

Inter-University Research Institute Corporation
National Institutes for the Humanities

Research Institute for Humanity and Nature

Prospectus 2015-2016





Message from the Director-General

The Research Institute for Humanity and Nature (RIHN) was established in April 2001 as an inter-university research institute corporation to conduct integrated research in global environmental studies. Our mission is to conduct integrated research that will resolve global environmental problems, guided by our awareness that the global environmental problems find their roots in human culture. Environmental degradation can be understood as an imbalance in the interaction between human beings and natural systems, and our goal is to decide what must be done to establish a dynamic interplay that will be sustainable in the future. We will conduct solution-oriented research in search of the ideal interaction of humanity and nature, in addition to academic research spanning the natural sciences, humanities, and social sciences, while also considering regional characteristics and historical contexts.

RIHN has been part of the inter-university research institute corporation, the National Institutes for the Humanities since its incorporation in fiscal year 2004. Since fiscal 2010, under Phase II medium-term plans and targets, the future design initiatives were proposed, and we incorporated a system of conducting research by adopting the methods of design science. In October of 2010, we published the Encyclopedia of Global Environmental Studies, portions of which have now been translated into English in order to make RIHN's completed research more accessible to an international audience. To reinforce our role and function as an inter-university research institute corporation, in fiscal year 2012

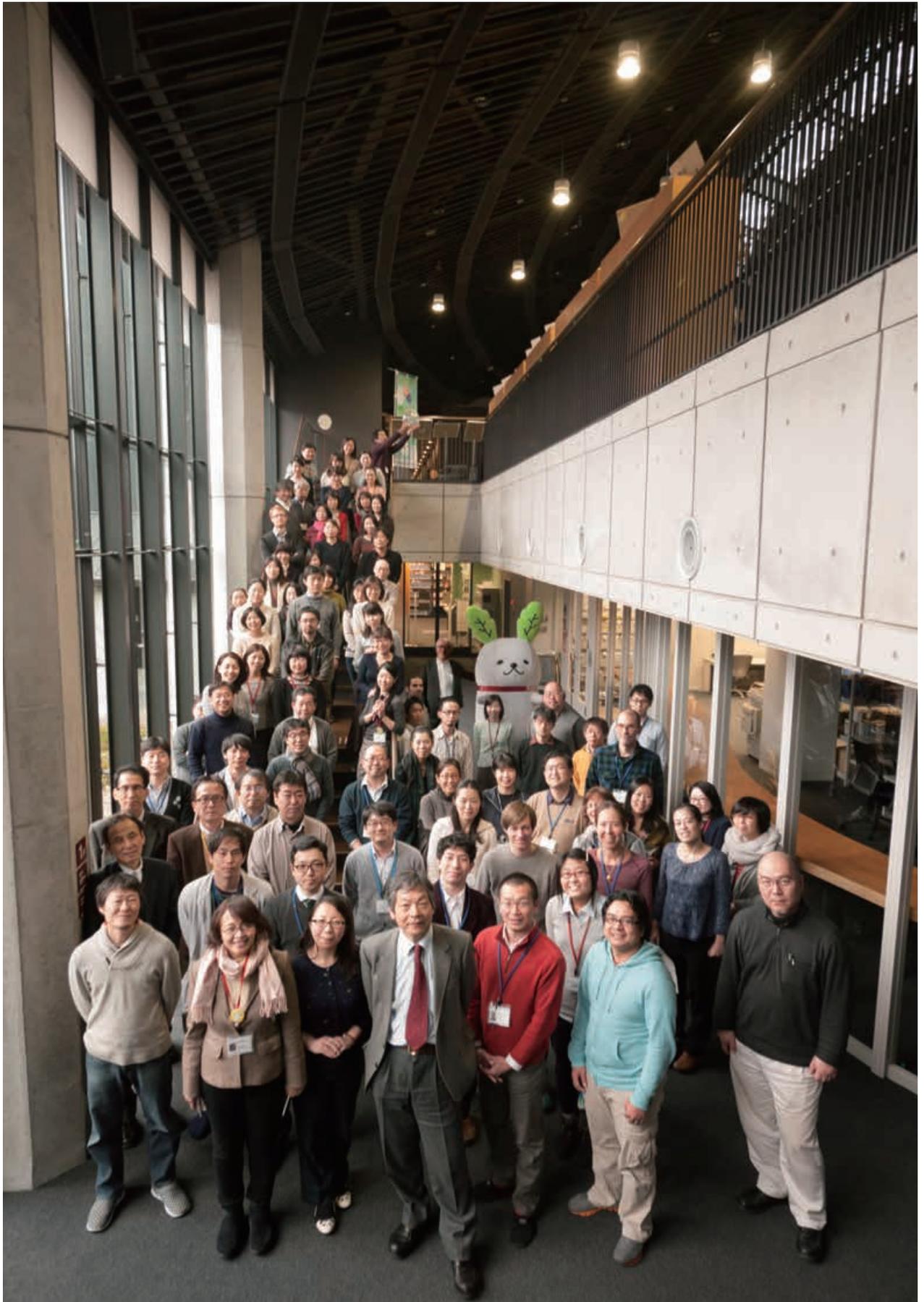
the network-based Global Environment Repository Project was established to resolve global environmental problems, and we have been constructing the infrastructure that will allow it to be used by universities and research institutes throughout Japan. Beginning in fiscal 2014, we introduced an institutional collaboration project to conduct joint research based on agreements with universities and other organizations.

In addition, we are now collaborating in a large-scale international project, Future Earth, aiming for a sustainable global society through integrated global environmental studies. These initiatives have earned the RIHN respect for its research activities that have, until now, focused on Asia, and in September 2014, it was designated as the Asian hub for Future Earth.

This fiscal year is the final year of our Phase II medium-term plan, and we are now summarizing our Phase II research achievements while aiming for new achievements in global environment studies as we enter Phase III.

安成 哲三
YASUNARI Tetsuzo

Director-General
Research Institute for Humanity and Nature



RIHN's Mission

Researchers across academic disciplines have attempted to find solutions to environmental problems since they have become a topic of wide popular concern. Despite extensive research in individual disciplines, however, the essential character of environmental problems remains unknown. There is need not for more partial descriptions of environmental problems, but for integrated knowledge of their causes and integrated approaches to their solutions. At RIHN our goal is therefore to develop 'design science': solution-oriented research based on genuine integration of the arts and sciences.

Such integrated environmental study is characterized by the belief that the essence of global environmental problems can be traced to the relationship of people with nature, that is, to human culture. RIHN projects therefore study not only the diverse cultures that now exist on Earth, with special emphasis in Asia, but also past patterns of cultural and environmental change. In addition to conducting high quality primary research, RIHN's goal is to enable discussion of the interactions between humanity and nature that different societies may or should establish in the future. RIHN has proposed the concept of "futurability", a translation of a Japanese term that combines the meanings of 'future' and 'potential', that is intended to stimulate discussion of what should be done to address environmental problems at their roots so that future generations do not inherit the same patterns of use and degradation.

The RIHN approach therefore suggests that environmental research must engage the social and cultural values related to nature. Humankind's environmental impact is now measurable throughout the world. We are increasingly aware of our dependence on finite resources and of the many negative consequences of a polluted biosphere. We also increasingly understand that many critical environmental problems cannot be separated from social inequity, especially in access to and benefits of natural resources. While exposing different value systems in such contexts can lead to social conflict, real resolution of social-environmental problems is a challenge shared by humanity in general and which requires genuine dialogue and exchange between the diverse peoples of the world.

As an institute, RIHN supports collaborative research projects that are defined and promoted through dialogue between researchers of many different disciplines. Since the research problems require experience in many fields of social thought and practice, RIHN projects must also engage people with other forms of non-academic experience and expertise. At their conclusion, RIHN projects should propose new knowledge and concepts to all members of society. In this sense, we hope that RIHN's achievements will become a common asset. Our mission is to reassert the significance of the human relation to nature, and through constructive dialogue and collaboration, to assist in the exploration of these relationships in different societies around the world.

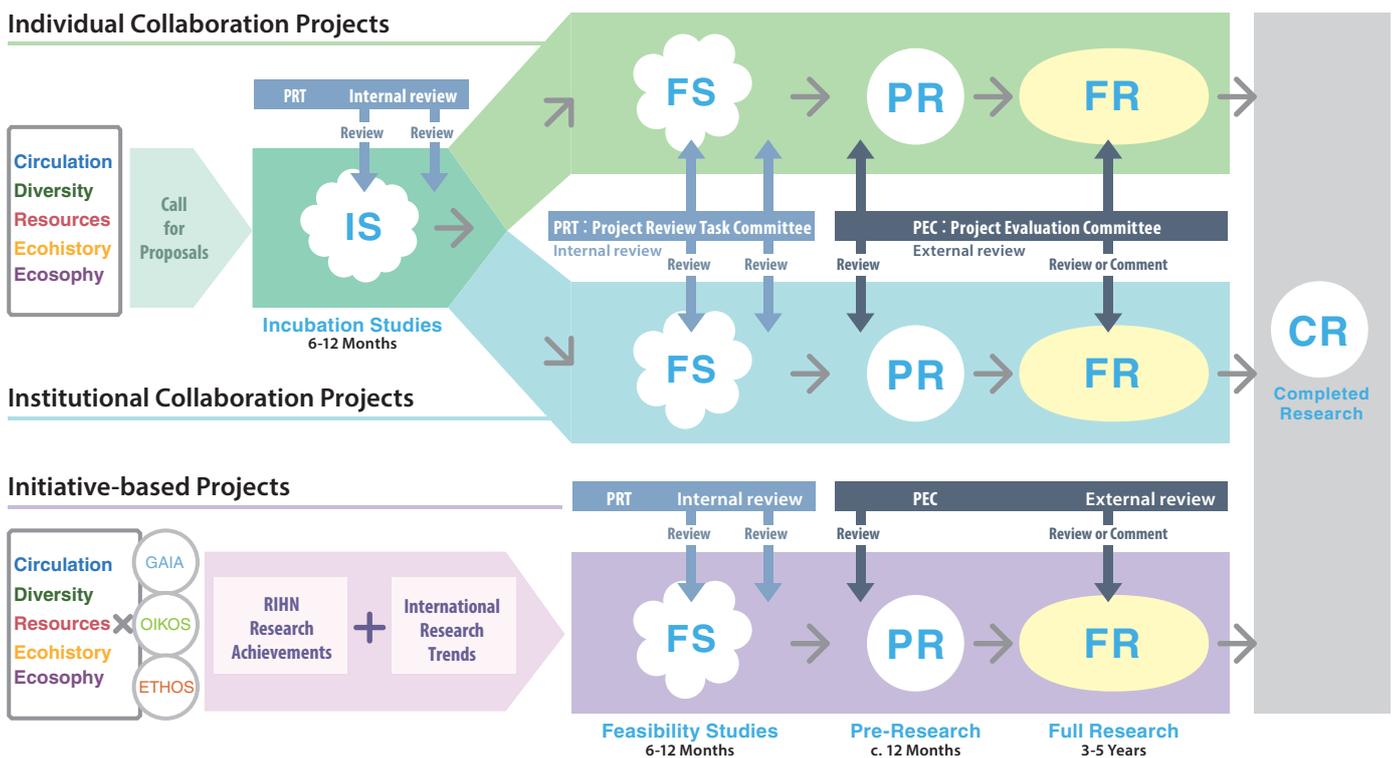


Top: Parvis KOOHAFKAN, Village life in Puno, Peru
Middle: TANAKA Ueru, Investigation of traditional farm tools, Sudan
Bottom: ABE Ken-ichi, (untitled), Peru

Research Structure

RIHN solicits, develops, funds, and hosts research projects lasting from between three to five years. Projects conduct high quality basic research; they are always multi-disciplinary and based on multiple methodologies. All projects are subject to a rigorous course of internal and external review. Proposals are developed over the course of 1-3 years (the periods of Incubation- and Feasibility-Study shown below), before entering 3-5 years of Full Research. Research projects are conducted within one of three structures.

Individual collaboration projects are proposed by Japanese or international researchers. **Institutional collaboration** projects are designed to facilitate close collaboration between RIHN and other leading institutes of environmental study in Japan. **Initiative-based** project proposals are generated within the institute itself. These proposals are formulated through a process of internal reflection of the strengths and weaknesses in current and past RIHN research as well as ongoing institute engagement with emerging themes in international research.



- **Incubation Studies (IS)** are proposed by individual researchers to the RIHN Project Review 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 Project Evaluation Committee at several stages.



Project Index

Most RIHN research projects are conducted within one of five research domains that reflect 'root metaphors' with significance beyond single disciplines or fields of study.

Full Research (FR)

Circulation

Circulation projects investigate the cycling of energy and matter on the Earth's surface in relation to human activity.

C-09	Designing Local Frameworks for Integrated Water Resources Management	KUBOTA Jumpei Dorotea RAMPISELA	10-11
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Diversity

Diversity projects describe and analyze the formation, maintenance and functions of biological and cultural diversity in specific environments.

D-05	Coastal Area Capability Enhancement in Southeast Asia	ISHIKAWA Satoshi	12-13
D-06	Biodiversity-driven Nutrient Cycling and Human Well-being in Social-Ecological Systems	OKUDA Noboru	24-25

Resources

Projects in this domain examine global environmental issues related to the use and conservation of natural resources.

R-07	Desertification and Livelihood in Semi-Arid Afro-Eurasia	TANAKA Ueru	14-15
R-08	Human-Environmental Security in Asia-Pacific Ring of Fire: Water-Energy-Food Nexus	TANIGUCHI Makoto ENDO Aiko	18-19
R-09	Long-term Sustainability through Place-Based, Small-scale Economies: Approaches from Historical Ecology	HABU Junko	20-21

Ecohistory

Ecohistory projects take historical approaches to the study of circulation, diversity, and resources.

H-05	Societal Adaptation to Climate Change: Integrating Palaeoclimatological Data with Historical and Archaeological Evidences	NAKATSUKA Takeshi	22-23
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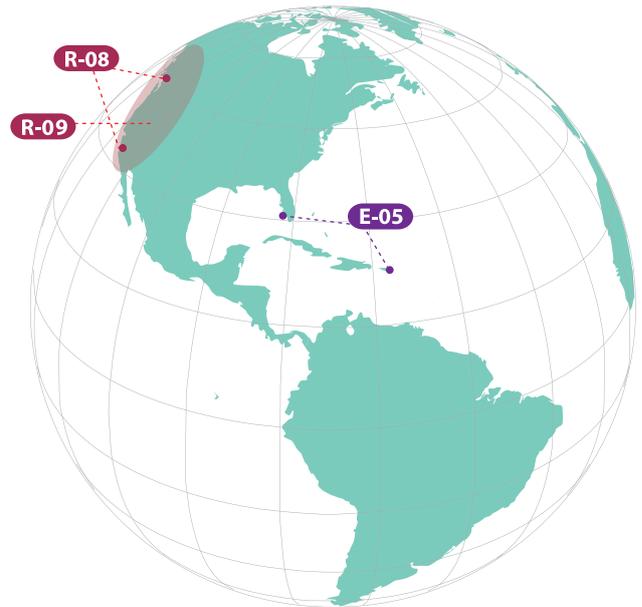
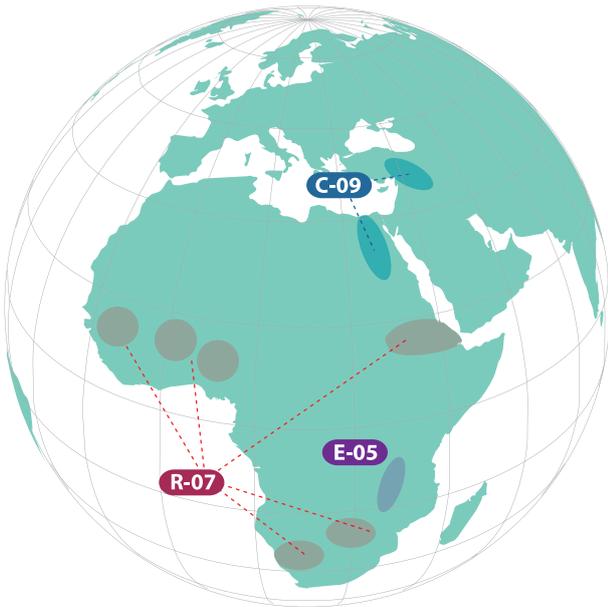
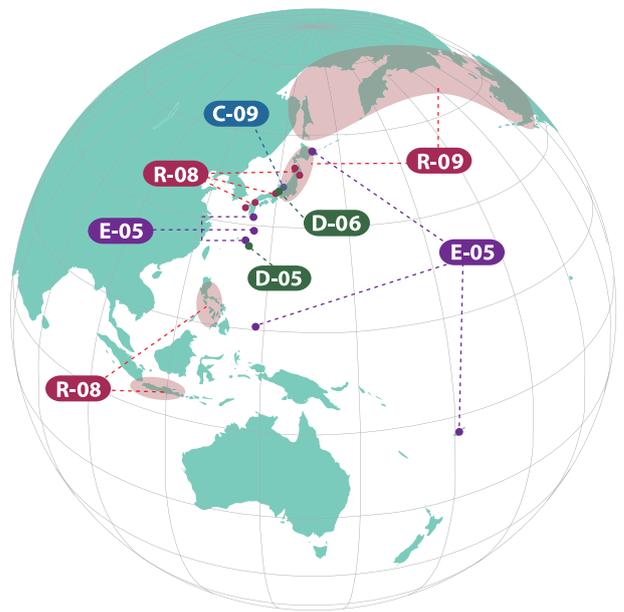
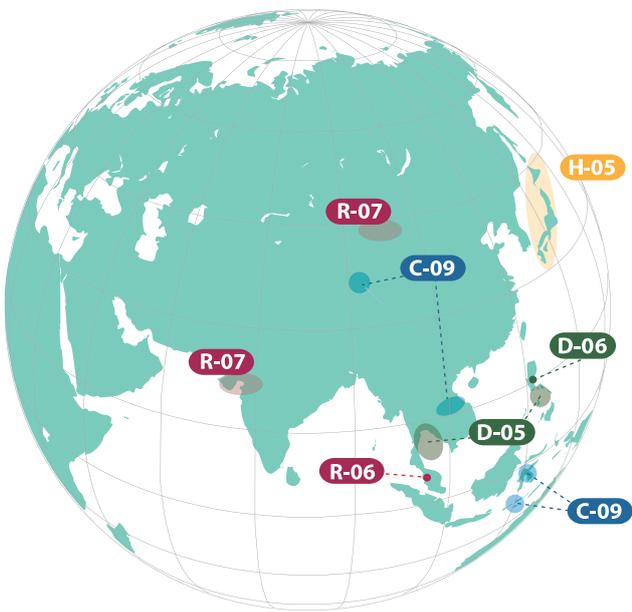
Ecosophy

Ecosophy projects examine the specific social and environmental contexts in which environmental problems occur, their linkages to social and material phenomena in other places, and the conceptual models used to describe such interconnection.

E-05	Creation and Sustainable Governance of New Commons through Formation of Integrated Local Environmental Knowledge	SATO Tetsu KIKUCHI Naoki	16-17
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Completed Research (CR)

C-07	Global Warming and the Human-Nature Dimension in Siberia: Social Adaptation to the Changes of the Terrestrial Ecosystem, with an Emphasis on Water Environments	HIYAMA Tetsuya	27
C-08	Megacities and the Global Environment	MURAMATSU Shin	30
R-05	A Study of Human Subsistence Ecosystems in Arab Societies: To Combat Livelihood Degradation for the Post-oil Era	NAWATA Hiroshi	28
R-06	Managing Environmental Risks to Food and Health Security in Asian Watersheds	KADA Ryohei	29



Designing Local Frameworks for Integrated Water Resources Management

Project Leader **KUBOTA Jumpei** RIHN

Professor Kubota earned a doctorate in forest hydrology from Kyoto University (1987). He has served as assistant professor at Kyoto University (1987-1989), and assistant professor (1989-1996) and associate professor (1997-2002) at Tokyo University of Agriculture and Technology. He joined RIHN in 2002, and now directs the Center for Research Development and the RIHN-China initiative. His major research fields are hydrology, water issues in arid regions, and human adaptation to societal and environmental changes.

Co-Project Leader **Dorotea RAMPISELA** RIHN

Dorotea Rampisela earned a doctorate in forest hydrology from Kyoto University (1992). She was previously senior lecturer at Hasanuddin University (1982-2013). She joined RIHN in Jan 2014. Her major research fields are hydrology, focusing on watershed management and relocation of people related to dam construction. She established an NGO and for the last ten years has conducted participatory research with water users association for irrigation water management.



Background and objectives

The concept of Integrated Water Resources Management (IWRM) was first proposed in the 1990s in order to recognize and coordinate the many stakeholders and sectors involved in effective water resources management. Despite several decades of development, there are still difficulties implementing IWRM in local communities and in effectively assessing the influence of human activities on water resources. While IWRM has focused on integrating the sectors and organizations governing water resources, it has not typically been able to incorporate demands from local water users or taken account of their cultural or historical backgrounds. This has resulted in a lack of flexibility from the supply side. As a consequence, new frameworks or guidelines have been requested in the field of local-to-regional water resources management.

The objective of this project is to propose knowledge structures and functions of water resources management to local-level stakeholders who play the essential role in adapting IWRM into society. The research therefore involves considerable exchange between the scientific evidence of water cycles in particular places and the wide range of stakeholders involved in water management and use. The project's goals are to develop cooperation between science and society in order to stimulate the co-creation of desirable local water resource management.

Research areas and methods

In order to accomplish the goals of the project, we have established several study sites in Indonesia, Turkey, Egypt and Japan. Cases in Indonesia and Turkey give us a geographical and hydrological contrast between humid and semiarid to arid regions experiencing increasing demand of water resources associated with rapid economic growth. The Japanese case presents interesting contrast as it shows steady or decreasing demand for water resources. Project researchers have surveyed the management structures reflecting the relationship between water users in each area and observed important background hydrological and socio-economic dynamics.

Project research puts special emphasis on the sites in Indonesia and Turkey as they present a simple hydrological contrast between humid and arid regions, while their historical and cultural differences offer comparative examples of water management structures.

We have been developing a GIS system to analyze land-use change indicated by satellite observations in relation to other important conditions such as areas affected by flooding and drought. We held stakeholder meetings and conducted action research in field study areas in order to promote mutual understanding of how different actors perceive water-related problems and seek new ways of establishing proper water resources management. Both the hydrological model and GIS system are utilized as information-sharing tools in stakeholder workshops.

Progress to date

In Indonesia, field surveys in Subak, Bali have indicated a recent organizational transition as public policies have shifted water management from autonomous to cooperative unions. Furthermore, we confirmed recent changes in the societal functions and roles of Subak related to globalization and mass tourism. A stakeholder meeting was held in Bali in 2013. Most of the participants reported problems that have recently arisen between Subak members and outsiders, such as water pollution caused by illegal waste dumping and illegal constructions on irrigation canals. Because the Subak population is made up of farmers, it is difficult to handle these problems and participants realized the necessity of communication beyond the normal scale of Subak governance. In the second meeting in 2014, we decided to establish a new "Forum DAS" (river committee) to address these problems. Two preparatory meetings were held in December 2014 and February 2015 including Subak representatives, officials and engineers in local governments, scientists, and NGO workers. In South Sulawesi, a lack of communication among water managers was clearly identified in the stakeholders meeting in January 2014, in which almost a hundred of leaders of farmers, water managers, and governmental supervisors participated. After this meeting, we have supported further autonomous discussion among water managers by utilizing the traditional "apalili" meeting. Through these meetings, a detailed schedule of water allocation was established and shared with water managers and farmers, improving the performance of water allocation and, consequently, rice production in 2014. We are planning to have another series of action-meetings in collaboration with stakeholders, expanding to other irrigation districts in 2015.

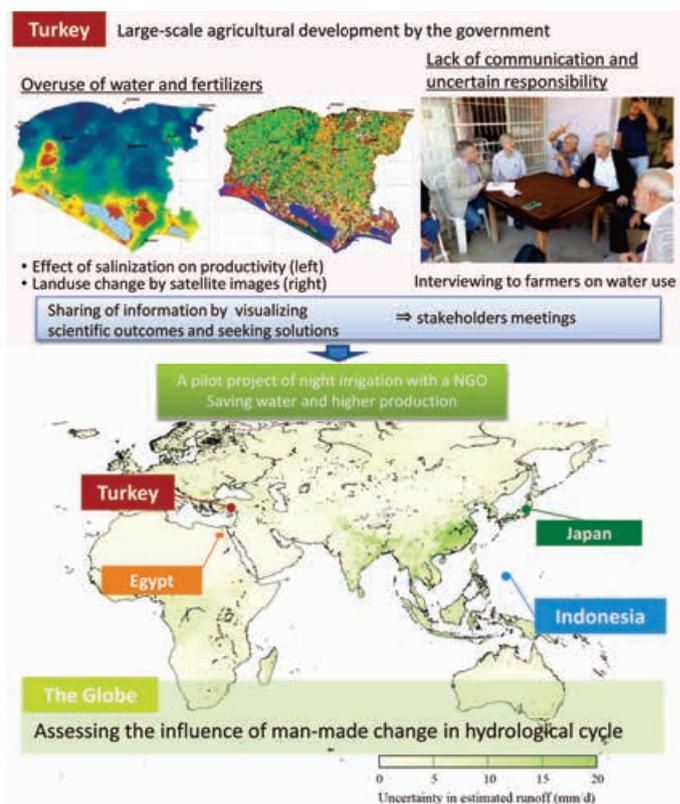


Figure 1 Progress of the project at a glance. The map in the center features indicates the uncertainty indicated by a model predicting water runoff, on which the key elements of research problems and findings in the case study sites on water resources management are featured. Deeper green color signifies higher uncertainty, i.e. difficulty in estimating water resources; it allows us to consider how uncertainty can be included in model development. Local-level co-creation of knowledge between science and society in the context of global freshwater use will be realized so as to develop transdisciplinary integration of water resources management.

In Turkey, we have identified similar problems in water management, such as information disparities and unclear responsibilities in spite of privatization. At the same time, surveys on river flow status, drainage water quality, and land use have revealed that excessive use of irrigation water and chemical fertilizer was responsible for degradation of watershed environment and land productivity. Two stakeholder meetings were held in March 2014 in order to enhance communication and mutual understanding among stakeholders. After the meeting, a local water users' association (WUA) consulted us on how to avoid over-irrigation and a resulting decrease in production. We proposed a night irrigation system. The WUA conducted a pilot project with governmental financing and the support of an NGO, which was very successful in that it reduced water used for irrigation while improving production by 30%. This pilot study was reported in the second stakeholders' meeting in October 2014 and we expect that more WUAs will employ the night irrigation system. These meetings, in addition to providing important opportunities for stakeholders to jointly address key problems in local water management, also allow project researchers to analyze changes in stakeholder behavior and decision-making processes as we further develop the methodologies of transdisciplinary investigation.

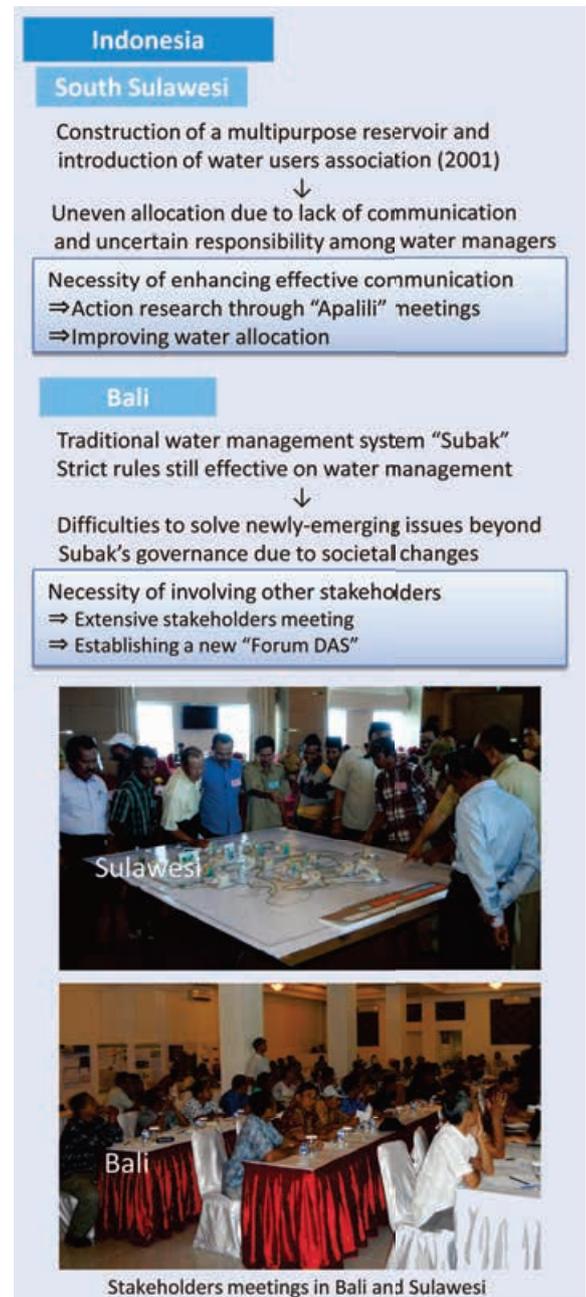


Figure 2 The results of stakeholders meetings in Indonesia

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Coastal Area Capability Enhancement in Southeast Asia

Project Leader **ISHIKAWA Satoshi** RIHN

Satoshi Ishikawa investigates population genetics and population dynamics of aquatic animals, and has participated in several rural development programs focused on improving fisheries and human capacity building in Southeast Asia. His current interest is how to harmonize conservation of coastal ecosystems and community-based management of fisheries resources. He received his baccalaureate from the National Fisheries University Japan, M.A. from Hiroshima University, and doctoral degree from the University of Tokyo.



Background

Coastal area ecosystem services are indispensable for rural people, but are also easily damaged by human use. Many coastal areas with high biodiversity and biological productivity are located in tropical zones of developing countries, as is the case in Southeast Asia. In such areas, ecosystem services, local livelihood and culture are closely related. Conservation and resource management strategies, however, are often derived from those of temperate regions, and usually target particular species or commercial resources with little consideration of how multiple ecologies and livelihood strategies overlap in culturally diverse contexts. In addition, in many cases, resource management and conservation activity are individually conducted by several different actors.

Ecosystem services have different significance for different peoples, depending on their interests and contexts. Although overuse and/or abuse of ecosystem services should be avoided, conservation actions should take careful account of the close relationship of local livelihoods and culture to local ecosystems, especially in rural areas lacking other livelihood opportunities. Addressing solutions to environmental problems in such contexts therefore requires linking people and policies engaged in both conservation and resource utilization.

This project attempts to examine several good ecosystem management practices based on local community participation in order to assess the conditions and functions of each actor in creating “Area-Capability”. We expect that an action contributing to Area-Capability can link utilization and conservation and facilitate appropriate ecosystem utilizations, improve local life, cultivate ecosystem health, and foster hope for local society.

Project framework

In Nishio City and Ishigaki Island in Japan, environmental education links several actors having different jobs and interests in new utilization and conservation activities. Around Hamana Lake (Japan), stock enhancement of Kuruma shrimp enhanced social capital among seven villages, facilitated smart fishery management, and stimulated fishermen to care for ecosystems. In Rayong, Thailand, a new community of fishermen was created based on set-net fishery installation, and they collected detailed fishery data and promoted zoning of fishing ground. In Batan Bay, Philippines, shrimp stock enhancement increased local peoples’ interest in ecosystem health. Project research conducts field surveys in these areas to collect detailed data and information about social and environmental changes regarding each event. Scientific and social analyses are conducted in order to examine the impacts of each event on both ecosystem health and quality of life. Further, we collaborate with key stakeholders, including local communities, governments and scientists, in order to identify key factors and conditions for local

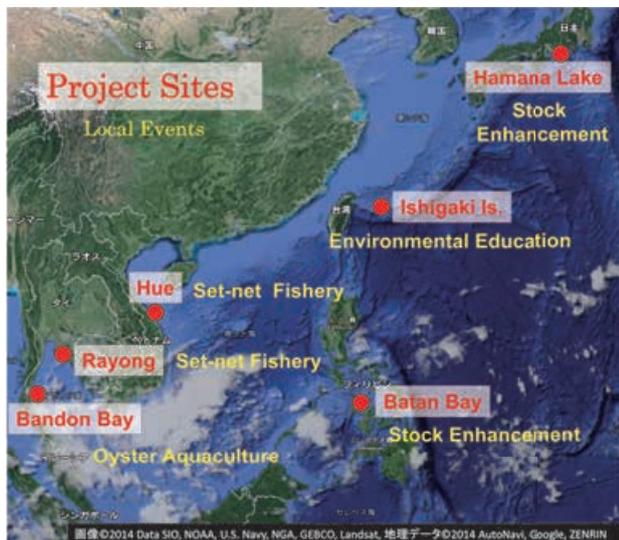


Figure 1 Research sites and characters of each area

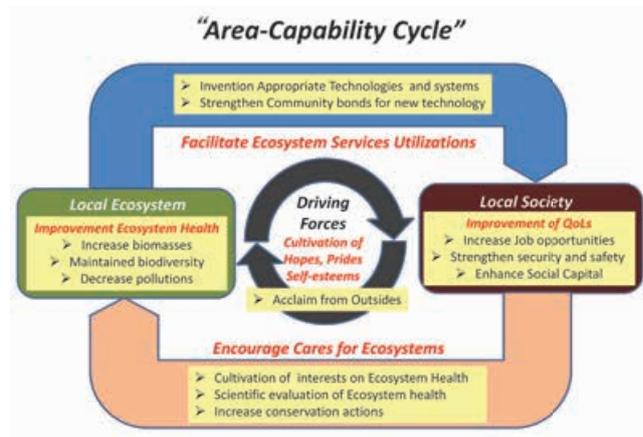


Figure 2 Conceptual model of the “Area-Capability Cycle”



Figure 3 ACC for shrimp stock enhancement in Hamana Lake, Japan

- Human development for invention new appropriate technologies and systems
- Strengthen (or Creation) of community bonds for the technology and system
- Rediscovery of local ecosystem services
- Scientific evaluation of new technology (or system) impact on ecosystem health
- Collaboration among local community, scientist, and government
- Fortify of hope for local life

Figure 5 Current hypothesis of 6 target items for rural development based on AC concept

community-based ecosystem management and rural development, examining the functions of each actor in the transformation of society.

This project is based on the joint research efforts of Southeast Asian Fisheries Development Center (SEAFDEC), Eastern Marine Fisheries Research and Development Center of Department Fishery, Thailand, Faculty of Fisheries of Kasetsart University, the University of the Philippines, Visayas (UPV), Aklan State University, and researchers from ten universities and one research organization in Japan.

Future tasks

The Area-Capability Cycle (ACC) was proposed as one model of sequential change in harmonization of natural resource conservation and management. ACC would be comprised of: 1) invention of appropriate technologies and improvement of the social and economic systems related to ecosystem service utilization; 2) enhance capability of community members; 3) improved concern for ecosystem health; 4) increased biomasses and maintained biodiversity or decreased pollution; 5) increased self-esteem and hope in local life. Several factors are important to the development of ACC, including: people who can create new technologies related to utilization of ecosystem services; communities that can legally utilize new technologies; collaboration between scientists, government and local communities to evaluate the impact of the technology and prevent overuse; new conservation actions, and; wider appreciation of the need for new relationships

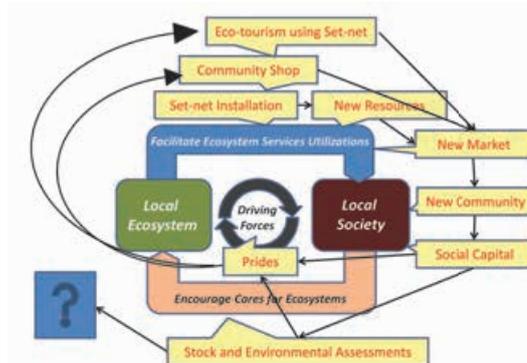


Figure 4 ACC for set-net in Rayong, Thailand. Weakness of impact survey on environments is suggested by ACC. Researchers should try to make an impact survey with the local community, and its results should be taken into account by the set-net fishery operation. The ACC should further clarify other improvements as well.



Photo 1 Community-based set-net fishery in Rayong, Thailand



Photo 2 Group photo from the international joint seminar held in Philippines 2014

with nature. Project research will apply the ACC model to many cases in order to examine its validity and refine understanding of how to harmonize conservation and management of natural resources. We will also compile all experience and information of ACC in order to make a manual useful to evaluation of rural development.

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Desertification and Livelihood in Semi-Arid Afro-Eurasia

Project Leader **TANAKA Ueru** RIHN

Ueru TANAKA obtained a Doctorate in Agriculture from Kyoto University (1997). He has previously worked as lecturer of Jomo Kenyatta College of Agriculture and Technology, Kenya (1983–1987), assistant professor in the Faculty of Agriculture, Kyoto University (1990–1999), associate professor in the Graduate School of Agriculture, Kyoto University (1999–2002), associate professor in the Graduate School of Global Environmental Studies, Kyoto University (2002–2011), and since 2012 is honorary professor of Hue University (Vietnam). His major fields of interests are agronomy, indigenous livelihood systems, desertification, and rural development support in West Africa, Southern Africa, India and Southeast Asia.



Research backgrounds, objectives and study areas

Desertification is a complex phenomenon related to land degradation and poverty, especially in sub-humid, semi-arid and arid areas. With increasing population, desertification is primarily caused by activities related to basic human survival and daily livelihood, such as cropping, animal husbandry, and gathering of fuel wood. Efforts to mitigate or solve desertification do not often take account of such causes. This may be one of the major reasons why desertification remains a serious problem despite commitments from the international community, including the United Nations Convention to Combat Desertification (1994), to address it.

This project's objectives are: 1) to deepen understanding of the social, cultural and ecological characteristics of targeted areas in semi-arid Afro-Eurasia; 2) to design and verify some practical techniques or approaches effective for desertification control in the context of rural development support; and 3) to propose and implement some techniques and approaches to desertification control and rural development, paying special attention to vulnerable people.

Project research takes place in the Sahel of West Africa (Burkina Faso, Niger and Senegal), Northeast Africa (Sudan), East Africa (Tanzania), Southern Africa (Namibia and Zambia), South Asia (India) and East Asia (Mongolia and China), as shown in Figure 1, where ecological conditions and land resources are degraded due to demographic pressure and uncertain socio-economic conditions, and extreme weather.

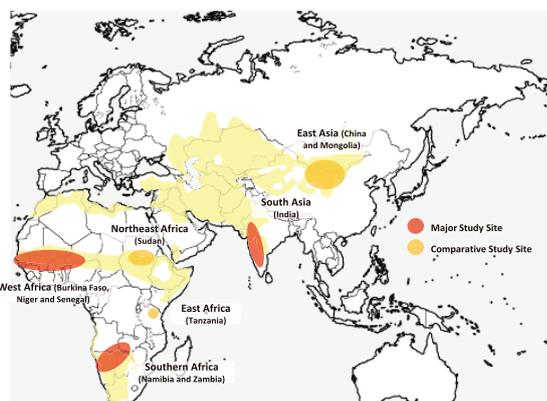


Figure 1 Study sites

Research activities

UNCCD has already set the framework for action to address desertification. We focus on 'scientific knowledge' and 'techniques' which may be associated with some shortcomings in the framework (Figure 2). Many techniques employed to control desertification to date, however scientifically sound and rational they may be, unfortunately are often not matched to the needs and situations of local people if, for example, they are too expensive or require too much time or labor. Some techniques are highly dependent on materials and machinery that may not be locally available.

Our project modifies such shortcomings and adds more knowledge and techniques through the activities in West Africa (Figure 3), Southern Africa (Figure 4) and South and East Asia (Figure 5). In West Africa the major focus of project work is on collaborating with local people in the innovation of practical desertification control techniques and extension methods, especially related to the livelihoods of vulnerable people. In Southern Africa, basic studies are being developed to describe agro-ecosystems, local livelihood systems, and adaptation strategies under demographic pressure and environmental fluctuation. In South Asia, we have inventoried local knowledge (e.g. indigenous knowledge, techniques and tools), in order to identify pastoralist peoples' adaptation strategies in high population areas experiencing fluctuating social and agro-climatic conditions. In East Asia, we re-appraise indigenous knowledge in the traditional upland farming systems. Comparative studies within Africa and between

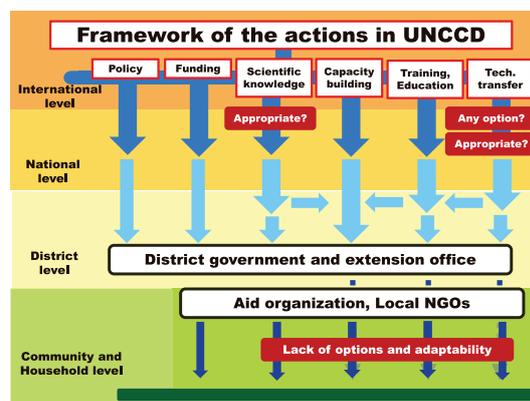


Figure 2 Focusing points and shortcomings in the framework of the actions in UNCCD

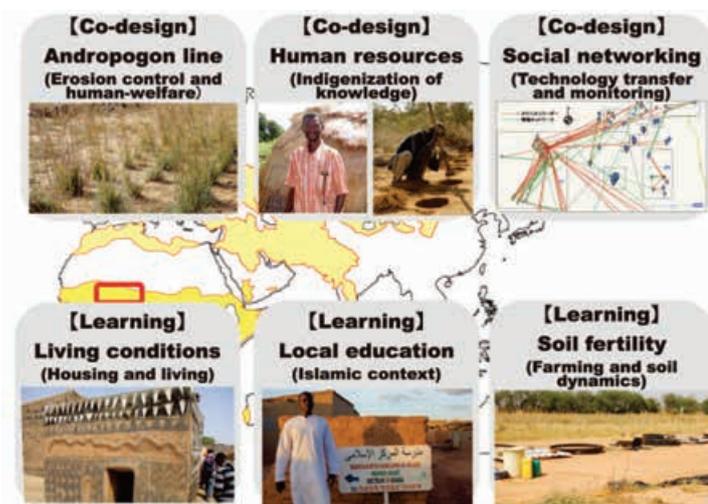


Figure 3 Activities in West Africa

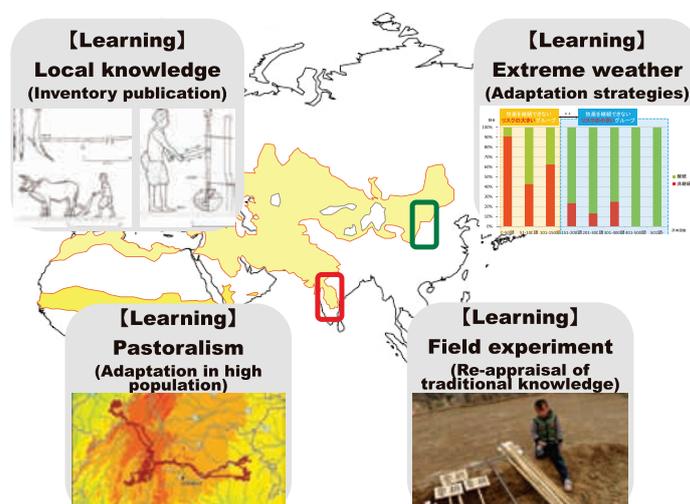


Figure 5 Activities in South and East Asia

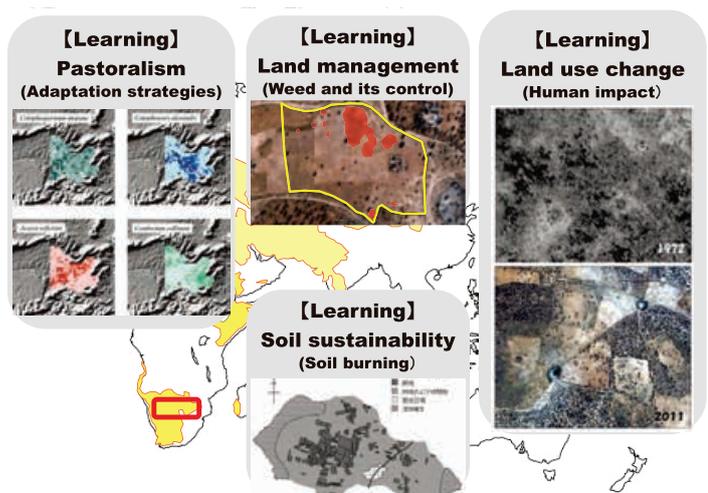


Figure 4 Activities in Southern Africa

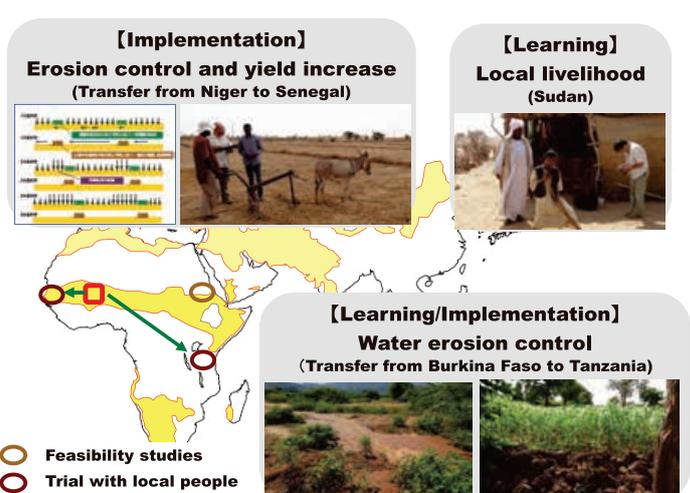


Figure 6 Implementation and feasibility studies on technology transfer in Africa

Africa and Asia are also underway in order to evaluate the possibility of horizontal technology transfer.

Progress to date

Practical innovations with local people

Together with volunteer villagers in Niger and Burkina Faso, we designed a 'fallow-band system' and 'andropogon line', both techniques based on use of local materials and indigenous knowledge, in order to control soil erosion and increase household income. In Niger, though the security situation makes collaboration difficult, we have found one local NGO working in extension and monitoring. In Burkina Faso, we pay special attention to some pioneer villagers who continue to modify or innovate practical techniques through their own efforts after our commitment.

As shown in Figure 6, together with an NGO established within an Islamic community in Senegal,

we began an implementation trial of the 'fallow-band system' and 'andropogon line'. The indigenous technique known as 'diguettes' (or *stone line*) commonly practiced in Burkina Faso to control soil erosion has been introduced to Tanzania.

Future tasks

We intend to make comparative studies on adaptation strategies utilized by people in agro-pastoral systems in relation to several key variables, including population areas, tropical/temperate climate regions, and cultivation/pastoral system. We also will explore the possibility of technology transfer, e.g. land use systems, restoration of degraded land, farming tools and soil management practices between Africa and Asia. In order to share such experiences and findings, we will increase the frequency of academic workshops and open seminars held domestically and internationally.

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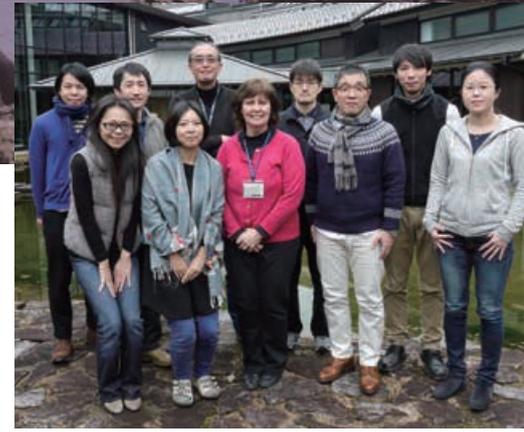
Creation and Sustainable Governance of New Commons through Formation of Integrated Local Environmental Knowledge (ILEK project)

Project Leader **SATO Tetsu** RIHN

Professor Tetsu Sato studied the ecology of cichlid fishes of African lakes for 20 years. Throughout his career, including as Conservation Director of WWF Japan and professor of Nagano University, he focused on creating knowledge bases for community-based management of natural resources. He also led a project to create a network of local scientists producing Integrated Local Environmental Knowledge.

Co-Project Leader **KIKUCHI Naoki** RIHN

Associate professor Naoki Kikuchi has been working at the Hyogo Prefectural Homeland for Oriental White Stork as a residential researcher on environmental sociology regarding restoration of the Oriental White Stork. His transdisciplinary research focuses on solutions of environmental problems from the perspectives of local stakeholders.



Research objectives

Local ecosystem services have deteriorated all over the world for various reasons. Ecosystem services should be managed as new commons by collaboration of various stakeholders, both within and from outside the communities. In order to create and sustainably manage such commons, the formation and circulation of local knowledge systems deeply embedded in real local settings is desperately needed. Integrated Local Environmental Knowledge (ILEK, Fig. 1), a novel concept of local knowledge blending scientific as well as various types of knowledge systems among stakeholders, is produced, circulated and utilized in diverse cases of local research and actions to support adaptive changes toward sustainability of local communities.

Our project aims to clarify mechanisms to facilitate production and circulation of ILEK and dynamic changes of social systems to propose ILEK-based adaptive governance mechanisms of local communities. We also seek mechanisms for cross-scale governance of global environment problems, primarily by analyzing formation of cross-scale knowledge bases created as knowledge flows and is mediated by bilateral translators who promote the circulation of knowledge between knowledge producers and users, both within local communities and across global, regional and local scales (Fig. 2). Through the transdisciplinary integration of these research results, we aim to design “science for/with society” and

“society making full use of science” for bottom-up solutions of global environmental problems.

Main results to date

We have selected 61 case study sites from past and ongoing RIHN projects as well as other examples of diverse production of local knowledge in order to accumulate and analyze ILEK production mechanisms (Fig. 3). Project members belonging to the case study group are deeply involved in each local community and conduct participatory research. These researchers also conduct meta-analysis in order to integrate diverse case study results in collaboration with the Theory and Modeling group and various task forces to understand ILEK production and adaptive governance mechanisms leveraged by ILEK. Fifteen cases of Action-based Verification have been selected among case study sites and cases of cross-scale translators to verify focused hypotheses concerning ILEK-based adaptive governance, including the Shiraho community in Ishigaki Island (Japan), Nishibetsu River Watershed (Japan), Sarasota Bay in Florida (USA), Karapinar area (Turkey), Lake Malawi National Park (Malawi), and the Japan Biosphere Reserve Network.

Residential researchers live in local communities, and in contrast to visiting researchers from outside the communities, they conduct transdisciplinary research as local stakeholders and also are involved in producing ILEK. Bilateral knowledge translators promote circulation of ILEK among scientists and diverse knowledge users by evaluating and transforming scientific knowledge from the viewpoints of knowledge

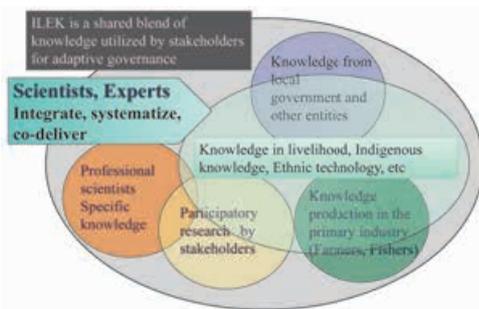


Figure 1 Structure of ILEK

Production and circulation of ILEK is not exclusively performed by professional scientists. Rather, it is often produced and circulated by diverse actors in local communities, including skilled workers in primary industries, local government officials, local companies and NGOs, most of them being knowledge users at the same time. ILEK is formed and utilized through dynamic interactions among different actors/stakeholders in local communities, integrating scientific and local knowledge in daily livelihood and practices among local stakeholders. In this process of ILEK production, scientists and experts are assuming new roles to reorganize and integrate various knowledge systems from the viewpoints of knowledge users and co-deliver ILEK to promote collaboration among diverse stakeholders for solutions of local environmental problems

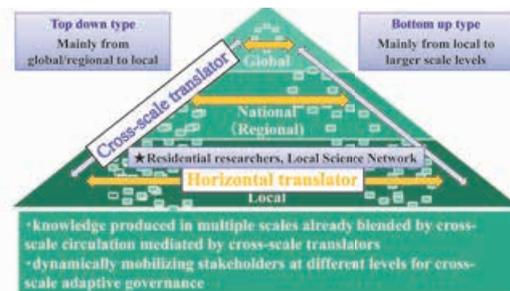


Figure 2 Roles of bilateral knowledge translators

Bilateral translators connecting various scale levels from local to global promote intensive knowledge flows across different scale levels. Diversity and multiplicity of bilateral translators were found to play crucial roles in promoting cross-scale knowledge circulations. We aim to understand and utilize this processes to clarify mechanisms of cross-scale adaptive governance supported by knowledge bases emerging from integration of various knowledge types at different scale levels.



Figure 3 Case study sites of the ILEK project
Sixty one project case study sites are grouped into East Asia (32), EU and North America (12), and Developing Countries (17) teams. Project members are embedded in each case study site as residential/visiting researchers or bilateral translators to collaborate with various local stakeholders in producing and utilizing ILEK. Web GIS and other techniques are currently developed to categorize case study sites using natural and social-ecological indices for meta-analysis and integration.

users, and by translating knowledge among stakeholders into scientific language.

We constructed a conceptual model of ILEK-based adaptive governance focusing on functions of these important actors of local communities (ILEK Triangle, Fig. 4), and identified five hypothetical categories of important drivers of adaptive societal changes promoted by ILEK production and circulation, namely “create and visualize values”, “create nexus among actors (local and cross-scale)”, “provide options and opportunities”, “emergence of collaborative actions” and “appropriate translation”. Participatory observations in case studies from the world and in-depth interviews with various actors playing important roles in knowledge production, circulation and utilization opened a new research approach to understand interactive functions of these driver categories in the ILEK Triangle, resulted in identification of diversity and multiplicity of bilateral knowledge translations as an important factor of cross-scale governance. The findings will be integrated in the theoretical models together with outcomes from the action-based verification processes to understand elaborate mechanisms of ILEK-based adaptive governance.

Future research plan

We are moving forward to elaborate the analytical framework of ILEK-based adaptive governance using the ILEK Triangle and the action-based verification processes to verify focused hypotheses derived from meta-analyses of diverse case studies from the world. In order to understand ILEK functions in the real-life adaptive governance systems in local communities, interactions between science and various types of local knowledge production must be incorporated to the research processes by co-design of research and co-production of knowledge with stakeholders.

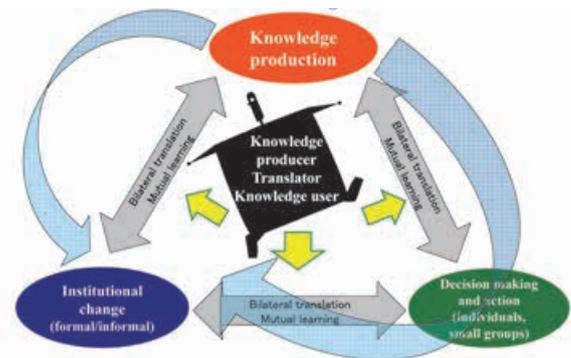


Figure 4 Conceptual model of adaptive governance (ILEK Triangle)
The ILEK Triangle model is composed of an interactive system of three important elements of ILEK-based adaptive governance (knowledge production, decision making and action, and formal/informal institutional change), driven by knowledge producers, knowledge users and translators. The pathways to achieve ILEK-based adaptive governance are postulated in this model with two different processes starting from knowledge production resulting in institutional changes via changes in individual decisions and actions, or directly influencing formal and informal institutions and human networks.

This transdisciplinary approach to promote intensive interactions, feedbacks and mutual learning among residential/visiting researchers, bilateral translators, and diverse stakeholders is the core of the ILEK project. We will further strengthen the transdisciplinary approach both in local case studies and abstract meta-analysis processes by designing stakeholder workshops. Action-based verification processes and further development of meta-analyses and modeling methodologies will contribute to production of solution-oriented research outputs to support ILEK-based adaptive governance to tackle with the challenges of diverse global environmental problems.

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

Project Leader **TANIGUCHI Makoto** RIHN

Professor Makoto Taniguchi is a hydrologist. He has worked on global studies of groundwater as a leader of the UNESCO GRAPHIC Project "Groundwater Resources Assessment under the Pressures of Humanity and Climate Change", as Vice President (2007-2011) of the International Committee of Groundwater of IAHS under IUGG, and as national representative (2007-present) of IAHS. He is also an editor of the books "Subsurface Hydrological Responses to Land Cover/Use Changes", "Land and Marine Hydrogeology", "The Dilemma of Boundaries" and "Groundwater and Subsurface Environments".

Co-Project Leader **ENDO Aiko** RIHN

Associate professor Aiko Endo studies the economics of fisheries as well as coastal and marine policy. She has taken interdisciplinary and multi-sectoral approaches to Integrated Coastal Management (ICM) in coastal areas in Japan and has experience in projects which made national policy proposals. Her research theme is to find the proper governance structure linking local, national, regional, and global to solve the environmental issues through interdisciplinary and transdisciplinary research with co-design and co-production.



Research objectives and background

Climate change and economic development are causing increased pressure on water, energy and food resources, presenting communities with increased levels of tradeoffs and potential conflicts among these resources. Therefore, the water-energy-food nexus is one of the most important and fundamental global environmental issues facing the world. As water is the central matter within this cluster, we will focus on the inherent tradeoffs between water and food, and water and energy. For the purposes of this project, we define human-environmental security as the joint optimization between human and environmental security as well as the water-energy and water-food connections. To optimize the governance and management within these inter-connected needs, it is desirable to increase human-environmental security by improving social management for the water-energy-food nexus. In this research project, we intend to establish a method to manage and optimize the human-environmental security of the water-energy-food nexus. We base our approach on the viewpoint that it is important for a sustainable society to increase human-environmental security and decrease vulnerability by optimizing the connections within the critical water-energy and water-food clusters.

We will take a regional perspective to address these global environmental problems. The geological and geomorphological conditions in our proposed study area are heavily influenced by the so-called "Ring of Fire," around the Pacific Ocean. Within these areas including Japan and Southeast Asia, the hydro-meteorological conditions are dominated by the Asia monsoon. The populations that live under these natural conditions face elevated risk and potential disaster as negative impacts, while also benefitting from positive ecological goods and services. There are therefore tradeoffs and conflicts within the water-energy-food nexus, as well as among various stakeholders in the region.

The objective of this project is to maximize human-environmental security (minimize vulnerability) by choosing management structures and policies that optimize both the water-food and water-energy connections in Asia-Pacific coastal regions. We define a joint security approach as optimized policy for both critical water clusters. Optimal policies will develop joint security approaches for human-environmental security in the coastal region of the Ring of Fire, including stakeholders and decision-makers.

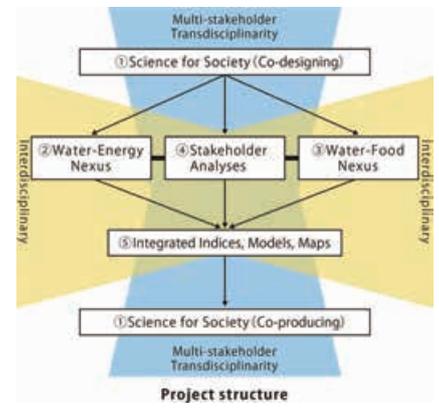
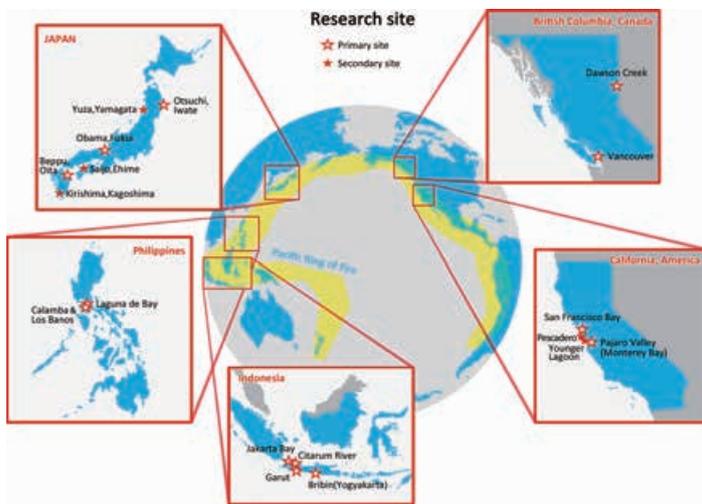
Research methods and structures

Five different interdisciplinary approaches, scales and clusters will be used in this investigation: (1) Environmental governance, science in/for society, and co-design/co-production approaches, in particular emphasizing integration of local-national scale stakeholders, and regional scale stakeholders such as GEC (Global Environmental Change) Asia/ Future Earth in Asia-Pacific Platform; (2) Biophysical measurements/analyses of the water-energy nexus by using state-of-art space satellite, geothermic, and hydrogeological techniques to evaluate linkages between water and energy; (3) Biophysical measurements/analyses within the water-food (e.g., fisheries resources) nexus by using state-of-art geochemical, coastal oceanographic, geophysical, hydrologic, and ecological techniques including isotopic tracers to evaluate the linkages between land and ocean; (4) Social measurements/analyses of water-energy-food relationships by use of stakeholder analyses, social network analyses, and community surveys, based on sociology, economics, anthropology, psychology, and behaviour science methodologies; and (5) Development of integrated indicators/indices based on cost-benefit/efficiency analysis, environmental valuation, principal component analyses (PCA), and factors weights determined by feedback from stakeholder meeting/workshops, integrated physical models including water, nutrients for fishery resources, and temperature related to energy developments, integrated maps for the tools of policy option selections.

Research activities and findings

At the regional scale of the water-energy-food nexus among 32 Asia-Pacific countries, we found that: the US mostly consumed energy for water transportation in comparison with other countries; and the ratio of utilization of water and energy consumption for fisheries activities in Japan, the Philippines and Indonesia were higher than that of other countries.

At the local scale of the water-energy nexus, the requisite amount of energy to raise the temperature of river water and the actual conditions of flows of hot spring water waste to rivers were obtained under the survey in Beppu, Japan. In addition the potential of geothermal energy was examined accurately by using an absolute gravimeter in Beppu and Kamojang Geothermal Field, Indonesia and the ground heat in Obama, Japan was also estimated.



RIHN initiative project
 (1) Integration of RIHN projects results
 (2) Co-design / co-production (design science)



Water-Energy-Food Nexus



Local people involved in groundwater survey



WEF Nexus meeting in San Francisco



Contents of integration



Methods for integration

Integration(Contents,methods)

At the local scale of the water-food nexus, physical, chemical and biological surveys were conducted at four sites in Japan (Otsuchi, Obama, Beppu, and Yuza), two sites in Indonesia (Citarum river and Jakarta bay), and in the Philippines (Laguna de Bay) with different spatial scales (inter-bay scale and within-bay scale). In Otsuchi, physical and biological surveys were conducted on submarine groundwater discharge (SGD) and collections of crustaceans/fishes. Biotic and abiotic data were compared between the two bays. Radon concentration, abundance and species diversity of fishes were higher in the bay with higher SGD. In Obama bay, physical and biological surveys were conducted, and higher fish abundance and species diversity were observed at the site with higher radon concentration.

Expected results

1. Suggested guidelines to increase environmental security and reduce conflicts related to the water-energy-food nexus.
2. Recommendations for decreasing coastal vulnerability related to the separate governance of land and oceans.
3. Policy and governance structure recommendations for improved water management.
4. Suggestions for sustainable environmental management of the water-energy-food nexus in the Asia-Pacific region.

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Long-term Sustainability through Place-Based, Small-scale Economies: Approaches from Historical Ecology

Project Leader **HABU Junko** RIHN

Born in Kawasaki City, Japan, Junko Habu received her BA (1982) and MA (1984) from Keio University in Tokyo and PhD (1996) from McGill University in Montreal. She is the project leader of the Small-Scale Economies Project and a Professor at RIHN, and also a Professor of Anthropology at the University of California, Berkeley. As an environmental archaeologist, she has excavated a number of prehistoric Jomon sites and historic Edo period sites in Japan and conducted fieldwork in North America. Her books include *Ancient Jomon of Japan* (Cambridge University Press, 2004) and *Evaluating Multiple Narratives* (Springer 2008, co-edited with Fawcett and Matsunaga).



Objectives and background

This project examines the importance of place-based, small-scale and diversified economies for the long-term sustainability of human societies. Our working hypothesis is that a highly specialized subsistence strategy can support a larger community for a short period, but a decrease in subsistence and food diversity makes the production system and its associated community more vulnerable in the long-run. Archaeological, historical and paleoenvironmental studies are used to test this hypothesis (*Longue-Durée* Group). Ethnographic and ecological studies of contemporary small-scale food systems and communities link these studies to ongoing academic and popular discussion of the scale and methods of alternative food systems (Contemporary Society Group). In combination, studies of the past and present point to the future, as the research process also involves the development of implementation and public outreach programs that promote place-based, small-scale, and diversified food production (Implementation, Outreach and Policy Proposal Group).

We realize that there are many additional factors that affect the dynamics among subsistence/food diversity, the scale of a food production system, and its long-term sustainability (see Figure 1). Correlations among these factors will also be examined when testing the main hypothesis.

Small-scale economies and global environmental challenges

For the purposes of this project, a “small-scale economy” is not defined solely on the basis of the absolute size of the economic unit, but rather in terms of the relative scale of food production within a given socioeconomic context. Our definition of small-scale economy addresses the range of networks that enable food production, distribution, and consumption in a given locality without precluding links to the outside economy. We are particularly interested in relatively small-scale food production with the following characteristics: 1) goals not limited to the pursuit of short-term efficiency and profits; 2) production for local markets rather than domination of the world market; and 3) readily available information about the producers.

Based on the premise that improved understanding of the operation of small-scale economies should inform contemporary approaches to global environmental

challenges, our project conducts comparative and integrative field investigations at multiple present and past sites. In particular, this project aims to address vulnerability of food production systems caused by soil and water contamination, loss of food and biodiversity, and long-lasting damage to ecosystems. For example, the development of large-scale monoculture-based agriculture, which makes use of a large amount of chemical pesticides and fertilizers, has resulted in serious soil and water contamination and the destruction of ecosystems. The loss of biodiversity resulting from over-specialization has aroused concern about the vulnerability of global food production and other related environmental systems. We propose that smaller-scale and more place-based economies can provide an alternative model that reduces environmental damage and encourages food diversity, thereby improving the resilience of our food systems.

Geographic focus: North Pacific Rim

Northern Japan is the core research area because of its extensive archaeological record and its significance as a food-producing region in Japan. We draw key comparative case studies from the west coast of North America because of the abundance of ethnographic and ecological scholarship on the region, as well as the presence of active contemporary food/agriculture movements. The two regions share similar climates, vegetation, fauna, and levels of seismic activity. Historically, small-scale economies supported by marine food exploitation and intensive nut collecting thrived in both areas, and cultural ties

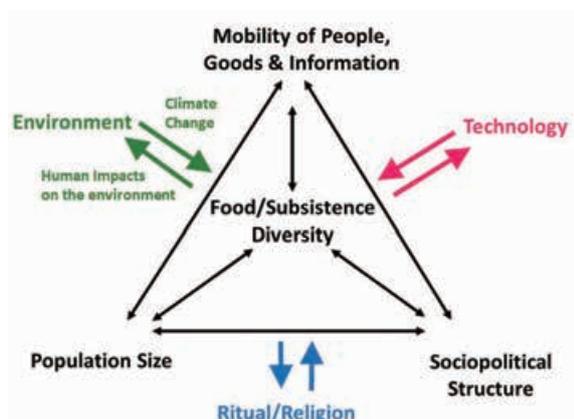


Figure 1 Mechanisms of Long-term Culture Change

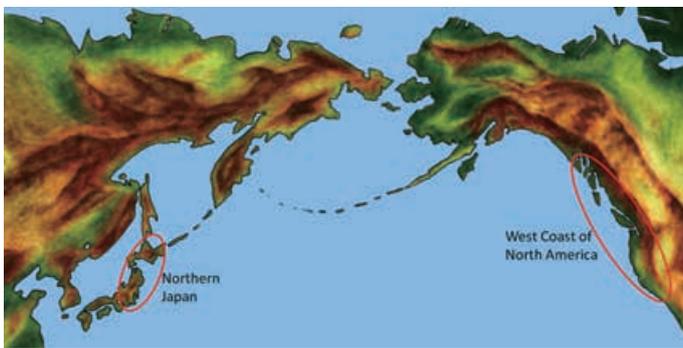


Figure 2 Main Research Areas



Photo 1 Archaeological Excavation of a Middle Jomon Site in Aomori Prefecture

between them date back to the migration of anatomically modern humans from Asia to the Americas after the late Pleistocene.

Research activities and findings

Longue-Durée Group: Results of our analyses of settlement patterns and food diversity in northern Japan are consistent with our hypothesis that over-specialization leads to the vulnerability of a socioeconomic system. These data also aid in the development of a new understanding of Early-Middle Jomon chronology and vegetation, which will be important in determining the role of climate change in the long-term shifts in Jomon subsistence patterns. Contrary to the Jomon data, comparative studies from the west coast of North America suggest that increased subsistence diversity correlates with long-term sustainability of complex hunter-gatherer societies. The role of social networks in system resilience is also being explored across multiple regions.



Photo 2 Urban Agriculture Initiative in California

Contemporary Society Group: In northern Japan, interviews and participant observation are being conducted in order to understand the correlations between scale of economy, food diversity, and the resilience of food and environmental systems. These studies have revealed the importance of social networks in mitigating unexpected disruption and dislocation, including those caused by the 2011 Great East Japan Earthquake and the aftermath of the Fukushima nuclear accident. In North America, our research focuses on Native American/Alaskan harvest and distribution of diverse food resources, as well as on the significance of small-scale urban farming for local food security. We are also conducting ethnographic research on the traditional environmental knowledge of rural groups in Japan and indigenous groups in North America.

Implementation, Outreach and Policy Proposal Group:

Our implementation and outreach programs include: (1) an eco-literacy educational program focusing on cherry salmon in the Hei River Area of Iwate Prefecture, (2) an educational program about the traditional environmental knowledge of the Tlingit people of the Northwest Coast, (3) a TERM (Traditional Environmental and Resource Management) program in collaboration with the Amah Mutsun Tribe of California, (4) an urban agriculture initiative in collaboration with educational programs at UC Berkeley, and (5) a phytoremediation program using ferns to remediate soil contamination by arsenic.

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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 last two 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

When global warming causes many difficulties in our society, 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 or seasonal time resolutions for last several millennia, using up-to-date palaeoclimatological methods to identify outstanding periods of climate variations. Then we use historical and archaeological approaches to investigate how local societies reacted to the 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 by various proxies, such as tree rings (Photo 1), coral rings (Photo 2), ice cores, lake and marine sediments, and historical weather records, and compared with historical documents (Photo 3) and archaeological archives (Photo 4). 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 paddy rice 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 provided us of precise archaeological records at numerous excavated sites all over Japan. In addition, a palaeoclimatological tool (tree-ring cellulose oxygen isotope ratio) particularly useful in the Asian monsoon region has been developed recently to reconstruct summer precipitation on which rice paddy cultivation in Japan depends and provide Japanese archaeologists with a reliable tool for annual resolved dating of numerous excavated woods.

Remarkable results

So far, we have been using many tree-ring samples from around Japan in order to analyze tree-ring oxygen isotope ratios during the last 4.3 thousand years in annual time resolution. Besides, we have collected many tree-ring width datasets all over Asia in the framework of international palaeo-climatological project (PAGES) and reconstructed inter-annual variations of averaged summer temperature in East Asia (Cook et al., 2013). Annual resolution of past climate data enable us to confirm whether there are direct relations between extreme climate conditions and special paleographic events, and to discuss how periodicity of climate variations influences people's livelihood. Figure 1 illustrates that multi-decadal (20-50 years) summer temperature variability might have often underlain major famines and political regime shifts during the medieval upheaval period in Japan. We are now investigating how people in the past from Jomon to Early Modern eras reacted to those large climate fluctuations, using various historical documents and archaeological archives.

Final goal

Because the relationship between climate and society is one of the most mysterious subjects remaining in history and archaeology, this project must have the potential to substantially improve our understanding of Japanese history. The most important hypothesis in this project is that society, vulnerable to climate variations, must be vulnerable to environmental changes, too. Although the sources of "past climate variations" are completely different from those of "present global environmental problems", both kinds of change might have the same structure in the context of societal adaptation. Therefore, the final goal of this project is to conduct detailed examinations of societal adaptation to past large-scale climate variations in order to propose adaptation strategies to environmental change in the present.

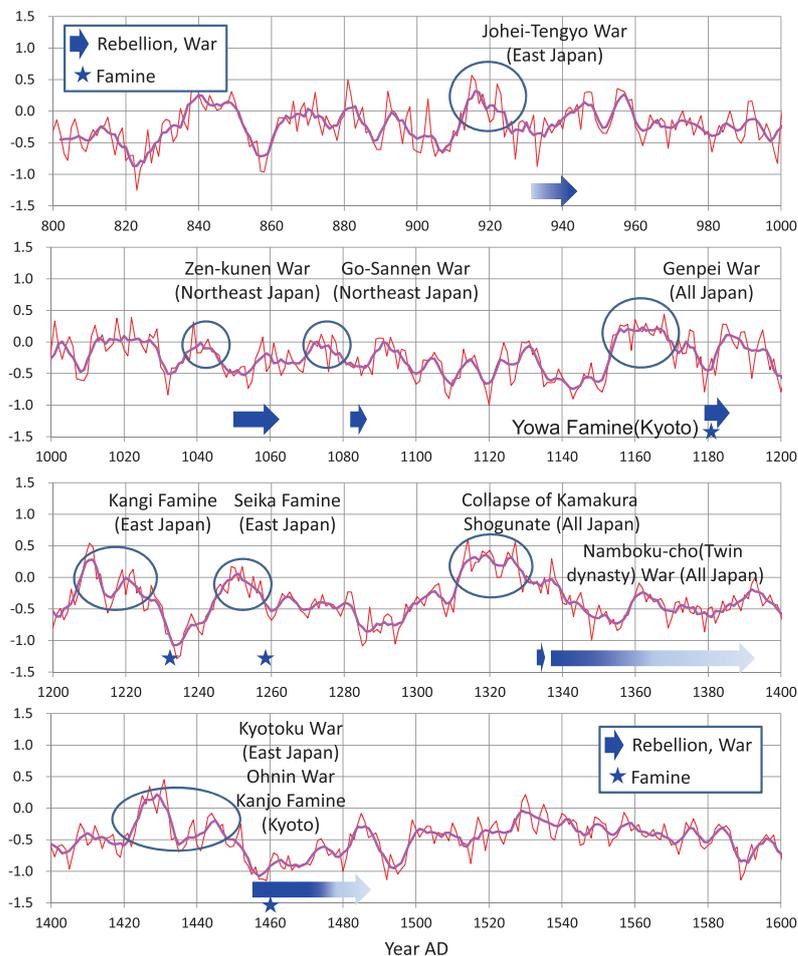


Figure 1 Apparent coincidences between annually resolved average summer temperature variations in East Asia (Cook et al., 2013) and major famines and warfare in Japan from the 9th to 16th centuries. Temperature is shown as the deviation from the average temperature between 1960 and 1990. Thin and thick lines indicate summer temperature in yearly resolution and its 5 years running mean, respectively.



Photo 1 Collection of a tree-ring core from a pine tree



Photo 3 Investigation of early modern documents in Iwate prefecture



Photo 2 Survey of coral reef in Southwest Japan



Photo 4 Watergate piles and pit-house pillars excavated from Aichi prefecture

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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 we should conserve biodiversity. I have approached this question by integrating different research fields related to biodiversity, especially molecular biology and macro-ecology, while a member of the Center for Ecological Research at Kyoto University. At present, I am developing methods for adaptive watershed governance that can address environmental issues related to nutrient imbalances on both local and global scales. I also should 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, such as nitrogen and phosphorus, to produce food are related to the great global increase in population, life expectancy, and economic prosperity experienced in the twentieth century. Overexploitation of nutrient resources leads to disturbance of natural biogeochemical cycles, however, contributing to significant eutrophication in almost all watersheds with densely populated areas (Photos 1, 2). Such nutrient imbalances are a main driver of biodiversity loss on a global scale. It is now recognized that nutrient imbalances and biodiversity loss are prevalent throughout the planet and pose a risk to sustainable human development. In order to solve these problems related to nutrient imbalances and to ultimately construct sustainable social-ecological systems, we have to enhance nutrient recycling on watershed scales.

Although many governments have adapted nutrient management practices, most are unsuccessful because top-down policy or scientific approaches often do not resonate with local community experience. We therefore need to develop governance practices based on exchange between stakeholders and the integration of local and scientific knowledge to solve social and environmental issues specific to local communities. Such community-based governance, if practiced in many places, may result in the solution of issues related to nutrient imbalances found on watershed scales. In this endeavor, project research aims to develop a framework for adaptive watershed governance that takes

account of how biodiversity, nutrient recycling and human well-being are altered through community activities. In this way we hope to improve the strategies used to increase these response variables through the PDCA cycle, according to approaches of transdisciplinary science (Fig. 1).

Research methods

Our hypothesis is that human activities affect biodiversity through alteration of nutrient balances, while biodiversity affects human well-being through alteration of ecosystem functioning and services (Fig. 2). According to this hypothesis, we work in a transdisciplinary process with a variety of stakeholders to integrate local and scientific knowledge on adaptive watershed governance directed towards increasing biodiversity, ecosystem services and human well-being.

In order to empower citizens in watershed governance, we introduce some methods to visualize how nutrient recycling is enhanced through community activities. To motivate stakeholders, we also evaluate how numerous ecosystem services are derived from biodiversity. We will also develop a new method to evaluate human well-being in local communities, as it is closely associated with site-specific cultural services. We expect that such a context-dependent description of human well-being will enhance the sense of community created through collective recognition of locally unique values.

Research progress

A preliminary field survey was conducted in the catchment of Yasu River, the largest tributary of the Lake Biwa



Figure 1 Conceptual schema of adaptive watershed governance

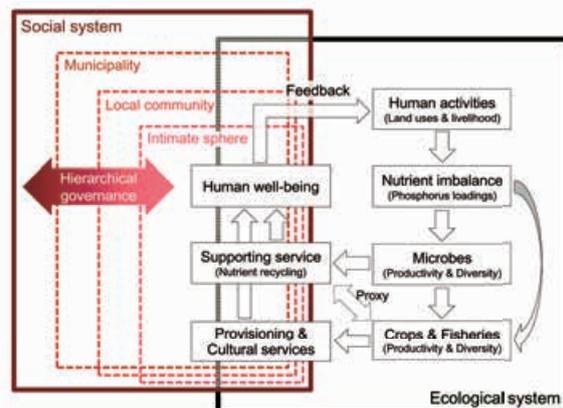
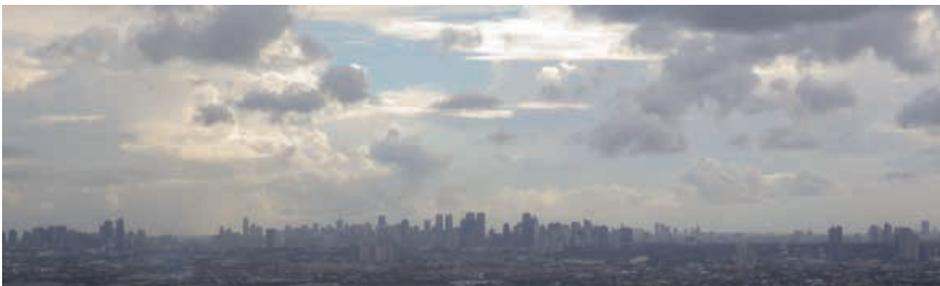


Figure 2 Nutrient-mediated human-nature interactions



Photos 1 and 2 Metro Manila. The zone of economic development (above) and surrounding slums (below) that confront serious issues such as overpopulation, eutrophication and poverty



Photos 3 and 4 Community-based governance in the Lake Biwa Watershed (left) and the Laguna de Bay Watershed (right)

Watershed (Japan). We selected four local communities as models for community-based governance from upstream, middle-stream, downstream, and coastal area of this sub-watershed. Through dialogue with local communities, we focused on local community activities which have the potential to enhance biodiversity and nutrient recycling. Preliminary observations and experimental studies demonstrated that local knowledge-based activities are indeed likely to be useful in enhancement of biodiversity and nutrient recycling.

We have also established three techniques to visualize biodiversity-driven nutrient recycling. The first is nutrient spiral metrics, which indicates how watershed ecosystems metabolize nutrients (Fig. 3). The second consists of phosphate oxygen isotope analysis in order to trace phosphate cycling in aquatic and terrestrial ecosystems. The third is a molecular technique to characterize microbial diversity and functions of nutrient recycling in ecosystems. So far, these techniques reveal that our hypothesis on nutrient-mediated human-nature interactions can be partly supported. They also allow us to do comparative studies in other ecosystems.

On entering the period of full-research, we organized seven discipline-oriented research units and twelve site-based or issue-based working groups, which are composed of a total of 83 collaborators.

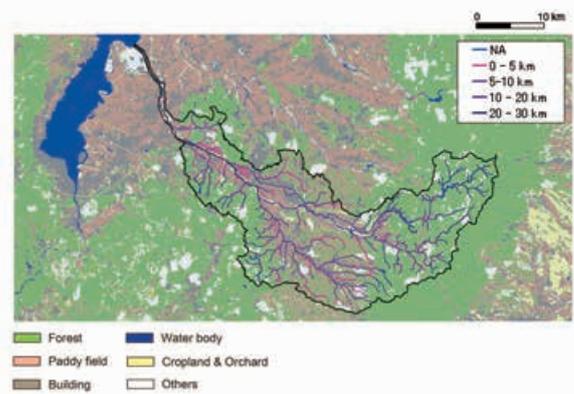


Figure 3 Map of phosphorus spiral length in the sub-watershed of Lake Biwa

Perspectives

Comparative examination of four other watershed systems in Monsoon Asia, three in Japan (Lake Shinji, Inba Marsh, and Hachiro Lagoon) and one in Laguna de Bay, Philippines, allows us to consider the generality and specificity of adaptive governance in relation to social, cultural and geographical features (Photos 3, 4). Disseminating our research outcomes, we also want to expand the research network related to nutrients and watershed governance, especially in other developing countries in Asia.

Sub Leader

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Kyoto University

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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 and are assessed in the final project evaluation, conducted two years after formal project conclusion. At RIHN, however, 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	No	Research Project
2006	HAYASAKA Tadahiro	C-01	Emissions of Greenhouse Gases and Aerosols, and Human Activities in East Asia
	KANAE Shinjiro	C-02	Global Water Cycle Variation and the Current World Water Resources Issues and Their Perspectives
	WATANABE Tsugihiro	R-01	Impact of Climate Changes on Agricultural Production System in the Arid Areas
	NAKAWO Masayoshi	H-01	Historical Evolution of the Adaptability in an Oasis Region to Water Resource Changes
	YACHI Shigeo	E-01	Multi-Disciplinary Research for Understanding Interactions between Humans and Nature in the Lake Biwa-Yodo River Watershed
2007	FUKUSHIMA Yoshihiro	C-03	Recent Rapid Change of Water Circulation in the Yellow River and Its Effects on Environment
	ICHIKAWA Masahiro	D-01	Sustainability and Biodiversity Assessment on Forest Utilization Options
	AKIMICHI Tomoya	R-02	A Trans-Disciplinary Study on Regional Eco-History in Tropical Monsoon Asia: 1945-2005
2008	SEKINO Tatsuki	E-02	Interaction between Environmental Quality of the Watershed and Environmental Consciousness
	TAKASO Tokushiro	E-03	Interactions between Natural Environment and Human Social Systems in Subtropical Islands
2009	SHIRAIWA Takayuki	C-04	Human Activities in Northeastern Asia and their Impact on Biological Productivity in the North Pacific Ocean
2010	TANIGUCHI Makoto	C-05	Human Impacts on Urban Subsurface Environments
	YUMOTO Takakazu	D-02	A New Cultural and Historical Exploration into Human-Nature Relationships in the Japanese Archipelago
	SATO Yo-ichiro	H-02	Agriculture and Environment Interactions in Eurasia: Past, Present and Future
2011	KAWABATA Zen'ichiro	C-06	Effects of Environmental Change on the Interactions between Pathogens and Humans
	KUBOTA Jumpei	R-03	Historical Interactions between Multi-Cultural Societies and the Natural Environment in a Semi-Arid Region in Central Eurasia
	OSADA Toshiki	H-03	Environmental Change and the Indus Civilization
	UCHIYAMA Junzo	H-04	Neolithisation and Modernisation: Landscape History on East Asian Inland Seas
	UMETSU Chieko	E-04	Vulnerability and Resilience of Social-Ecological Systems
2012	OKUMIYA Kiyohito	D-03	Human Life, Aging and Disease in High-Altitude Environments: Physio-Medical, Ecological and Cultural Adaptation in "Highland Civilizations"
	SAKAI Shoko	D-04	Collapse and Restoration of Ecosystem Networks with Human Activity
	MOJI Kazuhiko	R-04	Environmental Change and Infectious Disease in Tropical Asia
2013	HIYAMA Tetsuya	C-07	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	R-05	A Study of Human Subsistence Ecosystems in Arab Societies: To Combat Livelihood Degradation for the Post-oil Era
	KADA Ryohei	R-06	Managing Environmental Risks to Food and Health Security in Asian Watersheds
2014	MURAMATSU Shin	C-08	Megacities and the Global Environment

Global Warming and the Human-Nature Dimension in Siberia: Social Adaptation to the Changes of the Terrestrial Ecosystem, with an Emphasis on Water Environments

Project Leader **HIYAMA Tetsuya** Nagoya University

The extent of Arctic summer sea ice has been decreasing, especially on the Eurasian continental side. Global warming is a partial cause. Cyclones have appeared frequently in summer in the region, bringing much precipitation to Siberia in particular. Meteorological data revealed high rates of summer precipitation in the upper and middle parts of the Siberian Lena River Basin from 2005 to 2008 and in 2012.

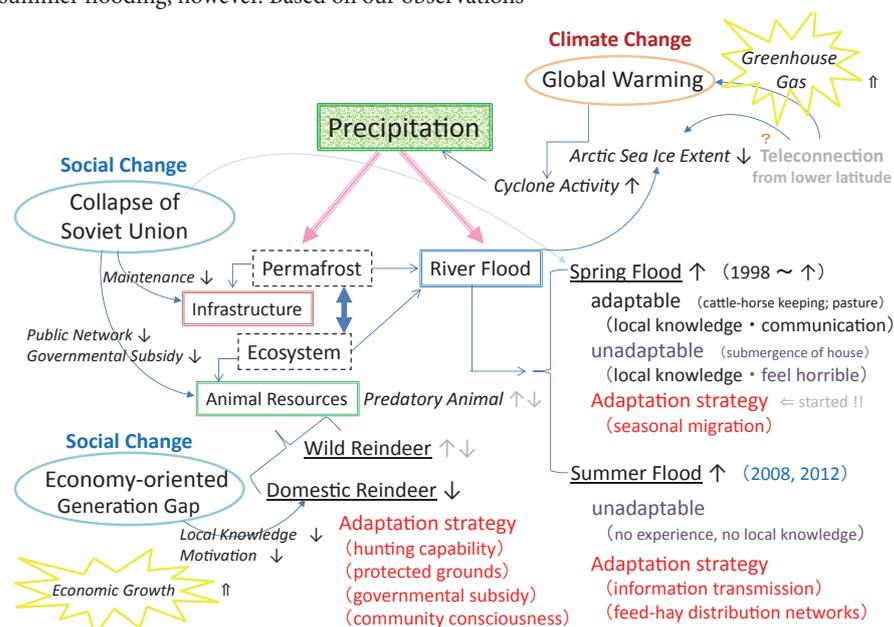
Summer river flooding around Yakutsk, capital city of the Sakha Republic of the Russian Federation, has become a problem, severely damaging local agriculture and pastoralism. River ice flooding also occurs along the Lena River in the spring, and can be severe when low winter temperatures are followed by gradually increasing spring temperatures. Such spring floods have caused severe damages to local residents living along the river in almost every year since 1998.

Our project investigated local perceptions and local governmental adaptation strategies for both spring- and summer-river flooding. Interestingly, spring flooding has been recognized as beneficial except when it causes damages to villages along the river. This is because spring floods bring nutrient-rich water to the river islands on which the farmers cultivate pastures for cattle and horses. Summer river flooding, on the contrary is seen as a hazard, because it submerges the pasture completely in summer, and prevents harvesting of hay for cattle and horses. Village relocation was one of the adaptation strategies to prevent damages from spring floods. Because local people prefer to live along the river on which their subsistence depends, they agreed, with government support, to migrate seasonally. There have been no similar adaptations to summer flooding, however. Based on our observations

and analysis, we intend to promote sustainable subsistence activities in the region by proposing strategies to facilitate information transmission and improvement of feed-hay distribution networks that can aid in adaptation to spring and summer river flooding.

We also investigated how animal keepers and hunters have adapted to social-environmental changes in the region. Interviews with keepers of domesticated reindeer revealed that current climate change has not severely damaged their operations. Careful management of the microhabitats of domesticated reindeer has allowed them to successfully adapt to climate change even though they were severely affected by social changes following the collapse of the Soviet Union. We also documented the migration routes of wild reindeer, tracking them with an ARGOS satellite system, in order to understand their seasonal behavior. Similar to reindeer populations in North America and North Europe, Siberian reindeer have a summer breeding season, winter hibernating season, and other migration seasons. Because recent climate changes degrade reindeer moss in winter, the birthrate and weight of reindeer in the spring has tended to decline. Establishment of protected winter hibernating grounds would therefore help to protect wild reindeer populations. In order to preserve the practice of keeping reindeer, one of the very important subsistence activities in Siberia, governmental subsidies should be provided to keepers of reindeers and to hunters of carnivores.

We intend to inform our Russia counterparts of our analysis and recommended adaptation strategies so that they can be considered by local governments and people.



Human - nature interactions in Siberia
The left-hand side shows reindeer-related subsistence activities and the right-hand side indicates river flood impacts to the local residents. In the lower part of the figure, adaptation strategies are proposed for both issues.

A Study of Human Subsistence Ecosystems in Arab Societies: To Combat Livelihood Degradation for the Post-oil Era

NAWATA Hiroshi Akita University

Research objectives and background

Japan and the oil-rich countries of the Middle East have put excessive pressures on the Earth's energy, water, and food resources. In prioritizing their own economic prosperity, these countries have exploited irreplaceable resources, such as fossil fuel and fossil water. Schemes to plant alien species have also placed stress on local ecosystems. Such practices have increased social and economic differences among the peoples of the Middle East at a time when the region faces a turning point in modern oil-based industrialization. The current fossil fuel-based interdependencies must be transformed into new relations that can support viable future societies.

Our project was focused on human subsistence ecosystems, namely life-support mechanisms and self-sufficient modes of production (hunting, gathering, fishing, herding, farming, and forestry) with low energy resource consumption. Based on our results, we proposed a scientific framework for strengthening subsistence productivity and rehabilitating daily life in Arab societies in the post-oil era.

Study outcomes

1) Publication of ten volumes of Arab Subsistence Ecosystems in Japanese

Camels, date palms, dugongs, mangroves, and coral (reefs) are believed to be the keystone species of Arab human subsistence ecosystems (social ecosystems). These species support diverse communities and their extinction could lead to the disappearance of other species and human communities. The survival of these species is likely to depend on the wise use of ecotones, socio-ecological niches in the arid Middle East environment (Nawata 2010). The ten volumes of Arab Subsistence Ecosystems were published to describe our results on the following: 1) interrelationships between humanity and nature; 2) date palms, 3) mangroves, 4) the alien species mesquite, 5) camels, 6) coral reefs, 7) dugongs, 8) sorghum and millet, 9) motivated practitioners and local communities, and 10) is the modern human really a keystone species?

2) The Surviving in the Desert exhibit at the National Museum of Nature and Science

The exhibition *Surviving in the Desert: Strategies of Humans, Plants, & Animals* ran at the National Museum of Nature and Science, Tokyo, from November 2013 to February 2014. Research results and materials collected in this project were on display. The exhibition organized twenty-seven gallery talks, symposia and lectures to communicate with Japanese citizens. More than one hundred thousand visitors visited the exhibit, demonstrating a significant public interest in the project's findings on contemporary environmental problems.

3) Feedback from Japanese citizens regarding the post-oil era

A RIHN book series volume titled *Human Resources and Engineering in the Post-Oil Era: A Search for Viable Future Societies in Japan and Oil-Rich Countries of the Middle East* was edited by the Project Leader and Project Researcher, based on feedback from Japanese citizens on the post-oil era, after attending three RIHN Open Seminars for the public on "How will you live without oil?" presented between 2009 and 2011 (Ishiyama & Nawata eds. 2013). One book review said: "This book took the initiative in examining renewable human resources and engineering to get ready for the post-oil era" (June 5, 2013, Environment Newspaper).

4) Publication of the Arab Subsistence Monograph series in multiple languages

In order to increase the availability of scientific knowledge and provide universal and equitable access to scientific data and documents, we made our results accessible to local and national decision-makers by reporting the results in English, the common language of the scientific community, and in Arabic, French, English, and Kiswahili, the languages of the communities in the study region, in the first volume *Exploitation and Conservation of Middle East Tree Resources in the Oil Era* (Nawata, Ishiyama & Nakamura, 2013).

5) Research implementation through development projects in Arab societies

The results of the study were applied as part of the Japan International Cooperation Agency project "Capacity Development Project for the Provision of Services of Basic Human Needs in Kassala" (2011–2013) in cooperation with the Sudan University of Science and Technology. Based on joint Japanese and Sudanese research, we organized a training course on mesquite management and utilization for outreach workers. The results were immediately presented at an international conference and published in an academic book (Mendez-Vilas ed. 2012).



Project Publications

Managing Environmental Risks to Food and Health Security in Asian Watersheds

Project Leader **KADA Ryohei** Shijonawate Gakuen University

This research project examined the impact of ecological hazards, such as flood, soil erosion, and water pollution, on the inter-relations of food production and public health in Southeast Asian watersheds. Field research was conducted in the Santa Rosa sub-watershed of the Laguna Lake region of the Philippines. Laguna de Bay is one of the largest fresh-water lake in Asia, and its water resources are utilized for agriculture, manufacture, aquaculture, potable water, water transport, and leisure. The region is highly populated and variegated, containing rich ecological resources that are threatened by rapid land use changes, urbanization and industrialization. In many dimensions it is therefore representative of the challenges facing other watersheds in Southeast Asia.

The project had four principal objectives. First, it documented the current levels and pathways of heavy metal, chemical, and organic pollution of Laguna Lake. Second, it investigated the health profile of local residents, the quality of their diet, as well as their perception of food risks. Third, it analyzed the impacts of land use change in the Laguna Lake area on water and material cycles, including sedimentation and groundwater level and quality. Finally, it prepared alternative policy options with the potential to improve environmental quality for sustainable development in the region.

Transdisciplinary approach

Project research teams were comprised mainly of researchers from RIHN, University of the Philippines, Yokohama National University, Shiga University, University of the Ryukyus, and Ehime University. These researchers worked in collaboration with stakeholders such as the



Laguna de Bay stakeholders and Community Forum 2013

Laguna Lake Development Authorities (LLDA), local government units, fishermen's unions, and health workers.

Major project findings include the following: 1) Urban development and industry in the western region and upstream open garbage disposal could be sources of pollutants, indicating the close linkage of environmental degradation and food-health security; 2) Lead (Pb) was identified as prevalent pollutant causing chronic poisoning of local children, as it is known to negatively affect brain and bodily functions; and, 3) A community-based social action research program, called the "Yaman ng Lawa" Program (*Blessings of the Lake*, in Tagalog), was established in 2012 in order to assess how stakeholder participation improves fishery and water resource management, waste control, and public health.

Toward collective action in resource management

The *Yaman ng Lawa* Program follows the common resource management idea promoted by E. Ostrom. Such participatory, community-based watershed social action can combat environmental degradation and protect local fish habitat and health of fisheries. Through this participatory approach, we could collect and arrange local knowledge (see Figure). For our transdisciplinary study and activities, RIHN was awarded "Diwa ng Lawa" (*Spirit of the Lake*) honors in 2013 by LLDA, the Philippine Government.

In the CR phase of research, we attempt to examine and evaluate how this transformative social experiment may enable environmental conservation and sustainable livelihoods for local fishing folk. Key research questions include: (1) the processes by which major stakeholders participate; (2) how such activities resulted in environmental improvement, and; (3) the major socioeconomic outcomes of this social experiment.

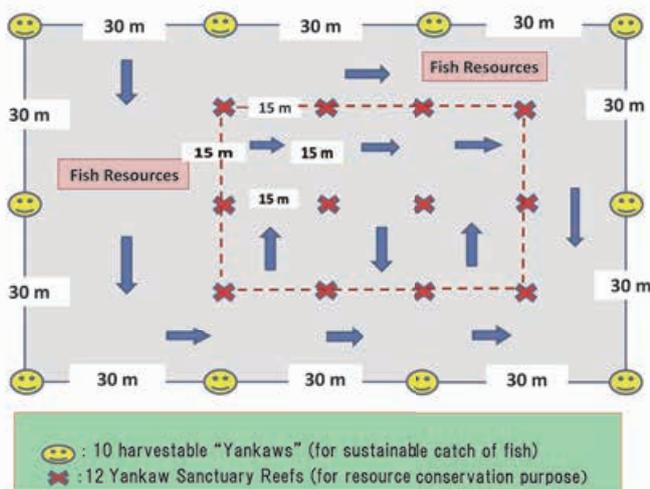


Figure Design of Yankaw Sanctuary System for Recovery of Fishery Resources

Megacities and the Global Environment

MURAMATSU Shin The University of Tokyo

1. What, and how much, have we learned?

The seven findings presented below represent the accomplishments of the Megacity Project over the past five years.

(1) We identified the principle underlying the ideal organization of megacities from the standpoint of sustainability of human society. That is to say, we delineated constraints for cities so that the burden they place on the global environment does not exceed planetary boundaries. In order to enable this, it is necessary to mobilize humanity in a direction that maximizes the economic and social potential of cities. In doing so, it is critically important that we simultaneously pursue optimal benefits in the three areas of global environment, society, and economy (the *triple benefit principle*)

(2) We developed the City Sustainability Index (CSI) as a means of assessing megacities. Using this index, we assessed 18 megacities and found that none can be considered sustainable at present (Figure). What policies and measures, then, are needed to respond to this situation? In reply to this question we proposed a fundamental approach to achieving the ideal organization of megacities (3), which we coined “radical incrementalism with long-term vision.” Megacities are extremely large and complex. At present, it is not possible to find an optimal solution for all aspects of megacities. Radical incrementalism entails (a) repeatedly choosing actions from among the feasible options that are locally optimal in the short-term while (b) maintaining a long-term vision for pursuing sustainability for humankind and (c) emphasizing a city’s history.

Similarly, in order to deal with the size and complexity of megacities, it is necessary to deliberate on the ideal organization of cities with a wide range of experts and variety of stakeholders. We proposed a “megacity scenario-based approach” (4) as a means for realizing such co-design. Furthermore, as a prerequisite to achieving the ideal organization of megacities, we pointed out the importance of taking the local ecosystem into consideration while also paying attention to the geographic

characteristics and history of a given city (5). Each megacity is influenced by the climate, livelihood patterns, and topography of the particular ecosystem in which it is located, whether it be in the Monsoon Asia or mid-latitude arid region. Each megacity is further constrained, in both positive sense and negative senses, by events that occur on the time axis.

We also pointed out that in order to realize the ideal organization of megacities, we should focus on “residential environment” (6), which is the most important space in which humans live. The Megacity Project identified two means of intervening in the residential environment based on an inclusive urbanism approach focusing on the triple benefit society. Furthermore, we pointed out that in order to achieve the ideal organization of megacities, we should pay close attention to the economic development of the middle class (7). This focus on the economic component of the triplet benefit stems from the belief that people begin to consider the sustainability of human society only after they feel a certain degree of economic affluence.

2. Our vision of global environmental studies

Global environmental studies integrates a wide range of disciplines in order to think about the means necessary “for humankind to continue existing on the planet called Earth while enjoying a certain degree of affluence.” There are a number of possible approaches to creating such a field of study. In our project, we focused on cities, which are home to half of the world’s population, and, especially among these, on 18 megacities with a population of 10 million or greater.

3. New connections

The identification and development of the seven concepts and approaches presented above represent the accomplishments of our Megacity Project. Detailed content of each can be found in *Shirizu: Megatoshi to Sasutenabiriri* (Series: Megacities and Sustainability) a complete set of 6 volumes scheduled to be published by the University of Tokyo Press in 2015.



Figure City sustainability index (CSI)

A model constructed to investigate the sustainability of 18 megacities (Tokyo, Jakarta, Seoul, Mumbai, Sao Paulo, Mexico City, Manila, New Delhi, Cairo, Kolkata, Osaka-Kobe, Shanghai, Buenos Aires, New York, Los Angeles, Karachi, Dhaka, and Moscow).



Above: SASAKI Yuko, Researchers talking about their dream on the sand dune, Niger

Left below: KONDO Yasuhisa, Waiting for the good light from the top of a ladder, India

Right middle: SEKINO Nobuyuki, Interviewing fishermen, Senegal

Right below: MIMURA Yutaka, Looking at a precious post-1950 map from Indonesia at Cornell University, USA

Current Feasibility Studies

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

Initiative-based FS

Steven R. MCGREEVY, RIHN

How can we create ecologically and socially sustainable agrifood systems? Taking a bottom-up, action research approach, this project seeks to initiate sustainable agrifood transition through the creation of new communities of social practice and collective action with stakeholders ranged along global and local food chains, at locations in Japan, China, Thailand, and Bhutan. Novel methodological approaches including participatory foodshed mapping and social practice backcasting will be employed, and consumer-oriented tools will be developed (food LCA app, local eco-brand).

Area : Japan, China, Thailand, Bhutan

* This project will be converted to PR status in mid-2015.



Photo Upper left- Bhutanese agricultural landscape; Upper right- Children's food literacy education (Japan); Lower left- Consumer food cooperative (Holland); Lower right- Farmers and researcher workshop (China)

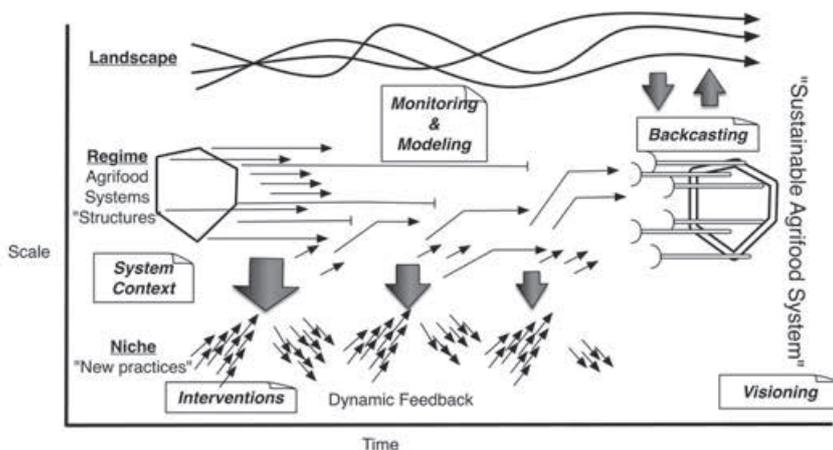


Figure Research activities as part of a transition process (adapted from Geels and Schot 2007). Niche-scaled practices interact with higher level techno-political structures, established cultures, and configurations of power, and are constrained, enabled, and evolve over time. Durable practices have the potential to reconfigure prevailing regimes (such as political, technological, or market orientations) as well as slow-changing social and cultural institutions and values.

Integrative Study on the Linkage of Agricultural Activities and Environmental Degradation through Systematic Analysis, Research and Improving Practices, and Reintegration

Individual Collaboration FS

FUNAKAWA Shinya, Kyoto University

In the proposed project, an analysis will be performed to gain a more systematic understanding of the environmental problems that occur due to human agricultural activities (Figure). Next, an attempt will be made to lessen these problems through individual theoretical and practical research. Finally, the results obtained in the individual case studies will be integrated in order to construct comprehensive countermeasures and to develop strategies to address the environmental problems.

Area : Laos, Indonesia, Tanzania, Kazakhstan, Japan and others

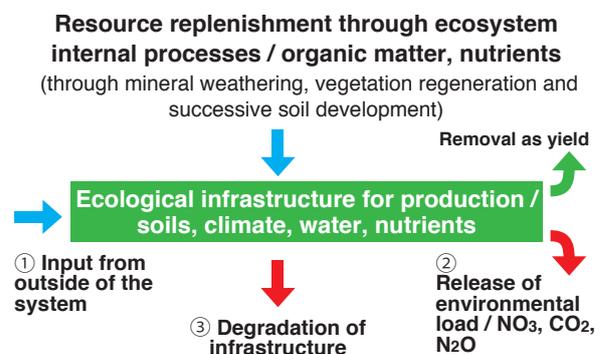


Figure Basic scheme for understanding resource utilization in agricultural practices and related environmental problems

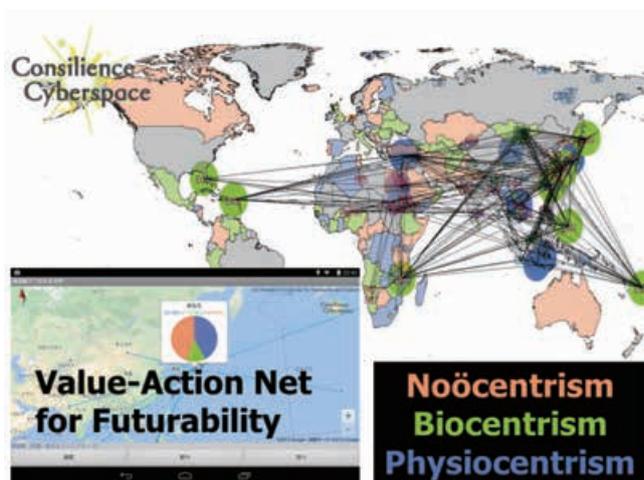
Co-Creating Heuristic and Autonomous Risk-Recognition System and Value-Action Networking for Futurability

HANDOHI Itsuki C., RIHN

Initiative-based FS

We aim to examine and design environmental norms and governance to live with 'Chemical Imbalance Manifested as Environmental Risks in the Anthropocene (CHIMERA)' in peace. CHIMERA encompasses transboundary environmental problems such as chemical pollution and global warming, and the fears and benefits of chemicals have forced humanity to take very anthropocentric adaptations, namely environmental litigations and formulations of international regulations. Global-scale paradigms such as Planetary Boundaries and Global Catastrophic Risk are less transparent to local stakeholders, hence here is a dissociation between localism and globalism. Largely using our Android/iOS app, 'Value-Action Net for Futurability', we develop a heuristic and autonomous risk-recognition system, to which global monitoring and modelling of CHIMERA and its associated environmental litigations, movements, laws, and values are integrated. This will be the first real test for a wide spectrum of stakeholders (including more than 100,000 app users) to co-create novel global environmental values to complement current international regulations for chemical pollution preventions, and to inaugurate unprecedented, global-scale societal transformation towards futurability.

Area : Globe



Our Android/iOS app, 'Value-Action Net for Futurability' is a terminal to 'Consilience Cyberspace', a cyber platform embodying a co-creation between science and society towards a unity of knowledge for futurability that helps identify the environmental values and risk-recognition network transformation among a large indefinite number of stakeholders.

Local Standard in Globalization : Social Inclusive Approaches towards Transformation of Local Communities

KAJITANI Shinji, The University of Tokyo

Individual Collaboration FS

This project will investigate the possibility of pluralistic society by creating *local standards*, i.e. specific local values, which have far-reaching generality. For this purpose, we utilize the *inclusive approaches* consisting of *dialogue, survey, design and investment*, where people can recognize the differences among themselves while having empathy for each other. We hope to rebuild local communities and to link our practice with the construction of theory of décentralisation.

Area : Japan (Kumamoto, Fukushima, etc.) and East Asia



Photo 1 The main building of Kuimaru Primary School, built in the deep mountainous area of Fukushima Prefecture in 1937 and closed in 1980. The local assembly decided to keep it from destruction at the end of 2014 after receiving many requests from inside and outside of the village.

Photo 2 OCICA, a new brand of jewelry made in an area affected by the 2011 Tohoku earthquake. We consider it a good model for our project, which attempts to create local standards by combining dialogue, survey, design, and investment. (photo: NOSIGNER)

Food Sovereignty, Sustainable Agriculture and Fukushima Contamination

KANEKO Nobuhiro, Yokohama National University

Individual Collaboration FS

Our lives are supported by the global economy, and food is no exception. Agriculture in the Fukushima area has been seriously affected by the Fukushima nuclear accident. Actions taken to control radio-caesium crop contamination were very successful, but consumers still hesitate to purchase foods produced in Fukushima. Chemical fertilizers used in intensive farming systems reduce micronutrients such as zinc and selenium, and as a consequence crops produced under such management regimes are not always good for human health. Is it therefore possible to compare the risks posed by radiological contamination with those of intensive farming?

This project examines cropland nutrient pool and budgets and evaluates radio-caesium contamination of food. Comparing conventional, organic and conservation farming methods, we will propose the scale of system that allows farmers and consumers to maintain effective nutrient cycling and reliable relationships based on food and energy sovereignty.

Area : Japan

Photo 1 Farmers learn about levels of cesium present in their products.
Photo 2 Farmers bought this device capable of measuring cesium.



Toward the Regeneration of Tropical Peatland Societies: Establishment of an International Research Network and Proposals for the Future

MIZUNO Kosuke, Kyoto University

Institutional Collaboration FS

This project focuses on global environmental issues relating to tropical peat swamp forest, a very fragile ecological system which stores huge amounts of carbon and water. The purpose of this project is to offer perspectives for the "futurability" of tropical peat land society by discussing and implementing appropriate, concrete methods to conserve and utilize the peat swamp. Project research pays marked attention to the ecological and social characteristics of the particular area and local peoples, and reflects such information in the proposal.

Area : Tropical peat swamp forests and degraded areas, Southeast Asia

Photo 1 'Don't make forest fires' warns this sign. After repeated burning, this state forest area has become a low shrub land.

Photo 2 Our FS collaborated with the local community to build this simple dam used for rewetting peat soils and preventing them from burning.





Above: KUSAKA Soichiro, The David Sheldrick Wildlife Trust, Kenya
Bottom: OSHIUMI Keiichi, A boy is delighted with a morning squall, Cambodia



Above: ENDO Hitoshi, Walking in a golden field, India
Left below: OMOTO Reiko, Great storage, Ho Chi Minh, Vietnam
Right below: WATANABE Kazuo, Silent beach, Thailand



Research Coordination

Research at RIHN is facilitated by the Center for Research Development (CRD) and the Center for Research Promotion (CRP).

The CRD consists of four units. The Planning Unit is chiefly responsible for establishing RIHN's long term vision and organizing fundamental committees, including those related to project evaluation and personnel affairs. The Initiative Framework Unit serves as a cross-cutting mechanism to capture and synthesize key contributions of individual and institutional collaboration projects and to develop new research projects within RIHN (the 'initiative-based' projects). The Collaboration Nexus Unit facilitates the internal and external research networks. The Future Earth Unit coordinates RIHN engagement with the international Future Earth initiative.

The Center for Research Promotion (CRP) is divided into three units. The Survey and Analysis Unit develops and maintains the laboratory facilities necessary for research and fieldwork (see page 40). The Informatics Unit builds the databases and archives supporting ongoing research. Finally, the Communication and Production Unit determines how communication regarding RIHN research, processes and outcomes should be established with academic, public and user-specific communities (see pages 38-39).





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 2014 recipient of the Earth Hall of Fame Kyoto Award was Mr. HATAKEYAMA Shigeatsu, founder of the NPO Mori wa Umi no Koibito "The forests are lovers of the sea" and Professor of Field Studies and Practical Learning, Kyoto University.

RIHN Forum

The RIHN Forum is usually held at the Kyoto International Conference Center and is open to the general public. Since 2004 the proceedings were published as books intended for a general audience.

How to co-design the global environment and our future?
12 July 2014

RIHN International Symposium

An annual symposium at RIHN describing the key findings of concluding RIHN research projects.



Prof. Dr. Terry McGee, Professor Emeritus of Geography at the University of British Columbia, giving the 2014 keynote address

Living in the megacity: The emergence of sustainable urban environments
25-27 June 2014

RIHN Public Seminars

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

**Did the Heike collapse out of arrogance?
What tree rings tell us** 18 July, 2014

Tasting coffee and chocolate more deeply - Linking local production and consuming regions 19 September, 2014

Hear the story from a Hanamachi mother - Food, clothing, housing and environment in Kyoto 17 October, 2014

"Kyoto, Town, Environment" - A discussion with high school students 12 February, 2015

RIHN Area Seminars

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

The future of the Earth and regional knowledge - Towards a solution for environmental problem
11 February 2014, Tottori University of Environmental Studies, Tottori City, Tottori



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 2014 included:

Environmental conditions of the bivalves culture area in Bandon Bay, Southern Thailand

Jintana Salaenoi, Assistant Professor, Faculty of Fisheries, Kasetsart University /RIHN Visiting Research Fellow
23 June 2014

Agrarian change and livelihood dynamics among small scale farmers in South Tamil Nadu, India

Jegadeesan Muniandi, Assistant Professor, Tamil Nadu Agricultural University /RIHN Visiting Research Fellow
29 July 2014

Some future scenarios of Jakarta Megacity (Jabodetabek) urban expansion and beyond: West Java conurbation scenarios and potential impacts

Ernan Rustiadi, Dean, Faculty of Agriculture, Bogor University of Agriculture /RIHN Visiting Research Fellow
5 August 2014

The present and the past: Environmental services, biodiversity, metastable ecosystems, and the cultural categorisation of the landscape

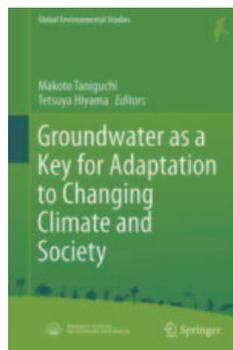
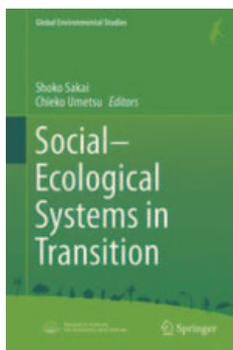
Liliana Janik, Assistant Director of Research, Department of Archaeology, University of Cambridge / RIHN Visiting Research Fellow
18 August 2014

Moving beyond case studies in social-ecological systems research

Tom Evans, Professor, Indiana University/RIHN Visiting Research Fellow
18 November 2014

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.



GES titles #4 and #5 published in 2014.

Other Symposia



The Small-scale Project organized a workshop at the University of California at Berkeley that allowed Japanese and U.S. archaeologists, anthropologists, and agroecologists, among others, to explore the lessons that can be learned from the long histories of human inhabitation of Japan and the Northwestern coastal zone of the U.S.. The workshop was co-sponsored by the Japan Society for the Promotion of Science, the Center for Japanese Studies at U.C. Berkeley, and RIHN.

New Volume: Humanity and Nature in the Japanese Archipelago

In 2015 the CRP published *Humanity and Nature in the Japanese Archipelago*, an English language illustrated volume based on research conducted at RIHN between 2000-2009 and originally published in Japanese in *The Encyclopedia of Global Environmental Studies* (2010).

Working with several authors of the original texts as well as a number of current RIHN researchers and a skilled team of scientific illustrators and artists, the original entries were brought into a single narrative describing key themes in the study of long-term human-environmental change in Japan. The volume includes a core section on

the Jomon period in Japan, a fascinating segment of human and environmental history about which there is little written in English for a non-specialist audience.



Yama no imo
Yam
(*Dioscorea japonica*)



Tanuki
Raccoon-Dog
(*Nyctereutes procyonoides*)

Research 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 Center for Research Promotion 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 Survey and Analysis Unit continues to develop new methods of data analysis and application. In conducting this research in collaboration with RIHN projects and universities and affiliated institutions throughout Japan, the division enhances the sophistication of experimental techniques and research information and promotes the shared use of facilities.



Main building



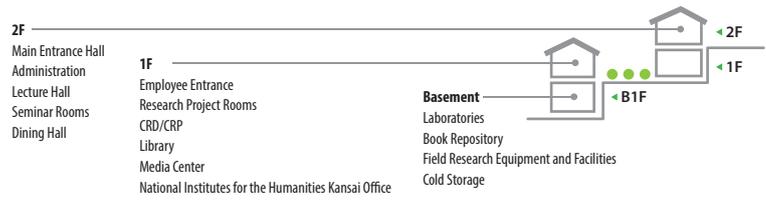
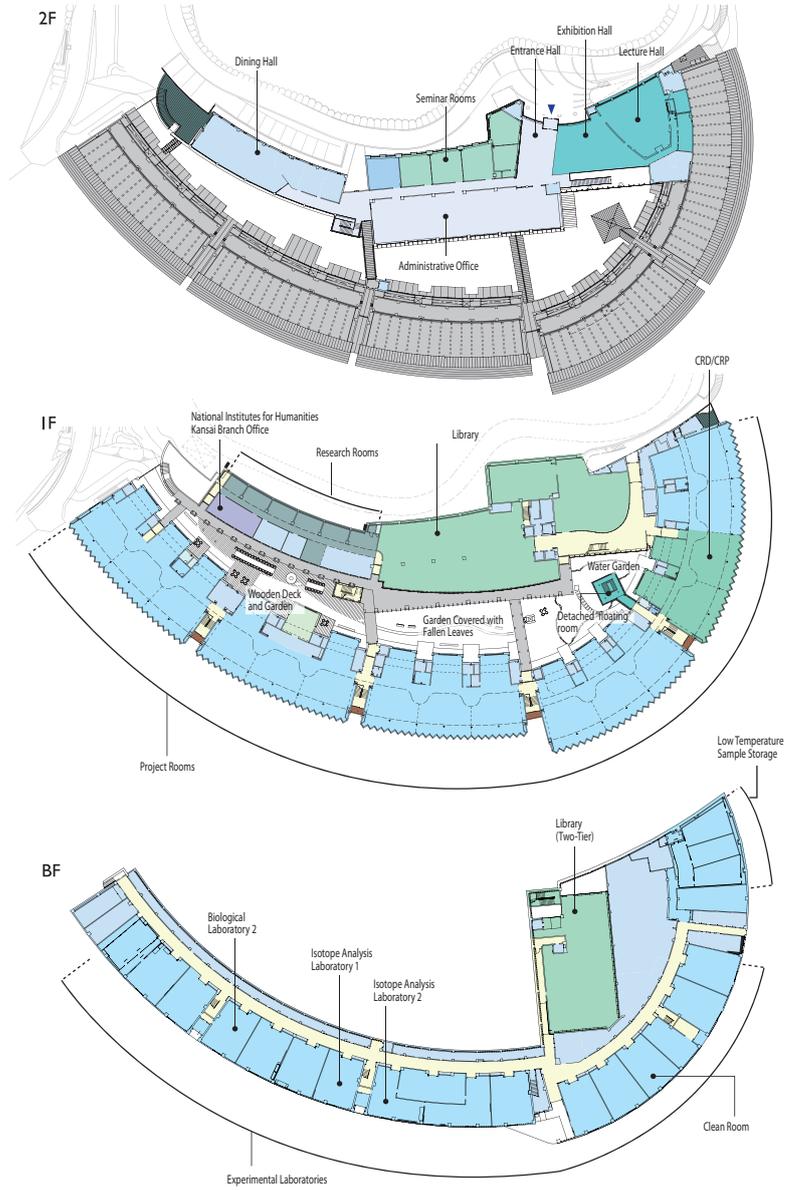
Main entrance hall



Basement laboratories



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



RIHN-China

As one of the research hubs of the National Institute for the Humanities' Center for the Promotion of Area Studies, RIHN has conducted the Research Initiative for Chinese Environmental Issues, in order to promote environmental studies on China and networking with environmental scholars concerned with environmental issues there. A RIHN-China Newsletter is published in Japanese and Chinese. RIHN-China also supports a series of symposia, held in both China and Japan, on critical environmental topics in China and East Asia. In 2014-15, among other activities, RIHN-China held an international symposium on "The Future of Rural Societies and Landscapes in East Asia" at RIHN. We organized the 4th Lecture on Global Environmental Studies at Peking University. Also, we are pleased to announce that "Water Resources and the Environment in China" will be published by RIHN-China members Kitagawa and Kubota in 2015.

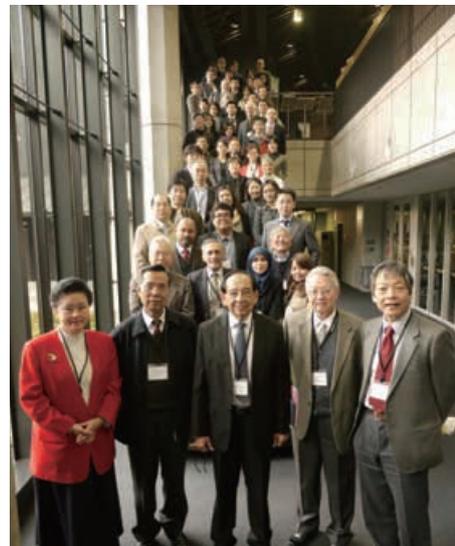


Photos (counterclockwise from top):

- The International Symposium on "The Future of Rural Societies and Landscapes in East Asia" in July 2014 at RIHN.
- The 3rd Lecture on Global Environmental Studies at Peking University in March 2014.
- RIHN-China newsletter "Ten Chi Zin" and RIHN-China Study Series No.3 "Our Lakes: From the Present towards a Future Perspective"

Future Earth

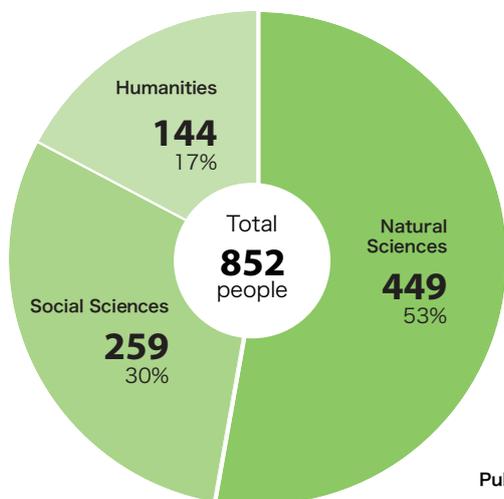
Future Earth is a global research platform designed to provide the knowledge needed to support transformations towards sustainability (see www.futureearth.org). Future Earth seeks to build and connect knowledge to increase the impact of research in diverse contexts, to explore new development paths, and to find new ways to accelerate transitions to sustainable development. While mobilizing scientists around the world, the initiative will strengthen partnerships with policy-makers and other stakeholders to design and implement research in close collaboration. The RIHN Future Earth Unit hosts the Future Earth Regional Hub for Asia. The Hub will support the development of Future Earth in the region, help connect researchers and other stakeholders and facilitate the formation of regionally relevant and credible governance structures for the initiative.



Photos: "3rd International Workshop on Future Earth in Asia" in January 2015 at RIHN

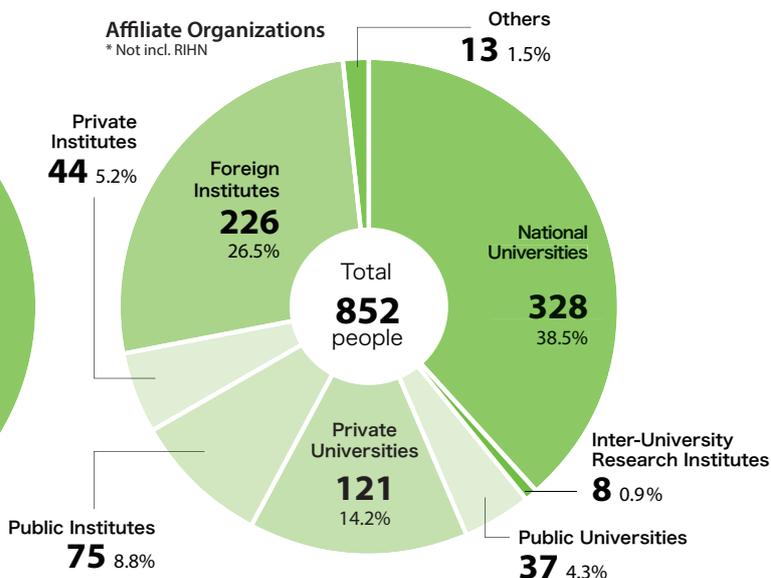
Research Collaboration

Research Areas

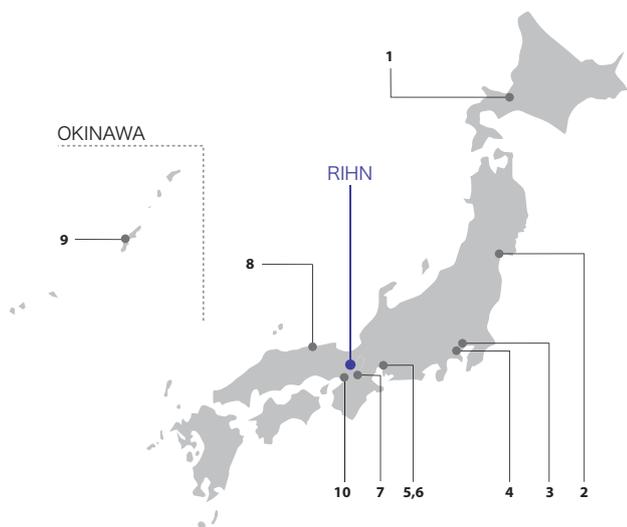


Affiliate Organizations

* Not incl. RIHN



*As of March 31st, 2015



Collaboration in Japan

1. Institute of Low Temperature Science, Hokkaido University
2. Graduate School of Science, Tohoku University
3. Institute of Industrial Sciences, the University of Tokyo
4. Graduate School and Research Institute of Environment and Information Sciences, Yokohama National University
5. Hydrospheric-Atmospheric Research Center, Nagoya University
6. Graduate School of Environmental Studies, Nagoya University
7. Center for Ecological Research, Kyoto University
8. Arid Land Research Center, Tottori University
9. Tropical Biosphere Research Center, University of the Ryukyus
10. National Museum of Ethnology

International Collaboration

Memoranda of Understanding and Research Cooperation Agreements (As of March 31st, 2015)

BANGLADESH

International Centre for Diarrhoeal Disease Research

CHINA

East China Normal University
Peking University
Yunnan Health and Development Research Association

EGYPT

National Water Research Center (NWRC)

FRANCE

La Fondation Maison des Sciences de l'Homme

INDIA

Institute of Rajasthan Studies, JRN Rajasthan Vidyapeeth
Maharaja Sayajirao University of Baroda

INDONESIA

Bogor Agricultural University
Universitas Hasanuddin
Indonesian Institute of Sciences
Universitas Indonesia
The Center for International Forestry Research

LAOS

National Institute of Public Health, Ministry of Health

NAMIBIA

Ministry of Agriculture, Water and Forestry

NIGER

International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), West and Central Africa
L'Organisation Nigériennes des Educateurs Novateurs

PHILIPPINES

Laguna Lake Development Authority
University of the Philippines Visayas

RUSSIA

Far Eastern Federal University

SUDAN

Sudan University of Science and Technology

SWEDEN

The Sven Hedin Foundation

THAILAND

Faculty of Fisheries, Kasetsart University
Rice Department, Ministry of Agriculture and Cooperatives
The Southeast Asian Fisheries Development Center

TURKEY

Adiyaman University
Çukurova University
Harran University

UNITED KINGDOM

Sainsbury Institute for the Study of Japanese Arts and Cultures

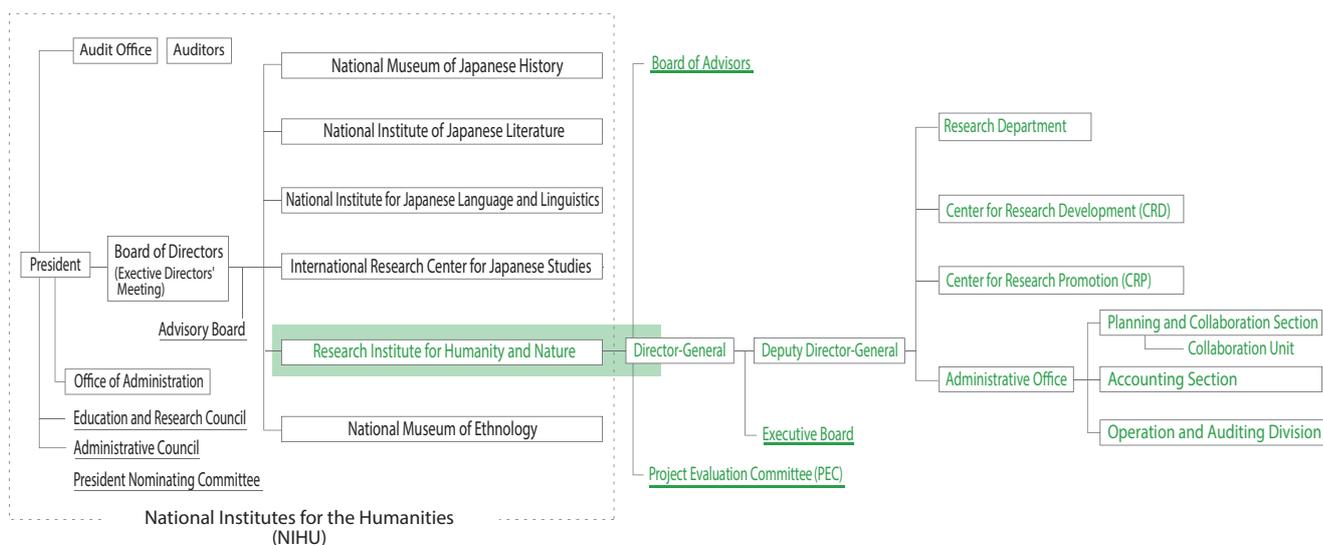
UNITED STATES OF AMERICA

Mote Marine Laboratory
University of the Virgin Islands
The University of California, Berkeley

ZAMBIA

Zambia Agricultural Research Institute, Ministry of Agriculture and Livestock

Administrative Structure



Financial Information

Segmental Financial Information (Fiscal Year 2013)

Operating Expenses

Category	Amount (Yen in thousands)
Operating Expenses	2,008,747
Inter-University/Joint Research	1,079,796
Outsourced Studies	101,480
Outsourced Operations	46,227
Personnel	781,242
General Management	142,340
Financial Expenses	36,203
Total Expenses	2,187,291

Operating Income

Category	Amount (Yen in thousands)
Subsidy for Operation	1,966,639
Contract Operations, etc.	46,184
Donations	8,087
Others	168,329
Total Earnings	2,189,241

Operational Balance 1,949

External Sources of Funding

(Fiscal Year 2013)

Category	Amount (Yen in thousands)
Fund for Promotion of Academic and Industrial Collaboration	42,767
Grants-in-Aids for Scientific Research	95,680
Donations for Research	15,679

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



Boards and Committees

*As of April, 2015

Board of Advisors

Oversees personnel, planning, administration and operation of the institute

<p>FUJIOKA Ichiro Professor Emeritus, Kyoto Sangyo University</p> <p>IKEYA Kazunobu Professor, Department of Cultural Research, National Museum of Ethnology</p> <p>KANZAWA Hiroshi Professor, Graduate School of Environmental Studies, Nagoya University</p> <p>KONO Yasuyuki Director, Center for Southeast Asian Studies, Kyoto University</p>	<p>NOE Keiichi President-appointed Extraordinary Professor, Institute of Liberal Arts and Sciences, Tohoku University</p> <p>OTSUKI Kyoichi Professor, Faculty of Agriculture, Kyushu University</p> <p>SUGIHARA Kaoru Senior Professor, National Graduate Institute for Policy Studies</p> <p>WASHITANI Izumi Professor, Faculty of Science and Engineering for Sustainable Society, Chuo University</p>	<p>HABU Junko Program Director, RIHN</p> <p>KUBOTA Jumpei Deputy Director-General, RIHN</p> <p>Director, CRD, RIHN</p> <p>MALLEE, Hein Program Director, RIHN</p> <p>NAKANO Takanori Director, CRP, RIHN</p> <p>NAKATSUKA Takeshi Program Director, RIHN</p> <p>SATO Tetsu Program Director, RIHN</p> <p>TANIGUCHI Makoto Program Director, RIHN</p>
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Project Evaluation Committee (PEC)

External review of research project proposals

Domestic

KOIKE Isao
Professor Emeritus, the University of Tokyo / Former Inspector General, University of the Ryukyus

KOIKE Toshio
Professor, School of Engineering, The University of Tokyo

MIYAZAKI Koji
Professor, Research Institute for Languages and Cultures of Asia and Africa, Tokyo University of Foreign Studies

MORIOKA Masahiro
Professor, School of Humanities and Social Sciences, Osaka Prefecture University

NAKAMURA Masami
Science and Technology Journalist / Former Professor, Edogawa University

NAKANISHI Hisae
Professor, Graduate School of Global Studies, Doshisha University

WADA Eitaro
Professor Emeritus, Kyoto University/ Professor Emeritus, Research Institute for Humanity and Nature

YASUOKA Yoshifumi
Professor Emeritus, The University of Tokyo

Overseas

CHEN, Deliang
Professor, Department of Earth Sciences, University of Gothenburg, Sweden

CHUN Kyung-soo
Professor, Department of Anthropology, Seoul National University, Korea

KLEPPER, Gernot
Professor, Kiel Institute for the World Economy, Germany

LAURANCE, William F.
Distinguished Research Professor and Australian Laureate, James Cook University, Australia

MCDONALD, Anne
Professor, Graduate School of Global Environmental Studies, Sophia University, Japan

RANDALL, Roland
Life Fellow, Girton College, University of Cambridge, UK

SCHOLZ, Roland
Professor Emeritus, Institute for Environmental Decisions, Swiss Federal Institute of Technology Zurich, Switzerland

VAN DER LEEUW, Sander
Foundation Professor, School of Sustainability, Arizona State University, USA

Executive Board

Oversees administrative operation of the institute

<p>YASUNARI Tetsuzo Director-General</p> <p>KUBOTA Jumpei Deputy Director-General Director, CRD</p> <p>ABE Ken-ichi Head of Unit, CRP</p> <p>HABU Junko Program Director</p> <p>ISHII Reiichiro Head of Unit, CRD</p>	<p>MALLEE, Hein Program Director</p> <p>NAKANO Takanori Director, CRP</p> <p>NAKATSUKA Takeshi Program Director</p> <p>SATO Tetsu Program Director</p> <p>SEKINO Tatsuki Head of Unit, CRP</p>	<p>TANIGUCHI Makoto Program Director Head of Unit, CRD</p> <p>TAYASU Ichiro Head of Unit, CRP</p> <p>KAWANO Hiroshi Director, Administrative Office</p>
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Advisor

TACHIMOTO Narifumi

Professors Emeritus

NAKANISHI Masami
WADA Eitaro
HIDAKA Toshitaka
NAKAWO Masayoshi

FUKUSHIMA Yoshihiro
AKIMICHI Tomoya
KAWABATA Zen'ichiro
OSADA Toshiki

TACHIMOTO Narifumi
SATO Yo-ichiro
MOJI Kazuhiko
KADA Ryohei

RIHN STAFF

DIRECTOR-GENERAL

DEPUTY DIRECTOR-GENERAL (Planning and Coordination)

YASUNARI Tetsuzo

KUBOTA Jumpei

ADMINISTRATIVE OFFICE

ADMINISTRATIVE DIRECTOR KAWANO Hiroshi

PLANNING AND COLLABORATION SECTION

Head HIRAISHI Noriyoshi
Deputy Head IZUMORI Yoshihiro
General Affairs and Planning Subsection
Head BIVONE Junko
Chief FUJIKAWA Takeshi
Clerk KARIYA Midori
Personnel Subsection
Chief TANAKA Miika
Clerk NAKAOHJI Yu
Clerk TANAKA Naoko
Research Planning Subsection
Head NARUI Akinori
Clerk KOGISO Ayana

International Affairs Subsection
Head BIVONE Junko
Chief FUJIKAWA Takeshi
Chief ZENIZUKA Rie
Collaboration Unit
Head IZUMORI Yoshihiro
Cooperative Research Support Subunit
Clerk MASUDA Maho
Clerk NAGATA Satoko
Public Relations Subunit
Head IZUMORI Yoshihiro
Clerk INOUE Yuko

ACCOUNTING SECTION

Head YOSHIDA Takashi
Deputy Head TERAZAWA Kunihiro
Specialist UEGAKI Yasuhiro
Financial Planning Subsection
Head MIYAUCHI Teruaki
Clerk TSUJIMURA Hanako
Facility Management Subsection
Head UMEGAMI Tatsushi
Accounting and Procurement Subsection
Head SAKODA Fumiyo
Clerk SAWAMURA Takahiro

OPERATION AND AUDITING DIVISION

Head YOSHIDA Takashi
Auditing Subunit
Head YAMAMOTO Hiroshi

RESEARCH DEPARTMENT

Program Directors

HABU Junko
MALLEE, Hein
NAKATSUKA Takeshi
SATO Tetsu
TANIGUCHI Makoto

Professors

HABU Junko Environmental Anthropology, Historical Ecology, East Asian Archaeology
Hydrology
KUBOTA Jumpei Biogeochemistry, Paleoclimatology
NAKATSUKA Takeshi Local Environmental Studies,
SATO Tetsu Conservation Ecology
TANIGUCHI Makoto Hydrology

Associate Professors

ENDO Aiko Marine and Coastal Policy, Fishery Economics
ISHIKAWA Satoshi Conservation Ecology, Global Fisheries Science
KIKUCHI Naoki Environmental Sociology
OKUDA Noboru Ecological Science
RAMPISOLA, Dorotea Agnes Soil and Water Management
TANAKA Ueru Agricultural Studies

Visiting Professors

FUNAKAWA Shinya Environmental Agronomy
HIMIYAMA Yukio Geography
HIYAMA Tetsuya Ecohydrology
KANEKO Nobuhiro Soil Ecology
KANIE Norichika Earth System Governance
KUSAGO Takayoshi Action-based Development Studies
MATSUI Takeshi Nature in Cultural Perspectives
MURAMATSU Shin Architectural History, Urban History
NAKAGAMI Ken'ichi Environmental Economics and Policy
NAWATA Hiroshi Cultural Anthropology
YONEMOTO Shohei History and Philosophy of Science

Visiting Associate Professors

KAJITANI Shinji Philosophy
NAITO Daisuke Southeast Asian Area Study,
Political Ecology
OKUMIYA Kiyohito Field Medicine
SHIRAIWA Takayuki Glaciology
TERADA Masahiro History, Museum Anthropology
UCHIYAMA Junzo Environmental Archaeology,
Landscape History

Visiting Research Fellows

BOUTSON, Anukorn Coastal Fisheries
SAPTOMO, Satyanto Krido Irrigation and Water Management

Senior Project Researchers

C-09 KOTERA Akihiko Agro-Environmental Informatics
H-05 SANO Masaki Paleoclimatology

Project Researchers

C-09 HASHIMOTO (WATANABE) Satoko Soil Science
C-09 SEKINO Nobuyuki Environmental Sociology
D-05 OKAMOTO Yuki Agricultural Systems
D-05 WATANABE Kazuo Area Studies
D-06 ISHIDA Takuya Forest Environmental Science
D-06 KOBAYASHI Yuki Environmental Microbiology
R-07 ENDO Hitoshi Archaeology
R-07 ISHIYAMA Shun Cultural Anthropology
R-07 MIYAZAKI Hidetoshi Soil Science
R-07 SHIMIZU Takao Cultural Anthropology
R-07 TESHIROGI Koki Geography
R-08 MASUHARA Naoki Public Administration Studies, Energy Policy
R-08 OH Tomohiro Resource Governance
R-08 YAMADA Makoto Hydrology
R-09 ADACHI Kaori Archaeology

R-09 OISHI Takanori Ecological Anthropology
R-09 SUNANO Yui Ecological Anthropology
H-05 ITO Keisuke Japanese History
H-05 KAMATANI Kaoru History
H-05 XU Chenxi Paleoclimatology
E-05 KITAMURA Kenji Environment
E-05 MIKI Hiroshi Statistical Physics
E-05 TAKEMURA Shion Landscape Ecology
E-05 OMOTO Reiko Geography, Food Studies,
Social Network Analysis

Project Research Associates

C-09 KATO Hisaaki Policy Studies
C-09 KOYAMA Masami Evolutionary Ecology of Fish
D-05 KAKIOKA Ryo Fish Evolution and Systematics
D-05 HONMA Saki Ecology
D-05 MUTO Nozomu Coastal Oceanography
D-06 HIROSE Mikiko
D-06 UEHARA Yoshitoshi
R-07 KIHIRA Tomoe
R-08 HONDA Hisami
R-08 OKAMOTO Takako
R-08 TERAMOTO Shun
R-09 KATO Satoko
R-09 KOBAYASHI Yuko
R-09 TAKEHARA Mari
R-09 TOMII Noriko
H-05 LI Zhen Earth and Environmental Sciences
H-05 UCHIDA Rieko
H-05 YAMAMOTO Mami
E-05 FUKUSHIMA Atsuko
E-05 KITOLELEI, Jokim Veu Fisheries Resource Management

Center for Research Development (CRD)

DIRECTOR KUBOTA Jumpei

Heads of Units

Initiative Framework Unit KUBOTA Jumpei
Collaboration Nexus Unit ISHII Reichiro
Planning Unit TANIGUCHI Makoto
Future Earth Unit TANIGUCHI Makoto

Professors

KUBOTA Jumpei Hydrology
MALLEE, Hein Social Science

Associate Professors

ISHII Reichiro Theoretical Ecology
HANDOH Itsuki C. Earth Systems Science, Mathematical Modeling
TAKAGI Akira Fisheries Science, Molecular Ecology

Assistant Professors

MCGREEVY, Steven Robert Rural Sustainable Development
ONISHI Yuko Biogeography, Macroecology

Research Fellow, NIHU Center for Area Studies / RIHN Initiative for Chinese Environmental Issues (RIHN-China)

JIANG Hongwei Human Ecology

Center Research Associates

NISHIMURA Takeshi
OKA Masami

Center for Research Promotion (CRP)

DIRECTOR NAKANO Takanori

Heads of Units

Survey and Analysis Unit TAYASU Ichiro
Informatics Unit SEKINO Tatsuki
Communication and Production Unit ABE Ken-ichi

Professors

ABE Ken-ichi Ecological Anthropology
NAKANO Takanori Isotope Environmental Studies
TAYASU Ichiro Isotope Ecology, Isotope Environmental Science

Associate Professors

KONDO Yasuhisa Archaeology, GIS
NILES, Daniel Geography
SEKINO Tatsuki Information Science

Assistant Professors

KUMAZAWA Terukazu Environmental Planning, Regional Informatics
SHIN Kicheol Petrology, Geochemistry, Isotope Geology
TAKESHIMA Hirohiko Molecular Ecology, Evolutionary Genetics
YASUTOMI Natsuko Meteorology, Climatology

Center Researchers

KATO Yoshikazu Aquatic Ecology
YOSHIMIZU Chikage Biogeochemistry

Center Research Associates

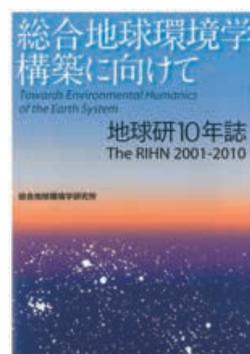
MARES, Emmanuel Bernard Japanese Garden History
MATSUBAYASHI Jun Stable Isotope Ecology
OSADA Yutaka Ecology

Visiting Professor

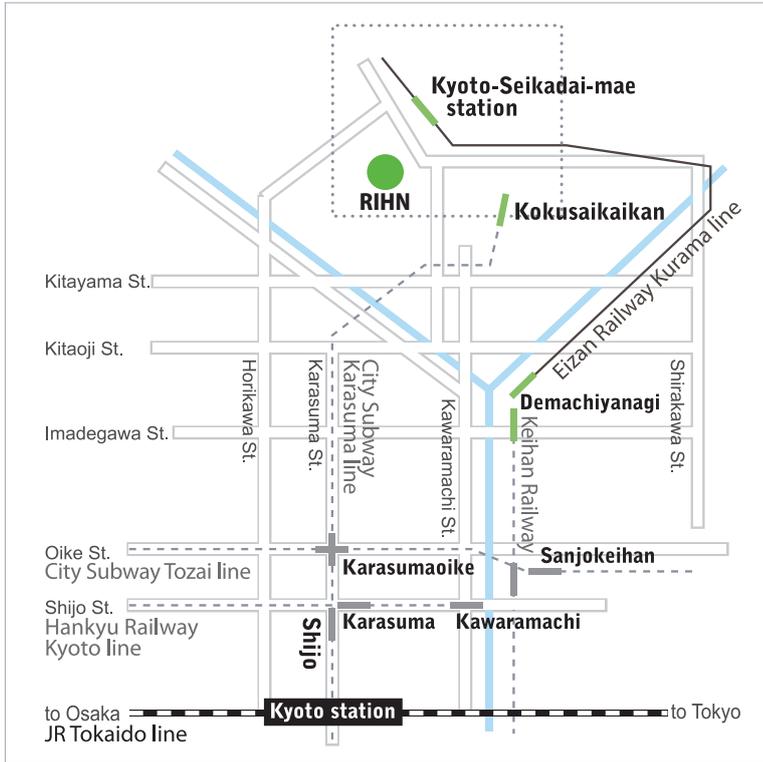
AKIMICHI Tomoya Integrated Area Study

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 Future Earth Regional Hub / Office for Asia



Access



By City Subway

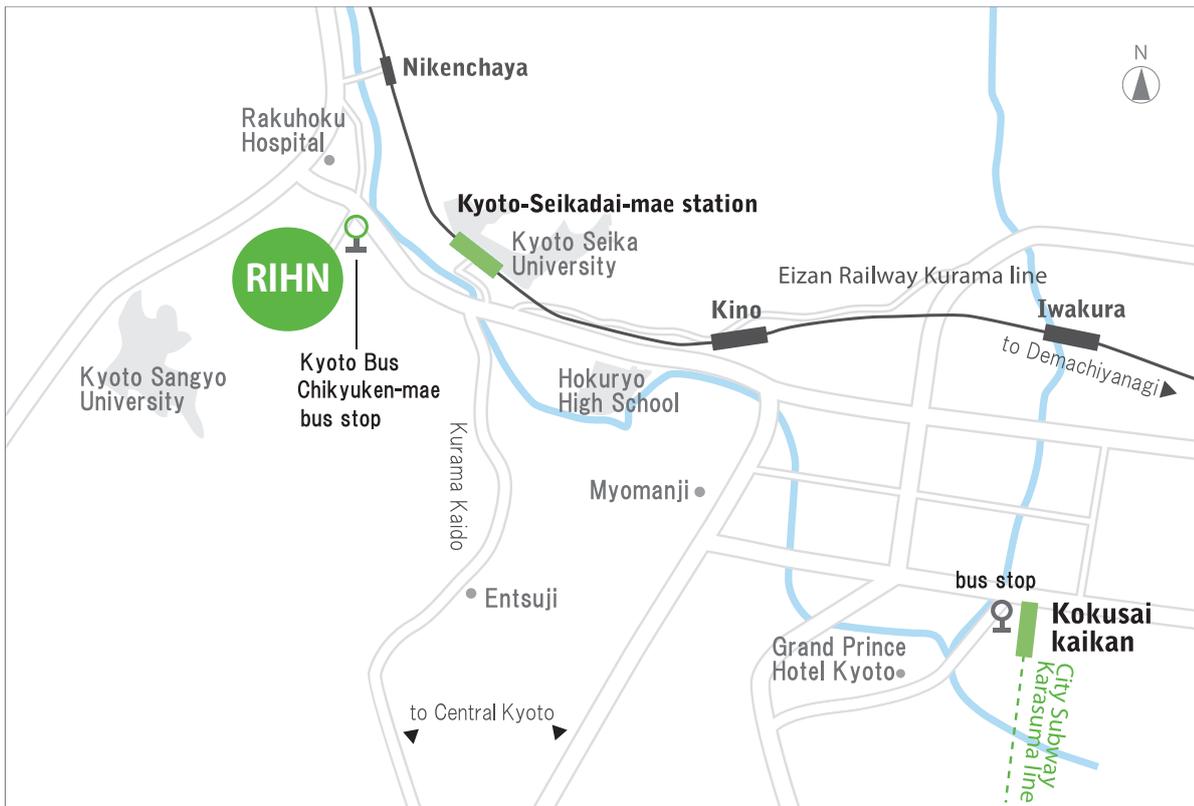
From Kyoto Station, take the Karasuma Line to Kokusaikaikan Station (the last station), and transfer to Kyoto Bus.

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 2015-2016

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HABU Junko and Steven R. MCGREEVY

Designed by OKAZAWA Rina

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A man maintaining terraced paddy fields, Bali
Photo by SEKINO Nobuyuki

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Kids can make anything into a toy, Guinea
Photo by NAKAGAWA Chigusa

Dabbling at field work, Burkina Faso
Photo provided by SASAKI Yuku



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ISSN 2185-8055
April 2014

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