima Island, Japan. Biodiversity Data Journal(5):e14789. DOI:10.3897/BDJ.5.e14789 (reviewed).

・Osawa, Takeshi, Yusuke Ueno 2017,07 Research-Implementation Gap in Japanese ecology field. Japanese Journal of Ecology(67):257-265. (in Japanese)

・Osawa, Takeshi 2017,05 Data gaps in biodiversity informatics for conservation science in Japan. Japanese Journal of Conservation Ecology(22):41-53. (in Japanese) (reviewed).

・Osawa, Takeshi 2017,04 Redefine the meanings of "Open" in definition of Open Data Perspective for both free use and re-use. Journal of Information Processing and Management 60(1):11-19. DOI:10.1241/johokanri.60.11 (in Japanese)

【Review Articles】

・Kondo, Yasuhisa 2018,02 Data science and Palaeolithic research. Archaeology Journal(708):16-19. (in Japanese)

・Wang, Ge, Ken'ichi Sato, Yasuhisa Kondo, Yumi Matsuo 2018,02 First Hatenathon Report on Promoting Science of Team Science in Japan in Japan. Journal of Information Processing and Management 60(11):824-827. (in Japanese)

・Hayashi, Kazuhiro, Hiroko Udaka, Yasuhisa Kondo 2017,07 Two streams of open science meet at RIHN. Humanity & Nature Newsletter(67):7-11. (in Japanese)

○Research Presentations

【Oral Presentation】

・Kondo, Yasuhisa, Hideyuki Onishi, Yoko Iwamoto Is 'culture' a buzzword? Ontological challenge of an interdisciplinary project on the cultural history of early modern humans in Asia. The 46th annual conference on Computer Applications and Quantitative Methods in Archaeology (CAA), 2018.03.20-2018.03.22, Tübingen, Germany.

・Akira Saito, Yasuhisa Kondo, Nozomi Mizota, Tomoko Koyama Visualizing the relationship between Repartimientos and Reducciones: An experiment with the Resource Description Framework. International Symposium Unsettling Resettlement: Forced Concentration of the Native Population in the Colonial Andes, 2018.02.23-2018.02.24, TN, USA.

・Kondo, Yasuhisa, Hideyuki Onishi, Yoko Iwamoto Is "culture" a buzzword?. The 4th conference of Cultural History of PaleoAsia, 2017.12.10, Tokyo, Japan. (in Japanese)

・Kondo, Yasuhisa Action research on local demand: case study from the digital heritage development in Oman. JSWAA symposium "Investigations and Protections of Cultural Heritage in West Asia Aided by Advanced Science and Technologies", 2017.11.18, Tokyo,Japan.

・Kondo, Yasuhisa Action research on local demand: case study from the digital heritage development in Oman. JSWAA symposium "Investigations and Protections of Cultural Heritage in West Asia Aided by Advanced Science and Technologies", 2017.11.18, Tokyo, Japan. (in Japanese)

・Kondo, Yasuhisa, Terukazu Kumazawa, Naoki Kikuchi, Kaoru Kamatani, Natsuko Yasutomi, Yuta Uchiyama, Kengo Hayashi, Shin Muramatsu RIHN as a heartland of interdisciplinary and transdisciplinary innovation. The 32nd annual conference of the Japanese Society for Research Policy and Innovation Management, 2017.10.28-2017.10.29, Kyoto, Japan. (in Japanese)

・Wang, Ge, Yumi Matsuo, Ken'ichi Sato A trend study on Science of Team Science. The 32th annual conference of the Japan Society for Research Policy and Innovation Management, 2017.10.27-2017.10.28, Kyoto, Japan. (in Japanese)

・Tara Beuzen-Waller, Jessica Giraud, Guillaume Gernez, Romain Courault, Yasuhisa Kondo, Charlotte Cable, Christopher Thornton, Éric Fouache Reconstructing the emergence of oasis territories in the piedmont of the Hajar Moutains (Sultanate of Oman): A synthesis of archaeological, geomorphological and geographical data. XXVIIIe Rencontres internationales d' archéologie et d' histoire d' Antibes, 2017.10.10-2017.10.12, Antibes, France..

・Kondo, Yasuhisa Exploring further than open science: participatory and transdisciplinary aspects of open science. ICSU-WDS Asia-Oceania Conference 2017, 2017.09.26-2017.09.28, Kyoto, Japan. (in Japanese)

・Ikeuchi, Ui, Takashi Harada, Sho Sato, Yukinori Okabe, Hiroshi Itsumura Data literacy perceptions and research data management practices by researchers in Japan. European Conference on Information Literacy (ECIL) 2017, 2017.09.18-2017.09.21, Saint-Malo, France.

・Onishi, Hideyuki Capability of the Ainu cultural heritage sites as common local resource: Cultural landscape of the Po River Heritage and Natural Park. The 51st Conference of the Japanese Society of Cultural Anthropology, held at Kobe University, 2017.05.27-2017.05.28, Hyogo, Japan. (in Japanese)

・Kondo, Yasuhisa, Terukazu Kumazawa, Takanori Nakano, Ichiro Tayasu Information visualization for participatory multi-isoscape mapping. JpGU-AGU Joint Meeting 2017, 2017.05.20-2017.05.25, Chiba, Japan. (in Japanese)

・Murayama, Yasuhiro International Trends in open science and research data infrastructure. JpGU-AGU Joint Meeting 2017, 2017.05.20-2017.05.25, Chiba, Japan. (in Japanese)

・Wang, Ge, Yosuke Nagashima, Yumi Matsuo How to involve NPO sector into research activities: A discussion based on literature review and interview. The The 19th annual conference of The Japan NPO Research Association held at Tokyo Gakugei University, 2017.05.13-2017.05.14, Tokyo, Japan. (in Japanese)

【Poster Presentation】

・Kondo, Yasuhisa, Noboru Okuda, Satoshi Asano, Kanako Ishikawa, Kei Kano, Kaoru Kamatani, Terukazu Kumazawa, Ken’ichi Sato, Sayoko Shimoyama, Eiichi Fujisawa, Kyohei Matsushita, Ken’ichi Wakita Diverting a wicked socio-environmental problem by civic ideas: a community-based approach for waterweed reuse in the Lake Biwa catchment. The 9th RIHN Tokyo Seminar, 2018.01.27, Tokyo, Japan. (in Japanese)

・Takehiro Miki, Taichi Kuronuma, Yasuhisa Kondo An analysis of spatial relationship between the Umm an-Nār type tombs and reusing remains at Bāt cemetery, Az-Zahirah, Oman. Seminar for Arabian Studies, 2017.08.04-2017.08.06, London, UK..

・Kondo, Yasuhisa, Kazuhiro Hayashi, Ui Ikeuchi, Miki Kuribayashi, Sachiko Yano, Asanobu Kitamoto Future of open science with society: Report on a multi-stakeholder workshop in Japan. JpGU-AGU Joint Meeting 2017, 2017.05.20-2017.05.25, Chiba, Japan.

・Kondo, Yasuhisa Knowledge bridging model to visualize and overcome knowledge information gaps between societal actors with the help of bridging agents. JpGU-AGU Joint Meeting 2017, 2017.05.20-2017.05.25, Chiba, Japan. (in Japanese)

【Invited Lecture / Honorary Lecture / Panelist】

・Ikeuchi, Ui, 2017 The Future of Scholarly Communication and University Libraries Conceived from Open Science. , 2017.08.25, Akita, Japan. (in Japanese)

Incubation Studies

Practical approaches toward alleviation of vicious cycles between poverty and environmental degradation under fragile environment in Afro-Asia

TANAKA Ueru (Research Institute for Humanity and Nature)

"Poverty and environmental degradation and its vicious linkages" are one of the fundamental causes of regional and global environmental problems. International community has made enormous efforts to solve the problems, i.e. through the frameworks such as Earth Summit (UNCED, 1992), Millennium Development Goals (MDGs, 2000), Sustainable Development Goals (SDGs, 2015). Nevertheless, the problems such as the expansion of poverty, the deterioration of resources and ecosystems, and loss of cultural diversity have become serious with time. In this study, especially focusing on "fragile environment (society, resources and ecological environment easily deteriorated by human activity)" and "vulnerable people (physically handicapped, elderly people, minority ethnic groups, economically poor, etc.)", we seek the possible ways to develop practical participatory approaches toward alleviation of environmental degradation and poverty in Southeast Asia (Vietnam and Laos), Southern India, East Africa (Tanzania, Zanzibar and Rwanda). The research efforts are also expanded towards the establishment of TD (transdisciplinary) approaches, practical options of social implementation, a new paradigm in global environmental studies and various expressions of academic achievement.

Multiple Development Paths and Natural Environment in the Tropical Regions of Indian Ocean Rim: Comparisons and Connections

WAKIMURA Kohei (Graduate School of Economics, Osaka City University)

In this research, we take up three tropical regions of the Indian Ocean Rim, South Asia, Southeast Asia and East Africa, and then ask about comparisons and linkages among development paths of these three regions. Since the early19th century, in the process of incorporation of them into the world economy, these three regions were positioned as primary products export economies. As a result, there emerged a great divergence between the temperate regions and these three regions in terms of wellbeing. However, there are clear differences even among the development paths of these three tropical regions. In this research, we will clarify the pluralities of these three development paths particularly in relation to the natural environment. In this analysis, we will include the factor of Indian Ocean which connects three regions by trade and migration.

Future Image of Living Sphere by Restructuring Sustainable Relation between Humans and Land

OKABE Akiko (Graduate School of Frontier Sciences, the University of Tokyo)

Exploration and implementation of a new social mechanisms for the solution of intergenerational sustainability problems

KOTANI Koji (Kochi University of Technology)

It has been reported that societies have been more urbanized, specialized and competitive together with economic growth under capitalism and democracy. In such a situation, there is a tendency that people do not exhibit strong preference, interest and action for environmental problems and sustainability especially in urban areas, which we call ``Problems of preferences and actions toward sustainability in urban areas. "On the other hand, population density in rural areas is expected to be further decreasing in the future together with the aforementioned urbanization so that the management of fundamental public goods located in rural areas such as natural resources and environmental goods becomes more difficult due to the shortage of labor, which we call `` problems of sustainable management for fundamental public goods in rural areas. "In this research project, we seek to analyze and solve the two aforementioned problems as central agendas through conducting field research and experiments in both rural and urban areas of several Asian countries. Through these field researches and experiments, we analyze how people's preferences and culture change together with urbanization and the degree of competition by looking at rural and urban areas, clarifying the reasons why the problems arise. After that, we seek to develop a series of new mechanisms to solve the problems and test the effectiveness of the new mechanisms for possible improvement of sustainability through observing behavioral and preference changes by conducting further field research and experiments.

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" 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 2017

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

The division accepted 18 proposals of "Collaborative research with the Division" and 46 proposals of "General collaborative research" in FY2017 of "Joint Research Grant for the Environmental Isotope Study".

The division organized a session in JpGU2017 entitled "H-TT23: Development and applications of environmental traceability methods" on 23 May 2017. 18 oral and 15 poster papers were presented in the session.

The division organized a short course of Environmental Isotope Study: Course 1 for light elements (29 - 31 August) and Course 2 for heavy elements (5-7 September). 16 researchers attended the course.

The division organized the sixth annual symposium of Environmental Isotope Study on 22 December. 137 researchers and students attended the symposium.

○Members

Laboratory and Analysis Division

◎ TAYASU, Ichiro (RIHN Center,Professor)
SHIN, Kicheol (RIHN Center,Assisitant Professor)
OSADA, Yutaka (RIHN Center,Researcher)
KATO, Yoshikazu (RIHN Center,Researcher)
SAITO, Yu (RIHN Center,Researcher)
HARAGUCHI, Takashi (RIHN Center,Researcher)

YABUSAKI, Shiho (RIHN Center,Researcher)
YOSHIMIZU, Chikage (RIHN Center,Researcher)
OHTA, Tamihisa (RIHN Center,JSPS Research Fellow)
MATSUMOTO, Takuya (RIHN Center,JSPS Research Fellow)
NITZCHE, Kai (RIHN Center,JSPS Research Fellow)
UEDA, Sachiko (RIHN Center,Technical Assistant)
YASUDA, Akiko (RIHN Center,Technical Assistant)
YUZEN, Natsuko (RIHN Center,Technical Assistant)
KURATA, Junko (RIHN Center,Clerical Assistant)
FUCHIGAMI, Yuriko (RIHN Center,Clerical Assistant)

FY2017 members of Joint Research Grant for the Environmental Isotope Study

SASE, Hiroyuki (Asia Center for Air Pollution Research, Japan Environmental Sanitation Center)
KAWAGOE, seiki (Faculty of Symbiotic Systems Science Fukushima University)
OKUSHI, Kenichi (Graduate school of HUMAN Development and Environment Kobe University)
NONOSE, Naoko (National Metrology Institue of Japan National Insutitute of Advanced Industrial Science and Technology)
TANIMIZU, Masaharu (School of Science and Technology Kwansei Gakuin University)
OKOCHI, Hiroshi (Faculty of Science and Engineering, Waseda University)
SHIMADA, Kojiro (Faculty of Science and Engineering, Waseda University)
SORIN, Yoshiki (Institute for Chemical Research Kyoto University)
MORIMOTO, Maki (Faculty of Education Gifu University)
NAKAGIRI, Taka (Graduate School of Life and Environmental Sciences Osaka Prefecture University)
OTAKE, Tsubasa (Graduate School of Engineering Hokkaido University)
ANMA, Ryo (College of Geoscience of Tsukuba University)
KUSAKA, Soichiro (Museum of Natural and Environmental History, Shizuoka)
AZUMA, Nobuyuki (Faculty of Agriculture and Life Science at Hirosaki University)
YAMASHITA, Katsuyuki (Graduate School of Natural Science and Technology, Okayama University)
ISHIMARU, Eriko (Hiroshima University Museum)
YOKOO, Yoriko (Faculty of Science and Engineering Doshisha University)
SUGITANI, Kenichiro (Graduate School of Environmental Studies Nagoya Universit)
SHODA, Shinya (Nara National Research Institute for Cultural Properties)
HANBA, Yuko (Kyoto Institute of Technology)
NARUKAWA, Tomohiro (National Institute of Advanced Industrial Science and Technology ,National Metrology Institute of Japan)
YAMASHITA, Yoh (Field Science Education and Research Center, Kyoto University)
OKADA, Naoki (Kyoto University Graduate School of Global Environmental Studies)
KOSHIKAWA, Masami (Center for Regional Environmental Research, National Institute for Environmental Studies)
NAOE, Shoji (Senior Scientist, Forest Ecology Group, Tohoku Research Center, Forestry and Forest Products Research Institute)
TAKEUCHI, Nozom (Graduate School of Science Chiba University)
CHIBA, Hitoshi (Graduate School of Natural science and Technology Okayama University)
KITAYAMA, Kanehiro (Graduate School of Agriculture, Kyoto University)
ISHIYAMA, Daizo (Graduate School of International Resource Sciences Akita University)
MATSUBAYASHI, Jun (Japan Agency for Marine-Earth Science and Technology)
OISHI, Yoshitaka (Center for Arts and Sciences,Fukui Prefectural University)
YAMADA, Yoshiriro (Facultry of Agriculture,Kagawa University)
YOSHIDA, Takeo (National Agriculture and Food Research Organization)
ITO, Takashi (College of Education, Ibaraki UNIversity)
FUDAMOTO, Konomi (Center for Ecological Research,Kyoto University)
HAYASHI, Takeshi (Faculty of Education and Human Studies,Akita University)
YAMASHITA, Katsuyuki (Graduate School of Natural science and Technology Okayama University)

KODA, Ryosuke	(Research Institute of Environment, Agriculture and Fisheries, Osaka Prefecture)
HIURA, Tutomu	(Field Science Center for Northern Biosphere Forest Research Station,Hokkaido University)
KATSUYAMA, Masanori	(Graduate School of Agriculture, Kyoto University)
NATUHARA, Yosihiro	(Graduate School of Environmental Studies,Nagoya University)
MIZUNO, Kazuharu	(Graduate School of Letters Kyoto University)
SAITOH, Takeshi	(Graduate School of Science and Engineering,Saitama University)
TAMURA, Tomomi	(Nara National Research Institute for Cultural Properties)
FUSHIMI, Noriaki	(Shizuoka Prefecture)
SOMEDA, Hidetoshi	(National Defense Medical College)
KOGURE, Tetsuya	(Interdisciplinary Faculty of Science and Engineering of Shimane University)
ABE, Yutaka	(Suntory Global Innovation Center)
YOSHIOKA,Yumi	(Faculty of Agriculture at Tottori University)
NAGATSUKA, Naoko	(National Institute of Polar Research)
KASHIWAYA, Koki	(Graduate School of Engineering)
GAKUHARI, Takashi	(Institute of Human and Social Sciences,Kanazawa University)
KAMAUCHI, Hiromits	(Institute of Nature and Environmental Technology Kanazawa University)
ASAHARA, Yoshihiro	(Graduate School of Environmental Studies Nagoya University)
HORIKAWA, Keiji	(University of TOYAMA)
CHO, Kei	(Graduate School of University of TOYAMA)
SATO, Takuya	(Graduate School of Science ,Faculty of Science,Kobe University)

○ 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】

- Tamihisa Ohta, Ki-Cheol Shin,Yu Saitoh,Takanori Nakano, Tsutom Hiura 2018,02 The Effects of Differences in Vegetation on Calcium Dynamics in Headwater Streams. Ecosystems:1-14. (reviewed).
- Pham, Q. M., Ishiyama, D., Sato, H. and Ogawa, Y. 2018,02 Vertical variation of lead content in sediment collected from man-made Tamagawa Dam lake in Akita Prefecture. Resource Geology. DOI: 10.1111/rge.12164 (reviewed).
- Keisuke Nishida, Yuko T. Hanba 2017,12 Photosynthetic response of four fern species from different habitats to drought stress: relationship between morpho-anatomical and physiological traits. Photosynthetica 55(4):689-697. DOI:10.1007/s11099-017-0694-3
- Y. Hoshika, Y. Osada, A. De Marco, J. Penuelas, E. Paoletti 2017,12 Global diurnal and nocturnal parameters of stomatal conductance in woody plants and major crops. Global Eclogy and Biogeography 27(2):257-275. DOI:10.1111/geb.12681 (reviewed).
- Keisuke Aoyama, Takanori Nakan, Ki-Cheol Shin, Atsunobu Izawa, Sakie Morita 2017,12 Variation of strontium stable isotope ratios and origins of strontium in Japanese vegetables and comparison with Chinese vegetables. Food Chemistry 237:1186-1195. (reviewed).
- Kaori Takemura, Rina Watanabe, Ryuji Kameishi, Naoya Sakaguchi, Hiroyuki Kamachi, Atsushi Kume, Tomomichi Fujita, Ichirou Karahara, Yuko T. Hanba 2017,12 Hypergravity of 10 G changes plant growth, anatomy, chloroplast sizes and photosynthesis of the moss Physcomitrella patens. International Journal of Microgravity Science and Applications 29(6):467-473. DOI:10.1007/s12217-017-9565-6

・Uchiyama, R., Okochi, H., Ogata, H., Katsumi,N., Asai, D. and Nakano, T. 2017,09 Geochemical and stable isotope characteristics of urban heavy rain in the downtown of Tokyo, Japan. Atmospheric Research 194:109-118. DOI:10.1016/j.atmosres.2017.04.029

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・Ito, A., Otake, T., Shin, K.-C., Ariffin, K. S., Yeoh, F.-Y., and Sato, T. 2017,07 Geochemical signatures and processes in a stream contaminated by heavy mineral processing near Ipoh city. Applied Geochemistry 82:89-101. DOI:10.1016/j.apgeochem.2017.05.007 (reviewed).

・Uchiyama,R., Okochi,H., Katsumi,N., Ogata,H. 2017,06 The impact of air pollutants on rainwater chemistry during "Urban-induced heavy rainfall" in downtown Tokyo, Japan. Journal of Geophysical Research: Atmospheres 122(12):6502-6519. DOI:10.1002/2017JD026803

・K. Fukaya, A. Kawamori, Y. Osada, M. Kitazawa, M. Ishiguro 2017,05 The forecasting of menstruation based on a state-spacemodeling of basal body temperature time series. Statistics in Medicine 36(21): 3361-3379. DOI:10.1002/sim.7345 (reviewed).

・Shotaro Takano, Masaharu Tanimizu, Takafumi Hirata, Ki-Cheol Shin, Yusuke Fukami, Katsuhiko Suzuki, Yoshiki Sohrin 2017,05 A simple and rapid method for isotopic analysis of nickel, copper, and zinc in seawater using chelating extraction and anion exchange. Analytica Chimica Acta 967:1-11. (reviewed).

・Akihisa Mori, Hiroyuki Kamachi, Ichirou Karahara, Atsushi Kume, Yuko T. Hanba, Kaori Takemura, Tomomichi Fujita 2017,04 Comparisons of the Effects of Vibration of Two Centrifugal Systems on the Growth and Morphological Parameters of the Moss Physcomitrella patens. Biological Sciences in Space(31):9-13. DOI:10.2187/bss.31.9

・Pham, Q. M., Ishiyama, D. and Sera, K. 2017 Geochemistry of chemical species in river water of Shibukuro-Tama-Omono River System containing acidic thermal water and mine drainage water in Akita Prefecture, Japan. NMCC Annual Report 23:151-158.

・Umezawa, Y., Tamaki, A., Suzuki, T., Takeuchi, S., Yoshimizu, C. and Tayasu, I. 2018,03 Phytoplankton as a principal diet for callianassid shrimp larvae in coastal waters, estimated from laboratory rearing and stable isotope analysis. Marine Ecology Progress Series 592:141-158. DOI:10.3354/meps12507 (reviewed).

・Tuno, N., Kohzu, A., Tayasu, I., Nakayama, T., Githeko, A. and Yan, G. 2018,01 Algal diet accelerates larval growth of Anopheles gambiae (Diptera: Culicidae) and Anopheles arabiensis (Diptera: Culicidae). Journal of Medical Entomology 55. DOI:10.1093/jme/tjx244 (reviewed).

・Archer, C.; Andersen, M. B.; Cloquet, C.; Conway, T. M.; Dong, S.; Ellwood, M.; Moore, R.; Nelson, J.; Rehkamper, M.; Rouxel, O.; Samanta, M.; Shin, K.-C.; Sohrin, Y.; Takano, S.; Wasylenki, L. 2017,09 Inter-calibration of a proposed new primary reference standard AA-ETH Zn for zinc isotopic analysis. Journal of Analytical Atomic Spectrometry 32(2):415-419. DOI:10.1016/j.aca.2017.03.010 (reviewed).

・Shinozuka, K., Chiwa, M., Tayasu, I., Yoshimizu, C., Otsuki, K. and Kume, A. 2017,09 Differences in stream water nitrate concentrations between a nitrogen-saturated upland forest and a downstream mixed land use river basin. Hydrology 4:43. DOI:10.3390/hydrology4030043 (reviewed).

・Okano, J., Tayasu, I., Nakano, S. and Okuda, N. 2017,07 Differential responses of two ecologically similar case-bearing caddisflies species to a fish chemical cue: implication for a coexistence mechanism.. Zoological Science 34:461-467. DOI:10.2108/zs160207 (reviewed).

・Matsubayashi, J., Saitoh, Y., Uehara, Y., Osada, Y., Habu, J., Sasaki, T. and Tayasu, I. 2017,06 Incremental analysis of vertebral centra can reconstruct the stable isotope chronology of teleost fishes.. Methods in Ecology and Evolution 8:1755-1763. DOI:10.1111/2041-210X.12834 (reviewed).

・Ishikawa, N.F., Chikaraishi, Y., Ohkouchi, N., Murakami, A.R., Tayasu, I., Togashi, H., Okano, J., Sakai, Y., Iwata, T., Kondoh, M. and Okuda, N. 2017,05 Integrated trophic position decreases in more diverse communities of stream food webs. Scientific Reports 7:2130. DOI:10.1038/s41598-017-02155-8 (reviewed).

・Saitoh, Y., Tamura, T., Nakano, T. 2017,05 Geochemical constraints on the sources of beach sand, southern Sendai Bay, northeast Japan. Marine Geology 387:97-107. DOI:10.1016/j.margeo.2017.04.004 (reviewed).

・Naoko Nonose, Toshihiro Suzuki,Ki-Cheol SHIN, Tsutomu MIURA, Akiharu HIOKI 2017,04 Characterization of a new candidate isotopic reference material for natural Pb using primary measurement method. Analytica Chimica Acta 974:27-42. DOI:10.1016/j.aca.2017.04.019. (reviewed).

・Satomi Shiodera 2017 Tropical peatlands and their environmental issues in Southeast Asia: Indonesian Cases. Proceedings of “Exploring Academic Frontiers for a Sustainable Future: Challenges for Japan-ASEAN Research Collaboration”:221-236.

・Nitzsche K.N., Kaiser M., Premke K., Gessler A., Ellerbrock R., Hoffmann C., Kleeberg A. and Kayler Z.E. 2017 Organic matter distribution and retention along transects from hilltop to kettle hole within an agricultural landscape. Biogeochemistry 136(1):47-70. DOI:10.1007/s10533-017-0380-3 (reviewed).

・Nitzsche K.N., Kalettka T., Premke K., Lischeid G., Gessler A. and Kayler Z.E. 2017 Land-use and hydroperiod affect kettle hole sediment carbon and nitrogen biogeochemistry. Science of the Total Environment 574:46-56. DOI:10.1016/j.scitotenv.2016.09.003 (reviewed).

・Koh Hasegawa, Tamihisa Ohta, Satoru Takahashi 2017 Are hatchery chum salmon fry a native invader? Direct and indirect effects of stocking salmon fry on stream organisms. Hydrobiologia in press. DOI: 10.1007/s10750-017-3344-7 (reviewed).

・Ikuyo Saeki, Shigeru Niwa, Noriyuki Osada, Fujio Hyodo, Tamihisa Ohta, Yoshitaka Oishi, Tsutom Hiura 2017 Adaptive significance of arboreality: field evidence from a tree-climbing land snail. Animal Behaviour 127:53-66. DOI:10.1016/j.anbehav.2017.02.022 (reviewed).

・Jun Matsubayashi, Tamihisa Ohta, Osamu Takahashi, Ichiro Tayasu 2017 Reconstruction of the extinct Ezo wolf’s diet. Journal of Zoology 302(2):88-93. DOI:10.1111/jzo.12436 (reviewed).

【Review Articles】

・Ohkouchi, N., Chikaraishi, Y, Close, H.G., Fry, B., Larsen, T., Madigan, D.J., McCarthy, M.D., McMahon, K.W., Nagata, T., Naito, Y.I., Ogawa, N.O., Popp, B.N., Steffan, S., Takano, Y., Tayasu, I., Wyatt, A.S.J., Yamaguchi, Y.T. and Yokoyama, Y. 2017,08 Advances in the application of amino acid nitrogen isotopic analysis in ecological and biogeochemical studies.. Organic Geochemistry 113:150-174. DOI:10.1016/j.orggeochem.2017.07.009 (reviewed).

○Research Presentations

【Oral Presentation】

・Naoko Nagatsuka, Nozomu Takeuchi, Jun Uetake, Rigen Shimada, Yukihiko Onuma, Sota Tanaka, Takanori Nakano Sr and Nd isotope ratios of cryoconite in western Greenland: identification of sources and the process of transportation of minerals on the dark-colored ice. International Symposium on Cryosphere and Biosphere, 2018.03.18, Kyoto.

・Shannon M. Hanson, Benjamin P. Harvey, Sylvain Agostini, Chikage Yoshimizu, Ichiro Tayasu and Benoit Thibodeau Studying the effect of high pCO2 on the nitrogen cycle within the coral holobiont using stable isotopes. ALSO/AGU Ocean meeting, 2018.02.15, Portland, Oregon,USA.

・Shoedarto, R.M., Tada, Y., Kashiwaya, K., Kubo, T., K., Koike, Malik, D., Iskandar, I., Heriawan, M.N. and Notosiswoyo, S Deducing geothermal boiling zone from rare earth elements on early-stage geothermal exploration. 43th Annual Stanford Geothermal Workshop, 2018.02.12-2018.02.14, Stanford.

・Rahayudin, Y., Kashiwaya, K., Susmanto, A., Tada, Y., Iskandar, I. and Koike, K. Estimation of fluid-rock interaction process and recharge area of the Tampomas geothermal field, West Java, Indonesia by water chemistry. 43th Annual Stanford Geothermal Workshop, 2018.02.12-2018.02.14, Stanford.

・ Konomi Fudamoto Strontium isotope and Sr/Ca ratios in whole otoliths reveal movement patterns of fish within and between rivers. CER-NIE Joint Symposium, December 2017.

・Nakamura, M., Okochi, H., Katsumi, N., Minami, Y., Kobayashi, H., Miura, K and Kato, S Observation of Cloud Water Chemistry in the Free Troposphere and the Atmospheric Boundary Layer on Mt. Fuji (4). 2017 Symposium on Atmospheric Chmistry & Physics at Mountain Sites, November 2017, Gotemba.

・Hiroyuki Sase, Naoyuki Yamashita, Tatsuyoshi Saito, Hathairatana Garivait, Bopit Kietvuttinon, Thiti Visaratana, Masayuki Morohashi, Yayoi Inomata, Makoto Nakata, Tsuyoshi Ohizumi, Kazuhide Matsuda Different reactions of forested catchments to decline of atmospheric S deposition in Japan and Thailand. IUFRO Tokyo 2017, Actions for Sustainable Forest Ecosystems under Air Pollution and Climate Change, October 2017, Fuchu Campus, Tokyo University of Agriculture and Technology, Fuchu, Tokyo.

・R.M. Shoedarto, Y. Tada, K. Kashiwaya, T. Kubo, K. Koike, I. Iskandar, M.N. Heriawan, S. Notosiswoyo, D. Malik Rare earth elements as supporting approaches for early-stage geothermal exploration. Goldschmidt 2017, 2017.08.13-2017.08.18, Paris.

・Jiing Zhang, Shota Kambayashi, Bing Zhang Significance of Submarine Groundwater Discharge on Material Transportation from Land to Ocean: Under Long Term Climate Change and Environmental Accident. 27th Goldschmidt Conference. August, 2017.08.13-2017.08.18, Paris, France. 4478

・Shoedarto, R.M., Tada, Y., Kashiwaya, K., Koike, K. Iskandar, I., Heriawan, M.N., Notosiswoyo, S. and Malik, D. Oxygen isotope and ranking faults analyses to delineate water-rock interaction processes in a high-temperature geothermal system. Geoinforum2017, 2017.06.29-2017.06.30, Yamanashi Prefectural Library .

・Kusaka, S., Yamada, Y., Yoneda, M. Radiocarbon dating on human skeletal remains from Inariyama shell mound of the Jomon period in Japan. Radiocarbon and Diet 2017, 2017.06.20-2017.06.23, Aarhus University, Denmark.

・Shohei Fujinaga, Yuki Kobayashi, Aya Murakami, Masayuki Ushio, Uhram Song, Ichiro Tayasu, Naoto F. Ishikawa, Junichi Okano, Chia-Ying Ko, Hiroyuki Togashi, Yoichiro Sakai, Masayuki Itoh, Nobuhito Ohte, Shinichi Nakano, Tomoya Iwata, Noboru Okuda Bacterial community composition and richness in biofilms of Yasu and Ado Rivers. JpGU-AGU Joint Meeting 2017, 2017.05.21, Makuhari Messe, Chiba.

・Takuya Ishida, Yoshitoshi Uehara, Tomoya Iwata, Osberet Leo A. Privaldos, Satoshi Asano, Toru Ikeya, Kenichi Osaka, Junichiro Ide, Ichiro Tayasu, Noboru Okuda Biogeochimical cycling of phosphate in the Yasu River Watershed: Insight from oxygen isotope of phosphate. JpGU-AGU Joint Meeting 2017, 2017.05.21, Makuhari Messe, Chiba.

・Chia-Ying Ko, Tomoya Iwata, Jun-Yi Lee, Aya Murakami, Junichi Okano, Naoto Ishikawa, Yoichiro Sakai, Ichiro Tayasu, Masayuki Itoh, Uhram Song, Hiroyuki Togashi, Shinich Nakano, Nobuhito Ohte, Noboru Okuda Alpha and beta diversity of benthic macroinvertebrates in natural and disturbed river watersheds and their environmental driver. JpGU-AGU Joint Meeting 2017, 2017.05.21, Makuhari Messe, Chiba.

・Jun'ichiro Ide, Abigail P. Cid-Andres, Takuya Ishida, Ken'ichi Osaka, Tomoya Iwata, Takuya Hayashi, Masanori Akashi, Ichiro Tayasu, Noboru Okuda Comparisons of oxygen isotope ratio of phosphate in river water and rocks between two watersheds in central Japan. JpGU-AGU Joint Meeting 2017, 2017.05.21, Makuhari Messe, Chiba.

・Tamihisa Ohta, Hiura Tsutom Geographic variation of Japanese cedar (Cryptomeria japonica) may have a different effect on soil ecosystem. JPGU-AGU joint Meeting 2017, May 2017, Makuhari Messe、Chiba.

・Yumi Yoshioka, Maho Ito, Kimihito Nakamura, Hiroshi Takimoto, Takeo Tsuchihara Estimation of the groundwater recharge processes using end-member mixing analysis in a paddy-dominated alluvial fan, Japan. JpGU-AGU Joint Meeting 2017, May 2017, Chiba, Japan.

【Poster Presentation】

・Shiomuki,M, Takeuchi,N. Li ,Z The characteristics of cryoconite granules in the glacial forefield of Ürümqi Glacier No.1, Tien Shan, China. International Symposium on Cryosphere and Biosphere, March 2018, Kyoto.

・Okamoto, C., Takeuchi, N., Tayasu, I., Ohta, O. The wingless winter stonefly and its food on snowfields in Japan: analysis of the food web using stable isotopes of carbon and nitrogen. International Symposium on Cryosphere and Biosphere, March 2018, Kyoto.

・Ishiwatari, K., Takeuchi, N., Tayasu, I., Ohta, T. Ecology of collembola (springtails) living on seasonal snow in the deciduous forest in Yamagata Prefecture, Japan. International Symposium on Cryosphere and Biosphere, March 2018, Kyoto.

・Sugiyama, R., Takeuchi N., Li, Z., Spatial variations in chemical soluble ions in the ablation area of Ürümqi Glacier No.1, Tien Shan, China. International Symposium on Cryosphere and Biosphere, March 2018, Kyoto.

・A. Ito, T. Otake, A. Maulana, K. Sanematsu, Sufriadin, T. Sato Geochemical and mineralogical variations in weathering profiles of Ni laterite deposits in East Sulawesi, Indonesia. Asia Africa Mineral Resources Conference, 2017.11.17, Myanmar.

・N. Sugimoto, T. Hosono, and M. Tanimizu Origin of groundwater in Kumamoto city estimated from multiple stable isotope proxies (B, Li, O H). 7th Asia-Pacific Winter Conference on Plasma Spectro-chemistry, November 2017, Shimane.

・Maniwa, M., Okochi. H., Shimada, K., Nakano, T., Igawa, M Stream Water Chemistry in a Mountain Forest near the Tokyo Metropolitan Area and the Impact of Atmospheric Deposition (3). 2017 Symposium on Atmospheric Chmistry & Physics at Mountain Sites , November 2017, Gotemba.

・Nishimura, S., Okochi. H., Shimada. K., Nakano. N, Igawa. M Effect of Atmospheric Deposition on Trace Metals in Stream Water in Mountains near the Tokyo Metropolitan Area (4). 2017 Symposium on Atmospheric Chmistry & Physics at Mountain Sites, November 2017, Gotemba.

・Takashi Kiyomizu, Saya Yamagishi, Atsushi Kume and Yuko T. Hanba Contrast photosynthetic response to air pollutants between an urban shrub Rhododendron × pulchrum and an urban tall tree Ginkgo biloba in Kyoto city: stomatal and leaf mesophyll anatomy are key traits. 3rd asian air pollution workshop, 2017.10.21, Tokyo University of Agriculture and Technology .

・Tomomitsu Kinoshita, Yuko T. Hanba Seasonal variation in atmospheric carbon isotope composition and photosynthesis of Ginkgo biloba. 3rd asian air pollution workshop, 2017.10.21, Tokyo University of Agriculture and Technology.

・T. Otake, S. Nakamura, R. Yamada, K. Shin, S. Ono, T. Sato Large Fe isotope fractionations found in sulfide ores and ferruginous cherts in volcanogenic massive sulfide deposits. Goldschmidt Conference 2017, 2017.08.16, Le Palais des Congrès de Paris.

・Makoto Tsujisaka, Shotaro Takano, Takafumi Hirata, Ki-Cheol Shin and Yoshiki Sohrin Estimation of the paleoenvironment based on the concentration and isotope ratio of molybdenum and tungsten in the Japan Sea sediment. Goldshmidt, Paris, 2017.08.13-2017.08.18.

・Pham, Q. M, Ishiyama, D., Ogawa, Y. and Fukuyama, M. (2017) Transport and speciation of trace metals in Tama - Omono River System in Akita Prefecture, Japan. Goldschmidt Conference, 2017.08.13-2017.08.18, Paris, France.

・Ayami SUZUKI, Shiho YABUSAKI, Ken SUZUKI, Seiki KAWAGOE Evaluation Of Regional Snow Distribution Effect By Using Chemical Feature. 13th Annual Meeting Asia Oceania Geosciences, 2017.08.06-2017.08.11, Singapore. HS06-A006

・Kenichiro Sugitani, Akira Ushikawa, Mariko Yamamoto, Koshi Yamamoto, Kazuyuki Muraoka, Jyunichi Kitamura, Tamihisa Ohta, and Ichiro Tayasu Carbon and nitrogen isotopic features of the bivalve Corbicura japonica and Corbicura leana in the Harai River (Mie Prefecture, central Japan)- a preliminary report. JpGU-AGU Joint Meeting 2017, 2017.05.25, Makuhari Messe, Chiba.

・Maki Noguchi Aita, Kazuaki Tadokoro, Fujio Hyodo, Ichiro Tayasu, Chikage Yoshimizu, Jun Nishioka, Naomi Harada Nitrogen and Carbon stable isotope ratios of zooplankton in the Oyashio region of the western North Pacific. JpGU-AGU Joint Meeting 2017, 2017.05.25, Makuhari Messe, Chiba.

・Tohru Ikeya, Chia-Ying Ko, Elfritzson Martin Peralta, Takuya Ishida, Yoshitoshi Uehara, Satoshi Asano, Noboru Okuda, Masayuki Ushio, Shohei Fujinaga, Ichiro Tayasu, Tomoya Iwata The community composition and diversity of epilithic bacterium and microalgae in a Japanese river system during irrigation season. JpGU-AGU Joint Meeting 2017, 2017.05.20, Makuhari Messe, Chiba.

・Saito, T., Watanabe, N., Kawabe, H., Shin, K.C., Tayasu, I., and Kawamoto, K Characteristics of water quality and stable isotopes (O, H, and Sr) in 15 rivers of Sado Island, Niigata Prefecture. JpGU-AGU Joint Meeting 2017, May 2017, Makuhari Messe、Chiba.

・Koki Ishiwatari, Nozomu Takeuchi, Ichiro Tayasu, Tamihisa Ohta Ecology of collembola (springtails) living on seasonal snow in the deciduous forest in Yamagata Prefecture, Japan - Life cycle and food source inferred from C and N Stable Isotope and their population density and body size-. International Symposium on Cryosphere and Biosphere, 2018.03.16, Kyoto Prefectural University, Kyoto,.

・Chika Okamoto, Nozomu Takeuchi, Ichiro Tayasu, Tamihisa Ohta The wingless winter stonefly and its food on snowfields in Japan: analysis of the food web using stable isotopes of carbon and nitrogen. International Symposium on Cryosphere and Biosphere, 2018.03.16, Kyoto Prefectural University, Kyoto.

・Kai Nitzsche, Ichiro Tayasu A novel way to link terrestrial and aquatic ecosystems: a bio-geo multi-isotope approach. 7th Symposium on Environmental Isotope Study, 2017.12.22, RIHN, Kyoto.

【Invited Lecture / Honorary Lecture / Panelist】

・Yuko T. Hanba Mesophyll/internal conductance in ferns and mosses. Commemorative workshop for Professor Graham Farquhar, 2017 Kyoto Prize laureate, 2017.11.18, Koshiba Hall, The University of Tokyo.

・Atsushi Kume, Yuko T Hanba, Kaori Takemura, Hiroyuki Kamachi, Ichirou Karahara, Tomomichi Fujita Effects of long-term hypergravity treatment on the growth and photosynthesis of Physcomitrella Patens. PSB2017、Plant Signaling & Behavior 2017, 2017.06.28, Shimane Prefectural Convention Center.

・Kenichiro Sugitani, Akira Ushikawa, Mariko Yamamoto, Koshi Yamamoto, Kazuyuki Muraoka, Jyunichi Kitamura, Tamihisa Ohta, Ichiro Tayasu Carbon and nitrogen isotopic features of the bivalve Corbicura japonica and Corbicura leana in the Harai River (Mie Prefecture, central Japan)-preliminary report. JpGU-AGU Joint Meeting 2017, May 2017, .

Division Name: Information Resources Division

Head of Division: SEKINO, Tatsuki

○ 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.

○ Progress and Results in 2017

Collection and accumulation of research resources

(Number of the registered into RIHN Archives in FY 2017)

bibliographic records: 614

objects: 144

electric data: 297

images: 326

(Activities about Institutional Repository in FY 2017)

Register count: 1053

Download count: 44,687

(Total number of the registered into RIHN Archives as of 10th April)

bibliographic records: 8,052

objects: 3,098

electric data: 3,833

(Total count about Institutional Repository as of 10th April)

Registered items: 1,873

(including 1,295 items released for public)

Researches about information technology

The following seminars and lectures were held in FY 2017.

GIS lecture for global environmental study (FOSS4G 2017 KYOTO.KANSAI Hands On Day)

Date: 16th October 2017

2nd Seminar

Application of ontology engineering for knowledge design of global environmental science

Date: 29th May 2017

3rd Seminar

Sustainable Heritage Management in Oman

Date: 14th July 2017

4th Seminar

Toward developing temporal information platform for resource sharing - How is past time specified?

Date: 3rd February 2018

Development of applications

Web pages which is an entrance to access documents and data accumulated in RIHN Archives was designed collaborating with a project NIHU. In FY 2017, themes relating with projects in Program 2 extracted, and icons about the themes were created for the web pages.

●Achievements

○Papers

【Original Articles】

・Yasuhisa Kondo, Katsuhiro Sano, Takayuki Omori, Ayako Abe-Ouchi, Wing-Le Chan, Seiji Kadowaki, Masaki Naganuma, Ryouta O’ishi, Takashi Oguchi, Yoshihiro Nishiaki, Minoru Yoneda 2018,01 Ecological niche and least-cost path analyses to estimate optimal migration routes of Initial Upper Palaeolithic populations to Eurasia. Yoshihiro Nishiaki, Takeru Akazawa (ed.) The Middle and Upper Paleolithic Archaeology of the Levant and Beyond. Replacement of Neanderthals by Modern Humans Series, 5. Springer Nature Singapore, Singapore, pp.199-212. DOI:10.1007/978-981-10-6826-3_13

・Tatsuki Sekino 2017,11 Basic linked data resource for temporal information.. Proceedings of the 2017 Pacific Neighborhood Consortium Annual Conference and Joint Meetings (PNC), IEEE Catalog Number: CFP17M10-ART:76-82. (reviewed).

【Review Articles】

・Yasuhisa Kondo 2018,01 Data science and palaeolithic research. The Archaeological Journal(708):16. DOI:19 (in Japanese) in Japanese with English title

○Research Presentations

【Oral Presentation】

・Yasuhisa Kondo, Hideyuki Onishi, Yoko Iwamoto Is ‘culture’ a buzzword? Ontological challenge of an interdisciplinary project on the cultural history of early modern humans in Asia. 46th annual conference on Computer Applications and Quantitative Methods in Archaeology, 2018.03.19-2018.03.23, Universität Tübingen, Germany.

・Akira Saito, Yasuhisa Kondo, Nozomi Mizota, Tomoko Koyama Visualizing the relationship between Repartimientos and Reducciones: An experiment with the Resource Description Framework. International Symposium Unsettling Resettlement: Forced Concentration of the Native Population in the Colonial Andes, 2018.02.23-2018.02.24, Vanderbilt University, Nashville, TN, USA.

・Asako Iwami・Michinori Kimura・Terukazu Kumazawa Local Residents’ Awareness of the Value of Regional Resources -A Case Study of Traditional Food “Heshiko” of Kutsuki District, Shiga Prefecture -. 10th International Symposium on Environmentally Conscious Design and Inverse Manufacturing, 2017.11.29-2017.12.01, Tainan.

・Terukazu Kumazawa Towards Establishing Collaboration Assessment Based on Ontology Engineering. JSAI International Symposia on AI (JSAI-ISAI) ; Workshop kNeXI 2017 (International Workshop on kNowledge eXplication for Industry), 2017.11.14-2017.11.15, 東京都文京区.

・Tatsuki Sekino Basic linked data resource for temporal information. Pacific Neighborhood Consortium Annual Conference 2017, 2017.11.07-2017.11.09, The Magic School of Green Technologies, National Cheng Kung University, Tainan, Taiwan.

・Tara Beuzen-Waller, Jessica Giraud, Guillaume Gernez, Romain Courault, Yasuhisa Kondo, Charlotte Cable, Christopher Thornton, Éric Fouache Reconstructing the emergence of oasis territories in the piedmont of the Hajar Moutains (Sultanate of Oman): A synthesis of archaeological, geomorphological and geographical data. XXVIIIe Rencontres internationales d’archéologie et d’histoire d’Antibes, 2017.10.10-2017.10.12, Antibes, France.

・Yasuhisa Kondo, Terukazu Kumazawa, Ichiro Tayasu, Takanori Nakano Information visualization for participatory multi-isoscape mapping. JpGU-AGU Joint Meeting 2017, 2017.05.20-2017.05.25, Makuhari Messe, Chiba, Japan. (in Japanese)

・Yasuhisa Kondo, Seiji Kadowaki, Hiroyuki Kitagawa, Miho Suzuki, Hiroto Nakata, Atsushi Noguchi, Atsushi Nobayashi, Yoshihiro Nishiaki Data sharing within the PaleoAsia project to accelerate interdisciplinary research. The 3rd Conference on Cultural History of PaleoAsia, 2017.05.13-2017.05.14, National Museum of Ethnology, Suita-shi, Osaka. (in Japanese)

【Poster Presentation】

・Takehiro Miki, Taichi Kuronuma, Yasuhisa Kondo An analysis of spatial relationship between the Umm an-Nār type tombs and reusing remains at Bāt cemetery, Az-Zahirah, Oman. Seminar for Arabian Studies 2017, 2017.08.04-2017.08.06, The British Museum, London, UK.

・Yasuhisa Kondo Knowledge bridging model to visualize and overcome knowledge information gaps between societal actors with the help of bridging agents. JpGU-AGU Joint Meeting 2017, 2017.05.20-2017.05.25, Makuhari Messe, Chiba, Japan.

・Yasuhisa Kondo, Kazuhiro Hayashi, Miki Kuribayashi, Sachiko Yano, Asanobu Kitamoto Asanobu Kitamoto Future of open science with society: Report on a multi-stakeholder workshop in Japan. JpGU-AGU Joint Meeting 2017, 2017.05.20-2017.05.25, Makuhari Messe, Chiba, Japan.

Division Name: Collaboration Division

Head of Division: MALEE, Hein

○ 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 2017

1. Information Collection: Organizing seminars and workshops (with participation of research institutions and governments from Japan and abroad)

Held RIHN Seminars No. 142 to 157.

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. Also, to further postgraduate education, it participated in brainstorming meetings towards a new Graduate Education Program with Kyoto University and formulated the arrangements and conditions for participation of RIHN teaching staff.

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: Research for Sustainability in the Anthropocene" by Amy Luers, Future Earth Executive Director (October 2017, Kyoto University)

・ The 6th International Symposium for Future Earth in Asia: Sustainable Consumption in Asia: (January 2018, Kyoto University and RIHN)

・The 4th Regional Advisory Committee Meeting for Future Earth in Asia (January 2018, RIHN)

・The 8th Future Earth in Asia Seminar (January 2018, RIHN)

・Special Seminar ”Designing Impactful Communications for Transdisciplinarity – linking local and global actions for a sustainable future” inviting Mr. Alistair Scrutton, the Director of Communications for Future Earth (March 2018, RIHN)

◇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 Committee meeting (18 April, 24 July 2017, Science Council of Japan)

・Future Earth National Committee for Japan preparatory meeting (22 May 2017, Science Council of Japan)

・Future Earth Japan Consortium meeting (15 September 2017, Science Council of Japan)

・Future Earth Japan National Committee Inaugural Meeting (15 September 2017, Science Council of Japan)

・Future Earth Secretariat Retreat (18-20 September 2017, Denver, USA)

・1st Steering Committee Meeting for Future Earth Japan National Committee (19 October 2017, Science Council of Japan)

・1st Meeting of the Future Earth Promotion and Collaboration Committee (31 January 2018, Science Council of Japan)

◇Supported the development of the Knowledge-Action Network on Systems of Sustainable Consumption and Production (KAN-SSCP)

・Online Coordinating meetings for the KAN-SSCP (13meetings held during the period between 2017/4-2018/3)

・Development Team Online Meetings for the KAN-SSCP (5 April, 7 June and 7 September, and 7 November 2017)

・SSCP KAN Online Community Forum (23 January, 13 February, 27 February 2018)

・SSCP KAN Online Collaborative Charrette (20 March 2018)

◇Developed and updated contents for the website of the Regional Centre for Future Earth in Asia http://www.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 conducted and organized lectures and presentations on multiple occasions including a special lecture at the 2nd Multicultural Health Forum (April 2017, RIHN), 17th Conference of the Science Council of Asia (June 2017, Philippines), the 3rd Faculty of Health Sciences International Conference (July 2017, Sapporo) and the NIHU Public Symposium (February 2018, Tokyo). The Project also disseminated research results and enhanced its network through those occasions.

◇Submitted a research proposal entitled “Future Earth: Exploring global sustainability at local to global scales through comprehensive understanding on the interaction between earth and human systems” to the 2017 Roadmap Grant by the MEXT, in collaboration with five domestic research institutes as core partners and with the RIHN as the representative institute for the project.

◇Shortlisted to be interviewed for the MEXT Grant-in-Aid for Scientific Research on Innovative Areas with a proposal entitled “Research towards the creation of new Anthropocene studies” 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 2017 (2017/5/20-5/25 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 “Strategic Research Agenda for Future Earth in Japan”.

◇Lecture series for Doshisha University Science and Engineering Department (2017/5/12-6/30, 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 (2018/3/14-3/16, 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)

○Members

◎ MALLEE, Hein	(Research Institute for Humanity and Nature,Professors, Heads of Divisions)
ISHII Reiichiro	(Research Institute for Humanity and Nature,Associate Professors)
ONISHI Yuko	(Research Institute for Humanity and Nature,Assisitant Professors)
HASHIMOTO Yuki	(Research Institute for Humanity and Nature,Specially Appointed Assistant Professors,Future Earth)
JIANG, Hong-wei	(Research Institute for Humanity and Nature,Specially Appointed Assistant Professors,EcoHealth)

●Achievements

○Papers

【Original Articles】

・Hein Mallee 2017,06 The Evolution of Health as an Ecological Concept. Current Opinion in Environmental Sustainability 25:28-32. DOI:DOI:10.1016/j.cosust.2017.04.009 (reviewed).

○Research Presentations

【Oral Presentation】

・Hein Mallee "From Ecosystem Health to Planetary Health - The Development of "Health" as an Ecological Concept". 3rd Faculty of Health Sciences International Conference, 2017.07.07, Hokkaido University, Sapporo, Hokkaido .

・Yuko Onishi "Strategic Research Agenda for Future Earth in Japan: Collaborative priority setting with stakeholders of global environmental issues". JpGU-AGU Joint Meeting 2017, 2017.05.20, Makuhari Messe, Chiba.

【Invited Lecture / Honorary Lecture / Panelist】

・Hein Mallee "Discussion on Climate, Health and Environment." Moderator. The Belmont Forum Asia-Pacific Regional Information Day, 2017.10.28, Regent Hotel, Taipei.

・Hein Mallee Panel Discussions II "Best practices, lessons learned, and challenges for conducting TD research in Asia-Pacific.". The Belmont Forum Asia-Pacific Regional Information Day, 2017.10.27, Regent Hotel, Taipei.

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 2017

【Research Development of Achievement Transmission Technique in the Transdisciplinary Era】

Plan❶ Host a seminar

・Two TD VISUALIZATION seminars with Sanitation project “The Sanitation Value Chain: Designing Sanitation Systems as Eco-Community-Value System” (Project leader(described at the present name): Funamizu Naoyuki)

・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

Plan❷ Enhancement of cooperation with relevant organizations

・Conclusion of Partnership Agreement with NHK Educational (achievement transmission by video and use of iTunesU and YouTube)

・Production of video works like Globally Important Agricultural Heritage Systems (GIAHS)

Plan❸ Improvement of contents

・Transmission of project research results on iTunesU (“Soils and Fertilizers, the true story” by Desertification in Afro-Eurasia project “Desertification and Livelihood in Semi-Arid Afro-Eurasia” (Project leader: Tanaka Ueru), available to browse in Japanese, English, Tai, Vietnam and Indonesian languages)

【Research and Development of Materials for Environmental Education】

Plan❶ Host a gathering

・Exchange meeting among Meitoku Elementary School students(4th grade) and Hokuryo Senior High School students (2nd grade) coordinated by RIHN and the Society for History and Culture of Iwakura(Sharing study results in the integrated learning period)

Plan❷ Development of materials for environmental education

・Questionnaire survey in Rakuhoku and Hokuryo Senior High School to hear opinions after class(February 23)

・Presentation entitled “Environmental Education with Environmental Humanics: Practice and Future Tasks” in the 29th Annual Meeting of the Japanese Society for Environmental Education” and exchange views with practitioners and researchers (September 1-4)

・Open internet portal site “Eco Koto Manabo” mainly for environmental education practitioners with Environment department, Kyoto prefecture

【New Ideas and Values Creation through knowledge information networking】

Plan❶ Host a seminar

・“Knowledge Creation Seminar” for two times in collaboration with Osaka University and University of Shizuoka(Achievements of the seminar with University of Shizuoka will be published in RIHN Series during fiscal 2018.)

Plan❷ Survey with RIHN project members

・Local related seminar in the project commissioned from Himi city, Toyama Prefecture, with the area-capability project “Coastal Area-capability Enhancement in Southeast Asia” (Project Leader: Ishikawa Satoshi)

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.

・A video work was presented to the public in the 32nd Symposium “How Transdisciplinary Research Facilitates Informatics and Humanities Research”, organized by National Institutes for the Humanities.

・We are now proceeding with data conversion to be able to watch and preparing for release.

②Research and Development of Materials for Environmental Education

・In combination with Kochi University of Technology, we planned and ran the “Kyoto Protocol 20th Anniversary Workshop: Let’s Think about Environmental Problems in Kyoto and Happy Society with Imaginary Future Generation!” in the annual event “Kyoto Environment Festival 2017”, organized by Kyoto Prefecture.

・At the same event, we held exhibition of the International Children's Painting on the Environment and introduced totally 150 painting to the public.(December 9 and 10)

・We facilitated conference with inductees and exchange meeting with university and high school students in the 9th Earth Hall of Fame Kyoto.(February 10)

③New Ideas and Values Creation through knowledge information networking

・Miyazaki prefecture was entrusted with "Kikigaki (account of what one hears) project" as a new study program in Takachiho Public High School. In this project, our division has conducted closely collaboration with the appropriate five towns and villages, Miyazaki prefecture and NPO to prepare manuals and publish "speaker's profile book".

○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

○Editing

【Editing / Co-editing】

・Niles, Daniel (ed.) 2017,06 . 2016-2017 NIHU Prospectus. NIHU,

・Niles, Daniel (ed.) 2017,05 . 2016-2017 RIHN Prospectus. RIHN,

○Papers

【Original Articles】

・D. Niles(with Sander van der Leeuw) 2018,02 The Material Order. The Technosphere Magazine (HKW Anthropocene Curriculum) .

・D. Niles 2017 Learning from GIAHS landscapes. Japan Institute of Landscape Architecture 18(3): 260-263. (in Japanese)

○Research Presentations

【Oral Presentation】

・Daniel, NILES Holistic models of agricultural sustainability. FEAST Annual Assembly, 2018.01.06-2018.01.06, RIHN,Kyoto.

・Daniel, NILES Overlapping forms: linking material culture and environmental knowledge. , 2017.11.08-2017.11.08, Archaeological Research Facility, Department of Anthropology, UC Berkeley, USA.

【Invited Lecture / Honorary Lecture / Panelist】

・Daniel, NILES Ecology, Aesthetics and the Anthropocene: Seeking the patterns of environmental knowledge. , 2018.03.20-2018.03.20, Department of Geography, Chiang Mai University, Thailand.

・Daniel, NILES . commentator「Rethinking environmental praxis, disciplinarity, and sustainability: From the viewpoint of the Anthropocene in East Asia. Research Colloquium」, 2018.02.15-2018.02.15, RIHN,Kyoto. organized with Masahiro Terada and Yutaka Mimura

・Daniel, NILES Beyond control: Agricultural heritage and the Anthropocene. Agriculture and Human Impacts on the Environment: Japan, Asia and Beyond, 2017.11.06-2017.11.07, U.C. Berkeley, CA.

・Daniel, NILES The return of nature: On the structure and aesthetics of environmental knowledge. , 2017.11.02-2017.11.02, Clark University.

Outreach Programs and Events

1. RIHN International Symposium

In order to diffuse the findings of FR projects, the RIHN 12th International Symposium "Trans-scale Solutions for Sustainability" was held on 20-21 December 2017 at the Kyoto International Conference Center. The details of the symposium are as follows.

RIHN 12th International Symposium

<Wednesday, December 20>

Plenary Session

Chair: TANIGUCHI Makoto (RIHN)

Welcome and Introduction to Plenary Session: TANIGUCHI Makoto

Opening Remarks: YASUNARI Tetsuzo (Director-General, RIHN)

Keynote Address: Pathways to Global Sustainability: Multi-scale Tradeoffs
Peter H. VERBURG (Vrije Universiteit Amsterdam, the Netherlands)

Session 1: Trans-spatial Connections

Chair: TAYASU Ichiro (RIHN)

Introduction to Session 1: Trans-spatial Connections and Environmental Traceability Methods
TAYASU Ichiro (RIHN)

Isotopes and Isoscapes: Tools for Understanding and Explaining Spatial and Temporal Variations in Local Ecosystems and Suggesting Solutions to Global Environmental Issues
Carol KENDALL (United States Geological Survey, USA [emeritus])

Mapping the Carbon, Air Pollution, and Biodiversity Footprints of Nations: A GIS + GLOBAL SUPPLY CHAINS
KANEMOTO Keiichiro (Shinshu University)

Understanding Integration with Nexus Approach: Developing Transferable, Scalable, & Sustainable Methods
ENDO Aiko (RIHN)

Towards Integrated Solutions for Water, Energy, and Land Using an Integrated Nexus Modeling Framework
WADA Yoshihide (International Institute for Applied Systems Analysis (IIASA), Austria)

Roundtable Discussion
Chair: NAKASHIZUKA Tohru (RIHN)
The above speakers, Jiaguo QI (Michigan State University, USA) and OHTE Nobuhito (Kyoto University)

<Thursday, December 21>

Session 2: Trans-temporal Connections

Chair: ISHII Reiichiro (RIHN)

Introduction to Session 2: Towards the Reconciliation between the Regional Plannings and the Global Projections of Future Environmental Sustainability
ISHII Reiichiro (RIHN)

Integrated Analyses of Climate Policies for Simultaneous Realization of the Paris Agreement and the SDGs
TAKAHASHI Kiyoshi (National Institute for Environmental Studies)

Inclusive Wealth Report 2018
MANAGI Shunsuke (Kyushu University)

Tipping Points in the Anthropocene: Drivers, Connections, and Impacts
Garry PETERSON (Stockholm Resilience Centre, Sweden)

Roundtable Discussion
Chair: SAIJO Tatsuyoshi (RIHN)
The above speakers, SAIZEN Izuru (Kyoto University) and WADA Yoshihiko (Doshisha University)

Session 3: Social Responses to Tipping Points

Chair: TANIGUCHI Makoto (RIHN)

Introduction to Session 3

TANIGUCHI Makoto (RIHN)

Social Decisions for the Water-Energy-Food Nexus

TANIGUCHI Makoto (RIHN)

The Groundwater Commons Game: Modelling Cultural Values, Triggering Social Tipping Points, and Embarking on Sustainable Pathways towards Groundwater Conservation

Juan CASTILLA (Commonwealth Scientific and Industrial Research Organization (CSIRO), Australia)

Taking Social Responses to "Tipping" Points Seriously – Challenges and Opportunities

Victor GALAZ (Stockholm Resilience Centre, Sweden)

Roundtable Discussion

Chair: SUGIHARA Kaoru (RIHN)

The above speakers, Line GORDON (Stockholm Resilience Centre, Sweden) and HIYAMA Tetsuya (Nagoya University

General Discussion

Chair: TANIGUCHI Makoto RIHN)

Sessions Summaries and Discussion across All Sessions

Closing Remarks

KUBOTA Jumpei (RIHN)

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 7th Annual Symposium of Environmental Isotope Study

Date: 22 December, 2017

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. Five seminars were held in 2017 at the RIHN lecture hall and several sites in Kyoto.

RIHN staff offer accessible explanations of global environmental problems, and the Public Seminars have stimulated engrossing discussions of contemporary environmental concerns.

The 72nd Public Seminar 16 June, 2017

Environmental regeneration starting from the 'Can't help caring' sentiment

KIKUCHI Naoki (RIHN)

MIMURA Yutaka (RIHN)

The 73rd Public Seminar 4 July, 2017

Future Design

SAIJO Tatsuyoshi (RIHN)

KOBAYASHI Mai (RIHN)

The 74th Public Seminar 1 February, 2018
Our "Environment" between Present and Future: A Discussion with High School Students
Students at Kyoto Prefectural Rakuhoku High School

The 75th Public Seminar 15 February, 2018
Moving from management to care: the Area Capability approach to local resources
ISHIKAWA Satoshi (RIHN)
SHINKAI Rika (RIHN)

The 76th Public Seminar 23 March, 2018
China's Environmental Problems and Prospects for Japanese Cooperation
KUBOTA Jumpei (RIHN)
MIMURA Yutaka (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 2017, 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: 28 July, 2017
Venue: RIHN
Lecturer: FUNAMIZU Naoyuki (RIHN)
ITO Ryusei (Hokkaido University)

(Winter)
Date: 10 February, 2018
Venue: RIHN
Lecturer: KONDO Yasuhisa (RIHN)
SHIBATA Rei (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 2017.

Date: 28 July, 2017
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 2017, three seminars were held as below.

The 19th RIHN Area Seminar (Hokkaido)
"Rediscover "the agriculture": Understanding from the fields"
Date: 4 August 2017
Venue: Room F319, Graduate School of GLOBAL FOOD RESOURCES, HOKKAIDO UNIVERSITY

The 20th RIHN Area Seminar (Shiiba Village)
Date: 12 October 2017
Venue: Shiiba Village

The 21st RIHN Area Seminar (Shiga)
"Community Empowerment in Satoyama: Biodiversity Enhanced by Bonding Social Capitals"
Date: 24 February 2018
Venue: Koka City

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 2017 as below.

9th Tokyo Seminar
"Global Environment and Democracy: Learning in the Anthropocene II"
Date: 27 January, 2018
Venue: 21KOMCEE West, 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 2017 as below.

The Earth Forum Kyoto; International Symposium
Date: 11 February, 2018
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 2017 recipients of the Earth Hall of Fame Kyoto Award:

Miguel A. Altieri (Professor Emeritus at the University of California, Berkeley)
Margaret Anne McKean (Professor Emeritus at the Duke University)
Dennis L. Meadows (Professor Emeritus at the University of New Hampshire)

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.

142nd	20 April, 2017 at RIHN Lecture Hall Climate Change and Resiliencies of Traditional Agro-ecosystems Dr. Parviz Abolghassem KOOHAFKAN (RIHN Visiting Research Fellow)
143rd	28 April, 2017 at RIHN Lecture Hall 1. Riverine and Wetland environments: From niche construction to nutritional archaeology 30 May, 2017 at RIHN Lecture Hall 2. The geomorphology of The Anthropocene and implications for sustainable river and slope systems Dr. Antony Brown (University of Southampton/Invited Scholar RIHN)
144th	9 May, 2017 at RIHN Lecture Hall The Trump era and Global Environmental Issue YONEMOTO Shohei (Visiting Professor University of Tokyo, Visiting Professor RIHN)
145th	18 July, 2017 at RIHN Lecture Hall Digital Revolution and Planetary Boundaries Dr. Stephane Grumbach (Senior Scientist at INRIA, Director of IXXI, Rhône-Alpes Complex Systems Institute)
146th	26 July, 2017 at RIHN Lecture Hall An introduction to Applied Systems science Prof. Dr. Pavel Kabat (Director (IIASA))
147th	3 August, 2017 at RIHN Seminar Rooms 3 & 4 Review the history of malaria control and environment change in Hainan Island from an Ecohealth perspective Dingwei Sun (RIHN Visiting Research Fellow Program / Hainan Provincial Disease Management Center Associate Professor)
148th	18 October, 2017 at RIHN Seminar Rooms 3 & 4 Big Data for Urban Transformation. A Case Study Example from Los Angeles California Stephanie Pincetl, Professor in Residence and Founding Director, California Center for Sustainable Communities, Institute of the Environment and Sustainability, UCLA
149th	1 November, 2017 at RIHN Lecture Hall Observation, analysis and theory in ecology for next generations -What we have achieved in global environment studies- Linking biodiversity, ecosystems, and people across scales: challenges for ecology and sustainability Prof. Michel Loreau (Invited) Regional assessment on ecosystem services by using biodiversity data NAKASHIZUKA Tohru Sustainable management of tropical rain forest KITAYAMA Kanehiro Another tropical forest of Borneo: History of 50 years of forest village SAKAI Akiko Vegetation-Human interaction models based on field observaion in Mongolia

ISHII Reiichiro
Use of multi-elemental isotopes in ecological and environmental research
TAYASU Ichiro
Development of distribution survey method for macro-organisms using environmental DNA
MINAMOTO Toshifumi

150th 13 November, 2017 at RIHN Lecture Hall
Human impact on groundwater temperatures
Susanne Benz (Karlsruhe Institute of Technology)

151st 12 December, 2017 at RIHN Seminar Rooms 3 & 4
The Future of Cities in a Fossil-Carbon Constrained World
Prof. Stephanie Princetl (Director, California Center for Sustainable Communities, Invited Scholar)

152nd 11 January, 2018 at RIHN Lecture Hall
Resilience in the Sky: moisture recycling as connector of land and water
Lan Wang Erlandsson (JSPS Fellow, Researcher, Stockholm Resilience Centre, Stockholm University)

153rd 17 January, 2018 at RIHN Lecture Hall
Sustainability Challenges and Opportunities in West Asia
Mohammed Raouf Aly (Research Fellow, Gulf Research Center)

154th 5 March, 2018 at RIHN Lecture Hall
A Nexus Approach to Water, Food and Energy for Climate Smart Agriculture
Parviz Koohafkan (Invited Scholar RIHN, President, World Agricultural Heritage Foundation)

155th 9 March, 2018 at RIHN Lecture Hall
Effects of long- and short-term atmospheric water cycles on the water balance over the Maritime Continent
Hironari Kanamori

156th 13 March, 2018 at RIHN Lecture Hall
Action Research on Citizen Autonomy and Community Empowerment ~Practice of collaborative action research~
Takayoshi Kusago, PhD (Professor, School of Sociology, Kansai University)

157th 28 March, 2018 at RIHN Seminar Rooms 3 & 4
Economics of the Water-Energy-Food Nexus: Insights from Kumamoto and Obama
Kimberly Burnett, University of Hawaii Economic Research Organization (UHERO), RIHN Visiting Research Fellow

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.

283rd 4 July, 2017
Isotope as a tool of traceability -introduction of my study and core project
FUJIYOSHI Rei (Core Project Researcher)

284th 18 July, 2017
A small talk on contents of my “toolbox” for research
HARAGUCHI Takashi (Center Researcher)

285th 1 August, 2017
Earthquake in Colonial Indonesia and Records of Historical Materials
KAJITA Ryosuke (Project Researcher)

286th 5 September, 2017
How I use video in my research on Natural burial in Japan
KIM, Satbyul (Specially Appointed Assistant Professors)

287th 19 September, 2017
Temporal variation of stable isotopes of oxygen and hydrogen in precipitation
YABUSAKI Shiho (Center Researcher)

288th 3 October, 2017
Mystery of Head Tax, Disappeared Tombstones and Spread of Pots, and Academic Paintings as Miniature Paintings : Historical Studies in Burkina Faso (West Africa), Material Culture Studies, and anthropology⇔art
NAKAO Seiji (Project Researcher)

289th 17 October, 2017
Exploring the potentials of a new perspective for a local approach: The Water-Energy-Food Nexus
SPIEGELBERG, Maximilian (Project Researcher)

290th 31 October, 2017
The fair and equitable "benefit sharing" from the perspective of international debate on genetic resource.
KOBAYASHI Kunihiko (Project Researcher)

291st 7 November, 2017
An approach of ecology for human life: lessons from my study
IKEYA Toru (Project Researcher)

292nd 12 December, 2017
Seeing the paleoenvironment through the window of ancient "Kitchen"―From a view point of zoo-archaeologist.
SHINKAI Rika (Visiting Researchers)

293rd 16 January, 2018
Modelling and mapping cultural ecosystem services
SHIBATA Rei (Program Researcher)

294th 30 January, 2018
Neighborhood Association and Land ownership in modern Kyoto
IWAMOTO Yoko (Center Research Associates)

12. RIHN General Meeting (RGM)

(Former Name: RIHN Annual Open Meeting)

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 318 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: 29 November - 1 December, 2017
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 2017, press conferences were held as below.

The 1st Press Conference in FY2017
Date: 14 June, 2017
Venue: Kyoto Karasuma Convention Hall, Meeting room1

The 2nd Press Conference in FY2017
Date: 21 February, 2018
Venue: Kyoto Karasuma Convention Hall, Meeting room3

14. Publications

14-1 RIHN Science Series

"Crossing World beyond Nature and Culture: Dialogue with Philippe Descola"
Edited by AKIMICHI Tomoya (in Japanese)
"Catastrophe and Time Memory, Narrative, and the Energeia of History"
Written by TERADA Masahiro (in Japanese)

14-2 RIHN Book Series: Global Environmental Studies (in English)

This series introduces the research undertaken at, or in association with RIHN. The works published here will reflect the full breadth of RIHN scholarship in this transdisciplinary field of global environmental studies.

"Global Warming and Human - Nature Dimension in Northern Eurasia"
Edited by HIYAMA Tetsuya, TAKAKURA Hiroki, 2017
"The Water-Energy-Food Nexus - Human-Environmental Security in the Asia-Pacific Ring of Fire"
Edited by ENDO Aiko, OH Tomohiro, 2018

14-3 Others

"Megacities vol.5 Sprawling Megacities"
Edited by MURAMATSU Shin, MURAKAMI Akinobu, HAYASHI Kengo, KURIHARA Shinji (in Japanese)
"Megacities vol.6 Further Concentration in Megacities"
Edited by MURAMATSU Shin, OKABE Akiko, AMEMIYA Tomohiko (in Japanese)
"Handbook of East and Southeast Asian Archaeology"
Edited by Habu, Junko, Lape, Peter V., Olsen, John W.
Comic books "Soils and Fertilizers, the true story"
Collaborated with RIHN project 'Desertification and Livelihood in Semi-Arid Afro-Eurasia' (in Japanese, Thai, English, Indonesian and Vietnamese)

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 66-71 were published in fiscal year 2017.

Individual Achievements

A	ABE Ken-ichi	Professor
	ADACHI Kaori	Visiting Researcher
	AKIMICHI Tomoya	Emeritus Professor
	ASANO Satoshi	Project Researcher
B	BANSAL, Benjamin	Visiting Researcher
	BENZ, Susanne	Visiting Researcher
	BROWN, Antony Gavin	Visiting Research Fellow
	Burnett, Kimberly Michi	Visiting Research Fellow
E	ENDO Aiko	Associate Professor
F	FUJII Shigeo	Visiting Professor
	FUJIYOSHI Rei	Project Researcher
	FUNAMIZU Naoyuki	Professor
G	GAN, Jingchao	Visiting Researcher
H	HABU Junko	Visiting Professor
	HARAGUCHI Takashi	Center Researcher
	HASEGAWA Asako	Specially Appointed Assistant Professor
	HASHIMOTO Yuki	Specially Appointed Assistant Professor
	HAYASHI Hiroaki	Visiting Professor
	HAYASHI Koji	Project Researcher
	HAYASHIDA Sachiko	Visiting Professor
	HOMMA Kosuke	Visiting Associate Professor
	HONDA Hisami	Project Research Associate
I	IKEYA Tohru	Project Researcher
	IMAIZUMI Aki	Project Researcher
	ISHIBASHI Hiroyuki	Project Researcher
	ISHIDA Takuya	Project Researcher
	ISHII Reiichiro	Associate Professor
	ISHIKAWA Satoshi	Professor
	ISHIYAMA Shun	Visiting Researcher
	ITO Keisuke	Project Researcher
	IWAMOTO Yoko	Center Research Associate
J	JIANG, Hong-wei	Research Fellow NIHU Center for Area Studies
K	KAJITA Ryosuke	Project Researcher
	KAMATANI Kaoru	Specially Appointed Assistant Professor
	KANEKO Shinji	Visiting Professor
	KANEMOTO Keiichiro	Visiting Associate Professor
	KANIE Norichika	Visiting Professor
	KARATSU Fukiko	Program Research Associate
	KASUGA Fumiko	Visiting Professor
	KATAOKA Megumi	Research Associate
	KATO Yoshikazu	Center Researcher
	KATSURA Tomomi	Project Research Associate
	KAWASAKI Masahiro	Visiting Professor
	KIKUCHI Naoki	Visiting Associate Professor
	KIM Satbyul	Specially Appointed Assistant Professor
	KIMURA Ayako	Project Research Associate
	KISHIMOTO Sayaka	Center Research Associate
	KITAMURA Kenji	Visiting Researcher
	KOBAYASHI Kunihiko	Program Researcher
	KOBAYASHI Mai	Project Researcher

	KOBAYASHI Yuko	Project Research Associate
	KOHSAKA Ryo	Visiting Professor
	KONDO Yasuhisa	Associate Professor
	KOOHAFKAN, Abolghassem Parviz	Visiting Research Fellow
	KOZAN Osamu	Visiting Associate Professor
	KUBOTA Jumpei	Professor
	KUMAZAWA Terukazu	Associate Professor
	KURIU Harumi	Project Research Associate
	KUSAGOU Takayoshi	Visiting Professor
L	LAMBINO, Ria Adoracion Apostol	Project Researcher
	LI, Zhen	Project Researcher
M	MALLEE, Henricus Paulus	Professor
	MASUHARA Naoki	Senior Program Researcher
	MATSUDA Hirotaka	Visiting Associate Professor
	MATSUMOTO Takuya	Visiting Researcher
	MATSUOKA Yuko	Project Research Associate
	MC GREEVY, Steven Robert	Associate Professor
	MIKI Hiroshi	Visiting Researcher
	MIMURA Yutaka	Center Research Associate
	MIYAZAKI Hidetoshi	Visiting Researcher
	MIZUMA Sakiko	Project Research Associate
	MIZUNO Kosuke	Professor
	MORI Koichiro	Visiting Professor
	MOROTA Hiroaki	Program Researcher
	MURAMATSU Shin	Visiting Professor
	MURAYAMA Satoshi	Visiting Professor
N	NAITO Daisuke	Project Researcher
	NAKAGAMI Ken'ichi	Visiting Professor
	NAKAI Minami	Project Research Associate
	NAKAO Seiji	Project Researcher
	NAKASHIZUKA Tohru	Specially Appointed Professor
	NAKATSUKA Takeshi	Professor
	NILES, Daniel Ely	Associate Professor
	NITZCHE, Kai	Visiting Researcher
O	OH Tomohiro	Project Researcher
	OHTA Kazuhiko	Project Researcher
	OHTA Tamihisa	Visiting Researcher
	OKA Masami	Center Research Associate
	OKAMOTO Takako	Project Research Associate
	OKUDA Noboru	Associate Professor
	ONISHI Yuko	Assistant Professor
	OSADA Yutaka	Center Researcher
	OSAWA Takamasa	Project Researcher
	OTEGA-ASANTE, Osei	Visiting Researcher
P	PINCETL, Stephanie Sabine	Visiting Research Fellow
R	RAMPISELA, Dorotea	Visiting Professor
	RUPPRECHT, Christoph David Dietfried	Project Researcher
S	SAIJO Tatuyoshi	Specially Appointed Professor
	SAITO Yu	Center Researcher
	SAKAKIBARA Masayuki	Visiting Professor

	SATO Tomonobu	Visiting Researcher
	SEKINO Tatsuki	Professor
	SENDA Masako	Project Research Associate
	SHIBATA Akira	Visiting Professor
	SHIBATA Rei	Program Researcher
	SHIMADA Nahoko	Center Research Associate
	SHIMAUCHI Risa	Project Research Associate
	SHIN, Kicheol	Assistant Professor
	SHINKAI Rika	Visiting Researcher
	SHIRAIWA Takayuki	Visiting Associate Professor
	SPIEGELBERG, Maximilian	Project Researcher
	SUDA Masashi	Visiting Researcher
	SUGIHARA Kaoru	Specially Appointed Professor
	Sun, Dingwei	Visiting Research Fellow
	SUZUKI Haruka	Project Researcher
T	TAKESHIMA Hirohiko	Visiting Researcher
	TAKEUCHI Kiyoshi	Visiting Associate Professor
	TAMURA Norie	Senior Project Researcher
	TANAKA Ueru	Visiting Professor
	TANIGUCHI Makoto	Professor
	TAYASU Ichiro	Professor
	TERADA Masahiro	Visiting Associate Professor
	TERAMOTO Shun	Project Research Associate
	TESHIMA Mika	Project Research Associate
	TOYAMA Mari	Specially Appointed Associate Professor
	TSUSHIMA Akane	Project Researcher
U	UEHARA Yoshitoshi	Project Researcher
W	WANG-ERLANDSSON, Lan	Visiting Researcher
	WATANABE Kazuo	Visiting Associate Professor
	WATANABE Kirie	Project Research Associate
Y	YABUSAKI Shiho	Center Researcher
	YAMAMOTO Aya	Program Research Associate
	YANAKA Hiroko	Program Research Associate
	YASUNARI Tetsuzo	Director-General
	YONEMOTO Shohei	Visiting Professor
	YOSHIDA Takehito	Associate Professor
	YOSHIMIZU Chikage	Center Researcher

FUJIYOSHI, Rei

Project 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—

[Research Presentations]

[Poster Presentation]

・Lei FUJIYOSHI, Atsuko SUGIMOTO, Youhei YAMASHITA, Xiaoyang LI Influence of soil nitrogen availability on nitrogen isotope ratios of plant and soil by comparison of northern Japan (Hokkaido) and northern Mongolia . The 65th ANNUAL MEETING OF THE ECOLOGICAL SOCIETY OF JAPAN, 2018.03.14-2018.03.18, Sapporo Convention Center, 1-1-1 Higashi-Sapporo 6-jo, Shiroishi-ku, Sapporo, Japan.

FUNAMIZU Naoyuki

Professor

Born in 1953.

[Academic Career]

Department of Sanitary Engineering, Hokkaido University (1976)

Graduate School of Engineering, Department of Sanitary Engineering, Hokkaido University, Master Course (1978)

[Professional Career]

Assistant Professor, Department of Sanitary Engineering, Hokkaido University (1978)

Associate Professor, Department of Sanitary Engineering, Hokkaido University (1989)

Visiting Fellow, Department of Civil and Environment Engineering, University of California, Davis (1995)

Associate Professor, Graduate School of Engineering, Hokkaido University (1997)

Professor, Graduate School of Engineering, Hokkaido University (2004)

Specially Appointed Professor, Graduate School of Global Food Resources, Hokkaido University (2017)

[Higher Degrees]

Doctor of Engineering (Hokkaido University, 1986)

[Fields of Specialization]

Sanitary Engineering

[Academic Society Memberships]

International Water Association
Japan Society of Civil Engineers
Japan Society on Water Environment
Japan Swage Works Association
Japan Water Works Association
The Engineering Academy of Japan

[Awards]

WRRS2005 The best poster award: "Toxicity assessment of the hydrophilic organic matter in the activated sludge decay process" (2005)
The second Manufacturing award (Excellence Award)"Development of Bio-Toilet" (2007)
Japan Society on Water Environment Best Paper Award: "Transformation and characterisation of dissolved organic matter during the thermophilic aerobic biodegradation of feces" (2008)
International Water Association Fellow (2010)
Japan Water Forum Toilet Award to change the world (2014)
Japan Society on Water Environment Achievement award (2014)
Best Presentation Award 9th IWA International Symposium on Waste Management Problems in Agro-Industries: "Effect of burned shell dosage on crystal species in synthetic cow urine (S. Kaneko, R. Ito, N. Funamizu" (2014)
Best Poster Award IWA Specialist conference on Nutrient Removal and Recovery "Water and Inorganic Nitrogen Components Movement in the Soil Column of Grain Sorghum" (Abukmeil Reem, Funamizu N.) (2015)
Japan Society on Water Environment Academic Award "Development of Wastewater Differentiable Onsite Treatment System" (2015)

—Achievements—

[Papers]

[Original Articles]

・Oishi W, Sano D,Decrey L, Kadoya S, Kohn T, Funamizu N 2017 Identification of the inactivating factors and mechanisms exerted on MS2 coliphage in concentrated synthetic urine. Science of the total environemnt 598:213-219. DOI:10.1016/j.scitotenv.2017.04.088 (reviewed).
・Ryusei Ito, Mei Tanie, Ken Ushijima, Dewi Nilawati, Neni Sintawardani,Naoyuki Funamizu 2017 Evaluation of acceptance of a composting toilet prototype for people in slum area in Indonesia, Desalination and Water Treatment. Desalination and Water Treatment. DOI:doi: 10.5004/dwt.2017.20880 (reviewed).
・Drissa Sangare , Boukary Sawadogo, Mariam Sou/Dakoure, Danielle M. Ouedraogo,Nowaki Hijikata, Hamma Yacouba, Lacina Coulibaly, and Naoyuki Funamizu 2017 Short Term Effects of Treated Greywater by High Rate Algal Ponds Process on Vegetable Yield and Soil Properties under Sudano-Sahelian Climate Conditions. Environmental Progress & Sustainable Energy. DOI:10.1002/ep.12658 (reviewed).
・Oishi W, Sano D,Decrey L, Kadoya S, Kohn T, Funamizu N 2017 Identification of the inactivating factors and mechanisms exerted on MS2 coliphage in concentrated synthetic urine. Science of the total environemnt 598:213-219. DOI:10.1016/j.scitotenv.2017.04.088 (reviewed).

[Research Presentations]

[Oral Presentation]

・Zorica Srdjevic, Naoyuki Funamizu, Bojan Srdjevic, Ratko Bajčetić Grounded Theory Methodology and Public Participation in Water Management. 10th World Congress on Water Resources and Environment "Panta Rhei", 2017.07.05-2017.07.09, Athens.

[Invited Lecture / Honorary Lecture / Panelist]

・Funamizu N Sanitation Value Chain. 5th Annual research symposium, JSPS Alumni Association in Philippine, 2017.07.12, Manila.

HABU Junko

Visiting 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—

[Books]

[Authored/Co-authored]

・Habu, Junko, John W. Olsen and Peter Lape 2017 Handbook of East and Southeast Asian Archaeology. Springer, New York, NY (In press)

KAJITA Ryosuke

Project 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]

[Invited Lecture / Honorary Lecture / Panelist]

・Ryosuke Kajita Historical Disaster Research in Japan and Indonesia -International Cooperation for Security and Peace-. First Conference on Strategic and Global Studies: Toward World Peace Order, 2017.11.30, Indonesia, Depok.

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—

[Papers]

[Original Articles]

・Yasuhisa Kondo, Katsuhiro Sano, Takayuki Omori, Ayako Abe-Ouchi, Wing-Le Chan, Seiji Kadowaki, Masaki Naganuma, Ryouta O'ishi, Takashi Oguchi, Yoshihiro Nishiaki, Minoru Yoneda 2018,01 Ecological niche and least-cost path analyses to estimate optimal migration routes of Initial Upper Palaeolithic populations to Eurasia. Yoshihiro Nishiaki, Takeru Akazawa (ed.) The Middle and Upper Paleolithic Archaeology of the Levant and Beyond. Replacement of Neanderthals by Modern Humans Series, 5. Springer Nature Singapore, Singapore, pp.199-212. DOI:10.1007/978-981-10-6826-3_13

[Review Articles]

・Yasuhisa Kondo 2018,01 Data science and palaeolithic research. The Archaeological Journal(708):16. DOI:19 (in Japanese) in Japanese with English title

[Research Presentations]

[Oral Presentation]

・Yasuhisa Kondo, Hideyuki Onishi, Yoko Iwamoto Is ‘culture’ a buzzword? Ontological challenge of an interdisciplinary project on the cultural history of early modern humans in Asia. 46th annual conference on Computer Applications and Quantitative Methods in Archaeology, 2018.03.19-2018.03.23, Universität Tübingen, Germany.

・Akira Saito, Yasuhisa Kondo, Nozomi Mizota, Tomoko Koyama Visualizing the relationship between Repartimientos and Reducciones: An experiment with the Resource Description Framework. International Symposium Unsettling Resettlement: Forced Concentration of the Native Population in the Colonial Andes, 2018.02.23-2018.02.24, Vanderbilt University, Nashville, TN, USA.

・Yasuhisa Kondo, Hideyuki Onishi, Yoko Iwamoto Is ″culture″ a buzzword?. The 4th Conference on Cultural History of PaleoAsia, 2017.12.09-2017.12.10, Hongo Campus, The University of Tokyo. (in Japanese)

・Tara Beuzen-Waller, Jessica Giraud, Guillaume Gernez, Romain Courault, Yasuhisa Kondo, Charlotte Cable, Christopher Thornton, Éric Fouache Reconstructing the emergence of oasis territories in the piedmont of the Hajar Moutains (Sultanate of Oman): A synthesis of archaeological, geomorphological and geographical data. XXVIIIe Rencontres internationales d’archéologie et d’histoire d’Antibes , 2017.10.10-2017.10.12, Antibes, France.

・Yasuhisa Kondo, Terukazu Kumazawa, Ichiro Tayasu, Takanori Nakano Information visualization for participatory multi-isoscape mapping. JpGU-AGU Joint Meeting 2017, 2017.05.20-2017.05.25, Makuhari Messe, Chiba, Japan. (in Japanese)

・Yasuhisa Kondo, Seiji Kadowaki, Hiroyuki Kitagawa, Miho Suzuki, Hiroto Nakata, Atsushi Noguchi, Atsushi Nobayashi, Yoshihiro Nishiaki Data sharing within the PaleoAsia project to accelerate interdisciplinary research. The 3rd Conference on Cultural History of PaleoAsia, 2017.05.13-2017.05.14, National Museum of Ethnology, Suita-shi, Osaka. (in Japanese)

[Poster Presentation]

・Takehiro Miki, Taichi Kuronuma, Yasuhisa Kondo An analysis of spatial relationship between the Umm an-Nār type tombs and reusing remains at Bāt cemetery, Az-Zahirah, Oman. Seminar for Arabian Studies 2017, 2017.08.04-2017.08.06, The British Museum, London, UK.

・Yasuhisa Kondo Knowledge bridging model to visualize and overcome knowledge information gaps between societal actors with the help of bridging agents. JpGU-AGU Joint Meeting 2017, 2017.05.20-2017.05.25, Makuhari Messe, Chiba, Japan.

・Yasuhisa Kondo, Kazuhiro Hayashi, Miki Kuribayashi, Sachiko Yano, Asanobu Kitamoto Asanobu Kitamoto Future of open science with society: Report on a multi-stakeholder workshop in Japan. JpGU-AGU Joint Meeting 2017, 2017.05.20-2017.05.25, Makuhari Messe, Chiba, Japan.

KUMAZAWA Terukazu

Associate Professor

Born in 1974.

[Higher Degrees]

Dr of Engineering

[Fields of Specialization]

Environmental planning

Regional informatics

—Achievements—

[Books]

[Chapters/Sections]

・Aiko Endo, Terukazu Kumazawa, Kimberly Burnett, Akira Ishii, Izumi Tsurita, Christopher A.Wada, Takaaki Kato, Makoto Yamada, and Pedcris Orencio 2018,03 An Interdisciplinary Approach for Water-Energy-Food Nexus. Aiko Endo and Tomohiro Oh (ed.) The Water-Energy-Food Nexus: Human-Environmental Security in the Asia-Pacific Ring of Fire. Global Environmental Studies. Springer Singapore, Singapore, pp.289-299. DOI:10.1007/978-981-10-7383-0_20

・Terukazu Kumazawa, Keishiro Hara, Aiko Endo, and Makoto Taniguchi 2018,03 Assessment of Collaboration Process in Interdisciplinary Research of Water-energy-food Nexus by Means of Ontology Engineering. Aiko Endo and Tomohiro Oh (ed.) The Water-Energy-Food Nexus: Human-Environmental Security in the Asia-Pacific Ring of Fire. Global Environmental Studies. Springer , Singapore, pp.301-320. DOI: 10.1007/978-981-10-7383-0_21

[Research Presentations]

[Oral Presentation]

・Asako Iwami・Michinori Kimura・Terukazu Kumazawa Local Residents' Awareness of the Value of Regional Resources -A Case Study of Traditional Food "Heshiko" of Kutsuki District, Shiga Prefecture -. 10th International Symposium on Environmentally Conscious Design and Inverse Manufacturing, 2017.11.29-2017.12.01, Tainan.

・Terukazu Kumazawa Towards Establishing Collaboration Assessment Based on Ontology Engineering. JSAI International Symposia on AI (JSAI-ISAI) ; Workshop kNeXI 2017 (International Workshop on kNowledge eXplication for Industry), 2017.11.14-2017.11.15, 東京都文京区.

MALLEE, Hein

Professor

Born in 1963.

[Professional Career]

International Development Research Centre, Singapore
Senior Program Officer
Rural Poverty & Environment Program
Ecosystems Approaches to Human Health Program
2004 - 2013
++
Ford Foundation, Beijing
Program Officer
Environment and Development Program
1999 - 2004
++
China-Netherlands Poverty Alleviation Project | Huoshan, Anhui Province, China
Co-director
1997 - 1999

[Higher Degrees]

Ph.D. Leyden University 1997

[Fields of Specialization]

Social science
China Studies
Natural Resources Management
Forest Governance
Ecohealth

—Achievements—

[Papers]

[Original Articles]

・Hein Mallee 2017,06 The Evolution of Health as an Ecological Concept. Current Opinion in Environmental Sustainability 25C:28-32. DOI:https://doi.org/10.1016/j.cosust.2017.04.009 (reviewed).

[Research Presentations]

[Oral Presentation]

・Hein Mallee Introduction to Future Earth, Co-design and Co-production of Knowledge. Workshop on Further Development of a Future Earth Knowledge-Action Network on Systems of Sustainable Consumption and Production, 2017.05.03-2017.05.05, National Socio-environmental Synthesis Center, Annapolis, USA.

・Hein Mallee "Transdisciplinary Research". East Asia Sustainability Project Meeting, 2017.04.21, Institute of Developing Economies, Chiba. (in Japanese)

[Invited Lecture / Honorary Lecture / Panelist]

・Hein Mallee Rivalry and Integration of Traditional and Modern Health Views, Satelite Session (Session organizer, chair, panelist). 82th Annual Meeting of the Japanese Society of Health and Human Ecology, 2017.11.11, Okinawa Institute of Science and Technology. (in Japanese)

・Hein Mallee "Best practices, lessons learned, and challenges for conducting TD research in Asia-Pacific" (Panelist). Belmont Forum 2017 Asia-Pacific Information Day, 2017.10.27, Taipei.

・Hein Mallee "The Role of the Future Earth Regional Centre for Asia" (Invited Keynote Presentation). World Data System Asia-Oceania Conference 2017, 2017.09.27, Kyoto University.

・Hein Mallee "Future Earth in Asia: The Need for Regional Engagement". South Asia Regional Workshop on "Future Earth", Divecha Centre for Climate Change, Indian Institute for Science, 2017.07.20-2017.07.21, Bangalore.

・Hein Mallee "From Ecosystem Health to Planetary Health - The Development of "Health" as an Ecological Concept". 3rd Faculty of Health Sciences International Conference, Hokkaido University, 2017.07.07, Sapporo.

・Hein Mallee Problem-solving Research-- The Extended Family of Transdisciplinarity. JST, RISTEX Transdisciplinarity Seminar, 2017.05.22, Tokyo. (in Japanese)

・Hein Mallee "The Development of Health as an Ecological Concept". 2nd Multi-Cultural Medicine Research Association Meeting, 2017.04.22, RIHN. (in Japanese)

MASUHARA Naoki

Senior Program Researcher

Born in 1974.

[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

—Achievements—

[Research Presentations]

[Invited Lecture / Honorary Lecture / Panelist]

・Naoki Masuhara Comment on Dr. Jan-Erik Lane's presentation "The Twilight of Mankind: Global Warming cannot be managed through the COP21". 2017 Tokyo Conference, Japan Area Studies Association, 2017.06.03-2017.06.04, Koto-ku, Tokyo.

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
International Association for the Study of the Commons

—Achievements—

[Papers]

[Original Articles]

・Nakamura, Mari, Motoki Akitsu, Norie Tamura, Masashi Tachikawa, & Steven R. McGreevy 2017 Food procurement and consumption survey of child-rearing families: A multi-method investigation of child-rearing network members in Kameoka, Japan. Journal of Food System Research 24(3):263-268. (in Japanese) (reviewed).

・McGreevy, Steven R. & Christoph D. D. Rupprecht. 2017,10 Information Harvesters and Virtual Farmers: How Smartphone Food Apps are Enabling Consumers to Co-create more Sustainable Food Systems. Journal of the Japanese Institute for Landscape Architecture 81(3):288-291. (in Japanese) (reviewed).

[Research Presentations]

[Oral Presentation]

・McGreevy, Steven R. Lifeworlds of sustainable food consumption and production: agrifood systems in transition. CNR-FEAST Seminar, 2018.02.02, College for Natural Resources, Royal University of Bhutan.

・McGreevy, Steven R. Agrifood system transition to where? Assessing holistic local food security in Asia. American Association of Geographers (AAG) Annual Meeting, 2017.04.05-2017.04.10, Hynes Conventional Hall, Boston, MA USA.

・Rupprecht, Christoph D. D. & Steven R. McGreevy Degrowing urban Japan: From vacant lots to biocultural cityscapes. American Association of Geographers (AAG) Annual Meeting, 2017.04.05-2017.04.10, Hynes Convention Center, Boston, MA USA.

[Invited Lecture / Honorary Lecture / Panelist]

・McGreevy, Steven R. Food impact smartphone apps: progress and challenges. LCA Across Borders, 2017.08.31-2017.08.31, Ritsumeikan Campus (Kusatsu Campus). (in English, Japanese)

・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). Special Seminar, 2017.11.24, Nagano City Gondo East Plaza Shimin Koryu Center.. (in Japanese)

・McGreevy, Steven R. Creating food futures with farmers markets?. Transition to a Sustainable Society with Farmers Markets, 2017.11.23, Research Institute for Humanity and Nature. (in Japanese)

・McGreevy, Steven R. Scaling to holistic local food security: directions in agrifood system sustainability assessment. RIHN/UCB International Workshop "Food, Agriculture and Human Impacts on the Environment: Japan, Asia and Beyond", 2017.11.06-2017.11.07, University of California, Berkeley, USA.

・McGreevy, Steven R. . "Let's start Organic Life!" Monthly Seminar, Tsukaisute Jidai wo Kangaeru Kai & Anzen Nousan Kyokyu Center, 2017.09.17-2017.09.17, Patagonia Kyoto、Event Hall. (in Japanese)

・McGreevy, Steven R. Food Policy Councils - Citizen power to catalyze transition (Shoku to nou no mirai kaigi - Shimin no chikara de transition [tenkan] wo okosu ni ha). Monthly seminar, Let's Begin Organic Life! Tsukaisute Jidai wo Kangaeru Kai, Anzen Nousan Kyokyu Senta, 2017.09.17, Patagonia Kyoto, Event Hall. (in Japanese)

・McGreevy, Steven R. The Future of Food Game. International Youth Conference on the Environment in Nagano, 2017.06.30-2017.07.02, Otagiri、Nagano City Youth Training Center. (in Japanese)

NAKASHIZUKA Tohru

Specially Appointed Professor

Born in 1956.

—Achievements—

[Papers]

[Original Articles]

- Ohsawa, T., Okano, T., Nakao, F., Kabaya, K., Kofuku, S., Kikuchi, K. & Nakashizuka, T 2018,01 Underuse/overuse and diversity of provisioning services and their change: the case of the Japanese national ecosystem service assessment (JBO2). Sustainability Science:1-13. DOI:https://doi.org/10.1007/s11625-018-0531-z
- Takeuchi, Y., Soda, R., Diway, B., Tinjan ak. Kuda, Nakagawa, M., Nagamasu, H. & Nakashizuka, T. 2017,10 Biodiversity conservation values of fragmented communally reserved forests, managed by indigenous people, in a human-modified landscape in Borneo. PLOS ONE.
- Jacob Usinowicz, Chia-hao Chang-Yang, Yu-Yun Chen, James S. Clark, Christine Fletcher, nancy C. Garwood, Zhanqing hao, Jill Johnstone, Yiching Lin, Margaret R. Metz, takashi Masaki, tohru nakashizuka, I-Fang Sun, Renato Valencia, Yunyun Wang, Jess K. Zimmerman, Anthony R. Ives& S. Joseph Wright1 2017,09 Temporal coexistence mechanisms contribute to the latitudinal gradient in forest diversity. Nature 24038:105-108. DOI:10.1038
- Takano, K.T., Hibino, K., Numata, A., Oguro, M., Aiba, M., Shiogama, H., Takayabu, I. & Nakashizuka, T. 2017,09 Detecting latitudinal and altitudinal expansion of invasive bamboo Phyllostachys edulis and P. bambusoides (Poaceae) in Japan to project potential habitats under 1.5° C-4.0° C global warming. Ecology and Evolution(ece3.3471). DOI:10.1002
- Imamura, K., Nakashizuka, T. Managi, S. 2017,08 Abandoned Forest Ecosystem: Implications for Japan's Oak Wilt Disease.. Journal of Forest Economics(29):56-61.
- Kachina, P., Kurokawa, H., Oguro, M., Nakashizuka, T., Tanaka,H., Thinkampheang, S., Sangkaew, S. Panuthai、S. and Marod、D. 2017,08 Effect of Forest fire on the regeneration of a bamboo species (Cephalostachyum pergracile Munro) at a mixed deciduous forest in Mae Klong Watershed Research Station, Thailand. Tropics:37-48.
- Suzuki-Ohno, Y., Yokoyama, J., Nakashizuka, T. & Kawata, M 2017,07 Utilization of photographs taken by citizens for estimating bumblebee distributions. Scientific Reports.
- Yuta Inoue, Tomoaki Ichie, Tanaka Kenzo, Aogu Yoneyama, Tomo'omi Kumagai & Tohru Nakashizuka 2017,05 Effects of rainfall exclusion on leaf gas exchange traits and osmotic adjustment in mature canopy trees of Dryobalanops aromatica (Dipterocarpaceae) in a Malaysian tropical rain forest. Tree Physiology:1301-1311.
- Miki U. Ueda, Panida Kachina, Dokrak Marod, Tohru Nakashizukaa, Hiroko Kurokawa 2017,05 Soil properties and gross nitrogen dynamics in old growth and secondary forest in four types of tropical forest in Thailand. Forest Ecology and Management:130-139.
- Yuanzhi Li, Bill Shipley, Jodi N. Price, Vinícius de L. Dantas, Riin Tamme, Mark Westoby, Andrew Siefert, Brandon S. Schamp, Marko J. Spasojevic, Vincent Jung, Daniel C. Laughlin, Sarah J. Richardson, Yoann Le Bagousse-Pinguet, Christian Schöb, Antonio Gazol, Honor C. Prentice, Nicolas Gross, Jake Overton, Marcus V. Cianciaruso, Frédérique Louault, Chiho Kamiyama, Tohru Nakashizuka, Kouki Hikosaka, Takehiro Sasaki, Masatoshi Katabuchi, Cédric Frenette Dussault, Stephanie Gaucherand, Ning Chen, Marie Vandewalle, Marco Antônio Batalha 2017,05 Habitat filtering determines the functional niche occupancy of plant communities worldwide. Journal of Ecology:130-139.

[Research Presentations]

[Oral Presentation]

・Tohru Nakashizuka Assessing ecosystem service in Asian region by using biodiversity observation date. GEOSS Asia-Pacific Symposium, 2017.09.18-2017.09.20, Hanoi Vietnam.

NILES, Daniel

Associate Professor

Born in 1971.

[Academic Career]

Ph.D.(Graduate School of Geography, Clark University, Aug 1999-May 2007)
Seminar in College Teaching(Interdisciplinary Unit, Clark University, June-July 2006)
Certificate program in Wood Technology (3 of 4 semesters completed)(Laney College (Peralta Community College District, California), Jan 1998-May 1999, Jun-July 2000)
B.A. in Community Studies (High Honors)(University of California, Santa Cruz, Aug 1989-Mar 1994)

[Professional Career]

RIHN Communications Coordinator/PASONA(October 2008-March 2009)
RIHN Contract Worker(August 2008)
MINPAKU Visiting Researcher(1 June 2008-31 March 2009)
Lecturer, Department of Geography, Clark University(August-December 2006)
Editorial Assistant, The Geographical Review (June 2005-July 2006)
Research Assistant, Prof. Turner(August-December 2000)
Research Assistant, Profs. Turner and Kasperson(August-December 1999)
ESL Teacher(March 1998-January 1999)
Research Assistant, Professor Carter Wilson(August 1996-January 1997)

[Higher Degrees]

Ph.D.(Graduate School of Geography, Clark University, Aug 1999-May 2007)
B.A. in Community Studies (High Honors)(University of California, Santa Cruz, Aug 1989-Mar 1994)

[Fields of Specialization]

Geography

[Awards]

Full Tuition Fellowship, Graduate School of Geography, Clark University, 1999-2007
Biodiversity Conservation Award, Regional Environmental Council, Worcester, MA 2005
Pruser-Holtzsauer Award, Graduate School of Geography, Clark University, 2002
Community Service Award, City of San Francisco, CA 1995
Dean’s Undergraduate Award, University of California, Santa Cruz, 1994
Highest Honors, Department of Community Studies, University of California, Santa Cruz, 1994
Senior Thesis Honors, Department of Community Studies, University of California, Santa Cruz, 1994
Community Service Award, Crown College, University of California, Santa Cruz, 1994

—Achievements—

[Editing]

[Editing / Co-editing]

・Niles, Daniel (ed.) 2017,06 . 2016-2017 NIHU Prospectus.

・Niles, Daniel (ed.) 2017,05 . 2016-17 RIHN Prospectus.

[Research Presentations]

[Oral Presentation]

・Niles, Daniel Agriculture in the Anthropocene: The A-words. Annual Conference of the Association of American Geographers, 2017.04.08, Boston, USA.

NITZSCHE, Kai

Visiting Researcher

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]

・Nitzsche K.N., Kaiser M., Premke K., Gessler A., Ellerbrock R., Hoffmann C., Kleeberg A. and Kayler Z.E. 2017 Organic matter distribution and retention along transects from hilltop to kettle hole within an agricultural landscape. Biogeochemistry 136(1):47-70. DOI:10.1007/s10533-017-0380-3 (reviewed).

・Nitzsche K.N., Kalettka T., Premke K., Lischeid G., Gessler A. and Kayler Z.E. 2017 Land-use and hydroperiod affect kettle hole sediment carbon and nitrogen biogeochemistry. Science of the Total Environment 574:46-56. DOI:10.1016/j.scitotenv.2016.09.003 (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]

・Okano, J., Okuda, N. 2018,02 Effects of resource-dependent cannibalism on population size distribution and individual life history in a case-bearing caddisfly. Plos One. DOI:10.1371/journal.pone.0191925 Open Access

・Okano,J., J.Shibata, Y.Sakai, M.Yamaguchi, M.Ohishi, Y.Goda, S.Nakano, N.Okuda 2017,10 The effect of human activities on benthic macroinvertebrate diversity in tributary lagoons surrounding Lake Biwa. The Japanese Society of Limnology 2017:1-9. DOI:10.1007/s10201-017-0530-2

・Nakazawa, T., S.-Y. V. Liu, Y. Sakai, K. S. Araki, C.-H. Tsai & Okuda,N. 2017,09 Spatial genetic structure and body size divergence in endangered Gymnogobius isaza in ancient Lake Biwa. Mitochondrial DNA Part A. DOI:10.1080/24701394.2017.1357708

・Itoh, M., Kojima,H. P.-C. Ho, C.-W. Chang, T.-Y. Chen, S. S.-Y. Hsiao, Kobayashi,Y. Fujibayashi,M. S.-J. Kao, C.-h. Hsieh, Fukui,M. Okuda,N. Miki,T. F.-K. Shiah. 2017,09 Integrating isotopic, microbial, and modeling approaches to understand methane dynamics in a frequently disturbed deep reservoir in Taiwan. Ecological Research 32(6):861-871. DOI:10.1007/s11284-017-1502-z

・Okano, J., Tayasu, I., Nakano, S. and Okuda, N. 2017,07 Differential responses of two ecologically similar case-bearing caddisflies species to a fish chemical cue: implication for a coexistence mechanism. Zoological Science 34:461-467. DOI:10.2108/zs160207 (reviewed).

・Ishikawa, N. F., Y. Chikaraishi, N. Ohkouchi, A. R. Murakami, I. Tayasu, H. Togashi, J. Okano, Y. Sakai, T. Iwata, M. Kondoh & N. Okuda 2017,04 Integrated trophic position decreases in more diverse communities of stream food webs. Scientific Reports (7):2130. DOI:DOI:10.1038/s41598-017-02155-8

・Peralta, E. M., H. J. A. Guerrero, C. G. S. M. Arce, J. J. A. Domingo, M. A. Maute, M. D. S. San Miguel, E. M. C. Trino, I. B. B. De Jesus, J. C. A. Briones, F. S. Magbanua, N. Okuda, R. D. S. Papa 2018,03 Prevailing environmental conditions influence mollusk diversity and distribution around Talim Island of Laguna de Bay (Luzon Is., Philippines).. The Antoninus Journal 01:31-39.

[Research Presentations]

[Oral Presentation]

・Yi, R., P. Song, M. Maruo, S. Ban, T. Ishida & N. Okuda What is difference between orthophosphate and SRP in lake waters?. The Japanese Society of Limnology 82th Annual Meeting, 2017.09.29, Senboku.Akita.

・Asano,S. Wakita,K. Okuda,N. Tokito,M. Saizen,I Bio-indicators to Estimate a State of Socio-ecological System. Special Seminar at Hue University of Agriculture and Forestry, 2017.09.08, Vietnam.

・Teramura, K., M, Allen. J, Hargrove. J. D, Austin. S,Walsh. W, Porack. N, Trippel.Takata,K. Okuda,N. Yodo,T & Kitagawa,T “Construction of Genetic Linkage Maps of the Largemouth Bass”. American Fisheries Society 147th Annual Meeting, 2017.08.20-2017.08.24.

・Cabanillas-Terán, N., P. L. Andrade, J. Marin & Okuda,N. “Trophic niche partioning of Diadema mexicanum and Eucidaris thouarsii in rocky reef bottoms of Ecuador”. IX Congreso Mexicano de Arrecifes Coralinos, 2017.06.13-2017.06.16, Chetumal, Quintana Roo.

・Peralta, E. M., J. C. A. Briones, N. Okuda, F. S. Magbanua & R. D. S. Papa “Taxonomic Sufficiency: Implications from ecological studies on aquatic insects in Philippine watersheds”. 35th Association of Systematic Biologists of the Philippines-Symposium and Annual Meeting, 2017.05.28-2017.05.31, University of St. La Salle, Bacolod City.

・Iwata. T., T. Hayashi, M. Akashi, A. R. Murakami & N. Okuda “Nitrogen and phosphorus dynamics in two Japanese river networks with contrasting watershed land use”. In: Biodiversity, nutrients and other materials in ecosystems from headwaters to coasts. JpGU-AGU Joint Meeting 2017, 2017.05.21, Makuhari Messe.

・Trino, E. M. C., I. B. B. De Jesus, E. M. Peralta, H. Guerrero, A. Santos-Borja, F. Magbanua, J. C. Briones, R. D. Papa & N. Okuda “Biodiversity Assessment of Littoral Macrozoobenthos in Laguna de Bay, Philippines”. In: Biodiversity, nutrients and other materials in ecosystems from headwaters to coasts. JpGU-AGU Joint Meeting 2017, 2017.05.21, Makuhari Messe.

・Onodera, S., M. Saito, S. Ban, G. Jin, Y. Tomozawa & N. Okuda “Spatial Variation in Lacustrine Groundwater Discharge (LGD) as a Nutrient Source in Lake Biwa, Japan”. In: Biodiversity, nutrients and other materials in ecosystems from headwaters to coasts. JpGU-AGU Joint Meeting 2017, 2017.05.21, Makuhari Messe.

・Peralta, E. M., L. Batucan, Y. Uehara, T. Ishida, Y. Kobayashi, C.-Y. Ko, T. Iwata, A. Borja, J. C. Briones, R. D. Papa, F. Magbanua & N. Okuda “Benthic macroinvertebrates response to water quality and canopy cover of a heavily impacted tropical subwatershed”. In: Biodiversity, nutrients and other materials in ecosystems from headwaters to coasts. JpGU-AGU Joint Meeting 2017, 2017.05.21, Makuhari Messe.

・Ko, C.-Y., T. Iwata, J.-Y. Lee, A. Murakami, J. Okano, N. F. Ishikawa, Y. Sakai, I. Tayasu, M. Itoh, U. Song, H. Togashi, S. Nakano, N. Ohte & N. Okuda “Alpha and beta diversity of benthic macroinvertebrates in natural and disturbed river watersheds and their environmental driver”. In: Biodiversity, nutrients and other materials in ecosystems from headwaters to coasts. JpGU-AGU Joint Meeting 2017, 2017.05.21, Makuhari Messe.

・Fujinaga, S., Y. Kobayashi, A. R. Murakami, M. Ushio, U. Song, I. Tayasu, N. F. Ishikawa, J. Okano, C.-Y. Ko, H. Togashi, Y. Sakai, M. Itoh, N. Ohte, S. Nakano, T. Iwata1 & N. Okuda “Bacterial community composition and richness in biofilms of the Yasu and Ado Rivers”. In: Biodiversity, nutrients and other materials in ecosystems from headwaters to coasts. JpGU-AGU Joint Meeting 2017, 2017.05.21, Makuhari Messe.

・Ide, J., A. P. Cid-Andres, T. Ishida, K. Osaka, T. Iwata, T. Hayashi, M. Akashi, I. Tayasu & N. Okuda “Comparisons of oxygen isotope ratio of phosphate in river water and rocks between two watersheds in central Japan”. In: Biodiversity, nutrients and other materials in ecosystems from headwaters to coasts. JpGU-AGU Joint Meeting 2017, 2017.05.21, Makuhari Messe.

・Osaka, K., S. Chishiro, T. Iwata & N. Okuda “The quantitative evaluation of bio-available particulate phosphorus discharged from Yasu River”. In: Biodiversity, nutrients and other materials in ecosystems from headwaters to coasts. JpGU-AGU Joint Meeting 2017, 2017.05.21, Makuhari Messe.

・Ishida, T., Y. Uehara1, T. Iwata, O. Privaldos, S. Asano, T. Ikeya, K. Osaka, J. Ide, I. Tayasu & Noboru Okuda “Biogeochemical cycling of phosphate in the Yasu River Watershed: Insight from oxygen isotope of phosphate”. In: Biodiversity, nutrients and other materials in ecosystems from headwaters to coasts. JpGU-AGU Joint Meeting 2017, 2017.05.21, Makuhari Messe.

・De Jesus, I. B. B., J. C. A. Briones, O. L. A. Privaldos, E. M. Peralta, Y. Uehara, T. Ishida, A. S. Borja, F. S. Magbanua, R. D. S. Papa, T. Iwata & N. Okuda “Quantification of phosphorus and nitrogen uptake in a tropical freshwater ecosystem in Southeast Asia suggests N limitation”. In: Biodiversity, nutrients and other materials in ecosystems from headwaters to coasts. JpGU-AGU Joint Meeting 2017, 2017.05.21, Makuhari Messe.

・Okuda, N “Toward synthesis of watershed sciences”. In: Biodiversity, nutrients and other materials in ecosystems from headwaters to coasts. JpGU-AGU Joint Meeting 2017, 2017.05.20, Makuhari Messe.

[Poster Presentation]

・Uehara, Y., Y. Kataoka, T. Kikkou, T. Ishida, S. Asano, Y. Kobayashi, T. Otake & N. Okuda “Migration routes of pelagic crucian carp Carassius auratus grandoculisendemic to Lake Biwa revealed by otolith Sr stable isotopes”. In: Biodiversity, nutrients and other materials in ecosystems from headwaters to coasts. JpGU-AGU Joint Meeting 2017, 2017.05.20, Makuhari Messe.

・Jin, G., M. Saito, S. Onodera, T. Ishida, N. Okuda, R. Yi, S. Ban & Y. Tomozawa “Characteristic of oxygen isotope ratio of phosphate in endmember of Lake Biwa”. In: Biodiversity, nutrients and other materials in ecosystems from headwaters to coasts. JpGU-AGU Joint Meeting 2017, 2017.05.20, Makuhari Messe. (Poster)

・Asano S., Y. Uehara, H. Nakashima, M. Tokito, I. Saizen, O. L. Privaldos, K. Osaka & N. Okuda “Spatial Pattern of Ground Water Utilization in Silang-Santa Rosa Sub-watershed”. In: Biodiversity, nutrients and other materials in ecosystems from headwaters to coasts. JpGU-AGU Joint Meeting 2017, 2017.05.20, Makuhari Messe.

・Tan, A. K. V., A. E. Belen, C. Perez, G. R. Buenaventura, E. M. Peralta, I. B. B. De Jesus, P. Palomares, J. C. Briones, T. Ikeya, F. Magbanua, R. D. Papa & N. Okuda “Stream Benthic Macroinvertebrates Response to Water Quality of Urban and Rural Areas of the Marikina Watershed”. In: Biodiversity, nutrients and other materials in ecosystems from headwaters to coasts. JpGU-AGU Joint Meeting 2017, 2017.05.20, Makuhari Messe.

・Espiritu, K. G. R., J. N. A. De Vera, F. G. G. Cantre1, E. M. Peralta, I. B. B. De Jesus, P. Palomares, J. C. Briones, T. Ikeya, F. Magbanua, R. D. Papa & N. Okuda “Land use impact on benthic macroinvertebrate assemblages in selected lotic ecosystems in a government-declared protected landscape”. In: Biodiversity, nutrients and other materials in ecosystems from headwaters to coasts. JpGU-AGU Joint Meeting 2017, 2017.05.20, Makuhari Messe.

・Ikeya, T. C.-Y. Ko, E. M. Peralta, T. Ishida, Y. Uehara, S. Asano, N. Okuda, M. Ushio, S. Fujinaga, I. Tayasu& T. Iwata “The community composition and diversity of epilithic bacterium and microalgae in a Japanese river system during irrigation season”. In: Biodiversity, nutrients and other materials in ecosystems from headwaters to coasts. JpGU-AGU Joint Meeting 2017, 2017.05.20, Makuhari Messe. (in Japanese)

ONISHI Yuko

Assistant Professor

[Academic Career]

Environmental Change Institute (ECI), Department of Geography and the Environment, University of Oxford

National Center for Development Studies, Australian National University

[Professional Career]

IPCC Chapter Scientist, National Institute for Environmental Studies

Institute for Industrial Science (IIS), University of Tokyo

Food and Agriculture Organisation of the United Nations

[Higher Degrees]

Ph.D. (University of Oxford)

[Fields of Specialization]

Climate change

Biodiversity

Conservation biology

Ecology

Biogeography

—Achievements—

[Research Presentations]

[Oral Presentation]

・Yuko Onishi, Makoto Taniguchi, Hein Mallee, Takeshi Nishimura, Kuniyoshi Ebina, Masayuki Itoh, Hiroki Tsuruta Strategic Research Agenda for Future Earth in Japan: Collaborative priority setting with stakeholders of global environmental issues. JpGU-AGU Joint Meeting 2017, 2017.05.20-2017.05.25, Chiba, Japan.

RUPPRECHT, Christoph D. D.

Project 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—

[Books]

[Chapters/Sections]

・Rupprecht, C. D. D.; Byrne, J. A. 2017,12 Informal urban green space as anti-gentrification strategy?. Curran, W.; Hamilton, T. (ed.) Just Green Enough: Urban development and environmental gentrification. Routledge Equity, Justice and the Sustainable City series. Routledge, London, UK, pp.209-226.

[Papers]

[Original Articles]

・Rupprecht, C. D. D. 2017,12 Ready for more-than-human? Measuring urban residents' willingness to coexist with animals.. Fennia 195(2):142-160. DOI:10.11143/fennia.64182 (reviewed).

・McGreevy, S. R.; Rupprecht, C. D. D. 2017,11 Information Harvesters and Virtual Farmers: How Smartphone Food Apps are Enabling Consumers to Co-create more Sustainable Food Systems. Journal of the Japanese Institute of Landscape Architecture 81(3):288-291. (in Japanese)

・Rupprecht, C. D. D. 2017,08 Informal Urban Green Space: Residents' Perception, Use, and Management Preferences across Four Major Japanese Shrinking Cities. Land 6(3):59. DOI:10.3390/land6030059 (reviewed).

[Research Presentations]

[Oral Presentation]

・Rupprecht, C. D. D. Urban agriculture as a sustainability transition strategy for shrinking cities? The case of Kyoto, Japan. 6th International Symposium for Future Earth in Asia: Sustainable Consumption in Asia, 2018.01.15-2018.01.16, Research Institute for Humanity and Nature.

・Oda, K.; Rupprecht, C. D. D. Mapping agricultural land use change in the Kyoto City basin using FOSS4G. FOSS4G 2017 KYOTO.KANSAI, 2017.10.15-2017.10.15, RIHN, Kyoto. (in Japanese)

・Rupprecht, C. D. D. Territories of Encounter: Informal Urban Green Space in Shrinking Japanese Cities – a Birthplace for Convivial Imaginaries?. East Asian Anthropological Association Annual Meeting 2017, 2017.10.14-2017.10.15, Hong Kong. DOI:10.13140/RG.2.2.20292.94080

・Kim, M.; Rupprecht, C. D. D.; Furuya, K. Spatial typology in informal urban green spaces: The case of Ichikawa city, Japan. JpGU-AGU Joint Meeting 2017, 2017.05.24, Makuhari Messe.

・Rupprecht, C. D. D. Degrowing urban Japan: From vacant lots to biocultural cityscapes. American Association of Geographers Annual Meeting, 2017.04.07, Boston. DOI:10.13140/RG.2.2.29694.18241

[Poster Presentation]

・Rupprecht, C. D. D. Cross-cultural culinary mapping – How locals and tourists navigate the foodscape of Chiang Mai, Thailand. Japan Geoscience Union Meeting, 2017.05.24, Makuhari Messe.

[Invited Lecture / Honorary Lecture / Panelist]

・Rupprecht, C. D. D. Plans and chance encounters: lessons from exploring gaps and liminal zones. Fieldnet Lounge Seminar: Grassroots spaces of food and agriculture created by local residents – How to find them, how to study them?, 2018.01.20, Tokyo University of Foreign Studies.

・Rupprecht, C. D. D. Mapping agricultural land use change in Kyoto City (Japan) from 2007 to 2017. Mapping Urban Agriculture: Rethinking the power of maps for navigating transdisciplinary research on sustainability, 2017.11.22, RIHN, Kyoto.

・Rupprecht, C. D. D. Biocultural cityscapes: Towards urban landscape stewardship. Food, Agriculture and Human Impacts on the Environment: Japan, Asia and Beyond ; RIHN/UCB International Workshop, 2017.11.06-2017.11.07, Berkeley, CA. DOI:10.13140/RG.2.2.19426.22721

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]

・Tatsuyoshi Saijo and Junyi Shen, 2018,02 “Mate choice mechanism for solving a quasi-dilemma”. Journal of Behavioral and Experimental Economics 72:1-8. DOI:10.1016/j.socec.2017.10.004 (reviewed).

・Jun Feng, Tatsuyoshi Saijo, Junyi Shen and Xiangdong Qin 2018,02 ″Instability in the Voluntary Contribution Mechanism with a Quasi-linear Payoff Function: An Experimental Analysis,″. Journal of Behavioral and Experimental Economics 72 :67-77. DOI:10.1016/j.socec.2017.12.002 (reviewed).

・Tatsuyoshi Saijo, Takehiko Masuda, and Takafumi Yamakawa 2018,01 ″Approval Mechanism to Solve Prisoner's Dilemma: Comparison with Varian's Compensation Mechanism″. Social Choice and Welfare 51:65-77. DOI:10.1007/s00355-017-1107-z (reviewed).

・Shahrier, S., Kotani, K. & Saijo, T. 2017,11 ″Intergenerational Sustainability Dilemma and the Degree of Capitalism in the Society: A Field Experiment″. Sustainability Science 12(6):957-967. DOI: 10.1007/s11625-017-0447-z (reviewed).

・Saijo T., Feng J. and Kobayashi Y. 2017,11 ″Common-Pool Resources are Intrinsically Unstable″. International Journal of the Commons 11(2):597-620. (reviewed).

・Yoshio Kamijo, Asuka Komiya, Nobuhiro Mifune and Tatsuyoshi Saijo 2017,05 ″Negotiating with the future: Incorporating imaginary future generations into negotiations″. Sustainability Science 12:409-420. DOI:10.1007/s11625-016-0419-8 (reviewed).

[Research Presentations]

[Oral Presentation]

・Tatsuyoshi Saijo “Future Design”. RIHN/UCB 2017, 2017.11.07, University of California Berkeley, Berkeley, California.

・Tatsuyoshi Saijo “Future Design”. Democratic Responsibilities and Future People, Twenty-First Annual Meeting of The International Association for Environmental Philosophy, 2017.10.22, Sheraton Memphis Downtown Hotel, Memphis, Tennessee.

[Invited Lecture / Honorary Lecture / Panelist]

・Tatsuyoshi Saijo “Future Design”. 2017.10.26, School of Human Evolution and Social Change, Arizona State University, Tempe, Arizona.

・Tatsuyoshi Saijo “Future Design”. HSI2017-3rd Hitotsubashi Summer Institute, 2017.08.05, Hitotsubashi University, Tokyo.

・Tatsuyoshi Saijo “Future Design”. Research on Future Design, 2017.07.07, Graduate Program in Sustainability Science, University of Tokyo, Kashiwa Campus, Kashiwa.

SEKINO Tatsuki

Professor

Born in 1969.

[Academic Career]

Department of Zoology, Faculty of Science, Kyoto University, D. Course (1998)
Department of Biology, Faculty of Science, Shinshu University, M. Sc. (1993)
Department of Biology, Faculty of Science, Shinshu University (1991)

[Professional Career]

Professor, Center for Research Promotion, Research Institute for Humanity and Nature (2016)
Associate Professor, Research Promotion Center, Research Institute for Humanity and Nature (2002)
Researcher, Research Division, International Lake Environmental Committee Foundation (2001)
COE Scientist, Center for Ecological Research, Kyoto University (1999)

[Higher Degrees]

D. Sc. (University of Kyoto, 1998)
M. Sc. (University of Shishu, 1993)

[Fields of Specialization]

Information Science
Limnology

Ecology

[Academic Society Memberships]

Information Processing Society of Japan
Japanese Society of Limnology
Ecological Society of Japan

[Awards]

IPSJ Yamashita SIG Research Award (2015)

—Achievements—

[Papers]

[Original Articles]

・Tatsuki Sekino 2017,11 Basic linked data resource for temporal information.. Proceedings of the 2017 Pacific Neighborhood Consortium Annual Conference and Joint Meetings (PNC), IEEE Catalog Number: CFP17M10-ART:76-82. (reviewed).

[Research Presentations]

[Oral Presentation]

・Tatsuki Sekino Basic linked data resource for temporal information. Pacific Neighborhood Consortium Annual Conference 2017, 2017.11.07-2017.11.09, The Magic School of Green Technologies, National Cheng Kung University, Tainan, Taiwan.

SHIN Ki-Cheol

Assistant Professor

[Higher Degrees]

PhD (University of Tsukuba, 2008)

[Fields of Specialization]

Igneous petrology
Isotope Geochemistry

[Academic Society Memberships]

The Society of Resource Geology
The Geochemical Society of Japan
Discussion Group for Plasma Spectrochemistry

[Awards]

Resource Geology The Best Article award (2010)

—Achievements—

[Papers]

[Original Articles]

・Keisuke Aoyama, Takanori Nakan, Ki-Cheol Shin, Atsunobu Izawa, Sakie Morita 2017,12 Variation of strontium stable isotope ratios and origins of strontium in Japanese vegetables and comparison with Chinese vegetables. Food Chemistry 237:1186-1195. (reviewed).

・Akane Ito, Tsubasa Otake, Ki-Cheol Shin, Kamar Shah Ariffin, Fei-Yee Yeoh, Tsutomu Sato 2017,07 Geochemical signatures and processes in a stream contaminated by heavy mineral processing near Ipoh city, Malaysia. Applied Geochemistry 82:89-101. (reviewed).

・Naoko Nonose, Toshihiro Suzuki, Ki-Cheol SHIN, Tsutomu MIURA, Akiharu HIOKI 2017,06 Characterization of a new candidate isotopic reference material for natural Pb using primary measurement method. Analytica Chimica Acta 974:27-42. (reviewed).

・Shotaro Takano, Masaharu Tanimizu, Takafumi Hirata, Ki-Cheol Shin, Yusuke Fukami, Katsuhiko Suzuki, Yoshiki Sohrin 2017,05 A simple and rapid method for isotopic analysis of nickel, copper, and zinc in seawater using chelating extraction and anion exchange. Analytica Chimica Acta 967:1-11. (reviewed).

SPIEGELBERG, Maximilian

Project 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]

・Maximilian Spiegelberg Living with Neonics - Exploring the use, attitude and awareness around neonic household products in Kyoto ネオニコチノイドと暮らす：京都におけるネオニコチノイドを含有する家庭用品の使用状況、消費者動向・意識の探求/. Act beyond Trust 2018 Neonicotinoide Public Grant Presentation, 2018.03.18, Tokyo.

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—

[Papers]

[Original Articles]

- Sugihara, K. 2017 "Monsoon Asia, Intra-Regional Trade and Fossil-Fuel-Driven Industrialization". in Gareth Austin (ed.) Economic Development and Environmental History in the Anthropocene: Perspectives on Asia and Africa. Bloomsbury Academic, London, pp.119-144.
- Sugihara, K. 2017 "Monsoon Asia, Industrialization and Urbanization: The Making and Unmaking of the Regional Nexus". RIHN 11th International Symposium Proceedings 'Asia's Transformations to Sustainability: Past, Present and Future of the Anthropocene. pp.67-99.

[Research Presentations]

[Oral Presentation]

- Sugihara, K. "Intra-regional Trade and Labour-intensive Industrialization: A General Discussion". Workshop on Emerging States in Global Economic History (Part 2), 2018.03.26, RIHN, Kyoto.
- Sugihara, K. "Emerging States in Global Economic History". Workshop on Emerging States in Global Economic History (Part 1), 2018.03.24, GRIPS, Tokyo .

・Sugihara, K. “Intra-regional Trade and Labour-intensive Industrialization: A Regional Comparative Perspective and its Implications for the Emerging States”. Workshop for the Emerging States Project (Vol.2), 2018.03.09, GRIPS, Tokyo.

・Sugihara, K. “Transition to the Emerging State in History and the Developing World”. Workshop for the Emerging States Project , 2018.02.03, GRIPS, Tokyo. (General meeting with Professors Roy Bin Wong and Dr Chris Baker)

・Sugihara, K. “Intra-regional Trade and Labour-intensive Industrialization: A Regional Comparative Perspective and its Implications for the Emerging States”. Workshop for the Emerging States Project, 2018.01.12, GRIPS, Tokyo. (General meeting with Professor Sugata Bose)

・Sugihara, K. “Comments on Multiple Payment Systems in Globalizing Economies”. Pre-Conference of the World Economic History Congress 2018 Boston, 2017.12.15-2017.12.16, Kansai University, Osaka.

・Sugihara, K. “Urban Living Space as a Factor Endowment: A Note on Asia’s Long-term Development Path”. Workshop on ‘Learning from Historical Tokyo: Implications for Developing Cities’, 2017.06.05, GRIPS, Tokyo.

[Invited Lecture / Honorary Lecture / Panelist]

・Sugihara, K. (Organizer, Panelist and Chair) ″Roundtable on South Asia, Asia and Global History (with Professor Sugata Bose)”. Center for South Asian Studies, Ryukoku University, Kyoto, 2018.01.14.

・Sugihara, K. (Chair of Session 3 and roundtable discussant) ″Trans-scale Solutions for Sustainability″. RIHN 12th International Symposium, 2017.12.21-2017.12.22, Kyoto International Conference Hall, Kyoto.

SUZUKI Haruka

Project Researcher

—Achievements—

[Research Presentations]

[Oral Presentation]

・Haruka Suzuki Environmental Education and Area Studies Viewed from Summer School 2017 in Riau, Indonesia. International Workshop of Creation of Field Education with Area Studies: Views from Environmental Education Program in Indonesia and Japan. Kobe University, 2017.10.01, Kobe.

・Haruka Suzuki Peatland Restoration in Meranti, Riau: Peatland Restoration, Research, and Environmental Education Program. International Seminar “Action Research on Peatland Restoration, Policies of Indonesian Government and RIHN’s Peatland Restoration Studies”, 2017.04.07, Kyoto.

[Invited Lecture / Honorary Lecture / Panelist]

・Haruka Suzuki Peatland Restoration and Politics in Local community in Riau. Special lecture at Faculty of Politics and Public Policy, 2017.09.13, Universitas Riau, Pekanbaru.

・Haruka Suzuki What is Sustainability? -From the Perspective of Long-Term Ecological Resource Use. Special lecture at graduate program of Sociology, University of Riau, 2017.04.29, Pekanbaru.

・Haruka Suzuki Introduction of Japanese Culture and its Society. Special lecture at graduate program of sociology, 2017.04.22, Pekanbaru.

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—

[Papers]

[Original Articles]

- Ho Trung Thong, Le Nu Anh Thu, Dinh Van Tuyen and Tanaka Ueru 2017,05 Evaluation on nutrient values of brewery dried yeast and its effects on the growth performance and feed conversion ratio of colored chicken breed of starter and grower periods. Journal of Animal Husbandry Sciences and Technics - Animal Husbandry Association of Vietnam 219 (5/2017):17-23. (Other) (reviewed). (in Vitenamese with English abstract)

[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]

・Taniguchi, M., Endo, A., Gurdak, J.J., Swarzenski, P. 2017,07 Water-Energy-Food Nexus in the Asia-Pacific Region. J. Hydrol. Reg. Stud. 11:1-8. (reviewed).

[Research Presentations]

[Oral Presentation]

・Taniguchi, M. Groundwater-energy-food nexus for sustainability. 44th Conference of International Association of Hydrogeologists, 2017.09.26, Croacia.

・Taniguchi, M. Alternative use of subsurface energy as heat pump or groundwater. IASPEI, 2017.08.04, Kobe.

・Taniguchi, M. Interdisciplinary research for sustainable groundwater management in conjunction with geodesy, geothermic and coastal oceanography −. Australasian groundwater conference, Groundwater Futures, Science to practice, 2017.07.12, University of New South Wales, Sydney, Australia.

[Invited Lecture / Honorary Lecture / Panelist]

・Taniguchi, M. Sustainable Development of Water Resources to Achieve Water Security and Sustainable Growth. UNESCO-IHP, 2017.09.21, Jeju, Korea.

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)

—Achievements—

[Papers]

[Original Articles]

- Umezawa, Y., Tamaki, A., Suzuki, T., Takeuchi, S., Yoshimizu, C. and Tayasu, I. 2018,03 Phytoplankton as a principal diet for callianassid shrimp larvae in coastal waters, estimated from laboratory rearing and stable isotope analysis. Marine Ecology Progress Series 592:141-158. DOI:10.3354/meps12507 (reviewed).
- Tuno, N., Kohzu, A., Tayasu, I., Nakayama, T., Githeko, A. and Yan, G. 2018,01 Algal diet accelerates larval growth of Anopheles gambiae (Diptera: Culicidae) and Anopheles arabiensis (Diptera: Culicidae). Journal of Medical Entomology 55:600-608. DOI:10.1093/jme/tjx244 (reviewed).
- Okano, J., Tayasu, I., Nakano, S. and Okuda, N. 2017,07 Differential responses of two ecologically similar case-bearing caddisflies species to a fish chemical cue: implication for a coexistence mechanism. Zoological Science 34:461-467. DOI:10.2108/zs160207 (reviewed).
- Matsubayashi, J., Saitoh, Y., Uehara, Y., Osada, Y., Habu, J., Sasaki, T. and Tayasu, I. 2017,06 Incremental analysis of vertebral centra can reconstruct the stable isotope chronology of teleost fishes. Methods in Ecology and Evolution 8:1755-1763. DOI:10.1111/2041-210X.12834 (reviewed).
- Ishikawa, N.F., Chikaraishi, Y., Ohkouchi, N., Murakami, A.R., Tayasu, I., Togashi, H., Okano, J., Sakai, Y., Iwata, T., Kondoh, M. and Okuda, N. 2017,05 Integrated trophic position decreases in more diverse communities of stream food webs. Scientific Reports 7:2130. DOI:10.1038/s41598-017-02155-8 (reviewed).
- Shinozuka, K., Chiwa, M., Tayasu, I., Yoshimizu, C., Otsuki, K. and Kume, A. 2017,09 Differences in stream water nitrate concentrations between a nitrogen-saturated upland forest and a downstream mixed land use river basin. Hydrology 4:43. DOI:10.3390/hydrology4030043 (reviewed).

[Review Articles]

- Ohkouchi, N., Chikaraishi, Y, Close, H.G., Fry, B., Larsen, T., Madigan, D.J., McCarthy, M.D., McMahon, K.W., Nagata, T., Naito, Y.I., Ogawa, N.O., Popp, B.N., Steffan, S., Takano, Y., Tayasu, I., Wyatt, A.S.J., Yamaguchi, Y.T. and Yokoyama, Y. 2017,08 Advances in the application of amino acid nitrogen isotopic analysis in ecological and biogeochemical studies. Organic Geochemistry 113:150-174. DOI:10.1016/j.orggeochem.2017.07.009 (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]

History
Metahistory

—Achievements—

[Books]

[Authored/Co-authored]

・Masahiro Terada 2018,03 Katasutorohu to jikan: kioku/katari to rekishi no seisei (Catastrophe and Time: Memory, narrative, and the Energeia of history). RIHN Book Series of Environmental Humanics. Kyoto University Press, Kyoto, 902pp. (in Japanese)

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—

[Research Presentations]

[Invited Lecture / Honorary Lecture / Panelist]

- Tetsuzo Yasunari Future Earth -its importance & implication in Asia and Oceania-. AOGS 2017 Special Session 09, 2017.08.10, Singapore.
- Tetsuzo Yasunari The Asian Greenbelt - a possible tipping element for Future Earth. JpGU-AGU Joint Meeting 2017, 2017.05.20, Makuhari, Chiba.

YOSHIDA Takehito

Associate Professor

Born in 1972.

[Academic Career]

Bachelor of Fisheries, Hokkaido University, Japan (1995)
Master of Fisheries, Hokkaido University, Japan (1997)
Doctor of Science, Kyoto University, Japan (2001)

[Professional Career]

Postdoctoral Associate, Department of Ecology and Evolutionary Biology, Cornell University (2001)
Postdoctoral Fellow, Japan Society for the Promotion of Science, at Department of Ecology and Evolutionary Biology, Cornell University (2003)
Research Associate, Department of Ecology and Evolutionary Biology, Cornell University (2005)
Research Fellow, Japan Society for the Promotion of Science, at Research Institute for Humanity and Nature, Japan (2006)
Lecturer, Department of General Systems Studies, University of Tokyo (2006)

Associate Professor, Department of General Systems Studies, University of Tokyo (2008)

[Higher Degrees]

D.Sc (Kyoto University, 2001)

[Fields of Specialization]

Ecology, Limnology

[Academic Society Memberships]

Ecological Society of Japan
Japanese Society of Limnology
Society of Population Ecology
Society of Evolutionary Studies, Japan
Ecological Society of America
Association for the Sciences of Limnology and Oceanography
International Society of Limnology

[Awards]

Denzaburo Miyadi Award in 2005 (Ecological Society of Japan)
Young Scientist Initiative Award in 2007 (Society of Evolutionary Studies, Japan)

—Achievements—

[Papers]

[Original Articles]

・I-Ching Chen, Chih-hao Hsieh, Michio Kondoh, Hsing-Juh Lin, Takeshi Miki, Masahiro Nakamura, Takayuki Ohgushi, Jotaro Urabe, Takehito Yoshida 2017 Filling the gaps in ecological studies of socio-ecological systems. Ecological Research 32(6):873-885. DOI:10.1007/s11284-017-1521-9 (reviewed).

・Kenta Suzuki, Yuji Yamauchi, Takehito Yoshida 2017 Interplay between microbial trait dynamics and population dynamics revealed by the combination of laboratory experiment and computational approaches. Journal of Theoretical Biology 419:201-210. DOI:10.1016/j.jtbi.2017.02.014 (reviewed).

・Hirokazu Toju, Masato Yamamichi, Paulo R. Guimarães Jr, Jens M. Olesen, Akihiko Mougi, Takehito Yoshida, John N. Thompson 2017 Species-rich networks and eco-evolutionary synthesis at the metacommunity level. Nature Ecology & Evolution 1(24). DOI:10.1038/s41559-016-0024 (reviewed).

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 (FR4)	Societal Adaptation to Climate Change: Integrating Palaeoclimatological Data with Historical and Archaeological Evidences	78	5	31	3	17	6	7	3	2	4
Research Program 1 (FR1)	Toward the Regeneration of Tropical Peatland Societies: Building International Research Network on Paludiculture and Sutainable Peatland Management	69	6	29	1	5	0	2	4	1	21
Research Program 2 (FR4)	Human-Environmental Security in Asia-Pacific Ring of Fire: Water-Energy-Food Nexus	74	7	15	7	5	0	10	3	1	26
Research Program 2 (FR3)	Biodiversity-driven Nutrient Cycling and Human Well-Being in Social-ecological Systems	98	11	32	9	16	0	17	3	2	8
Research Program 3 (FR2)	Life-worlds of Sustainable Food Consumption: Agrifood Systems in Transition	78	10	15	1	11	0	8	9	3	21
Research Program 3 (FR1)	The Sanitation Value Chain: Designing Sanitation Systems as Eco-Community-Value System	52	3	24	0	1	0	4	0	2	18
Research Program 1 （PR）	Research and Social Implementation of Ecosystem-based Disaster Risk Reduction as Climate Change Adaptation in Shrinking Societies	80	2	46	5	11	0	10	6	0	0
Individual Collaboration FS （KANEKO）	Water-Energy-Nexus Technology for Marginal Settlements: Socially Optimal Size from the Perspectives of Reciprocity and Indigenous Knowledge	14	0	12	1	0	0	1	0	0	0
Individual Collaboration FS （MATSUDA）	Nature Cultural Diversity and Building Sustainable Society in Asia	8	0	4	0	3	0	0	0	0	1
Institutional Collaboration FS （KOHSAKA）	Transdisciplinary Approaches to Governance of Intellectual Properties: Genetic Resources and Traditional Knowledge in Terrestrial, Coastal and Marine Areas	34	1	10	2	5	2	7	7	0	0
Institutional Collaboration FS （SAKAKIBARA）	Co-Creation of Regional Innovation for Reducing Risk of Environmental Pollution	21	0	16	0	1	0	0	2	0	2

Institutional Collaboration FS（HOMMA）	Assessing Functional Diversity of Satoyama Paddy Landscapes in East Asia's Monsoon Region	19	0	13	0	0	0	1	0	1	4
Institutional Collaboration FS（MORI）	Developing Interactive Rural-Urban Systems to Improve Human Well-being	17	1	10	1	2	0	0	0	0	3
Institutional Collaboration FS（MURAYAMA）	Living Spaces: A Transdisciplinary Study on Locality, Nature and Global Interdependency	49	1	18	5	10	0	1	2	1	11
Institutional Collaboration FS（KANEMOTO）	Mapping the Environmental Impact Footprint of Cities, Companies, and Households	20	0	9	0	3	0	2	0	0	6
Institutional Collaboration FS（HAYASHIDA）	Co-benefit Strategy of Global Warming Mitigation and Clean Air - A Mitigation Study of SLCPs Emissions from Agriculture by Collaboration with Stakeholders in the Environs of Delhi	23	0	18	0	2	0	2	0	0	1
Core Program (FR1)	Proposal and Verification of the Validity of Isotope Environmental Traceability Methodology in Environmental Studies	21	9	2	1	3	0	6	0	0	0
Core FS (KONDO)	Knowledge binding to overcome gaps in the problem perception in collaborative research on socio-environmental interaction	25	10	5	0	2	1	5	2	0	0
Core FS (ONISHI)	Co-design and stakeholder engagement according to geographical scales	3	1	1	0	1	0	0	0	0	0
	Total	783	67	310	36	98	9	83	41	13	126

As of 31 March, 2018

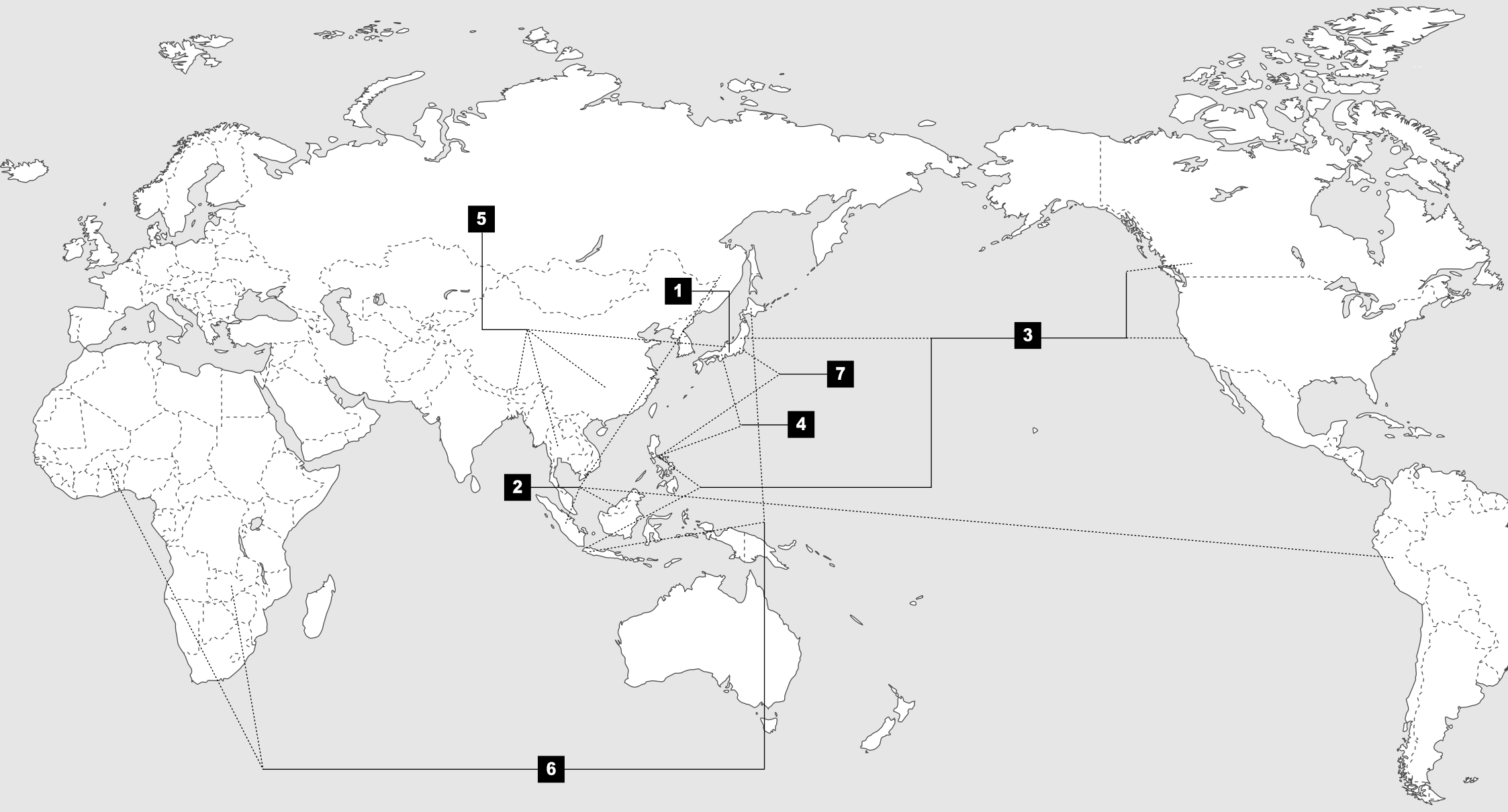
Appendix 2 Research Fields of Project Members

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 (FR4)	Societal Adaptation to Climate Change: Integrating Palaeoclimatological Data with Historical and Archaeological Evidences	39	3	36	78	(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 (FR1)	Toward the Regeneration of Tropical Peatland Societies: Building International Research Network on Paludiculture and Sutainable Peatland Management	40	21	8	69	(Natural Sciences) GIS Spatial Informatics, Political Ecology, Environmental Engineering, Environmental Resource Geology, Environmental Anthropology, Meteorology, Physical Geography, Informatics, Plant Ecology, Forest Ecology, Hydrology, Policy Research, Ecology, Biogeochemistry, Atmospheric Chemistry, Atmospheric Environmental Science, Air Quality Measurement, Carbon Cycle, Area Informatics, Urban Environmental Engineering, Soil Science, Hydrology, Land Use and Land Resources Management, Agriculture, Agrometeorology, Agricultural Hydrology, Agricultural Engineering, Land and Water Science, Silviculture (Humanities) Environmental Studies, Social Anthropology, Anthropology, Area Studies, History (Social Sciences) Area Studies(Indonesia), Political Ecology, Development Study, Environmental NGO Studies, Economics, Economic History, Natural Resource Management, Socioeconomic History, Human Geography, Anthropology, Political Science, Political Economics, Area Studies, Local Wood Use, Agriculture, Folk Ecology, Environment and Agricultural Change
Research Program 2 (FR4)	Human-Environmental Security in Asia-Pacific Ring of Fire: Water-Energy-Food Nexus	45	21	8	74	(Natural Sciences) Hydrology, Hot Spring Science, Energy Science, Thermal Energy, Agricultural Water Utilization, Bioresource Ecology, Model of Connectivity of Hills, Humans and Oceans, Geothermal Science, Estuary Ecology, Geothermal energy, Coastal Fisheries, Bioresource Science, Marine/Coastal Geology, Geology, Water - Energy Nexus, Coastal Oceanography, Hot Spring/Ecology/Energy, Hot Spring/Groundwater, Coastal Protection, Marine Ecology, Environmental Science, Satoumi Resource Ecology, Fisheries, Groundwater Management, Geochemistry, Geoscience, Geothermal Energy, Geothermal Energy Policy, Water Quality, Hydrological System Analysis, Hydrogeology, Limnology, Seismology, Engineering Seismology, Geotechnical Engineering, Numerical Modeling of Geothermal Reservoir (Humanities) Environmental Governance, Local Knowledge, Graphic Design, Resource Studies, Societal Action, Ecological Anthropology, Ethnobiology, Human Ecology (Social Sciences) Social Networking Theory, Coastal Sociology, Ocean Policy, Environment-economy Assessment, Environmental Economics, Environmental Planning, Environmental Policy, Climate Change Policy, Public Policy, Public Administration, International relations, Cultural Anthropology, Integrated water Resources Management, Fishery Resource, Policy process, Regional Studies, Crust Research, Global Environmental Policy, Geothermal Energy, Geothermal Energy Policy, Physical Modelling
Research Program 2 (FR3)	Biodiversity-driven Nutrient Cycling and Human Well-Being in Social-ecological Systems	75	20	3	98	(Natural Sciences) Plankton Ecology, Phosphorus Circulation, Satellite Ecology, Applied Ecology, Applied Geophysics, Chemical Oceanography, Marine EcoSystem Engineering, Environmental Systems Engineering, Environmental Economy, Environmental Agriculture, Environmental Microbiology, Environmental Analytic Chemistry, Environmental Conservation, Fish Ecology, Fish Genetics and Breeding Science, Fungology, Fungal Diversity, Spatial Statistics, Community Ecology, Limnology, Lake Synthetic Science, Plant Ecology, Plant Physiological Ecology, Forestry and Environmental Studies, Forest Hydrology, Forest Ecology, Evolutionary ecology, Ecological Genetics, Hydrosphere Ecology, Hydrosphere Chemistry, Aquatic Ecology, Aquatic Biology, Fisheries, Underwater Acoustic Studies, Hydrological Science, Hydrology, Mathematical Biology, Evolutionary Biology, Ecological Stoichiometry, Ecological Science, Ecology, Ecosystem Ecology, Biological Science, Biogeochemistry, Phycology, Groundwater Chemistry, Geophysics, Benthic Animal Diversity, Integrated Lake Basin Management, Isotope Environmental Science, Stable Isotope Ecology, Microbial Ecology, Molecular Ecology, Analytical Chemistry, Conservation Ecology, Freshwater Ecology, Freshwater Biology, Basin Environmental Studies, Basin Water, River Basin Conservation (Humanities) Archaeology, Social Psychology, Social Research, Sociology of Local Community, Geomatics, Historical Geography (Social Sciences) Ecological Economics, Applied Economics, Environmental Economy, Environmental Sociology, Environmental Policy, Quantitative Sociology, International Environmental Law, Industrial Ecology, Sociology, Social Psychology, Regional Planning, Regional Studies, Rural Sociology
Research Program 3 (FR2)	Life-worlds of Sustainable Food Consumption: Agri-food Systems in Transition	35	33	10	78	(Natural Sciences) Public Health, Life Cycle Assessment, LCA Analysis, App Design, 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, Agriculture, Agri-food Social Science, Organic Agriculture, Organic Agriculture, Green Space Planning (Humanities) Agroforestry, Science and Technology Studies, Environmental Sociology, Environmental Ethics, Social Statistics, Anthropology, Political Economy, Regional Policy and Planning, Cultural Anthropology, History (Social Sciences) Agri-food System, Innovation Studies, Gender Studies, Facilitation, Development Sociology, Environmental Management, Environmental Planning, Environmental Policy, Global Agricultural Economics, Sociology, Socioeconomics, Social Engineering, Social Policy, Food Sociology, Food Waste, Water Quality Monitoring, Policy Science, Organizational Theory, Geology, Urban / Rural Sociology, Agricultural Economics, Agri-food Social Science, Agricultural Policy, Rural Development Sociology, Rural Sociology, Child Care
Research Program 3 (FR1)	The Sanitation Value Chain: Designing Sanitation Systems as Eco-Community-Value System	27	18	7	52	(Natural Sciences) Genetic Engineering, Sanitary Engineering, Chemical Engineering, Environmental Engineering, Environmental Resources, Environmental and Sanitary Engineering, Public Health Microbiology, Global Food Resources, Water treatment Engineering, Regional Studies, Geomatics, Regional Agricultural Technologies (Humanities) Global health, Cultural Anthropology, Agricultural Economics (Social Sciences) African Political Science, Sanitation Services, Medical Anthropology, Video Production, Development Economics, International Health, Social Medicine, Sociology, Social Behavior, Community Participation, Human Ecology, Urban and Regional Planning, Agricultural Economics
Research Program 1 (PR)	Research and Social Implementation of Ecosystem-based Disaster Risk Reduction as Climate Change Adaptation in Shrinking Societies	60	17	3	80	(Natural Sciences) Green AI, Landscape Science, River Engineering, Pollen Analysis, Environmental Policy, Environmental Agriculture, Spatial Informatics, Community Ecology, Landscape Ecology, International Fisheries Development, Erosion Control, Forest Policy, Human Environment Design, Water Environment, Water Engineering, Ecology, Ecosystem Management, Ecosystem Management Engineering, Ecosystem Assessment Management, Conservation Ecology, Biodiversity Informatics, Rural Planning, Global Environmental Studies, GIS, Urban Planning, Urban Engineering, Civil Engineering, Statistical Science, Regional Planning, Watershed Policy, Landscape Architecture, Landscape Ecology and Planning, Landscape Planning, Silviculture (Humanities) Archeology, Japanese History, Cultural Anthropology (Social Sciences) Environmental Economics, Environmental Sociology, Environmental Policy, Tourism, Natural Environment Policy, Natural Capital, Politics, Landscaping, Landscape Architecture, General Insurance, Regional Policy and Planning, Agricultural Business Management, Cultural Policy
Individual Collaboration FS (KANEKO)	Water-Energy-Nexus Technology for Marginal Settlements: Socially Optimal Size from the Perspectives of Reciprocity and Indigenous Knowledge	4	9	1	14	(Natural Sciences) Sanitary Engineering, Environmental Science, Environmental Engineering, Engineering, Hydrology, Electrical Equipment, Electrical and Electronic Engineering, Electric Power Engineering, Power Conversion (Humanities) Development Aid Studies, Development Sociology, Area Studies, Development Experience of Japan (Social Sciences) Applied Economics, Applied Microeconomics, Applied Econometrics, Development Economics, Environmental Impact Assessment, Environmental Studies, Environmental Economics, Environmental Policy, Economics, Environmental Policy, Transport Economics, Law and Economics, Labor Economics
Individual Collaboration FS (MATSUDA)	Nature Cultural Diversity and Building Sustainable Society in Asia	1	7	0	8	(Natural Sciences) Landscape Ecology (Social Sciences) Development Administration, Environmental Psychology, Global Health, Social Epidemiology, Biotechnology Policy, Agricultural Economics
Institutional Collaboration FS (KOHSAKA)	Transdisciplinary Approaches to Governance of Intellectual Properties: Genetic Resources and Traditional Knowledge in Terrestrial, Coastal and Marine Areas	19	14	1	34	(Natural Sciences) Access and Benefit-Sharing, Biomimetics, Genetics, Genetic Resource Analysis, Genetic Resources Management, Marine Biology, Environmental Science, Environmental Conservation, International Law of the Sea, Insect Ecology, Plant Genetics and Breeding, Food Science, Functional Analysis of Microorganisms in Agro-Forest Systems, Plant Production and Environmental Agriculture, Bioresource Science, Intellectual Property, Molecular Biology (Humanities) Informatics, History of Cultural Exchange (Social Sciences) Political Ecology, Genetic Resources Management, Applied Econometrics, Law of the Sea, Development Sociology, Environmental Epidemiology, Environmental Economics, Environmental Sociology, Environmental Policy, International Environmental Law, Resource Management, Social Development, Plant Genetics, Intellectual Property Management, Urban and Regional Planning, Agricultural Economics
Institutional Collaboration FS (SAKAKIBARA)	Co-Creation of Regional Innovation for Reducing Risk of Environmental Pollution	15	5	1	21	(Natural Sciences) Epidemiology, Accelerator Science, Environmental Petrology, Environmental Economics, Atomic Collision Physics, Resource Economics, Ecology, Geoscience, Non-ferrous Metal Smelting, Physics, Inorganic Material Engineering (Humanities) Business Management (Social Sciences) Development Economics, Environmental Economics, Forest Science, Fishery Sociology, Regional Environment Studies, Rural Sociology, Rural Planning
Institutional Collaboration FS (HOMMA)	Assessing Functional Diversity of Satoyama Paddy Landscapes in East Asia's Monsoon Region	17	2	0	19	(Natural Sciences) Environmental Science, Mycology, Community Ecology, Entomology, Reintroduction Biology, Natural Science, Vegetation, Use of Plants, Food Science, Forest Utilization, Aquatic Ecology, Water Use, Ecology, Biodiversity, Life Science, Soil Science, Zooecology, Agriculture, Agricultural Irrigation, Agricultural Economics, Agricultural Water Utilization, Agricultural Engineering, Microbiology, Conservation Biology, Satoyama Usage History, Silviculture (Social Sciences) Ecology, Comparative Cultures
Institutional Collaboration FS (MORI)	Developing Interactive Rural-Urban Systems to Improve Human Well-being	6	8	3	17	(Natural Sciences) GIS, Environmental Ecology, Transportation, Urban Design Engineering, Urban Engineering, Agriculture, Agricultural Civil Engineering (Humanities) Megacities, Architectural History, Qualitative Research (Social Sciences) Communication Theory, Marketing, Environmental Management, Environmental Economics, Environmental Sociology, Economics, Architectural History, Science Communication, Agricultural Economics, Future Design
Institutional Collaboration FS (MURAYAMA)	Living Spaces: A Transdisciplinary Study on Locality, Nature and Global Interdependency	13	18	18	49	(Natural Sciences) Network Science, Multi-level Data Analysis, Climatology, Climate History, Meteorology, Ichthyology, Spatial Information Science, Paleoclimatology, Physical Geography, Fisheries, Quantitative Analyses of Behavior, Ecogeography, Biology, Biogeochemistry, Regional Sanitation, Geography, Geoinformatics, Urban and Regional Analysis, Nonlinear Physics, Molecular Epidemiology, Computational Neuroscience (Humanities) Narrative approach to Environmental History, History of the Family, History of Science, Environmental History, Environmental Humanities, Environmental Anthropology, Environmental Ethics, Landscape History, Socio-Economic History, Social History of Forestry, Human Geography, History of Psychiatry, Western History, Regional Environmental History, History by Region, Geography, Chinese Environmental History, Regional Environmental History in China, History of Philosophy, History of South Bohemia, History of Japan, History of Agriculture, Rural Sociology, Cultural Heritage, Cultural Informatics, Cultural Anthropology, Silviculture, Historical Geography (Social Sciences) Environmental History of Alps, Environmental History of Italian Alps, Environmental Decision Theory, Environmental History, Environmental Sociology, Tourism, History of Business Management, Economic History, Economic Geography, Social Movement Studies, Social Economic History, Social Dynamics, Plant Physiology, History of Political Theory, Regional Development Studies, Community Building, Tropical Horticulture, History of Agriculture, Historical Demography
Institutional Collaboration FS (KANEMOTO)	Mapping the Environmental Impact Footprint of Cities, Companies, and Households	7	13	0	20	(Natural Sciences) Life Cycle Assessment, Marine Ecology, Environmental Agriculture, Engineering, Input-Output Analysis, Atmospheric Science, Soil Science, Civil Engineering, Science (Social Sciences) System Engineering, Stock Analysis, Material Flow, Life Cycle Assessment, Applied Econometrics, Chemical Engineering, Science and Technology Studies, Environmental Economy, Economic Statistics, Industrial Ecology, Input-Output Analysis, Economics of Waste
Institutional Collaboration FS (HAYASHIDA)	Co-benefit Strategy of Global Warming Mitigation and Clean Air - A Mitigation Study of SLCPs Emissions from Agriculture by Collaboration with Stakeholders in the Environs of Delhi	16	7	0	23	(Natural Sciences) Aerosol, Remote Sensing, Clouds and Aerosols, Greenhouse Gas, Image Processing, Ocean Physics, Remote Sensing Environment and Disaster, Environmental Simulation, Environmental Informatics, Climatology, Climatic Variation, Meteorology, Ecosystem Ecology, Snow and Ice Science, Atmospheric Aerosol, Atmospheric Chemistry, Atmospheric Science, Atmospheric Environment, Development of Atmospheric Measurement Equipment, Atmospheric Physics, Atmospheric Radiation, Soil Microbiology, Microbial Ecology, Limnology (Social Sciences) Safety System, Environmental Economy, Economic History, Economic Policy, Resource Economics, Natural Geography (Topography, Quaternary Geology), Agriculture and Social Development, Social Systems Engineering, Human Geography, Regional Studies, Geography, Agricultural Economics
Core Program (FR1)	Proposal and Verification of the Validity of Isotope Environmental Traceability Methodology in Environmental Studies	13	6	2	21	(Natural Sciences) Paleoclimatology, Hydrology, Ecological Science, Groundwater Management, Geochemistry, Isotope Environmental Science, Stable Isotope Ecology, Conservation Biology, Limnology, Ecology and Environment, Rocks, Minerals and Mineralogy, Museology (Humanities) Archaeology, Social Behavior (Social Sciences) Environmental Sociology, Fisheries Economics
Core FS (KONDO)	Knowledge binding to overcome gaps in the problem perception in collaborative research on socio-environmental interaction	8	7	10	25	(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	2	0	3	(Natural Sciences) Biogeography (Social Sciences) Environmental Sociology, Environmental Policy
	Total	441	231	111	783	

As of 31 March, 2018

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, Peru, Russia

Program 2 Fair Use and Management of Diverse Resources

3 Human-Environmental Security in Asia-Pacific Ring of Fire: Water-Energy-Food Nexus

○Japan, Indonesia, Philippines, Canada, USA

4 Biodiversity-driven Nutrient Cycling and Human Well-being in Social-Ecological Systems

○Philippines, Japan

Program 3 Designing Lifeworlds of Sustainability and Wellbeing

5 Lifeworlds of Sustainable Food Consumption and Production:Agrifood Systems in Transition (FEAST Project)

○ 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