



NIHU

Inter-University Research Institute Corporation  
National Institutes for the Humanities

# Research Institute for Humanity and Nature

Prospectus 2018-2019



## Contents

Message from the Director-General	2
RIHN Philosophy and Approach	5
Organizational Structure	6-8
Project Index	10-11
Research Projects	12-29
Core Projects	30-32
Completed Research	34-36
Current Feasibility Studies	38-41
Coordination	42-43
Science Communication	44-45
Facilities	46-47
Ecohealth & Future Earth	48
Collaboration	49
Administrative Structure	50-52
A Brief History of RIHN	53
National Institutes for the Humanities	54-55
Access	56



## 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), 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 these interactions between humanity and nature ought to be. To achieve this mission, RIHN has been conducting interdisciplinary research spanning the natural sciences, humanities, and social sciences, and in recent years, has developed towards transdisciplinary research that involves collaboration with various stakeholders in society.

Since its establishment, RIHN researchers have formulated creative projects to address social needs in diverse fields of environmental interaction. Following an external review of research activities and organizational structures,

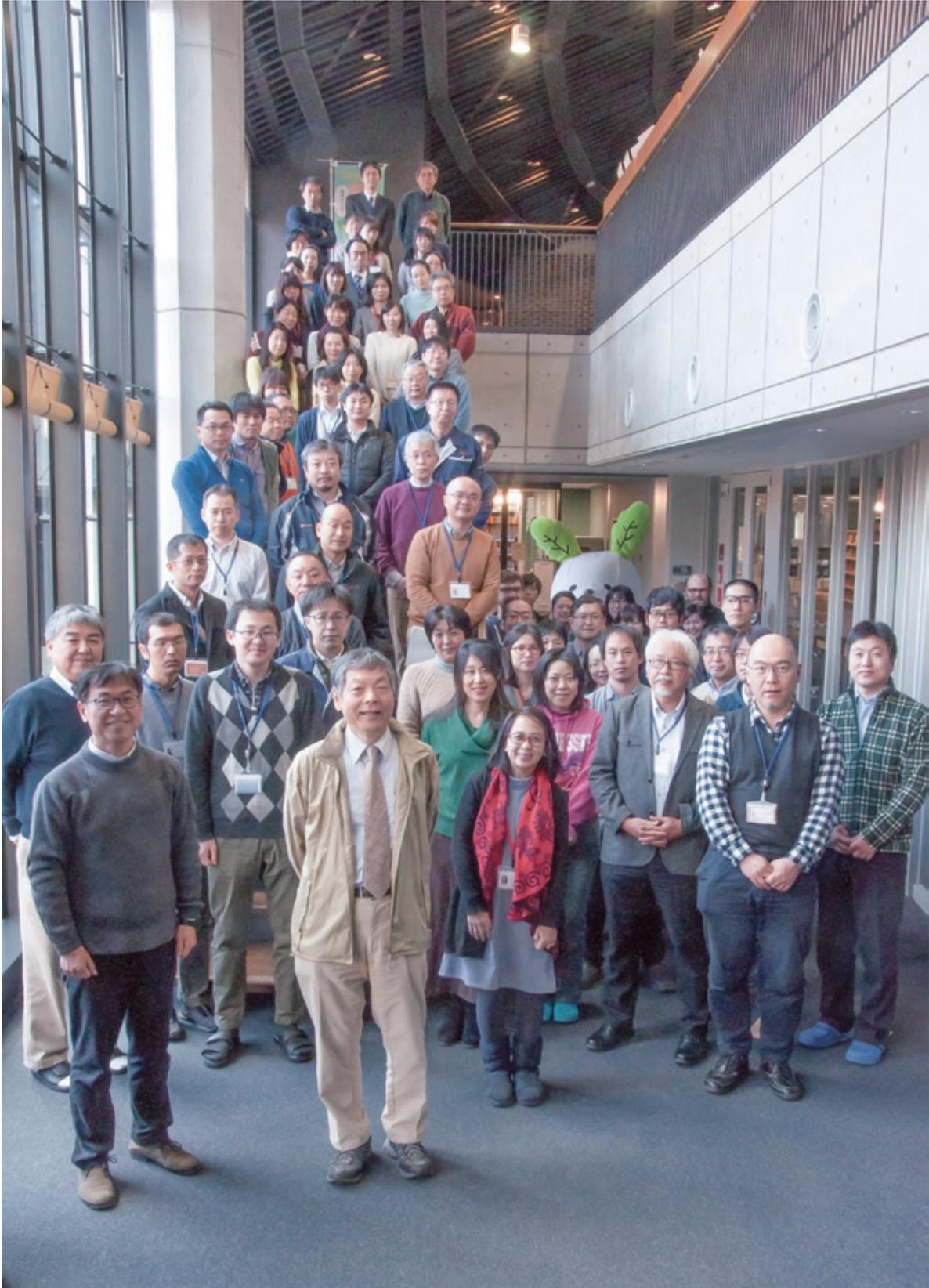
in fiscal year 2015 we reformed the ways in which we conduct and promote research projects in order to enhance coordination and integration of the projects for achieving the goals of the RIHN mission. As part of this reform, in April of 2016 (beginning of fiscal year 2016), we launched a new research initiative to achieve “Transformation Towards Sustainable Futures in Complex Human-Nature Systems in Asia.” For this purpose, we started a set of Research Programs, a Core Program, and the RIHN Center. With a new structure in place, we are now pursuing our initiative through enhanced collaboration within our institute, across the diverse research community, and with society in general.

To enhance international activities of RIHN, we are also collaborating with the international research platform Future Earth, which aims to integrate global environmental change research for achieving global sustainability.

In fiscal year 2018 we are fully implementing these new research initiatives.

安成 哲三  
YASUNARI Tetsuzo

Director-General  
Research Institute for Humanity and Nature





Above: WADE Shin-ichi, Short summer, Sapporo, Hokkaido, Japan

Bottom: OSHIUMI Keiichi, Old market, Siem Reap, Cambodia

## RIHN Philosophy and Approach

For several decades, researchers have attempted to find solutions to the environmental problems that now confront human communities at all scales, but despite extensive research in individual disciplines, many environmental problems have remained unresolved. There is therefore a need to go beyond partial descriptions of discrete environmental problems towards holistic understandings of the underlying causes of these problems and for integrated approaches to their solutions.

The Research Institute for Humanity and Nature is a national research institute established by the Government of Japan in 2001 and it is part of the National Institutes for the Humanities. RIHN research starts from the premise that environmental problems are rooted in human society, culture, and values. The goal of RIHN is to seek concepts, theories and mechanisms capable of describing and enabling transformation of human-environment interactions. This implies that RIHN research involves a normative dimension, driven by questions such as what the relationship between humanity and nature ought to be like. To this end, RIHN solicits, funds, and hosts integrative research projects investigating environmental change problems in specific settings. Research projects are undertaken by interdisciplinary teams at RIHN, partner institutions, and societal stakeholders in Japan and abroad.

We at RIHN believe that research ought to contribute to the search for solutions to real-world problems and, therefore, we promote a co-design and co-production approach where researchers and societal actors join hands in exploring problems and developing new framings and possible solutions. RIHN research is increasingly transdisciplinary in that it seeks to redefine

the role of science in society, improve dialogue between different traditions of knowledge, and stimulate new multi-actor local, national and international collaborations. This approach needs to draw on multiple, diverse perspectives from a range of disciplines including the natural and social sciences, arts and humanities, and engineering and design.

Science cannot be uniformly applied to the world but should instead enable solutions to social-environmental problems that are informed by lived social practices and communal values. RIHN research is developed globally, but with Asia as a core focus area. Not only is Asia's impact on global development increasingly conspicuous, but at the same time it is also home to many examples of long-term cultural-ecological continuity that need to be understood in terms of their own significance to regional dynamics. RIHN research crucially depends on long-established networks in Asia and contributes to transdisciplinary initiatives in the region, among others by hosting the Regional Centre for Future Earth in Asia.

RIHN research is guided by the following three objectives:

- Conduct research that analyzes the interaction between humanity and nature and critically examines the sustainability of human societies, based on past RIHN research and international literature and experiences
- Apply research results to solve real-world sustainability problems
- Promote solution-oriented research on environmental challenges that is co-designed and co-produced in close collaboration with societal stakeholders

While other regions are not excluded, the primary geographical focus of RIHN research is on Asia. More broadly, RIHN strives to deploy an Asian perspective in its research on global environmental change



## Organizational Structure

RIHN is fundamentally a project-based institute, with projects alternating through a 5-7-year cycle. Identification of ideas for projects happens through public solicitation. Through a process of evaluation and selection that includes “incubation” and “feasibility” stages, these ideas are gradually developed into fully-fledged projects and only get officially underway after evaluation by an international external review committee. At this point, the proponent becomes joins the RIHN community by becoming a staff member of the Institute. In most cases projects run for five years. They include a core team of researchers based at RIHN and a much larger network of partners at research institutions throughout Japan and abroad.

## RIHN Programs

RIHN research is organized into Programs and Projects rather than pre-existing academic disciplines or domains. Three Research Programs and one Core Program are each home to multiple projects that carry out research in line with the Program’s broad direction. The bundling and integration of Projects within the Programs facilitates synthesis of research results and allows for strategic planning of research. Programs are subject to annual review by the External Research-Evaluation Committee (see RIHN Project Trajectory on pages 7 & 8). RIHN endeavors to improve its research by making good use of the review results while also respecting the independence of each Program.

## Research Programs

Research Programs are organized around three themes identified in the Phase III Medium-Term Plan. In addressing environmental problems, technological and institutional developments are important, but RIHN recognizes that these need to build on the foundation of people's awareness, value systems and culture. The programs collaborate closely with society in developing and proposing options that contribute to the transition of society.

### Program 1: Societal transformation under environmental change

This program aims at providing realistic perspectives and options to facilitate the transition to 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.

### Program 2: Fair use and management of diverse resources

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 natural resources including energy, water and ecological resources.

### Program 3: Designing lifeworlds of sustainability and wellbeing

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.

## RIHN Project Trajectory : Research Project



**Incubation Studies (IS)** are proposed by individual researchers to the RIHN Project Review Task Committee. If approved, the researcher is granted seed money to prepare a proposal for Feasibility Study.

**Feasibility Studies (FS)** allow the study leader a period to develop a proposal for Full Research.

In the transitional **Pre-Research (PR)** period, the project leader formally assembles the team, establishes MOUs necessary for collaboration with other institutions and makes other preparations to enable Full Research.

**Full Research (FR)** lasts from three to five years. It typically involves a research team at RIHN and concurrent activity with collaborators overseas, several periods of field study, workshops and presentations, and outreach or communication to relevant communities. FR projects are evaluated by the External Research Evaluation Committee at the beginning (selection), mid-term and the end (final evaluation).

## Core Program

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

## RIHN Project Trajectory : Core Project



## RIHN Center

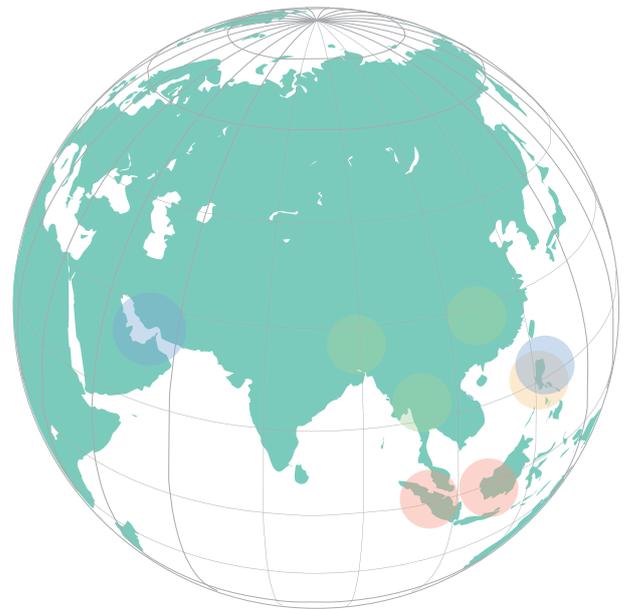
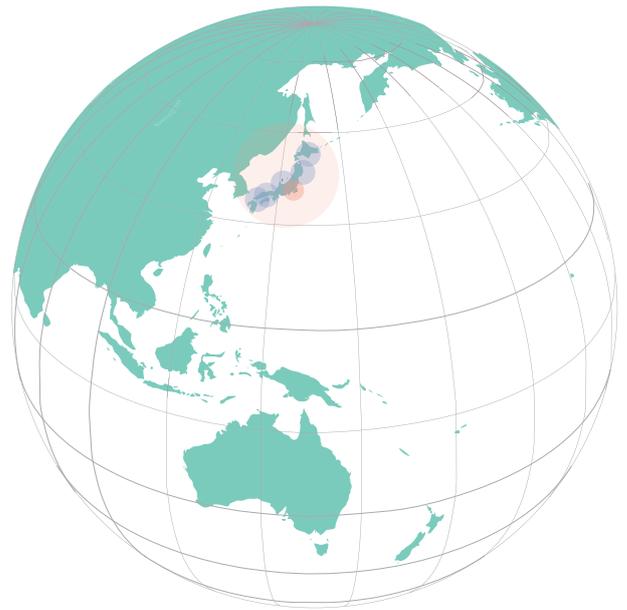
The RIHN Center provides the foundations for collaborative research and activities at RIHN. Its four Divisions manage and operate the laboratories and the information systems of the Institute, and facilitate communication, networking and capacity building (see detailed description on page 42.). Center faculty also engage in research in pursuing the goals of the Center. Collaboration is fundamental to the operation of the RIHN Center: it works closely with the Core Program and Research Programs by providing tools, facilities and methods. It also collaborates with the wider academic community in support of RIHN's role as a joint-use Inter-University Research Institute and engages a broad range of societal stakeholders in problem-solving research processes.

Above: TERAMOTO Shun, Life with a well pump, Los Baños, Philippines

Bottom: HONDA Naomi, Investigating electrical resistance on a beach, Fukushima, Japan



# Project Index



**Research Program 1: Societal Transformation under Environmental Change**

SUGIHARA Kaoru 12-13

**Societal Adaptation to Climate Change: Integrating Palaeoclimatological Data with Historical and Archaeological Evidences**

NAKATSUKA Takeshi 14-15

Research Field : Japan

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

MIZUNO Kosuke 16-17

Research Fields : Indonesia, Malaysia

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

YOSHIDA Takehito 18-19

Research Field : Japan

**Research Program 2: Fair Use and Management of Diverse Resources**

NAKASHIZUKA Tohru 20-21

**Biodiversity-driven Nutrient Cycling and Human Well-being in Social-Ecological Systems**

OKUDA Noboru 22-23

Research Fields : Japan, Philippines

**Research Program 3: Designing Lifeworlds of Sustainability and Wellbeing**

SAIJO Tatsuyoshi 24-25

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

Steven R. McGREEVY 26-27

Research Fields : Japan, Thailand, Bhutan, China

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

YAMAUCHI Taro 28-29

Research Fields : Zambia, Burkina Faso, Indonesia, Japan

**Core Program**

TANIGUCHI Makoto 30

**Proposal and Verification of the Validity of Isotope Environmental Traceability Methodology in Environmental Studies**

TAYASU Ichiro 31

Research Field : Japan

**Information Asymmetry Reduction in Open Team Science for Socio-environmental Cases**

KONDO Yasuhisa 32

Research Field : Japan, Oman

## Research Program 1

# Societal Transformation under Environmental Change

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.

To demonstrate the fundamental significance of global environmental sustainability for human society, we need to make intellectually explicit the links between environmental change and natural disasters on the one hand, and social issues such as livelihood, inequality, social security and conflict on the other, and reinforce understanding of these links 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 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. 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.



Program seminar at RIHN, 29th January 2018

Program Director **SUGIHARA Kaoru** RIHN

Trained in Japan (Doctorate at the University of Tokyo), I have held positions at the History Department of the School of Oriental and African Studies, University of London, the Center for Southeast Asian Studies, Kyoto University, the Graduate School of Economics, University of Tokyo, and the National Graduate Institute for Policy Studies (Japan). My research concerns the history of intra-Asian trade and labor-intensive industrialization in the last two centuries. I am currently working on the economic and environmental history of Monsoon Asia in long-term perspective. I also act as Vice-Chair of the Future Earth Committee of the Science Council of Japan

Researchers

**MASUHARA Naoki**  
**YAMAMOTO Aya**

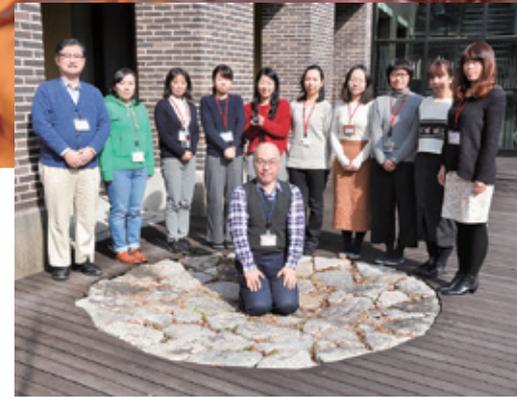
Senior Researcher  
Research Associate



# Societal Adaptation to Climate Change: Integrating Palaeoclimatological Data with Historical and Archaeological Evidences

Project Leader **NAKATSUKA Takeshi** RIHN

Professor Nakatsuka's specialties are palaeoclimatology and isotope biogeochemistry. Since his early career as a graduate student, he has been using nitrogen isotopes to study long-term variations of climate and its impacts on oceanic biogeochemical cycles. Recently, he changed his main research area from oceans to land and focused on using tree-ring oxygen isotopes to examine the relationship between climate change and human history. Investigating periodicity of climate during the last three millennia in Japan and the world, he now hypothesizes that past human societies were often damaged by multi-decadal climate variations as they were caught in a cycle of over-adaptation and subsequent failure of adaptation.



## Background and objectives

If global warming causes many societal difficulties, how can we adapt to the change? Remarkable recent progress in palaeoclimatology has elucidated the fact that large climate variations often underlay epochs of human history. How did our ancestors address such change in the past? Human history must include many examples from which we can extract common lessons relevant to contemporary global environmental change. The research target of this project is Japanese history from the prehistorical Jomon era to the present. First, we reconstruct past climate variations in Japan and Asia at annual time resolutions for the last several millennia, using up-to-date palaeoclimatological methods to identify outstanding periods of climate variation. Then we use historical and archaeological approaches to investigate how local societies reacted to climate variation in order to clarify common sociocultural characteristics of societies that are tolerant or vulnerable to changes in climate.

## Research methods

In this project, past climate variations are reconstructed based on various proxies, such as tree rings (Photo 1), historical weather records, lake and marine sediments, coral rings and speleothem, and compared with human responses recorded in historical documents (Photo 2) and archaeological archives. There are three reasons why we have chosen Japan as the main research area in this project. First, Japan is located at northeastern rim of the Asian summer monsoon, where small changes in monsoon dynamics might have significantly affected rice paddy cultivation on which Japanese sustenance has historically depended. Second, due to the historically high literacy

rate and long-lasting family system in Japan, innumerable historical documents dating back to the 8th century are preserved in both private and governmental sectors. Third, rapid land developments during last several decades have allowed for precise archaeological excavations at numerous sites all over Japan. In addition, a palaeoclimatological tool (tree-ring cellulose oxygen isotope ratio) particularly useful in the Asian monsoon region has recently been developed to reconstruct summer precipitation on which rice paddy cultivation in Japan depends, providing archaeologists with a reliable tool for annual dating of numerous excavated woods (Photo 3).

## Remarkable results

We have used many tree-ring samples from around Japan in order to analyze tree-ring oxygen isotope ratios during the last 4800 years in annual time resolution. We have also collected many tree-ring width datasets from all over Asia in the framework of an international palaeo-climatological project (PAGES) and reconstructed inter-annual variations of averaged East Asia summer temperatures. Comparison of annual climate records and paleographic information such as yearly tax accounts in early modern villages and administrative documents on water control in medieval manors, archaeological evidence on prehistorical and ancient societies excavated from farmland and habitat remains, and the newest isotopic dendrochronological data (Fig. 1) allows us to investigate how variations in temperature or precipitation influenced agricultural production, human livelihoods, and water management. As a result, we can understand how historical societies could or could not overcome serious climate changes in the past. For example, in the Medieval period, sudden



Photo 1 Sampling of a tree ring core from a living tree using an increment borer



Photo 2 Collection of historical information by investigation of old documents

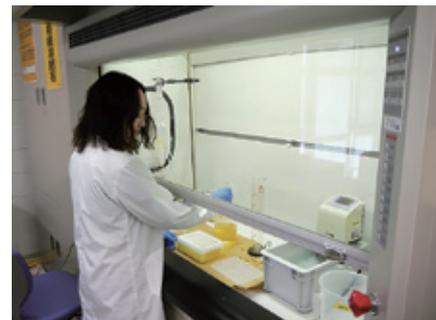
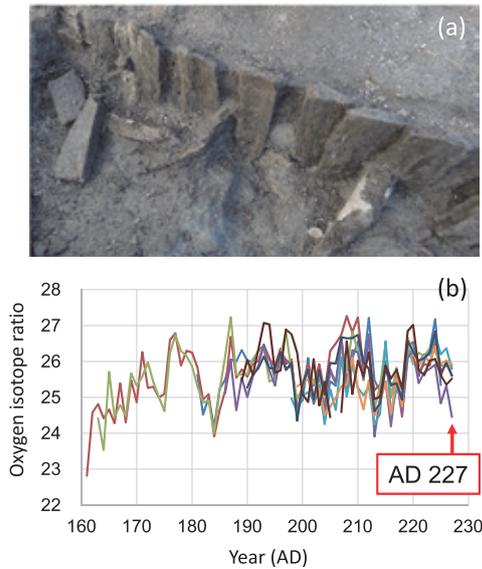


Photo 3 Extraction of tree ring cellulose from archaeologically excavated wood

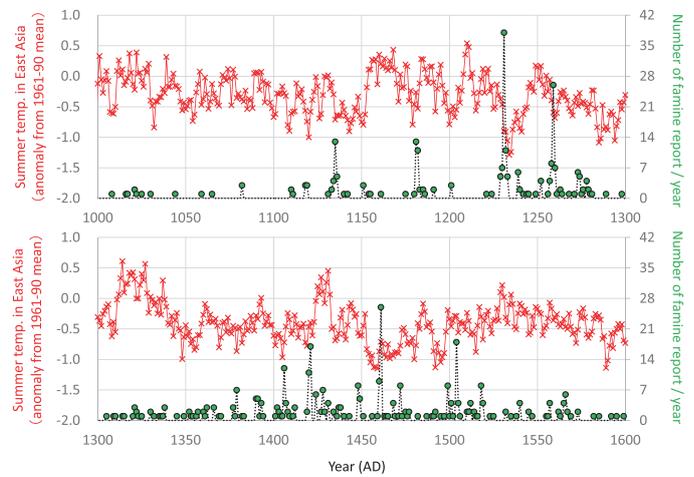
decreases in summer temperature often caused serious famines in Japan, though there were important exceptions during late 13th and 14th centuries (Fig. 2). On the other hand, sudden increases in precipitation often caused water disasters and subsequent social conflicts, analysis partly inferred from the number of old documents relevant to emergence of “Akuto” (outlaws) in the Kamakura era (Fig. 3). Such relationships between precipitation, disaster and societal change can be traced back to the early period of the Yayoi era about 2500 years ago.



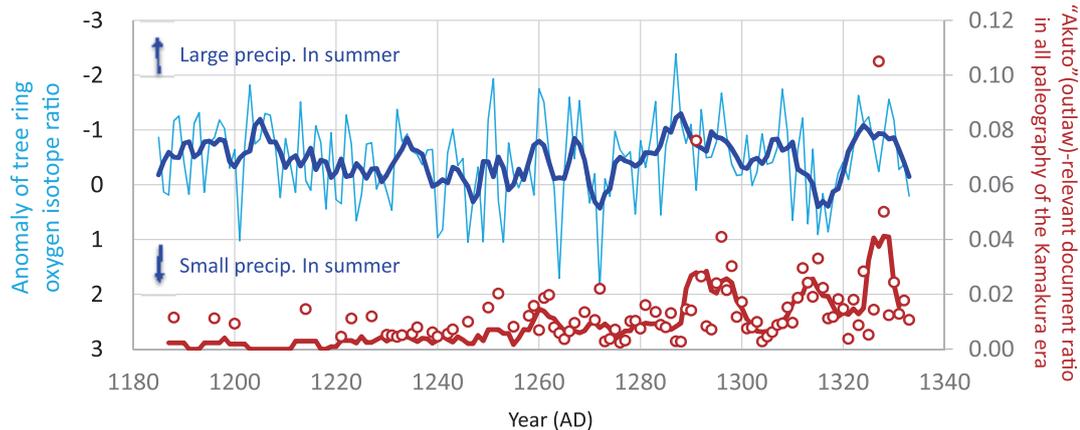
**Figure 1** Numerous wooden posts along an ancient waterway excavated from Shoji remain in Neyagawa city, Osaka prefecture (a) and variations in their tree-ring cellulose oxygen isotope ratios (b). Coincidence of the variations among many posts indicates that this waterway was constructed in 227AD. Samples of wooden posts were provided by Neyagawa city board of education.

### Final goal

As our present concerns for global warming clearly illustrate, large climate variations in the past have had serious impacts on our ancestors. As shown in Figs. 2 and 3, significant multi-decadal climate variations had especially negative impacts on historical societies. However, some past societies continued to attempt to overcome the influence of climate variations, while other societies collapsed. Comparative evaluation of historical climate adaptations may allow us to explain Japanese history since the Jomon era as a sequence of societal transformations designed to overcome large-scale intermittent climate variation. The final goal of this project is to bring such historical analysis to bear on fundamental adaptation strategies considered in relation to contemporary global environmental problems.



**Figure 2** Variations in East Asia summer temperature (red: reconstructed from tree ring width database in Asian wide region) and famine reports in Japan (green: number of old documents from each year containing famine-words) during Medieval period.



**Figure 3** Variations in Central Japan summer precipitation (blue: inferable from tree-ring oxygen isotope ratio) and documents related to “Akuto” (outlaws) (red: yearly ratios in all paleography) during the Kamakura era, 1185-1333 AD. Thick lines indicate five-year averages.

Sub Leader

**KAMATANI Kaoru**

Ritsumeikan University

Researchers at RIHN

**ITO Keisuke**

Researcher

**TSUSHIMA Akane**

Researcher

**LI Zhen**

Researcher

**TESHIMA Mika**

Research Associate

**KURIU Harumi**

Research Associate

**MIZUMA Sakiko**

Research Associate

Main Members

**SANO Masaki**

Waseda University

**WAKABAYASHI Kunihiro**

Doshisha University

**HIGAMI Noboru**

Aichi Prefectural Center for Archaeological Operations

**TAMURA Noriyoshi**

Beppu University

**MIZUNO Shoji**

The University of Shiga Prefecture

**SATO Daisuke**

Tohoku University

**WATANABE Koichi**

National Institute of Japanese Literature

**YASUE Koh**

Shinshu University

**ABE Osamu**

Nagoya University

**YOSHIMURA Kei**

The University of Tokyo

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



Project Leader **MIZUNO Kosuke** RIHN/Kyoto University

Kosuke Mizuno has been studying the Indonesian economy since 1978, focusing primarily on how economic change unfolds in rural West Java. Mizuno places special attention on issues of land, capital, and labor relations. Following the Indonesian democratization process and particularly the restoration of the right to organize in 1998, when former President Suharto stepped down, Mizuno has analyzed institutional change, economic development, and resource management within people's organizations such as farmers' unions and trade unions. He became the leader of an integrated natural and social science study on peatland society in Riau province in 2008, and continues to conduct action research on peatland rehabilitation. Mizuno strives for a deeper understanding of the historical and social dimensions of peatland society, and considers the commodities found therein, such as palm oil, to be crucial for the analysis of the Indonesian economy as a whole.

## Necessity of the study

Peat swamp forests are found throughout Southeast Asia, especially Indonesia, and contain massive stores of carbon and water. Over the last two decades, these swamps have been intensively exploited in order to create commercial acacia and oil palm plantations. As these tree species cannot grow in swamps, peatlands have been drained, creating extensive areas of dried peatlands that are extremely vulnerable to fire.

In 2015, peatland fires burned 2.1 million hectares of forest in Indonesia, affecting 45 million people. A half million people suffered from upper respiratory tract infections, and thousands of people, especially children, were afflicted with asthma. The government responded to this disaster by mobilizing the army, punishing people who set fires, and refusing to issue new peatland development permits. These measures were urgently needed, but provided only short-term relief. The public has demanded longer-term and more sustainable measures, such as the rewetting and reforestation promoted by this project since 2012.

The government of Indonesia established the Peatland Restoration Agency in January 2016, and declared that two million hectares of degraded peatlands will be restored by 2019. The objective of this research project is to generate

solutions to the current crisis of peat degradation and related fire and haze in tropical regions through action research. The project seeks to identify and implement alternative practices in collaboration with local people, academics, governmental offices and officials, NGOs, and international organizations.

The project conducts multidisciplinary research in order to clarify the entire process of peatland degradation. We focus on: A) gathering social and ecological baseline data on peatlands and measuring the impacts of fire and haze; B) implementing paludiculture projects in wetland areas as a potential strategy for the mitigation of peatland degradation; and C) identifying governance structures and incentives, including strengthening the land rights of people situated on state land, which can support sustainable peatland management. These studies are conducted in collaboration with local people, migrants, NGOs, plantation companies, and local and national governments.

## Achievements to date

Project researchers introduced the practice of rewetting and reforestation in peatland areas in Bengkalis District, Riau Province in 2010. This experimental site has attracted significant attention, especially since 2015 when fire and haze became very serious. Along with project-led international seminars, the site has significantly enhanced public awareness of the potential for rewetting and forestation to regenerate peatland.

On August 10, 2016, the Research Institute of Humanity and Nature, Kyoto University, and Hokkaido University



Photo 1 Rewetting by small wooden dam in Kepau Baru village, Meranti, Riau



Photo 2 Sago paludiculture in Kepau Baru village, Meranti, Riau

signed a Memorandum of Understanding with the Peatland Restoration Agency of Indonesia to conduct action research to restore degraded peatland. Our project has created action plans based on this MOU and has accordingly begun to implement a restoration program in Meranti District, Riau Province. We started to discuss the social forestry programs that are designed to strengthen the land rights of people on the degraded state land among local people, the Ministry of Environment and Forestry, local governments and NGOs.

### Research Targets

Peatland ecosystems are vulnerable. Damage from human disturbance can be irreversible. In order to achieve long-lasting solutions to peatland degradation, we investigate the social and ecological aspects of peatland vulnerability, and propose many programs to transform these vulnerabilities. Our research objective is to examine alternative livelihood strategies while building/changing the institutions that can encourage people to restore and make sustainable use of degraded peatlands. The project supports community-initiated paludiculture as a sustainable livelihood model

in rewetted peatlands while strengthening land rights on state land through social forestry programs. This research thus demonstrates the future potential of peatland-based societies, the phasing out of monoculture production activity, the development of paludiculture, and the enlargement of protected peatland areas.

### Publications

Catastrophe and Regeneration in Indonesia's Peatlands: Ecology, Economy and Society was published by the National University of Singapore Press in 2016. This volume provides inter-disciplinary field-based and historical analyses of peatland degradation through examination of the survival motives of local people, the profit motives of companies, and the conservation motives of Government and NGOs. The book showcases the potential solution of rewetting and reforestation "the people's forest". The book has been reviewed across various forms of media, including leading international academic journals. Our project will continue to build on this research in order to develop new insights on tropical peatland management.



Photo 3 Seedling for reforestation in Kepau Baru village, Meranti, Riau

#### Sub Leader

**KOZAN Osamu** Kyoto University/RIHN

#### Researchers at RIHN

**KAJITA Ryosuke** Researcher  
**OSAWA Takamasa** Researcher  
**SHIODERA Satomi** Researcher/Kyoto University

**SUZUKI Haruka** Researcher/Kyoto University/Universitas Riau  
**YAMANAKA Manabu** Researcher/Kobe University/JAMSTEC  
**KATSURA Tomomi** Research Associate

#### Main Members

**OKAMOTO Masaaki** Kyoto University  
**ITOH Masayuki** University of Hyogo  
**SHIMAMURA Tetsuya** Ehime University  
**NAITO Daisuke** Kyoto University  
**KAWASAKI Masahiro** RIHN  
**SATO Yuri** Institute of Developing Economies

**PAGE, Susan** University of Leicester, UK  
**GUNAWAN, Haris** Peatland Restoration Agency, Indonesia  
**SABIHAM, Supiandi** Bogor Agricultural University, Indonesia  
**SETIADI, Bambang** Agency for the Assessment and Application of Technology, Indonesia  
**DHENY, Trie Wahyu Sampurno** Indonesian Agency of Geospatial Information, Indonesia

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



Project Leader **YOSHIDA Takehito** RIHN/The University of Tokyo

Takehito Yoshida is an ecologist and limnologist who studies diversity and complexity of organisms and ecosystems from the viewpoints of adaptation and system dynamics, and explores human-nature interactions and sustainability in local communities in Japan. Trained in Kyoto University (PhD) and Cornell University (postdoc), he was a member of the faculty at the University of Tokyo at Komaba before jointly appointed at RIHN and the University of Tokyo.

## Outline of the project

The rate of natural disaster occurrence has been increasing, partly due to contemporary climate change, and adaptation to natural disaster risks is increasingly important to the sustainability of human societies. At the same time, many societies are experiencing shrinking populations. Ecosystem-based Disaster Risk Reduction (Eco-DRR) takes advantage of the multi-functionality of ecosystems and biodiversity, including their capacity to mitigate natural disasters while providing multiple ecosystem services, and population decline provides ample opportunity for implementing Eco-DRR. Our project will develop practical solutions for implementation of Eco-DRR by visualizing natural disaster risks, evaluating multi-functionality of Eco-DRR solutions, conducting transdisciplinary scenario analysis, examining traditional and local knowledge of disaster risk reduction, and collaborating with the insurance industry and other sectors.

## Background and goals

Climate change impacts natural and human systems and is projected to intensify in the future. Our project focuses on natural disasters, and it aims to contribute to risk reduction and management strategies. Climate change or natural disaster risks result from the interaction between a

climate-related hazard, and the exposure and vulnerability of human activities (Fig. 1), so that adaptation to natural disaster risk can be realized by reducing exposure (e.g. by improving land use) and vulnerability to hazards.

Hard-engineering natural disaster countermeasures 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 faced with situations in which hazard levels exceed safety levels, resulting in devastating natural disasters. Eco-DRR approaches focus on lowering the exposure of human activities to natural hazards, so reducing, if not preventing, associated losses and damages. Eco-DRR approaches, meanwhile, take advantage of the multi-functionality of ecosystems, so complementing conventional approaches to natural disaster management, although the effectiveness and multi-functionality of Eco-DRR is not yet clearly and quantitatively understood.

Japan's population is aging and shrinking, leading to the abandonment of farmlands, houses and decreases in other intensive land uses, a challenging circumstance that nevertheless provides an opportunity for improving land use. The population of Japan increased substantially over the last century, increasing the risk of and public exposure to natural disasters. Evaluating past natural disaster risks therefore provides valuable information of adaptation

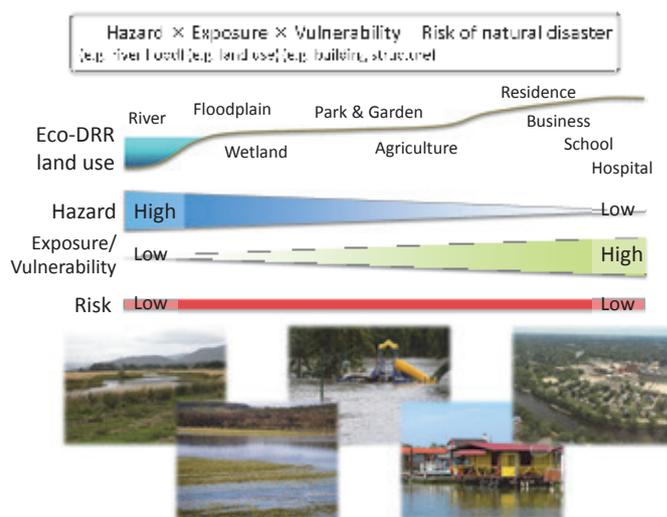


Figure 1 Ecosystem-based disaster risk reduction not only lowers disaster risks but also receives benefits of ecosystem services by reducing the exposure of human activities in high-hazard locations and supporting human activities in low-hazard places.

strategies considered in Japan as well as in other countries.

Given this background, the ECO-DRR Project sets two main goals: first, it develops methodologies to evaluate Eco-DRR multi-functionality and assess Eco-DRR by comparing multi-functionality between the past, the present and the future. Secondly, the Project supports Eco-DRR implementation through transdisciplinary collaborations with local communities, governments, insurance industry and other stakeholders.

### Research objectives

Three research components contribute to achieve the above two goals.

- (1) Visualizing the risks of natural disasters in the present and the past

The exposure and vulnerability associated with different natural disasters will be analyzed, and the risks evaluated and visualized as risk maps of the present and past. Modeling risk for the different exposure scenarios will contribute to future Eco-DRR assessments and plans.

- (2) Evaluating and modeling multi-functionality of Eco-DRR

Provisioning, regulating and cultural ecosystem services will be evaluated, and their spatial distribution will be modeled in relation to population and land use. The model will be used for evaluating the ecosystem services for different land use scenarios.

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

Together with local communities and governments, transdisciplinary platforms will be formed at research sites to deepen understanding, discuss future options, and build consensus around Eco-DRR approaches. Transdisciplinary scenario analysis will be conducted in consideration of climate change and shrinking population. In addition, traditional and local knowledge of disaster risk reduction will be inventoried and evaluated for multi-functionalities shared in the platform.

In collaboration with the insurance industry, a research forum will be formed to discuss the possibility and feasibility of insurance industry-led contributions to and economic incentives for Eco-DRR. The research forum will also assess various laws and institutions in national and local governments related to disaster risk reduction and land use.



Photo 1 Mikatagoko area in Fukui Prefecture, one of the research sites.



Photo 2 Hira mountains and their base area in Shiga Prefecture, one of the research sites.  
Photo courtesy of MATSUI Kimiaki.

---

#### Researchers at RIHN

**HUANG, Wanhui**  
**NAKAI Minami**

Researcher  
Research Associate

**SENDA Masako**  
**SHIMAUCHI Risa**

Research Associate  
Research Associate

#### Main Members

**FUKAMACHI Katsue**  
**FURUTA Naoya**  
**HASHIMOTO Shizuka**  
**ICHINOSE Tomohiro**  
**MIYOSHI Iwao**  
**NISHIHIRO Jun**

Kyoto University  
Taisho University / IUCN  
The University of Tokyo  
Keio University  
Kyoto Prefectural University  
Toho University

**SAITO Osamu**  
**SHIBASAKI Ryosuke**  
**TAKI Kentaro**  
**UEHARA Misato**  
**URASHIMA Hiroko**

United Nations University  
The University of Tokyo  
The University of Shiga Prefecture  
Shinshu University  
MS&AD Insurance Group Holdings, Inc.

## Research Program 2

# Fair Use and Management of Diverse Resources

Global environmental problems are inter-related. Studies concentrating on single issues are often not effective; consideration of inter-linkages of multiple resources involving stakeholders are essential. Recently, the nexus structure linking energy, water and food production has become a prominent area of study, but truly sustainable societies require more comprehensive understandings of the ecological resources that provide ecosystem services and cultural resources. The production, circulation and consumption of resources should be discussed in a wide range of spatial scales, and stakeholders should be involved in these discussions. Sustainable use of resources requires fair and wise systems and proper indices to manage these processes.

In particular, it is necessary to transform existing socio-economic or human behavioral systems to new systems that pay greater attention to renewable natural resources, as these have sometimes been externalized from conventional economics. Asia is experiencing rapid change in economy, urbanization and population, though traditional techniques for sustainable resource management, associated with the relatively rich humanosphere and cultural background in this region, also survive. Studies of such experience of resource use in Asia may thus give important suggestions to sustainability in general.

RIHN research projects have accumulated information and suggestions necessary for this transformation, though gaps remain. Program Two therefore explores wise and fair management systems capable of addressing multiple resource-uses by multiple stakeholders, in multi-spatial scales. We encourage new project proposals including those by innovative young scientists addressing such novel and under-examined subjects. Internal Program discussion will address the conditions necessary for transforming values and human behavior, as we propose new indices and institutions for fair resource management.

In fiscal 2017, we conducted a research review on the issue of equity in relation to the concept of fair use. We considered several dimensions of equity, including (1) economic equity related to the burdens and benefits of resource use, and procedural equity focusing on procedures for making such decisions; (2) the question of equity between whom, for instance, between modern generations, modern generation and future generations and human society and natural society; and (3) the question of who will or should evaluate equity is also an important element. In addition, in our first year of activity we also established a framework for understanding fair use.





Logging of tropical rain forest in Malaysia



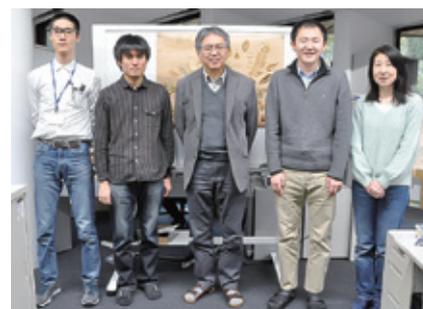
Palm oil factory in Malaysia

Program Director **NAKASHIZUKA Tohru** RIHN

Tohru Nakashizuka has studied forest ecology, biodiversity and ecosystem services at the Forestry and Forest Products Research Institute, Kyoto University as well as at Tohoku University. At RIHN, he is to study wise and fair use of diverse resources.

Researchers

<b>KOBAYASHI Kunihiro</b>	Researcher
<b>SHIBATA Rei</b>	Researcher
<b>KARATSU Fukiko</b>	Research Associate



# Biodiversity-driven Nutrient Cycling and Human Well-being in Social-Ecological Systems

Project Leader **OKUDA Noboru** RIHN

My specialty is ecology, the field of study concerned with the relationships between biodiversity and ecosystem functioning. One of ecology's central questions is why humankind should conserve biodiversity. As a member of the Center for Ecological Research at Kyoto University, I have approached this question by integrating different research fields related to biodiversity from gene to ecosystem. At present, I am developing methods for adaptive watershed governance that allow new environmental knowledge to reconcile global, regional, and local ecological issues. I should also say that I love nature and humanity and how they come together very much!



## Research background and objectives

Technological innovations in the use of nutrients for food production, in particular nitrogen and phosphorus, have allowed global increases in population and economic prosperity in the twentieth century. Overexploitation of nutrient resources, however, affects biogeochemical cycles and can lead to nutrient imbalances, eutrophication and loss of biodiversity. It is now recognized that nutrient imbalances and biodiversity loss are prevalent in watersheds around the world, and pose a risk to sustainable human development.

In spite of such risk, most citizens are not so interested in global environmental issues but are rather concerned about local issues related to their lives and livelihoods. Considering this dissonance in environmental consciousness, we aim to develop a framework for adaptive watershed governance to enhance social-ecological health of watershed system (Fig. 1).

## Research methods

We facilitate stakeholder engagement in community activities in order to enhance biodiversity, nutrient cycling and human well-being, according to our hypothesis that these are three components essential to the social-ecological health of watershed system and, like gears, also interdependently linked into community activities (Fig. 2). We begin with action research to empower members of each community within a watershed to conserve indigenous environmental icons, defined as indigenous nature with special significance to local life and livelihood (Process 1 in Fig. 2). As the value of engaging in such conservation efforts is shared among community members, community-based well-being is altered and reinforced

through bonding social capitals in a positive feedback of biodiversity conservation and biodiversity-driven nutrient cycling.

If such community activities enhance nutrient recycling at the watershed scale, they may benefit a variety of stakeholders other than the community members in ways not easily registered by local cultural values but inspired by the social-ecological health of watershed system. In disseminating our scientific understanding of the community dimensions of nutrient recycling, our project will facilitate social involvement in conservation activities as well as green consumption of local products by non-community members who appreciate social-ecological health. Such links accumulate bridging social capital and increase economic incentives (Process 2 in Fig. 2). With this scientific knowledge, community members may also gain institutional support from local governments. Such integration of local and scientific knowledge further enhances community-based well-being, and leads to empowerment of community activities.



Photos 1 Social engagement in biodiversity monitoring in the mid-stream community of the Yasu River sub-watershed



Figure 1 A conceptual schema of adaptive watershed governance

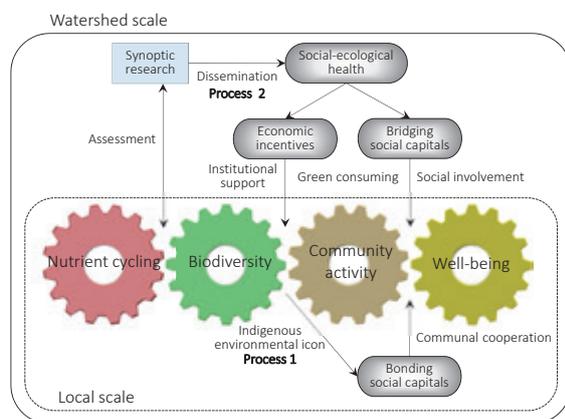
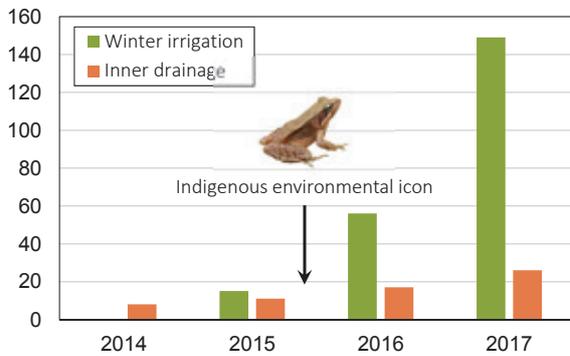


Figure 2 A working hypothesis of how biodiversity, nutrient cycling and human well-being are enhanced through the adaptive watershed governance



**Figure 3** Annual changes in the number of rice paddies in which eco-friendly farming was practiced. The community members regarded a brown frog as an indigenous environmental icon in 2016

To investigate this positive feedback process, we compare consequences of our watershed governance activities in two extreme watersheds in Asia: the Lake Biwa Watershed (Japan) and the Laguna de Bay Watershed (Philippines). The former is an infrastructure-oriented society and the latter a high-nutrient loading society.

### Research progress

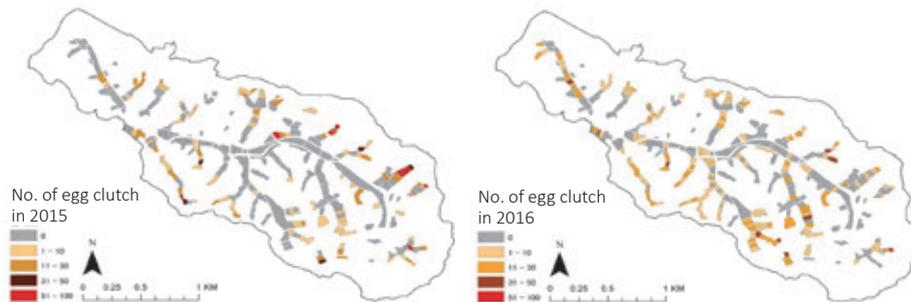
We practiced action research in the mid-stream community of the Yasu River sub-watershed of Lake Biwa. Based on exercises to explore the cultural significance of indigenous nature, farmers identified a brown frog as an indigenous environmental icon and practiced eco-friendly farming to conserve its habitat. Monitoring revealed that the brown frog prefers to spawn in rice paddies with

winter irrigation. Sharing of cultural values among the community members improved local engagement in conservation activities (Photos 1 & Fig. 3). We also found that eco-friendly farming had positive effects on wetland biodiversity, suggesting that the brown frog can serve as an indicator of local biodiversity as well as of the community-based well-being.

In the Laguna de Bay Watershed, in contrast, recent economic development has led to expansion of residential areas into the mid-stream area of the Silan-Santa Rosa sub-watershed. In downstream urban areas, nutrient loadings and eutrophication have led to significant loss of biodiversity. At present, people within the watershed are dependent on groundwater resources for drinking and irrigation and they are therefore highly concerned about groundwater overexploitation and pollution. Following our assessment of groundwater pollution, a watershed forum will be organized as a platform to discuss sustainable and fair use of groundwater resources. We will also conduct the action research to empower the mid-stream community to conserve a communal spring as an indigenous environmental icon (Photos 2).

### Perspectives

In developed societies, sewage treatment and tap water infrastructure systems have reduced eutrophication and improved comfort and convenience. Environmental consciousness, however, has receded from the nature of wetlands. What enhances our well-being? Is it enhanced by infrastructure? Our research seeks answers to these questions together with a variety of stakeholders.



**Figure 4** The number of rice paddies spawned by brown frog increased with the prevalence of eco-friendly farming



**Photos 2** In the mid-stream community of Silan-Santa Rosa sub-watershed, a communal spring serves as a drinking fountain (a), a chapel (b), a bath (c). Its admission fee is used for a community feast (d). A workshop on the sustainable use of communal spring (e-f)

Sub Leader

**YACHI Shigeo**

Kyoto University

Researchers at RIHN

**IKEYA Tohru**  
**ISHIBASHI Hiroyuki**  
**ISHIDA Takuya**

Researcher  
Researcher  
Researcher

**LAMBINO, Ria Adoracion Apostol**  
**UEHARA Yoshitoshi**  
**WATANABE Kirie**

Researcher  
Researcher  
Research Associate

Main Members

**IWATA Tomoya**  
**BAN Syuhei**  
**OSONO Takashi**  
**TAYASU Ichiro**

University of Yamanashi  
The University of Shiga Prefecture  
Doshisha University  
RIHN

**WAKITA Kenichi**  
**ASANO Satoshi**  
**SANTOS-BORJA, Adelina C.**

Ryukoku University  
Lake Biwa Environmental Research Institute  
Laguna Lake Development Authority, Philippines

## Research Program 3

### Designing Lifeworlds of Sustainability and Wellbeing

More than 60% of the world's population resides in Asia and over a third of global economic activity occurs there. Asia is comprised of an incredible diversity of cultures, histories, societies, economies, livelihoods, and ecologies. Asia is also affected by myriad global and local environmental issues, such as population increase, air, water, soil, and coastal pollution, increasing greenhouse gas emissions, and biodiversity loss. The region is also affected by growing wealth disparity, social isolation, rising levels of poverty, and the disappearance of traditional cultures and knowledge. The combination of migration between the countryside and cities, rural depopulation, and urban concentration is accompanied by rapid socio-cultural change, over-exploitation of resources, and deterioration of natural environments. Both urban and rural lifeworlds are disintegrating rapidly.

As a consequence, in reconstructing the lifeworld concept and highlighting the reciprocal linkages between rural and urban spaces, Program 3 designs lifeworlds of sustainability and wellbeing and co-creates concrete pathways for their realization. Program research is based on the diverse world-views and accumulation of experience of human-nature co-existence. These latent 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 contemporary problems and to help chart a course toward possible future societies. Program 3 builds upon these experiences and knowledges of human-nature interaction to propose concrete changes needed to achieve a sustainable society.

The transformations and frameworks leading to sustainable urban and rural lifeworld design, will also entail fundamental shifts in existing economic systems, markets, and political decision-making systems. Rather than investigating top-down approaches to system change, Program 3 will work with local residents, government officials, companies, citizen groups and other stakeholders to propose sustainable alternatives and gauge their feasibility.

In order to avoid the risk of developing proposals that are only applicable to specific regions or sites, Program 3 will aim for research results that are generalizable while also retain the diversity at the heart of local lifeworlds and wellbeing.



The varieties of fruits and vegetables for sale at the market in Kanchanaburi reflect Thailand's changing society



Socialization of composting type toilet in Burkina Faso, Photo by ITO Ryusei

Program Director **SAIJO Tatsuyoshi** RIHN

Tatsuyoshi Saijo (4th from left) specializes in designing social systems that promote sustainability and equity without inhibiting individual incentive. His interest is in developing the field of "Future Design", one that links the happiness and wellbeing of current generation to that of future generations.



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

Project Leader **Steven R. McGREEVY** RIHN

Steven R. McGreevy is an environmental sociologist (Kyoto University Ph.D. 2012) and associate professor at RIHN. He has a background in agriculture, rural sustainable development, and environmental education. His research focuses on novel approaches to rural revitalization that utilize local natural resources, sustainable knowledge dynamics, sustainable agrifood and energy transition, and the relinking of patterns of food consumption and production in local communities.



## Research Background

Agrifood systems in Asia face a myriad of sustainability challenges related to declining environmental health (GHG emissions, resource overuse, pollution, soil fertility), loss of diversity (biological, cultural, knowledge), and deterioration of small-scale farming due to globalizing market forces. At points of consumption, over-reliance on globalized food flows limits consumer agency and decreases food security and sovereignty. Diets increasingly composed of processed foods also negatively impact public health (rise in diabetes, obesity). The ways in which food is provided, consumed and governed need urgent change, but we lack understanding of how agrifood transitions emerge and take root, or of the role of existing and alternative institutions and policy, social practices, future visions, and economic arrangements, in advancing sustainable transitions.

## Research Overview and Objectives

The FEAST project takes a transdisciplinary approach to explicate the reality of, and potential for, sustainable agrifood transition in Asia. Individual field sites are located in Japan, Thailand, Bhutan, and China. Taking a lifeworld perspective, we analyze patterns of food consumption, the socio-cultural significance of food-practices, and the potential of consumer-based agency to change deeply held cultural notions and regional food systems. We also develop structural descriptions of the food system, by mapping national, regional, and local production, distribution, and consumption contexts. In combining socio-cultural and structural descriptions of the relationships between production and consumption, we are able to conduct visioning workshops with stakeholders and initiate food citizenship-oriented experiments and actions.

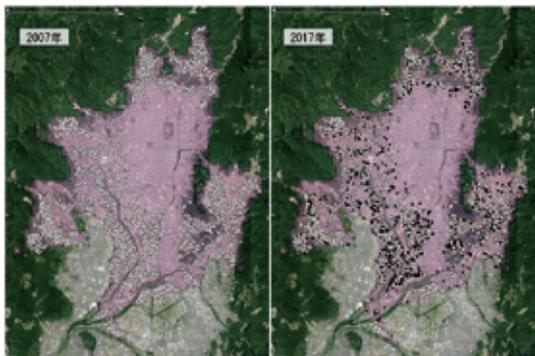
FEAST's process of co-design and co-production of sustainable food systems seeks to challenge mainstream economic thinking on consumption and growth. In engaging the public in structured debate of societal relationships with food and nature, our project reorients consumers to consider themselves as citizens and co-producers of the foodscapes on which they depend. FEAST seeks knowledge and mechanisms that can redefine the notion of long-term food security.

FEAST Working Groups will produce four types of knowledge relevant to catalyzing agrifood transitions (Figure 1). These are: 1) contextual knowledge of contemporary national, regional, and local food systems (production, distribution, and consumption); 2) co-produced visions of alternative food consumption and production practices and corresponding municipal-level transition plans identifying research, education, and policy needs; 3) modeling- and scenario-based knowledge supporting deliberation and planning processes; and 4) knowledge of two intervention strategies: the social learning dynamics affecting execution and effectiveness of workshop-based consensus-building for collective food action; and the significance of new methods of market transparency (e.g. eco-labels, food impact smartphone apps) in food system change.

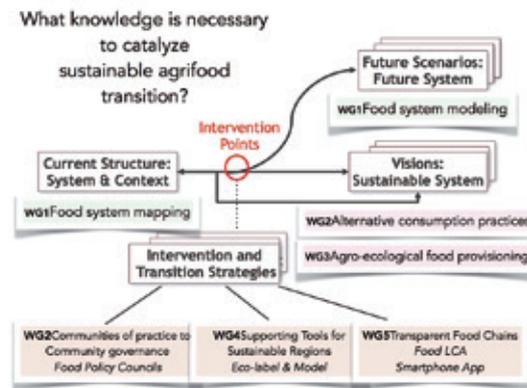
## Progress to Date

Over the past year, FEAST has made progress on a number of areas of research.

The Ecological Footprint of Japan's food consumption by sector and COICOP category was analyzed, revealing



**Photo 1** Urban agricultural land use change in Kyoto City from 2007 to 2017. A loss of 10% of agricultural productive land (1897 ha to 1696 ha) (Colored grids indicate mapped area, white = persistent, black = lost, yellow = gained).



**Figure 1** Diagram detailing how each FEAST working group is organized around the question of "What knowledge is necessary to catalyze sustainable agrifood transition?" Four kinds of knowledge are listed: 1) Current system and contextual knowledge; 2) Visions of sustainable future systems knowledge; 3) Future system scenario knowledge; and 4) Knowledge associated with intervention and transition strategies.

that importation of animal feed and ingredients processed into ready-to-eat meals sold at convenience store and supermarkets are the most impactful.

Satellite imagery was used to map both formal and informal urban agricultural land use change in Kyoto City. The research found that Kyoto City has lost about 10% of its agricultural productive land (from 1897 ha in 2007 to 1696 ha in 2017) in the last 10 years to housing development (40% post-ag. use) and abandonment (28% post-ag. use), even though it is a shrinking city. (Photo 1)

A comprehensive, multi-method survey of consumer eating habits and orientations to food including a web survey (n=1300) for Kyoto City, Nagano City, and Noshiro City (Akita) was conducted, as well as focus group interviews and photograph records of consumed foods for Kameoka City. Statistical analysis showed a variety of consumer types based on diet diversity and rice acquirement.

Multi-method workshops to envision ideal meals and food systems were held in Kyoto City (visioning, backcasting, and role-playing) and Kameoka City (visioning) with local food-related actors and government officials. Over fifty participants joined altogether. The visions and backcasting results will be included into future scenario modelling next year. (Photo 2)

Focus-group workshops on the future of food-related practices—purchasing, home cooking, and eating out—with “green,” “general,” and “innovative” consumer groups were conducted in Bangkok. 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.

Municipal agricultural policies and policy plans in Akita, Nagano, and Kyoto were surveyed to gauge policy orientation toward agroecological principles and a “food as a commons” perspective. An intensive analysis of 14 plans found a significant disconnect in municipal and national government policy orientation.

FEAST has finalized research partnerships with Noshiro City, Akita, and Royal University of Bhutan.



Photo 2 Consumer workshops on envisioning food futures, held in Kyoto City (upper left), backcasting group work output (upper right), food system role-playing video game (bottom left), food policy council simulator game (bottom right).



Photo 3 Kyoto Farmer's Market and Symposium “Transition to a Sustainable Society with Farmers Markets” held November 23, 2017 at RIHN.



Photo 4 FEAST Project Annual Assembly held January 6-7, 2018 at RIHN.

Sub Leader

**TAMURA Norie** RIHN Senior Researcher

Researchers at RIHN

**KOBAYASHI Mai** Researcher  
**RUPPRECHT, Christoph D. D.** Researcher  
**OTA Kazuhiko** Researcher

**IMAIZUMI Aki** Researcher  
**SPIEGELBERG, Maximilian** Researcher  
**MATSUOKA Yuko** Research Associate  
**KOBAYASHI Yuko** Research Associate

Main Members

**TSUCHIYA Kazuaki** The University of Tokyo  
**HARA Yuji** Wakayama University  
**AKITSU Motoki** Kyoto University  
**TACHIKAWA Masashi** Nagoya University  
**TANIGUCHI Yoshimitsu** Akira Prefectural University  
**NAKAMURA Mari** Nagoya Bunri University

**TANAKA Keiko** University of Kentucky, USA  
**SUDO Shigeto** National Agriculture and Food Research Organization  
**SHIBATA Akira** Ritsumeikan University  
**KISHIMOTO-MO Ayaka** National Agriculture and Food Research Organization  
**INABA Atsushi** Kogakuin University

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

Project Leader **YAMAUCHI Taro** RIHN/Hokkaido University

Dr. Taro Yamauchi is a professor at the Faculty of Health Sciences, Hokkaido University. He has a B.S., a M.S. and a Ph.D. in Health Sciences from the University of Tokyo. He does intensive fieldwork in a hunter-gather society, rural villages and urban slums in developing countries to understand lifestyle and health of local populations and their adaptation to their living environments. His research interests also include sanitation and participatory action research involving local children, youth and adults. He is Vice-President of the International Association of Physiological Anthropology (IAPA) and an executive member of International Society for the Study of Human Growth and Clinical Auxology (ISGA).



Sanitation generally refers to the provision of facilities and services for the safe disposal of human urine and feces. UN Millennium Development Goals Report 2015 reported that 2.4 billion people are still using unimproved sanitation facilities, including 946 million people who are still practicing open defecation. The developing world still has high under-five mortality and poverty rates. The world's population is estimated to reach approximately 10 billion in 2050, and this population growth will happen mostly in developing countries. At the same time, depopulation and aging are increasing, especially in rural area of developed world, and the financial capability of many local governments—which are key agents in the management of sanitation systems—is getting weaker.

Sanitation systems are essential for promoting public health, preventing environmental pollution, conserving ecosystem functions, and recycling resources. The question of how to handle the waste of 10 billion people is therefore highly relevant to the global environment.

### Working hypothesis of the research

The project investigates the following hypotheses:

Hypothesis 1: Current sanitation problems are caused by a 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 cannot work well without a social and institutional support system. The mismatch between prerequisites of technologies and local characteristics additionally complicates sanitation issues.

### Key concept – Sanitation Value chain as a solution (Figure1)

The project proposes a new concept, the Sanitation Value Chain, which has the following dimensions:

- 1) Places the values of people and community in the center of discussion, and prepares the sanitation system to correspond to this value chain;
- 2) Designs the sanitation system by focusing on direct incentives for individual users and communities;
- 3) Recognizes a sanitation system as an integrated system with social and technical units;
- 4) Designs the sanitation system by making a good match between social characteristics and prerequisites of technologies

### Goals of the project

The goals of this research project are to: 1) propose the concept of Sanitation Value Chain in relation 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.

### Research topics for achieving the goals

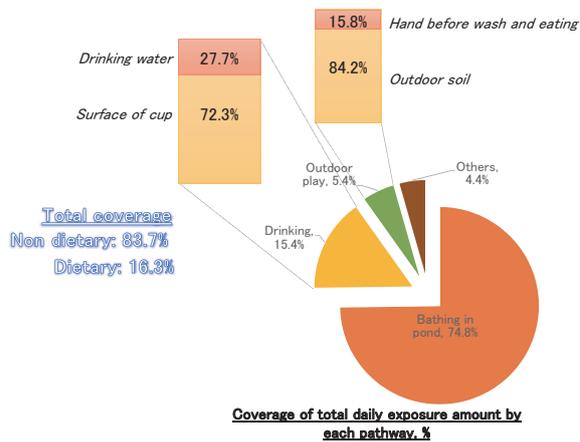
Topic-1 Life and Sanitation: By field survey, we learn about the values of people and the norm for human excreta, and reevaluate the sanitation system in relation to the residents lives.



Figure 1 The Sanitation Value Chain acts within and between other important social values. Example for people in rural area of Burkina Faso (Figure by KATAOKA Yoshimi)



Figure 2 The Sanitation Value Chain acts within and between other important social values. Example in urban area of Indonesia (Figure by USHJIMA Ken)



**Figure 3** E. coli exposure pathways. Example of measurement in Bangladesh, From: Harada et al. (2017) Fecal exposure analysis and E. coli pathotyping: a case study of a Bangladeshi slum, International Symposium on Green Technology for Value Chains 23-24 October, 2017, Balai Kartini, Jakarta.

Topic-2 Technology: We identify prerequisites of sanitation technologies and reevaluate the value that sanitation will give us. In addition, we develop new sanitization technology to make use of the value chain by understanding the values of people and local conditions.

Topic-3 Co-creation of sanitation value chain: We identify stakeholders and describe the value structures of people and communities, and analyze the hierarchy and structure of stakeholders' value chain and evaluate their affinities. We demonstrate co-creation process of the sanitation value chain.

Topic-4 Visualization: In order to co-create the value chain, it is necessary to make efforts to communicate research results to actors and stakeholders. Utilizing resources and institutional collaboration of RIHN, we will develop a method to express and transmit outcomes using various media.

### Research sites

The project is performing field studies at four sites: 1) the rural area in Ishikari River Basin, Hokkaido; 2) the rural area of Burkina Faso; 3) the urban area in Indonesia; and 4) the peri-urban area in Zambia.

### Achievements in FR studies

- Toilet for recycling resources. We have developed functioning toilet technologies necessary for the sanitation value chain (Figure 2) by making urine in the urban area valuable as fertilizer, the "Toilet that can concentrate urine" and "Toilet that can make phosphorus fertilizer".
- Tracking propagation of pathogens. Pathogenic bacteria propagate through various routes. We have



**Photo 1** Meeting with people in Bandung City, Indonesia (Photo by IKEMI Mayu)

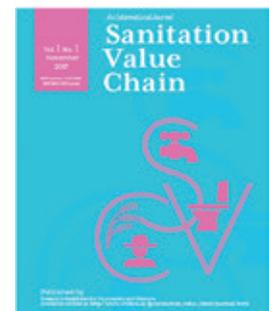


**Photo 2** Activities of a children's club formed in Lusaka City, Zambia (Photo by Sikopo P. NYAMBE)

developed a molecular biological method of tracking this propagation. In Bangladesh we found that: 1) the most important route of pollution is bathing. The contribution of water and food route is 16% (Figure 3); 2) the contamination of drinking cups is more important (72%) than of the water itself (28%); 3) the types of E. coli contained in human excreta and drinking water are different.

(3) Building relationship with people. We have created relationships with locals toward co-creation of sanitation value chains in the fields (Burkina Faso, Indonesia, Ishikari [Japan] and Zambia) (Photo 1 and Photo 2).

(4) A new international academic journal on sanitation. Our project members have begun to edit the international academic journal *Sanitation Value Chain* (ISSN: 2432-5066) in which papers from all over the world are published (Figure 4) Journal website: [http://www.chikyu.ac.jp/sanitation\\_value\\_chain/journal.html](http://www.chikyu.ac.jp/sanitation_value_chain/journal.html).



**Figure 4** International academic Journal "Sanitation Value Chain"

Sub Leader			
<b>FUNAMIZU Naoyuki</b>	Muroran Institute of Technology		
Researchers at RIHN			
<b>HAYASHI Koji</b>	Researcher	<b>KIMURA Ayako</b>	Research Associate
<b>NAKAO Seiji</b>	Researcher	<b>HONMA Saki</b>	Research Associate
Main Members			
<b>ITO Ryusei</b>	Hokkaido University	<b>FUJIWARA Taku</b>	Kochi University
<b>USHIJIMA Ken</b>	Hokkaido Research Organization	<b>HARADA Hidenori</b>	Kyoto University
<b>IKEMI Mayu</b>	Sapporo International University	<b>INOUE Takashi</b>	Hokkaido University
<b>KATAOKA Yoshimi</b>	Hokkaido University	<b>SINTAWADANI, Neni</b>	Indonesian Institute of Science (LIPI), Indonesia
<b>SANO Daisuke</b>	Tohoku University	<b>NYAMBE, Imasiku Anayaw</b>	University of Zambia, Zambia
<b>NAKATANI Tomoaki</b>	Yokohama City University	<b>LOPEZ ZAVALA, Miguel Ange</b>	Instituto Tecnológico y de Estudios Superiores de Monterrey, Mexico
<b>NABESHIMA Takako</b>	Hokkaido University		

# Core Program

The Core Program develops concepts and methodologies for transdisciplinary research to solve global environmental problems in collaboration with society. Core projects develop comprehensive and systematic concepts and methodologies for transdisciplinary research, which are widely applicable to global environmental issues, and accessible to related stakeholders.

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.

(See additional Core Program description on page 8.)



## Core FS

### Co-Design and Stakeholder Engagement According to Geographical Scales

ONISHI Yuko RIHN

Program Director **TANIGUCHI Makoto** RIHN

Prof. Dr. Makoto Taniguchi is a hydrologist and a deputy Director-General at RIHN. He received a Ph.D. from The Tsukuba University, Japan in 1987. He is currently the vice president of the International Association of Hydrogeologists and the president of the Japanese Association of Groundwater Hydrology. He has been working on water-related projects around the world, in particular Asia, authoring or co-authoring over 170 peer reviewed articles and 8 books including "Groundwater and Subsurface Environment", "The Dilemma of Boundaries" and "Groundwater as a Key for Adaptation to the Changing Climate and Society".

Researcher

**LEE, Sanghyun**

Researcher



# Proposal and Verification of the Validity of Isotope Environmental Traceability Methodology in Environmental Studies

Project Leader **TAYASU Ichiro** RIHN

Dr. TAYASU was Assistant Professor at RIHN (2002), Associate Professor at Kyoto University (2003), and is currently a Professor at RIHN (2014). His research focuses on isotope ecology and isotope environmental science.



In this project, we investigate environmental traceability as a key concept needed to solve environmental issues for various stakeholders. Stable isotope ratios of elements, together with concentrations of elements, can trace the flow of matter and chemicals through the environment, better describe ecosystem structure and conditions, and appraise the chemical profiles of food products. Spatio-temporal variation of multiple isotope ratios can be used to study Earth systems operating at local to global scales. This information can serve an important decision-making tool for local people considering water, food and environmental security, all of which are fundamental for the sustainability of human society.

This study seeks to establish methodologies for the use of environmental traceability in environmental studies. A combination of quantitative and qualitative tools, including “Multi-Isoscapes”, (the use of multiple elements and isotope ratios together with GIS-based mapping techniques), social surveys, and workshops are deployed to investigate the role of environmental traceability in addressing environmental issues. We hypothesize that the role and perception of

traceability methods in transdisciplinary processes will differ among stakeholders and that the co-production of “Multi-Isoscapes” can act as an effective bridging tool for understanding and explaining variation in local environments. The ultimate objective of this research is to demonstrate the effectiveness of multi-isotopic information in solving global environmental issues.

Project research tests (I) the effectiveness of the environmental traceability concept in environmental studies by comparing case studies in which isotopic methods were initiated by local government, citizen groups, and researchers; (II) the extent to which these different stakeholders hold different views of the concepts of food traceability and environmental traceability and the effectivity of these concepts in communicating links between food production and consumption. Field research is taking place in Japan at sites in Ono City, Fukui; Otsuchi Town, Iwate; Saijo City, Ehime; Oshino Village, Yamanashi; the Chikusa river watershed, Hyogo; Lake Biwa and surrounding watershed in Shiga; as well as in the Laguna de Bay and surrounding watershed in the Philippines.



Photo 1 Hongan-Shozu pond in Ono City, Fukui, recharged by ground water



Photo 2 A symposium held in Oshino Village, where we used a questionnaire for studying the effect of environmental traceability methodology

Researcher at RIHN

**FUJIYOSHI Lei**

Researcher

Main Members

**NAKANO Takanori**

RIHN / Waseda University

**SHIN Ki-Cheol**

RIHN

**YABUSAKI Shiho**

RIHN

**KONDO Yasuhisa**

RIHN

**OKUDA Noboru**

RIHN

**MCGREEVY, Steven R.**

RIHN

**MORI Seiichi**

Gifu Keizai University

**YOKOO Yoriko**

Doshisha University

**YAMADA Yoshihiro**

**KAERIYAMA Toshiaki**

**TOKUMASU Minoru**

**OOMORI Noboru**

**OHKUSHI Ken'ichi**

**MITSUHASHI Hiromune**

**YOKOYAMA Tadashi**

Kagawa University

Gratitude to the Water Foundation

Saijo City Office

Oshino Village Office

Kobe University

University of Hyogo / Museum of Nature and Human Activities, Hyogo

Hyogo prefectural Ako School for Students with Special Needs

# Information Asymmetry Reduction in Open Team Science for Socio-environmental Cases

Project Leader **KONDO Yasuhisa** RIHN

Yasuhisa Kondo has worked for four years as an associate professor at the Information Resources Division of the RIHN Center. Originally, he studied archaeology and geographical information sciences (The University of Tokyo PhD 2010). He is currently interested in open science, participatory action research, and transdisciplinary research promotion for environmental archaeology and socio-environmental cases. He is also coordinating an archaeological mission to Oman.



This Core Project develops a theory and methodology to reduce information asymmetry between actors in team-based science for socio-environmental cases.

Social issues caused by environment deterioration are often so complex that solution-oriented research is team-based and involves research experts from different domains in interdisciplinary (ID) projects as well as practitioners such as governments, funders, industries, non-profit organizations, and members of civil society in transdisciplinary (TD) projects. Such team-based science is often disrupted by information asymmetry—a condition in which one party has relevant information while the others do not—between participants, as they are actors with different values, knowledge, and socioeconomic status. This asymmetry leads to different understandings of focal issues and other actors.

In our working hypothesis, information asymmetry can be reduced through a combination of: (1) diversion, or an approach to divert a wicked problem between stakeholders to a sharable object or goal for which all actors, including the unengaged public, can work together; (2) participation and empowerment of marginalized (or ‘small voice’) actors; (3) fair data visualization; and (4) dialogue. These approaches work to re-calibrate the influence of dominant actors such as principal investigator (PI) in ID projects and research experts, funders, and policy makers in TD projects.

As an example of the holistic approach to diversion, ID projects may employ a “switched explanation” in which particular research results are explained by counterpart experts. Civic tech, or participatory co-production of solutions for local issues by self-motivated civic engineers using information and communication technologies and open data, is applied where appropriate in the TD cases. The FAIR data principle (that data is Findable, Accessible, Interoperable, and Reusable) is introduced to encourage researchers to provide their data to the public (the FAIR principle is useful when researchers are reluctant to follow the open data license, in which ‘anyone can freely access, use, modify, and share data for any purpose’ *in sensu stricto*).

This working hypothesis is tested in ID, TD, and ID-TD transitional case studies, including community-based waterweed recycling in the Lake Biwa catchment, Japan. The effects of problem diversion on project progress and participants’ perceptual transformation are measured through participatory observation, semi-structured interviews, and periodical questionnaire surveys. Based on these assessments, the hypothesis is improved and tested again. This Hypothesis-Practice-Assessment Cycle is repeated flexibly to improve the methodology, which co-evolves and integrates the open science and TD theories as a new paradigm for environmental studies.

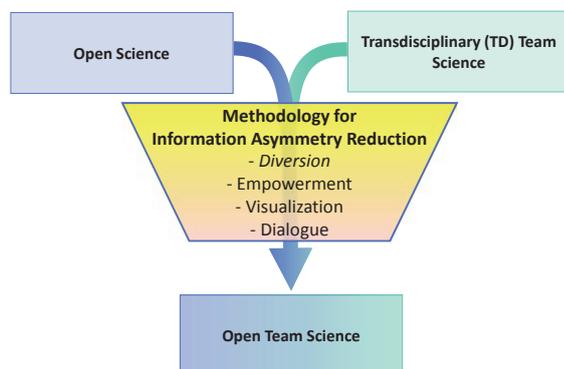


Figure 1 This Core Project integrates open science and transdisciplinary team science theories to create an open team science methodology.



Photo1 Graphic recording works as a method for fair data visualization and dialogue in civic tech workshops.

Main Members

- |                             |  |
|-----------------------------|--|
| <b>KANO Kei</b>             | Shiga University                         |
| <b>KUMAZAWA Terukazu</b>    | RIHN                                     |
| <b>NAKASHIMA Ken'ichiro</b> | Hiroshima University                     |
| <b>ONISHI Hideyuki</b>      | Doshisha Women's College of Liberal Arts |
| <b>OSAWA Takeshi</b>        | Tokyo Metropolitan University            |

- |                          |                          |
|--------------------------|--------------------------|
| <b>NAKATSUKA Takeshi</b> | RIHN                     |
| <b>OKUDA Noboru</b>      | RIHN                     |
| <b>YAMAUCHI Taro</b>     | RIHN/Hokkaido University |
- A project researcher to be appointed



Above: ABE Ken-ichi, *Tanokamimodoshi*, Satsumasendai, Kagoshima, Japan  
Bottom: OSHIUMI Keiichi, A train running through Maeklong Market, Thailand



## Completed Research



When a project moves to Completed Research (CR) status, the contract with RIHN is concluded. Research teams disperse to university research, teaching, and other duties. Project publications and other communications and contributions may follow for several years. At RIHN, each project forms part of the institute's heritage; project results and data are entered into the RIHN archives upon which future RIHN projects may be formulated.



Fiscal Year Completed	Leader	Research Project
2006	HAYASAKA Tadahiro	Emissions of Greenhouse Gases and Aerosols, and Human Activities in East Asia
	KANAE Shinjiro	Global Water Cycle Variation and the Current World Water Resources Issues and Their Perspectives
	WATANABE Tsugihiko	Impact of Climate Changes on Agricultural Production System in the Arid Areas
	NAKAWO Masayoshi	Historical Evolution of the Adaptability in an Oasis Region to Water Resource Changes
	YACHI Shigeo	Multi-Disciplinary Research for Understanding Interactions between Humans and Nature in the Lake Biwa-Yodo River Watershed
2007	FUKUSHIMA Yoshihiro	Recent Rapid Change of Water Circulation in the Yellow River and Its Effects on Environment
	ICHIKAWA Masahiro	Sustainability and Biodiversity Assessment on Forest Utilization Options
	AKIMICHI Tomoya	A Trans-Disciplinary Study on Regional Eco-History in Tropical Monsoon Asia: 1945-2005
2008	SEKINO Tatsuki	Interaction between Environmental Quality of the Watershed and Environmental Consciousness
	TAKASO Tokushiro	Interactions between Natural Environment and Human Social Systems in Subtropical Islands
2009	SHIRAIWA Takayuki	Human Activities in Northeastern Asia and their Impact on Biological Productivity in the North Pacific Ocean
2010	TANIGUCHI Makoto	Human Impacts on Urban Subsurface Environments
	YUMOTO Takakazu	A New Cultural and Historical Exploration into Human-Nature Relationships in the Japanese Archipelago
	SATO Yo-Ichiro	Agriculture and Environment Interactions in Eurasia: Past, Present and Future
2011	KAWABATA Zen'ichiro	Effects of Environmental Change on the Interactions between Pathogens and Humans
	KUBOTA Jumpei	Historical Interactions between Multi-Cultural Societies and the Natural Environment in a Semi-Arid Region in Central Eurasia
	OSADA Toshiki	Environmental Change and the Indus Civilization
	UCHIYAMA Junzo	Neolithisation and Modernisation: Landscape History on East Asian Inland Seas
	UMETSU Chieko	Vulnerability and Resilience of Social-Ecological Systems
2012	OKUMIYA Kiyohito	Human Life, Aging and Disease in High-Altitude Environments: Physio-Medical, Ecological and Cultural Adaptation in "Highland Civilizations"
	SAKAI Shoko	Collapse and Restoration of Ecosystem Networks with Human Activity
	MOJI Kazuhiko	Environmental Change and Infectious Disease in Tropical Asia
2013	HIYAMA Tetsuya	Global Warming and the Human-Nature Dimension in Siberia: Social Adaptation to the Changes of the Terrestrial Ecosystem, with an Emphasis on Water Environments
	NAWATA Hiroshi	A Study of Human Subsistence Ecosystems in Arab Societies: To Combat Livelihood Degradation for the Post-oil Era
	KADA Ryohei	Managing Environmental Risks to Food and Health Security in Asian Watersheds
2014	MURAMATSU Shin	Megacities and the Global Environment
2015	KUBOTA Jumpei	Designing Local Frameworks for Integrated Water Resources Management
2016	HABU Junko	Long-term Sustainability through Place-Based, Small-Scale Economies: Approaches from Historical Ecology
	SATO Tetsu KIKUCHI Naoki	Creation and Sustainable Governance of New Commons through Formation of Integrated Local Environmental Knowledge
	ISHIKAWA Satoshi	Coastal Area-capability Enhancement in Southeast Asia
	TANAKA Ueru	Desertification and Livelihood in Semi-Arid Afro-Eurasia
2017	ENDO Aiko	Human-Environmental Security in Asia-Pacific Ring of Fire: Water-Energy-Food Nexus

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

Project Leader **ENDO Aiko** RIHN

Climate change and social change, including accelerating development, urbanization, and globalization are increasing pressure on water, energy and food resources, increasing the number of tradeoffs and potential conflicts among these resources that have their complex interactions. In order to address these issues, the objectives of the project were 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. The project also proposed solutions to local and global environmental problems by contributing to global research networks associated with the Future Earth platform and the U.N. Sustainable Development Goals.

The project involved 60 researchers from different disciplines and five countries, including Indonesia, the Philippines, Canada, Japan and the USA. Five research groups carried out the following tasks: 1) the Water-Energy Nexus Group conducted biophysical measurement and analysis using space satellites, geothermic, and hydrogeological techniques; 2) the Water-Food Nexus Group carried out biophysical measurements and analyses using geochemical, coastal oceanographic, geophysical, hydrologic, and ecological methods, including isotopic tracers; 3) the Stakeholder Analysis Group conducted stakeholder and social network analyses, community surveys, and scenario planning based on social and behavioral science approaches; 4) the Socio-culture of Resource Usage Group developed the science-policy interface based on its examination of the socio-cultural history of groundwater use; and 5) the Interdisciplinary Group completed the research with a mission to: i) identify research problems; and ii) determine the 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/non-disciplinary views on the analyses; and iii) design a nexus system.

## Results

For the water-energy nexus component, we calculated the potential of using groundwater as a source of thermal energy in Obama. In Beppu, the subsurface environment, including flow of groundwater and hot springs, have been clarified by gravity measurement.

The Water-Food Nexus Group identified the location of submarine groundwater discharge at Obama and Beppu bays, and estimated the supply of nutrients conveyed from land to ocean by groundwater. Stakeholder analysis of hot spring resources also clarified key issues related to future scenarios and social change.

The Interdisciplinary Group developed several integrated methods, including model of Beppu and Otsuchi, Japan, Pajaro Valley, California, and British Columbia, Canada. This group also designed a nexus system at the local scale to understand the complexity of the nexus system and establish a clear definition of the nexus concept.

For collaborative scientific activities with society, we designed lectures open to local citizens and conducted a participatory survey on hot springs with local residences and stakeholders in Beppu. We developed a web page, the "Spring Map", in order to share the results of our groundwater survey. Such activities with local governments and private sector raised awareness of nexus issues.



Figure 1 Target research sites

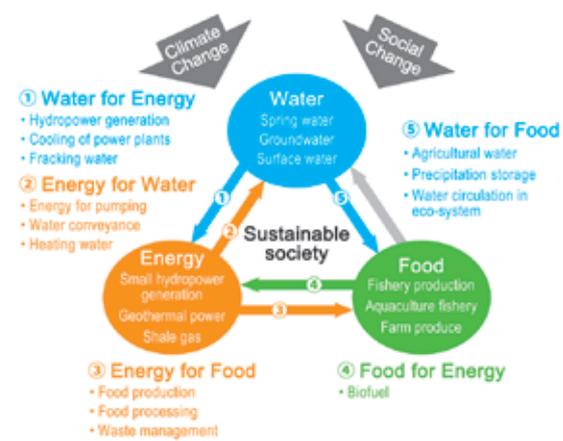


Figure 2 What is the Water, Energy and Food nexus?



Above: JIANG Hongwei, Departing for a field survey early in the morning, Savannakhet, Laos  
Bottom: NAKAO Seiji, A blacksmith is making a toy bird, Burkina Faso



## Current Feasibility Studies

Feasibility Studies are based on proposals solicited annually by RIHN from the research community at-large. If approved by the Project Review Task Committee, lead researchers are granted seed funding in order to develop their proposal for Full Research. FS status can be maintained for no longer than two years.



Above: UEHARA Yoshitoshi, Promising young researchers, Silang, Philippines

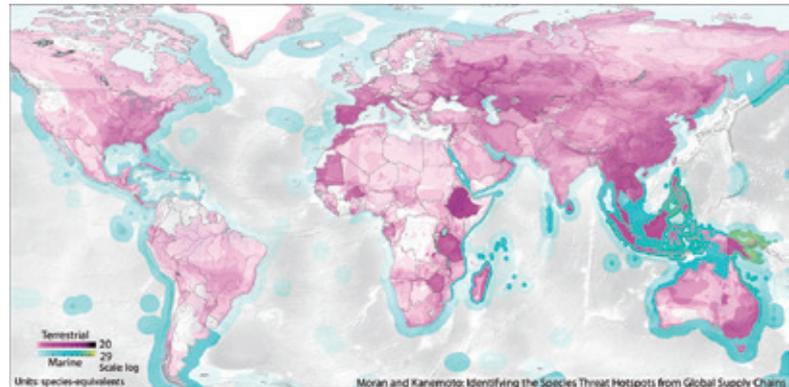
Bottom: OKUDA Noboru, Conducting a biological survey in paddy fields with the local residents, Koga, Shiga, Japan

## Mapping the Environmental Impact Footprint of Cities, Companies, and Household

**KANEMOTO Keiichiro, Shinshu University**

Area : World

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

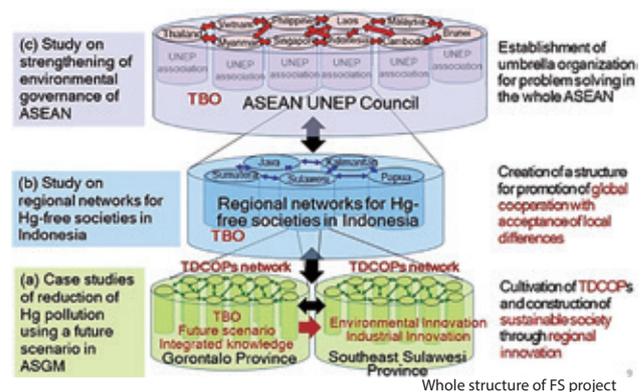


## Co-Creation of Sustainable Regional Innovation for Reducing Risk of High-impact Environmental Pollution

**SAKAKIBARA Masayuki, Ehime University**

Area : Sulawesi Island in Indonesia, ASEAN countries

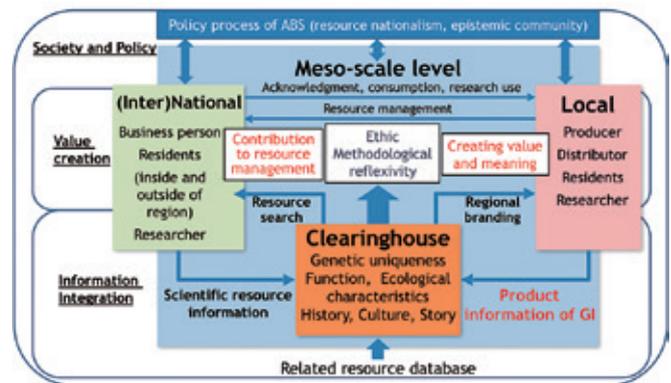
The Minamata Convention on Mercury (Hg) is a global treaty established to protect human health and the environment from the adverse effects of Hg. Recent investigations by the United Nation Environment Programme (UNEP) have highlighted the continuing significance of Hg pollution in developing countries and its harmful effects on human health and ecosystems. One of the main causes of Hg pollution is artisanal and small-scale gold mining (ASGM), in which Hg is used in the traditional method of amalgamation to extract gold from the ore rock. Recent investigations by UNEP have highlighted the enormity of Hg pollution in developing countries and its harmful effects on human health and ecosystems. The purpose of our FR is to understand the link between poverty reduction and environmental management, and to establish develop a process for constructing sustainable societies through regional innovations in ASGM areas and to strengthen related environmental governance in developing countries. In our FS, we will conduct, within the scope of Association of Southeast Asian Nations (ASEAN) countries: a) case studies of reductions in Hg pollution using a future scenario of ASGM; b) a study of regional networks that aim to generate Hg-free societies communities in Indonesia; c) a study of improvements in environmental governance in ASEAN countries; and d) a study of the design, practical use, and evaluation of transformative boundary objects (TBOs), based on a transdisciplinary approach.



**FS Fair and Equitable Benefit Sharing of Biological and Genetic Resources in the Era of Digital Information: Improving Livelihoods and Agrobiodiversity Conservation by Intellectual Property and Storylines**  
**KOHSAKA Ryo, Tohoku University**

Area : Thailand, Japan, Philippines, Myanmar, South Korea, China, Indonesia

This project addresses fundamental national and local issues of the Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization (ABS) including (1) the high resource transaction costs caused by lack of relevant information, and (2) lack of incentives for local people. To address the first issue we introduce clearing-house systems to efficiently share relevant scientific and cultural information with stakeholders. To tackle the second issue we develop branding and benefit-sharing schemes using clearing-house systems and scientific methods to evaluate genetic and functional characteristics of the resources. Finally, the appropriate meso-scale level schemes are developed in order to link international, national, and local ABS activities and institutions in the era of digital information.

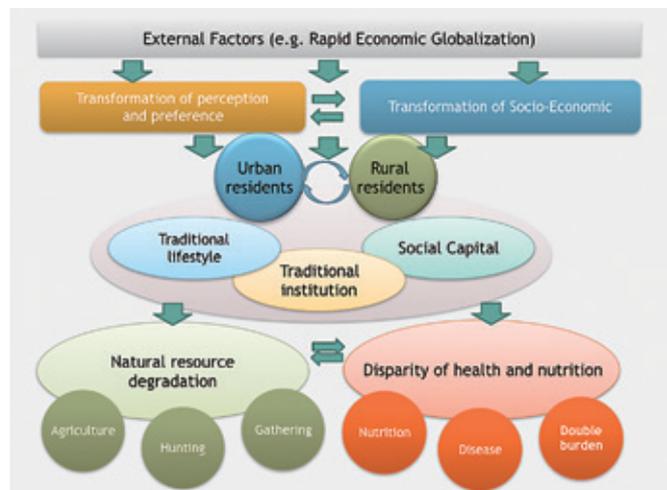


Proposed meso-scale scheme based on co-design and co-production

**FS Transformation and Reconstruction of Agri-Cultural Diversity in Southeast Asia**  
**MATSUDA Hirotaka, Tokyo University of Agriculture**

Area : South East Asia

Environmental degradation associated with modern societies has been based on culture and institutions that reflect the incentives of these societies. Naturally, culture and institutions have been dynamically transformed. The purpose of this research is to examine the East Asian historical experience of poverty, disparity of health, and utilization of natural resources, including agriculture, in order to reveal the significance of change in Asian institutions and cultural diversity and contribute to the construction of sustainable East Asian societies.



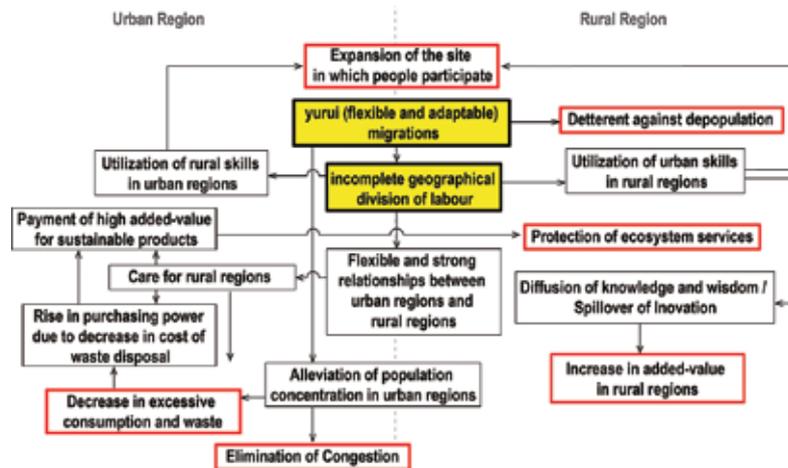
Research framework of the research

## Developing Interactive Rural-Urban Systems to Improve Human Well-being: Migration for Humanity and Nature

MORI Koichiro, Shiga University

Area : Jakarta and Medan in Indonesia, Sabae, Umajimura, Kurihara, Noto and Toyooka in Japan

The purpose of this research is to develop interactive urban-rural systems that can address global environmental problems and enhance human well-being within global environmental limits. The project investigates our hypotheses that the incomplete geographical division of labour between urban and rural areas and flexible and adaptable (yurui) migrations between urban and rural areas can provide strategies to abate problems related to urban overcrowding. The project will conduct social practical experiments.



Two key concepts, incomplete geographical division of labour and yurui migrations, can address environmental, economic and social problems through interactions of people between urban and rural areas.

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

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

Area : Informal settlements in Latin American countries

Slums have emerged as a consequence of socio-economic globalization and are frequently associated with land informality.

By questioning the land property as individual 'right', this project attempts to propose how to increase tenure security at neighborhood level through introducing the land possession as collective 'responsibility' to maintain properly the distributed land plots to individuals. The target project research areas are informal settlements in Latin American countries. We strategically introduce community engagement projects to explore the possibility of the scattered living sphere at neighborhood level and through generations. Such idea is inspired by the informal community logic that might have also links to the Andean pre-modern knowledge.



Workshop with local people sharing knowledge about the neighborhood, Barrio Cantera, an informal settlement with land slide risk in San Martin de los Andes, Argentina, October 2017.

## Coordination



The RIHN Center provides the foundations and platforms for RIHN's research activities and supports engagement in interactive collaborations with academic and societal stakeholders. The Center also undertakes 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 the 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 hosts the Regional Center for Future Earth in Asia.



**I** magine our world, as a giant puzzle. We all have a piece, so we can choose to leave it out or put it in place.



## Science Communication

As a national research institute, RIHN is expected to conduct exemplary science. It also must communicate its research agenda and results to the public and contribute to public awareness and discussion of contemporary environmentalism. A number of public symposia, seminar series, and publications are designed to reach specialist and general audiences. Recent activities and publications include:

### The Earth Forum Kyoto and the Earth Hall of Fame Kyoto Award

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 Center, and RIHN.



The 2017 recipients of the Earth Hall of Fame Kyoto Award were Prof. Miguel A. Altieri, professor emeritus of Agroecology at the University of California, Berkeley, Prof. Margaret Anne McKean, political economist and professor emeritus at the Duke University, and Prof. Dennis L. Meadows, scientist and professor emeritus of the University of New Hampshire.

### RIHN Regional Community Seminars

RIHN Regional Community Seminars take place in, and address specific environmental issues pertaining to, a particular part of Japan.

**Rediscovering agriculture: Learning from the fields**  
4 August 2017, Graduate School of Global Food Resources, Hokkaido University

**Linking connectedness to the future: Change and continuity in globally important agricultural heritage systems**  
12 October 2017, Shiiba Village Development Center, Higashiusuki, Miyazaki

**Community empowerment: How social capital helps enhance biodiversity**  
24 February 2018, Kafuka Shogai Gakushukan, Koka, Shiga

### RIHN International Symposium

An annual symposium at RIHN exploring the key concepts of RIHN Research Programs.



Professor Peter H. Verburg, of Vrije Universiteit Amsterdam, the Netherlands, giving the 2017 keynote address.

### Trans-scale Solutions for Sustainability 20-21 December 2017

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

### RIHN Public Seminars

Public seminars are held throughout the year at RIHN or in the city center.

**Environmental regeneration starting from the 'Can't help caring' sentiment**  
16 June 2017

**Future Design**  
4 July 2017

**Our environment between present and future : A discussion with high school students**  
1 February 2018

**Moving from management to care: The area capability approach to local resources**  
15 February 2018

**China's environmental problems and prospects for Japanese cooperation**  
23 March 2018

## RIHN Seminars

This seminar series is oriented towards researchers at RIHN, inviting a wide range of visiting scholars to present their most current research. Seminars in 2017 included:

### Riverine and wetland environments: From niche construction to nutritional archaeology

Antony BROWN, professor, University of Southampton/RIHN  
Invited Scholar  
28 April 2017

### Digital revolution and planetary boundaries

Stephane GRUMBACH, Senior Scientist at INRIA, Director of IXI, Rhône-Alpes Complex Systems Institute  
18 July 2017

### An introduction to applied systems science

Pavel KABAT, Director, IIASA  
26 July 2017

### The future of cities in a fossil-carbon constrained world

Stephanie PINCETL, Director, California Center for Sustainable Communities, RIHN Invited Scholar  
12 December 2017

### Sustainability challenges and opportunities in West Asia

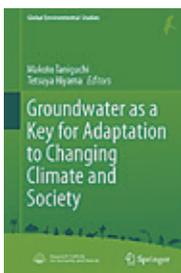
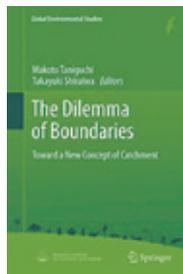
Mohammed Aly Raouf, Research Fellow, Gulf Research Center  
17 January 2018

### A nexus approach to "water, food and energy for climate smart agriculture

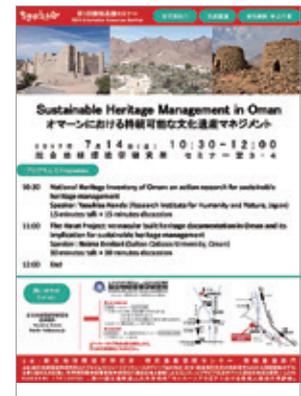
Parviz KOOHAFKAN, President, World Agricultural Heritage Foundation, RIHN Invited Scholar  
5 March 2018

## RIHN Book Series: Global Environmental Studies

RIHN has partnered with Springer Publishers to establish the Global Environmental Studies book series. Titles in the series reflect the full breadth of RIHN scholarship.



## Other Symposia



## Facilities

Research rooms on the RIHN campus are designed to provide a sense of openness. The design concept is to allow implemented projects to be loosely interconnected as they occur in one large curved space 150 meters in length. The facilities help external researchers as well as RIHN research staff to meet one another, since they are designed with the maximization of shared use in mind. At the center of the main building, a library and computer room are located for the convenience of many users, and three common rooms are provided for casual discussions. On the basement floor, a cluster of fully functional laboratories has been designed with emphasis on convenience for shared use, as with the research rooms.

The separate RIHN House is a guesthouse. The assembly hall and a dining lounge located to the left of the house entrance serve as meeting spaces for the RIHN staff as well as for guests.

Appropriately for an institution researching the global environment, RIHN is housed in a tile-roofed building suited to the Kyoto landscape, where as many as possible of the trees already on the site have been retained. Lighting and air-conditioning also employ the latest designs to minimize the building's impact on the environment. The design has won acclaim, receiving awards from the Illumination Engineering Institute of Japan, the Japan Institute of Architects, the Green Building Award from MIPIM Asia, and the Architectural Institute of Japan.



### Management

RIHN researchers work across the breadth of global environmental studies. If the diverse knowledge they produce is the warp, then the unifying weft is provided by field measurement, laboratory analysis, data and information management, and academic and social communication of research progress and results. In maintaining and supporting RIHN research capacity to collect and analyze data and to communicate research in numerous professional and public fora, the RIHN Center enhances our collaborative research around the world and contributes the kind of integrated knowledge that can solve global environmental problems.

### Laboratories

RIHN research projects are multi-disciplinary and multimethod; in common they share the need for high quality physical observation and chemical and biological analysis of the surface environments of the earth. As a national institute, RIHN houses eighteen basement laboratories designed to address this need. There are state-of-the-art laboratories dedicated to microscopic, DNA and stable isotope analysis. Additional facilities include two fieldwork preparation rooms for storage and maintenance of observational and sampling equipment, three low-temperature rooms for organism and ice core storage, three incubator rooms for storage of organisms requiring specific temperatures, and a clean room in which samples can be processed in a contamination-free environment.

### Instruments

RIHN research projects conduct a variety of studies around the world and collect a diverse range of samples that contain valuable information that will help illuminate human-nature interactions. Stable isotope and DNA data in particular can give very precise descriptions of how materials and species interact, change, and move through time and space. In addition to maintaining state-of-the-art laboratories, the Laboratory and Analysis Division of the RIHN Center continues to develop new methods of data analysis and application. In conducting this research in collaboration with RIHN projects, universities and affiliated institutions throughout Japan, the division enhances the sophistication of experimental techniques and exchange of research information, and promotes the shared use of facilities.



Main building



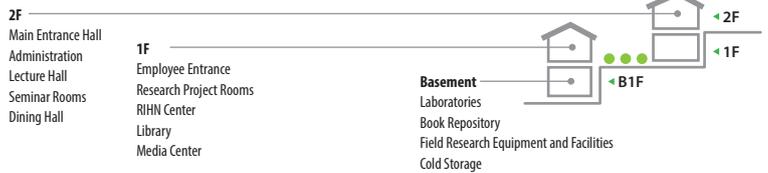
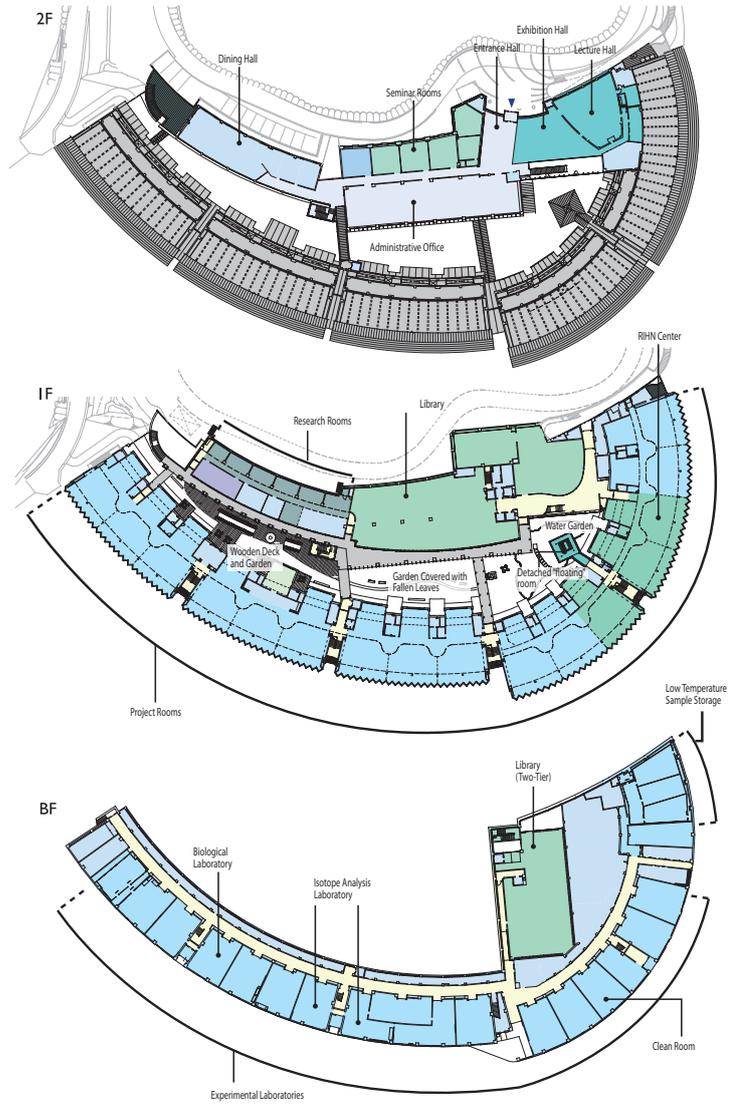
Main entrance hall



Basement laboratories



The RIHN House with one-, two-, and three-bedroom apartments for guest researchers and their families.



## Ecohealth

### New Development of Ecohealth Research in Asia

This project is a collaboration with the National Museum of Ethnology and the National Institute of Japanese Literature, supported by the National Institutes for the Humanities. It adopts an Ecohealth approach that places human health in a wider ecosystem context and explores the linkages among livelihoods, food and subsistence, ecological environment and demographic and social change in Asia. Through historical examination of concepts of health in East Asia and contemporary fieldwork in communities in Laos, China and Japan experiencing rapid demographic change, the project aims to move beyond disease-oriented understandings to a holistic and positive appreciation of health in specific contexts and places.



Project meeting for research exchange (Sep, 2017)

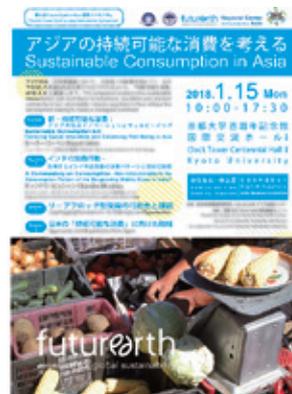
## Future Earth

Future Earth is a major international research platform providing knowledge and support to accelerate transformations to a sustainable world (see [www.futureearth.org](http://www.futureearth.org)). It aims to generate solutions-oriented research and innovation to address complex global problems, by linking the expertise of researchers across disciplines with policy-makers, business leaders, practitioners and other societal partners. The Collaboration Division in the RIHN Center is actively engaged in the co-design of research development, and hosts the Regional Centre for Future Earth in Asia ([www.futureearth.org/asiacentre/](http://www.futureearth.org/asiacentre/)). The Centre supports the development of Future Earth in the region, helps connect researchers and other stakeholders, and facilitates the formation of regionally relevant and credible governance structures for the initiative. The Centre has convened a Regional Advisory Committee to accelerate the regional development of Future Earth and supported the launch of two Future Earth programs focused in Asia: Sustainability Initiative in the Marginal Seas of South and East Asia (SIMSEA) and Monsoon Asia Integrated Research for Sustainability – Future Earth (MAIRS-FE). The Centre also leads the development of a Knowledge-Action Network on the focal topic of “Systems of Sustainable Consumption and Production” (<http://www.futureearth.org/future-earth-sscp>).



Future Earth session at the 17th Conference of Science Council of Asia

At the session the Future Earth community in Asia discussed “Air Pollution and Human Health in Asia” as a priority issue for the region.



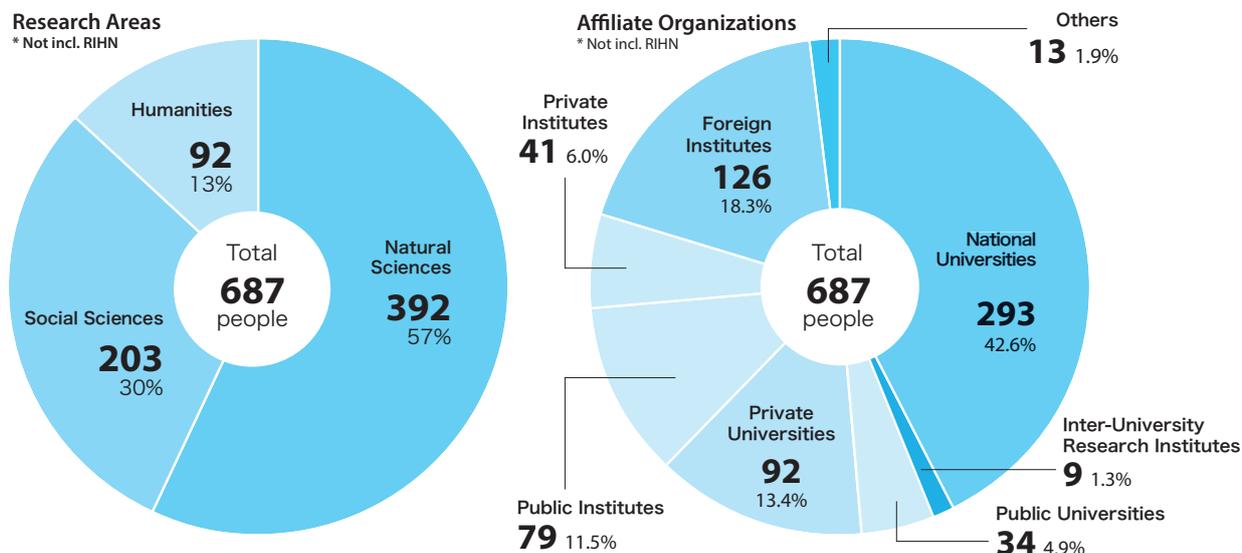
The 6th International Workshop on Future Earth in Asia: Sustainable Consumption in Asia



Regional Centre for Future Earth in Asia Website

A map of the Future Earth Community in Asia has been developed on the website. This map shows people and institutions in the region that are actively engaged in Future Earth activities. ([www.futureearth.org/asiacentre/](http://www.futureearth.org/asiacentre/))

## Collaboration



\*As of March 31st, 2018

## Collaboration in Japan

### Research Institutions

1. Graduate School of Environmental Studies, Nagoya University
2. Doshisha University
3. Nagasaki University
4. Kyoto Sangyo University
5. Tottori University of Environmental Studies
6. Kyoto University
7. Center for Environmental Remote Sensing, Chiba University
8. Institute of Decision Science for a Sustainable Society, Kyushu University
9. Institute of Nature and Environmental Technology, Kanazawa University
10. Faculty of Engineering, GI-CoRE, Faculty of Health Sciences, Research Faculty of Agriculture, Hokkaido University
11. Graduate School of Arts and Sciences, The University of Tokyo
12. Kyushu University
13. Graduate School of Life Sciences, Tohoku University

### Municipal Governments and Other Agencies

1. Saijo City, Ehime Prefecture
2. Kyoto Municipal Science Center for Youth
3. Food and Agricultural Materials Inspection Center (FAMIC)
4. Ono City, Fukui Prefecture
5. Kameoka City, Kyoto Prefecture
6. Inabe City, Mie Prefecture
7. Kyoto Prefectural Hokuryo Senior High School
8. Kyoto Prefectural Rakuohku High School
9. Miyazaki Prefecture
10. NHK Educational Corporation
11. Noshiro City, Akita Prefecture

## International Collaboration

Memoranda of Understanding and Research Cooperation Agreements (As of March 31st, 2018)

### AUSTRIA

International Institute for Applied Systems Analysis

### BANGLADESH

International Centre for Diarrhoeal Disease Research

### BHUTAN

College of Natural Resources, Royal University of Bhutan

### CHINA

East China Normal University  
Hainan Provincial Center for Disease Control and Prevention  
Peking University  
People's Government of Changzhou City  
Yunnan Health and Development Research Association

### FRANCE

La Fondation Maison des Sciences de l'Homme

### INDONESIA

The Agency of Peatland Restoration (Badan Restorasi Gambut)  
The Center for International Forestry Research  
Indonesian Institute of Sciences

### LAOS

Lao Tropical and Public Health Institute, Ministry of Health

### PHILIPPINES

Laguna Lake Development Authority  
University of the Philippines Diliman  
University of Santo Tomas

### RUSSIA

Far Eastern Federal University

### SWEDEN

The Sven Hedin Foundation

### TAIWAN

Research Center for Environmental Changes, Academia Sinica

### THAILAND

Rice Department, Ministry of Agriculture and Cooperatives

### UNITED KINGDOM

Sainsbury Institute for the Study of Japanese Arts and Cultures

### UNITED STATES OF AMERICA

University of California, Berkeley

### ZAMBIA

University of Zambia

## Administrative Structure



## Financial Information

### Budget

Income (Fiscal Year 2018)	
Category	Amount (Yen in thousands)
Subsidy for Operation	1,430,680
Self Revenue	18,645
<b>Total Earnings</b>	<b>1,449,325</b>

### External Sources of Funding

(Fiscal Year 2016)	
Category	Amount (Yen in thousands)
Fund for Promotion of Academic and Industrial Collaboration	83,796
Grants-in-Aids for Scientific Research	99,570
Donations for Research	3,862

(Fiscal Year 2017)	
Category	Amount (Yen in thousands)
Fund for Promotion of Academic and Industrial Collaboration	123,661
Grants-in-Aids for Scientific Research	178,949
Donations for Research	9,350

\* Fund for Promotion of Academic and Industrial Collaboration is the sum of contract research expenses.



# Boards and Committees

\*As of May, 2018

## Board of Advisors

■ Oversees personnel, planning, administration and operation of the institute

<p>ASAOKA Mie President, Kiko Network IKEYA Kazunobu Professor, National Museum of Ethnology KADA Yukiko Former Governor of Shiga Prefecture / Former President, Biwako Seikei Sport College KANZAWA Hiroshi Professor Emeritus, Nagoya University KOIKE Toshio Director, Global Centre of Excellence for Water Hazard and Risk Management</p>	<p>KONO Yasuyuki Professor, Center for Southeast Asian Studies, Kyoto University NIIKAWA Tatsuro Professor, Graduate School, Doshisha University NOE Keiichi Professor Emeritus &amp; President-appointed Extraordinary Professor, Tohoku University OTSUKI Kyoichi Professor, Faculty of Agriculture, Kyushu University</p>	<p>MALLEE, Hein Deputy Director-General, RIHN TANIGUCHI Makoto Deputy Director-General, RIHN NAKASHIZUKA Tohru Program Director, RIHN SAIJO Tatsuyoshi Program Director, RIHN SUGIHARA Kaoru Program Director, RIHN</p>	<p>TAYASU Ichiro Professor, RIHN ISHII Reichihiro Associate Professor, RIHN MCGREEVY, Steven R. Associate Professor, RIHN</p>
--	--	---	---

## External Research-Evaluation Committee

■ External review of research project proposals

### Domestic

KAWABATA Zen'ichiro  
Professor Emeritus, RIHN  
KONDO Akihiko  
Professor, Center for Environmental Remote Sensing / Department of Environmental Remote Sensing,  
Division of Earth and Environmental Sciences, Graduate School of Science and Engineering, Chiba  
University  
SUMI Akimasa  
Project Professor, Integrated Research System for Sustainability Science (IR3S) / Professor Emeritus,  
the University of Tokyo / Former President, National Institute for Environmental Studies  
TANAKA Masaru  
Director, Mounie Institute for Forest-Sato-Sea Studies / Professor Emeritus, Kyoto University  
TODA Takao  
Vice President for Human Security and Global Health, Japan International Cooperation Agency  
UCHIBORI Motomitsu  
Professor, The Open University of Japan  
WADA Eitaro  
Member of the Japan Academy / Professor Emeritus, Kyoto University

### Overseas

BAI, Xuemei  
Professor, Urban Environment and Human Ecology, Fenner School of Environment and Society,  
Australian National University, Australia  
BINDER, Claudia  
Professor, Laboratory for Human-Environmental Relations in Urban Systems (HERUS), IIE - ENAC -  
EPFL, Switzerland  
LU, Yonglong  
Professor, Research Center for Eco-Environmental Science, Chinese Academy of Sciences, China  
ROMERO LANKAO, Paty  
Senior Scientist, Research Applications Laboratory, Climate Science and Applications Program,  
National Center for Atmospheric Research, U.S.A.  
SHRIVASTAVA, Paul  
Chief Sustainability Officer / Director, Sustainability Institute / Professor, Management and  
Organization, Smeal College of Business, The Pennsylvania State University, U.S.A.  
VAN DER LEEUW, Sander  
Professor, School of Human Evolution and Social Change / School of Sustainability, Arizona State  
University, U.S.A.  
WONG, R. Bin  
Distinguished Professor of History, Department of History, University of California, Los Angeles, U.S.A.  
ZHANG, Shiqiu  
Professor, College of Environmental Sciences and Engineering, Peking University, China

## Council for Research Strategy

■ Oversees research strategy, personnel, project, and evaluation system

YASUNARI Tetsuzo	Director-General	SAIJO Tatsuyoshi	Specially Appointed Professor	MCGREEVY, Steven R.	Associate Professor
MALLEE, Hein	Deputy Director-General	SUGIHARA Kaoru	Specially Appointed Professor	KATSUHIRA Hiroshi	Director, Administrative Office
TANIGUCHI Makoto	Deputy Director-General	TAYASU Ichiro	Professor		
NAKASHIZUKA Tohru	Specially Appointed Professor	ISHII Reichihiro	Associate Professor		

## Senior Advisor

TACHIMOTO Narifumi

## Emeritus Professors

NAKANISHI Masami	FUKUSHIMA Yoshihiro	TACHIMOTO Narifumi	NAKANO Takanori
WADA Eitaro	AKIMICHI Tomoya	SATO Yo-Ichiro	SATO Tetsu
HIDAKA Toshitaka	KAWABATA Zen'ichiro	MOJI Kazuhiko	KUBOTA Jumpei
NAKAWO Masayoshi	OSADA Toshiaki	KADA Ryohei	

## RIHN STAFF

■ DIRECTOR-GENERAL	YASUNARI Tetsuzo
■ DEPUTY DIRECTOR-GENERAL (Planning and Coordination)	MALLEE, Hein
■ DEPUTY DIRECTOR-GENERAL (Research)	TANIGUCHI Makoto

## ADMINISTRATIVE OFFICE

■ ADMINISTRATIVE DIRECTOR KATSUHIRA Hiroshi

### ■ PLANNING AND COLLABORATION SECTION

Head HIGASHI Hideaki  
Deputy Head KITA Yoshifumi  
**General Affairs and Planning Subsection**  
Head BIVONE Junko  
Clerk KARIYA Midori  
Clerk KOGISO Ayana  
Clerk MASUDA Maho  
**Personnel Subsection**  
Head NAGATA Yukihiko  
Clerk MATSUKI Takeyuki  
Clerk NAGATA Satoko  
**International Affairs Subsection**  
Head ZENIZUKA Rie

### ■ Collaboration Unit

Head UEDA Yasutoshi  
**Research Planning Subunit**  
Head YUKI Toshitake  
**Cooperative Research Support Subunit**  
Head UEDA Yasutoshi  
Clerk SAWAMURA Takahiro  
**Information and Library Subunit**  
Chief YAMASHITA Takayoshi

### ■ ACCOUNTING SECTION

Head KIMURA Makoto  
Deputy Head KITAURA Toshiaki  
**Financial Planning Subsection**  
Head TOJIMA Mitsuo  
Chief HONDA Takayuki  
Clerk KOHO Sayaka  
**Facility Management Subsection**  
Head NAKAJIMA Kohei  
S.A.Specialist ZUI Zoujin  
**Accounting Subsection**  
Head SHIBUYA Hiroyuki  
**Procurement Subsection**  
Head NONAMI Masatoshi  
Clerk NAKANISHI Keita

### ■ OPERATION AND AUDITING DIVISION

Head KIMURA Makoto  
**Auditing Subunit**  
Head TOJIMA Mitsuo  
Chief HONDA Takayuki

## RESEARCH DEPARTMENT

### Program Directors

NAKASHIZUKA Tohru	Forest Ecology, Biodiversity
SAIJO Tatyuyoshi	Future Design
SUGIHARA Kaoru	Economic History, Environmental History

### Professors

MIZUNO Kosuke	Indonesian Area Research
NAKATSUKA Takeshi	Biogeochemistry, Paleoclimatology
TAYASU Ichiro	Isotope Ecology, Isotope Environmental Science
YAMAUCHI Taro	Human Ecology

### Associate Professors

KONDO Yasuhisa	Archaeology, GIS, Open Science
MCGREEVY, Steven R.	Environmental Sociology
OKUDA Noboru	Ecological Science
YOSHIDA Takehito	Ecology

### Specially Appointed Professors

NAKASHIZUKA Tohru	Forest Ecology, Biodiversity
SAIJO Tatyuyoshi	Future Design
SUGIHARA Kaoru	Economic History, Environmental History

### Visiting Professors

FUJII Shigeo	Water Environment and Sanitation, Micropollutants Contamination
HABU Junko	Environmental Anthropology, East Asian Archaeology
HAYASHI Hiroaki	Plant Nutrition and Fertilizer, Sustainable Development Studies
ISHIKAWA Satoshi	Conservation Ecology, Global Fisheries Science

KANIE Norichika	Earth System Governance
KASUGA Fumiko	Food Safety Planning
KAWASAKI Masahiro	Atmospheric Chemistry
KOHSAKA Ryo	Natural Resource Management and Global Environmental Policy
KUSAGOU Takayoshi	Action-based Development Studies
MORI Koichiro	Ecological Economics
NAKAGAMI Ken'ichi	Environmental Economics and Policy
OKABE Akiko	Architecture, Socio-cultural Environmental studies
OMORI Yasuhiro	Visual Anthropology
RAMPEL, Dorotea Agnes	Soil and Water Management
SAKAKIBARA Masayuki	Earth and Environmental Sciences
SHIBATA Akira	Rural Development, Biomass Carbonization
SUZUKI Takami	Visual Anthropology
TANAKA Ueru	Agro-ecosystems Studies
YONEMOTO Shohei	History and Philosophy of Science

### Visiting Associate Professors

ENDO Aiko	Marine and Coastal Policy, Fishery Economics
KAMATANI Kaoru	History
KANEMOTO Keiichiro	Industrial Ecology, Environmental Economics
KIKUCHI Naoki	Environmental Sociology
KOZAN Osamu	Hydrology
MATSUDA Hirotaka	Agricultural Economics, Development Economics
SHIRAIWA Takayuki	Glaciology, Physical Geography
TAKEUCHI Kiyoshi	Anthropology, African Area Studies
TERADA Masahiro	History, Metahistory
WATANABE Kazuo	Area Studies

### Senior Researchers

MASUHARA Naoki	Public Administration Studies and Energy Policy
TAMURA Norie	Natural Resource Management

### Researchers

FUJIYOSHI Lei	Isotope Environmental Science
HAYASHI Koji	Ecological Anthropology
HUANG, Wanhui	Regional Environmental Studies, GIS
IKEYA Tohru	Aquatic Ecology, Environmental Science
IMAIZUMI Aki	Agricultural Economics, Seed Supply System Analysis
ISHIBASHI Hiroyuki	Area Studies, Environmental Local History
ISHIDA Takuya	Forest Environmental Science
ITO Keisuke	Japanese History
KAJITA Ryosuke	Area Studies
KOBAYASHI Kunihiko	International Environmental Law
KOBAYASHI Mai	Environmental Sociology
LAMBINO Ria	Adoracion Apostol Environmental Governance
LEE, Sanghyun	Agricultural Water Management
LI Zhen	Earth and Environmental Sciences
NAKAO Seiji	Historical Anthropology
OSAWA Takamasa	Social Anthropology
OTA Kazuhiko	Japanese Environmental Ethics
RUPPRECHT, Christoph D. D.	Geography
SHIBATA Rei	Forest Ecology
SHIODERA Satomi	Forest Ecology
SPIEGELBERG, Maximilian	Environmental Management
SUZUKI Haruka	Area Studies
TSUSHIMA Akane	Paleoclimatology
UEHARA Yoshitoshi	Ecology
YAMANAKA Manabu	Atmosphere-Hydrosphere Sciences

### Research Associates

HONMA Saki	KURIU Harumi	SHIMAUCHI Risa
KARATSU Fukiko	MATSUOKA Yuko	TESHIMA Mika
KATSURA Tomomi	MIZUMA Sakiko	WATANABE Kirie
KIMURA Ayako	NAKAI Minami	YAMAMOTO Aya
KOBAYASHI Yuko	SENDA Masako	

## RIHN Center

**DIRECTOR** MALLEE, Hein

**Deputy Director** TAYASU Ichiro

**Core Program Director** TANIGUCHI Makoto

### Heads of Divisions

Laboratory and Analysis Division	TAYASU Ichiro
Information Resources Division	SEKINO Tatsuki
Collaboration Division	ISHII Reichiro
Communication and Production Division	ABE Ken-ichi

### Professors

ABE Ken-ichi	Ecological Anthropology
MALLEE, Hein	Social Science
SEKINO Tatsuki	Information Science
TANIGUCHI Makoto	Hydrology
TAYASU Ichiro	Isotope Ecology, Isotope Environmental Science

### Associate Professors

ISHII Reichiro	Theoretical Ecology
KONDO Yasuhisa	Archaeology, GIS, Open Science
KUMAZAWA Terukazu	Environmental Planning, Regional Informatics
NILES, Daniel	Geography
SHIN Kicheol	Petrology, Geochemistry, Isotope Geology

### Assistant Professor

ONISHI Yuko	Biogeography, Macroecology
-------------	----------------------------

### Research Fellow, NIHU Center for Transdisciplinary Innovation (Ecohealth)/ Specially Appointed Assistant Professor

JIANG Hongwei	Human Ecology
---------------	---------------

### Research Fellow, NIHU Center for Information and Public Relations/ Specially Appointed Assistant Professor

KIM, Satbyul	Cultural Anthropology
--------------	-----------------------

### Researchers

KAMAUCHI Hiromitsu	Ecocystem Ecology, Aquatic-terrestrial Interactions
KATO Yoshikazu	Aquatic Ecology
MIMURA Yutaka	Architectural History, Urban History, Historical GIS
SAITO Yu	Sedimentology
SHIMADA Nahoko	Study of Ecological Thought
YABUSAKI Shiho	Isotope Hydrology
YOSHIMIZU Chikage	Biogeochemistry

### Research Associates

IWAMOTO Yoko	Urban History
KISHIMOTO Sayaka	International Collaboration Studies
KURATA Junko	
OKA Masami	
UEDA Sachiko	
YASUDA Akiko	
YUZEN Natsuko	

## Institutional Research Unit

**HEAD** TANIGUCHI Makoto

### Members of Unit

TAYASU Ichiro	YAMAUCHI Taro	KONDO Yasuhisa	KUMAZAWA Terukazu
---------------	---------------	----------------	-------------------

### Specially Appointed Specialist

OSHIUMI Keiichi

## International Publications Unit

**HEAD** SUGIHARA Kaoru

### Members of Unit

YASUNARI Tetsuzo	ABE Ken-ichi	MALLEE, Hein	NILES, Daniel
------------------	--------------	--------------	---------------

## Public Relations Unit

**HEAD** MALLEE, Hein

### Members of Unit

ABE Ken-ichi	SEKINO Tatsuki	YOSHIDA Takehito	KUMAZAWA Terukazu
MCGREEVY, Steven R.	NILES, Daniel	KIM, Satbyul	

### Specially Appointed Associate Professor

TOYAMA Mari	Science Communication
-------------	-----------------------

### Specially Appointed Specialist

WADE Shin-ichi

### Research Associate

KIMURA Aoi

## A Brief History of RIHN

- 1993 — Prime minister's advisory panel on the Global Environment in 21st Century launched
- 1995 — "On the Promotion of Global Environmental Studies" published by The Science Council of Japan
- 1997 — Report "On the core research institute for Global Environmental Studies" published by MEXT (Ministry of Education, Culture, Sports, Science and Technology)
- 2001 — RIHN Established on the Kyoto University campus  
— HIDAKA Toshitaka, Director-General
- 2002 — RIHN relocated to the former Kasuga Primary School  
— The 1st RIHN Forum
- 2004 — RIHN becomes a member of the National Institutes for the Humanities  
— The 1st RIHN Public Seminar
- 2005 — The 1st RIHN Area Seminar
- 2006 — RIHN relocates to current facilities in northern Kyoto  
— The 1st RIHN International Symposium
- 2007 — TACHIMOTO Narifumi appointed as the second Director-General  
— The Center for Coordination, Promotion and Communication established  
— RIHN-China established  
— First research projects concluded
- 2008 — The 1st Collaborative Symposium with the International Research Center for Japanese Studies
- 2009 — The Earth Forum Kyoto and Earth Hall of Fame Kyoto Award established
- 2010 — Core Research Hub established  
— The RIHN Encyclopedia of Global Environmental Studies published
- 2011 — RIHN 10 year anniversary and publication  
— GEC-Japan network established
- 2013 — YASUNARI Tetsuzo appointed as the third Director-General  
— The Center for Coordination, Promotion and Communication reorganized into the Center for Research Development and the Center for Research Promotion
- 2014 — Selected as Regional Center for Future Earth in Asia
- 2016 — 3 Research Programs and Core Program established and RIHN Center reorganized



## Inter-University Research Institute Corporations National Institutes for the Humanities (NIHU)

<http://www.nihu.jp/>

NIHU carries out research on the human sciences and aims to create new value systems that will genuinely enrich our lives. NIHU is one of the four inter-university research institute corporations in Japan. It consists of six inter-university research institutes that specialize in humanities research. Each of the institutes is deeply involved in foundational research in their field as both domestic and international research centers. The six institutes interact in a complementary fashion and carry out research that transcends the frameworks of traditional disciplines. They also cooperate with other research organizations domestically and internationally in their attempt to identify and solve modern day issues.

### Research and Communications

In 2016, two new centers, the Center for Transdisciplinary Innovation (CTI) and the Center for Information and Public Relations (CIP) were established to improve governance at NIHU.

The two Centers promote international collaborative research by building a research network around the six institutes. At the same time, the Centers communicate their research globally and are committed to developing next generation scholars.

### Center for Transdisciplinary Innovation (CTI)

CTI strengthens mutual cooperation between the six institutes and leads NIHU's Transdisciplinary Projects that collaborate with universities and research institutions in Japan and overseas.

#### **NIHU Transdisciplinary Projects**

##### **Institute-based Projects**

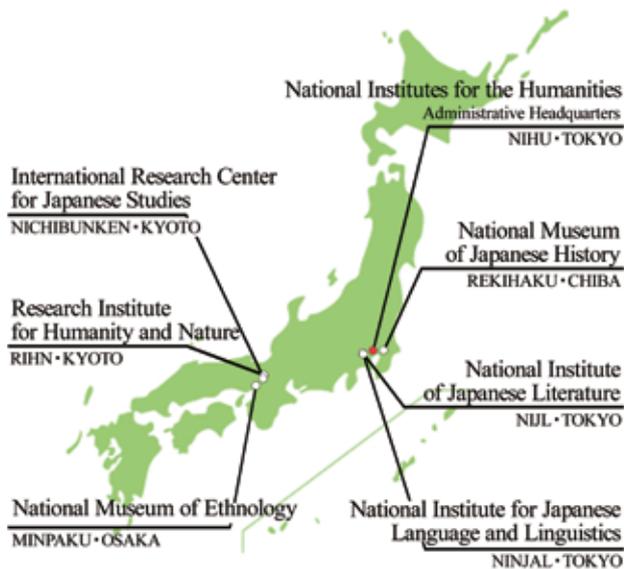
- REKIHAKU: Constructing Integrated Studies of Cultural and Research Resources, and Renovating Sharing Infrastructures of Research Resources in Japanese History and Culture
- NIJL: Project to Build an International Collaborative Research Network for Pre-modern Japanese Texts
- NINJAL: A New Integration of Japanese Language Studies based on Diverse Language Resources
- NICHIBUNKEN: Historical and International Research into Popular Culture to Pursue New Images of Japan
- RIHN: Transformation towards Sustainable Futures in Complex Human-Nature Systems in Asia
- MINPAKU: Info-Forum Museum for Cultural Resources of the World

##### **Multidisciplinary Collaborative Projects**

- Change of Local Communities and Reconstruction of Community Cultures after Disasters in Japanese Archipelago
- Rethinking Eco-health in Asia
- Development of a Field of Comprehensive Bibliographical Studies from an Interdisciplinary Perspective

##### **Network-based Projects**

- NIHU Area Studies
  - Northeast Asia Modern Middle East South Asia
- Japan-related Documents and Artifacts Held Overseas: NIHU International Collaborative Research and Utilization
  - The Archives of the Dutch Factory in Hirado
  - Insights into Japan-related Overseas Artifacts and Documents of the 19th Century in Europe through Research and Use
  - Research, Conservation and Utilization of the Marega Collection Preserved in the Vatican Library
  - Survey, Study and Use of the Japan-related Documents and Artifacts in North America
  - Coordination between Projects to Make Effective Use of Research Results



The NIHU Headquarters and six Inter-University Research Institutes



The four Inter-University Research Institute Corporations

## Center for Information and Public Relations (CIP)

CIP consolidates data related to human cultures by gathering information and research results from researchers affiliated with NIHU, and important documents and materials from the archives of the six institutes. The materials are made available to the public.

### Advanced Collaboration Systems

nihuINT <https://int.nihu.jp/?lang=en&>

Comprehensive search engine for databases operated by the six NIHU institutes as well as other organizations.

### Research Resource Databases and Publications

NIHU Repository

Cloud-based NIHU repository giving users comprehensive access to research papers from the six NIHU institutes.

Researcher's Profile <http://nrd.nihu.jp/search?m=home&l=en>

Comprehensive database containing information on researchers throughout NIHU.

Portal site for Japanese Studies [https://guides.nihu.jp/japan\\_links](https://guides.nihu.jp/japan_links)

English Resource Guide for Japanese Studies and Humanities in Japan.

NIHU Magazine [https://www.nihu.jp/ja/publication/nihu\\_magazine](https://www.nihu.jp/ja/publication/nihu_magazine)

A bilingual (Japanese and English-language) publication that covers topics such as the latest research trends, results and activities at NIHU.

### NIHU Symposiums

NIHU organizes symposiums for the general public in order to share the comprehensive human culture related research resources and results it has accumulated.

30th: "Rediscovering the Use and Value of Japan-Related Resources Recovered in the West", Jun 2017

31st: "Ecohealth: Healthy Living and the Environment," Feb 2018

32nd: "How Transdisciplinary Research Facilitates Informatics and Humanities Research", Feb 2018

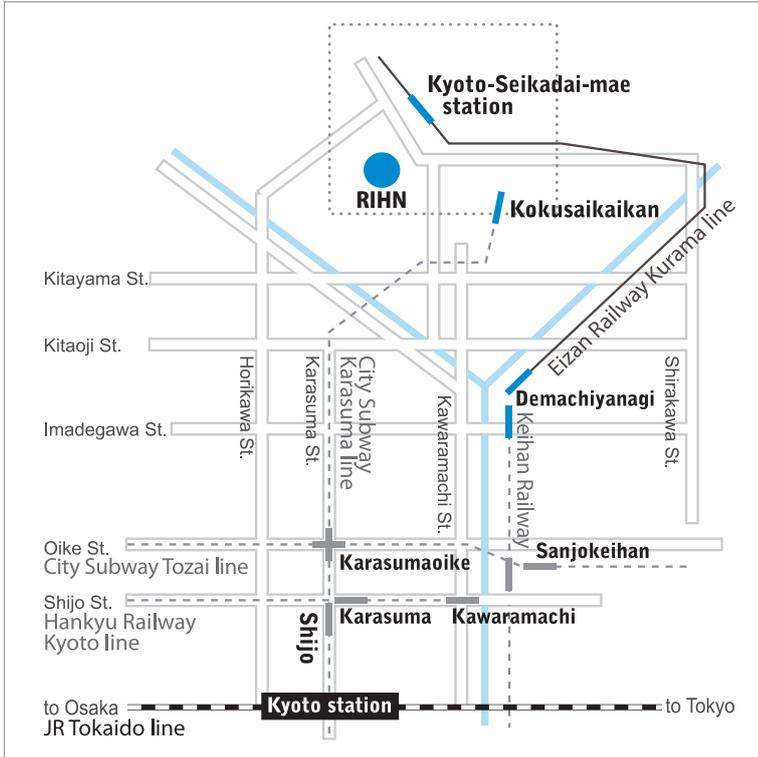
### Industry-Academia Collaborations

NIHU collaborates with industry and other partners to give back its fruits of research to society.

Joint symposium with Ajinomoto Foundation for Dietary Culture, Jan 2018

Joint lecture with Otemachi Academia, Mar 2018

## Access



### By City Subway

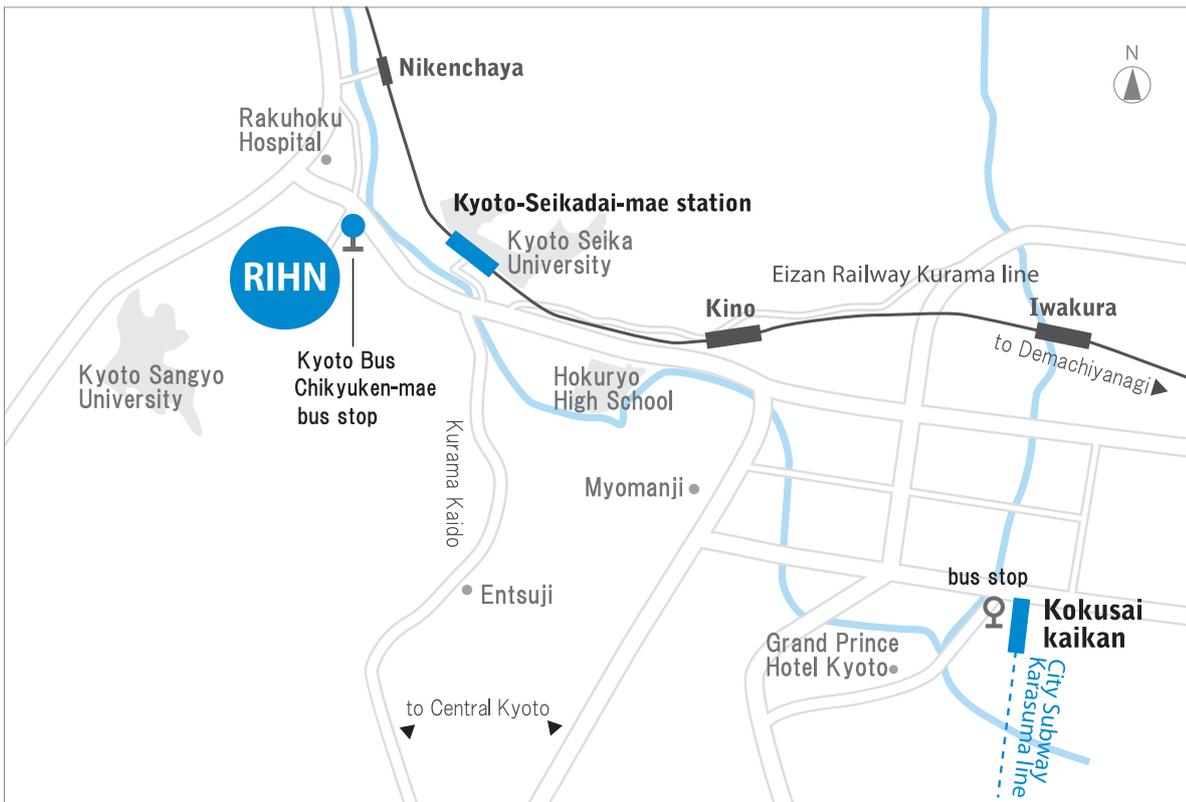
From Kyoto Station, take the Karasuma Line to Kokusaikaikan Station (the last station), and transfer to Kyoto Bus.

### By Kyoto Bus

From Kokusaikaikan Station, take bus No. 40, 50 or 52 to Chikyuken-mae. RIHN is at the base of the hill on your left.

### By Eizan Railway

From Demachiyanagi Station in Kyoto City, take the Kurama Line. Get off at Kyoto-Seikadai-mae Station. RIHN is a 10-minute walk from the station.



### RIHN Prospectus 2018-2019

Managing Editor: MALLEE, Hein  
Designed by OKAZAWA Rina

#### Front Cover photo:

Women carrying leaves for compost, Bhutan  
Photo by Sonam Phuntsho, Jigme Dorji National Park

#### Back Cover photo:

Fish Pen, Laguna de Bay, Philippines  
Photo By TERAMOTO Shun  
Flying over RIHN in the autumn sky  
Photo by WATANABE Kazuo



Inter-University Research Institute Corporation  
National Institutes for the Humanities  
**Research Institute for  
Humanity and Nature**

457-4 Motoyama, Kamigamo, Kita-ku, Kyoto  
603-8047, JAPAN

TEL. +81-75-707-2100  
FAX. +81-75-707-2106

kokusai@chikyu.ac.jp  
www.chikyu.ac.jp

ISSN 2185-8055  
**June 2018**

© RESEARCH INSTITUTE FOR HUMANITY AND NATURE

