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Message from the Director-General

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

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

As of the end of FY2015 RIHN has completed twenty-seven research projects, each of which has established extensive research networks in order to make important contributions in its area of specialization. FY2015 is the final year of the phase II of the interim plan of RIHN, and we overviewed the overall activities of the institute and published the report of the external review. Based on this report we have established the new structure of the institute, including the research strategy, project styles, supporting center etc. for the phase III of the interim plan of RIHN starting from FY2016.

As part of RIHN's international activities, RIHN is keeping the Asian Regional Centre for Future Earth, which is expected to promote the overall research and capacity buildings of Future Earth in Asia.

This annual report describes the updated outcome of these activities of RIHN for the FY2015. I do hope this annual report will help you to understand the overall activity within the FY2015.

With best regards,

YASUNARI Tetsuzo
Director-General
Research Institute for Humanity and Nature

Research Activities

●Full Research

Project No. **C-09-Init (Project leader: KUBOTA Jumpei)** **p. 5**
Project Name Designing Local Frameworks for Integrated Water Resources Management

Project No. **D-05 (Project leader: ISHIKAWA Satoshi)** **p. 14**
Project Name Coastal Area Capability Enhancement in Southeast Asia

Project No. **R-07 (Project leader: TANAKA Ueru)** **p. 23**
Project Name Desertification and Livelihood in Semi-Arid Afro-Eurasia

Project No. **E-05-Init (Project leader: SATO Tetsu)** **p. 31**
Project Name Creation and Sustainable Governance of New Commons through Formation of Integrated Local Environmental Knowledge

Project No. **R-08 Init (Project leader: TANIGUCHI Makoto)** **p. 40**
Project Name Human-Environmental Security in Asia-Pacific Ring of Fire: Water-Energy-Food Nexus

Project No. **R-09 (Project leader: HABU Junko)** **p. 49**
Project Name Long-term Sustainability through Place-Based, Small-scale Economies: Approaches from Historical Ecology

Project No. **H-05 (Project leader: NAKATSUKA Takeshi)** **p. 61**
Project Name Societal Adaptation to Climate Change: Integrating Palaeoclimatological Data with Historical and Archaeological Evidences

Project No. **D-06 (Project leader: OKUDA Noboru)** **p. 70**
Project Name Biodiversity-driven Nutrient Cycling and Human Well-being in Social-ecological Systems

●Pre Research

1. MCGREEVY, Steven Robert (RIHN) **p. 78**
   Life-worlds of Sustainable Food Consumption: Agrifood Systems in Transition

●Individual Collaboration FS

1. KAJITANI Shinji (The University of Tokyo)
   Local Standard in Globalization: Social Inclusive Approaches towards Transformation of Local Communities
2. KANEKO Nobuhiro (Yokohama National University)
   Food Sovereignty, Sustainable Agriculture and Fukushima Contamination
3. FUNAKAWA Shinya (Kyoto University)
   Integrative Study on the Linkage of Agricultural Activities and Environmental Degradation through Systematic Analysis, Research and Improving Practices, and Reintegration

●Institutional Collaboration FS

1. MIZUNO Kosuke (Kyoto University)
   Toward the Regeneration of Tropical Peatland Societies: Establishment of an International Research Network and Proposal of its Future
2. FUNAMIZU Naoyuki (Hokkaido University)
   Value-based Sanitation: Sanitation Value Chain for Human Happiness and Resources Management
3. ICHIE Tomoaki (Kochi University)
   Evaluation and Use of Non-monetary Benefits from Protected Tropical Rain Forest Areas in Southeast Asia

●Initiative-based FS

1. HANDOH Itsuki C. (RIHN)
   Co-Creating Heuristic and Autonomous Risk-Recognition System and Value-Action Networking for Futurability

●Incubation Studies

1. KANEKO Shinji (Hiroshima University) **p. 94**
   Social Optimization of Water-energy Nexus in Small-scale Distributed System for Poverty Alleviation
2. SAKAKIBARA Masayuki (Ehime University) **p. 94**
   Regional Innovation for High-environmental Impact Mitigation and its Social Acceptance
3. SUGIYAMA Saburo (Aichi Prefectural University) **p. 94**
   Interdisciplinary Comparative Research of Human Uniqueness: Re-interpreting the Formation of Ancient Civilization from Cognitive (Brain, Genome) Sciences and Global Environment Studies
4. MURAYAMA Satoshi (Kagawa University) **p. 95**
   Mathematical-geographical Modelling on Divergencies of Humanity and Nature in Early and Pre-modern Worlds
5. YOSHIDA Takehito (The University of Tokyo) **p. 95**
   Co-creating the Spatially-explicit Integrated Knowledge for Climate Change Adaptation of Local Communities
6. YAMAMOTO Taro (Nagasaki University) **p. 95**
   Exploratory Studies on Human Adaptation Mechanism to Modern Plague
7. OKI Kazuo (The University of Tokyo) **p. 96**
   Study on Causality between Economic Globalization and Local Environments by the Multi-framing Approach
8. HOMMA Kosuke (Niigata University) **p. 96**
   Assessing and Predicting Fluctuations in the Functional Diversity of Satoyama Paddy Landscapes in East Asia's Monsoon Region: Towards the Creation of New Satoyama in Response to the Transformation of Rural Society

●Completed Research (CR) Follow-up Grants **p. 97**

1. SAKAI Shoko (Kyoto University)
   Outreach Activity for Network Development in Malaysia
2. MOJI Kazuhiko (Nagasaki University)
   Support for the 9th National Health Research Forum of Lao PDR in 2015
3. KUBOTA, Jumpei (RIHN)
   Network Development for Establishing an Integrated Management Model of R. Syr Darya with Special Emphasis on Environmental Preservation
4. OKUMIYA Kiyohito (Kyoto University)
   The Establishment of the Occasion on Opinion and Information Exchange for Rural Development, Environmental Conservation and Health Promotion in Highland Mountainous Village
5. KADA Ryohei (Shijonawate Gakuen University)
   Evaluation of Social Experiment for Sustainable Risk Management
6. NAWATA Hiroshi (Akita University)
   Developing a New Framework for Forest Resource Management in Semi-arid Land: By Seeking an Appropriate Way of Utilization of Indigenous and Alien Species in Eastern Sudan
7. Muramatsu Shin (The University of Tokyo)
   Developing City Sustainability Index (CSI) System and Implementation of Case Method

Stage: Full Research

Project No.: C-09-Init

Project Name: Designing Local Frameworks for Integrated Water Resources Management

Abbreviated Title: C-09-Init

Project Leader: KUBOTA Jumpei

Research Axis: Circulation

URL: http://www.chikyu.ac.jp/P-C09/

Key Words: Integrated Water Resources Management (IWRM), local water resources governance, pro-humanistic water resources assessment, Water Consilience

○ Research Subject and Objectives

The concept of Integrated Water Resources Management (IWRM) was first proposed in the 1990s, at the time of worldwide growing environmental awareness and has been recognized as a fundamental principle for comprehensive water resources management, where in various sectors and many stakeholders are involved. However, challenges still remain in the implementation of IWRM in local communities and effective assessment of the influence of human activities on the water environment. IWRM has focused on integrating sectors and organizations that govern various resources, such as surface water and groundwater. However, there appears to be a lack of systematic flexibility, because they have insisted on water allocation plans of the demand side rather than various requests by the users' side, and historical and cultural backgrounds sometimes have not been considered well. Further, local water resources have been under joint management by water users, but there has been a switch to top-down management by public organizations with their increasing involvement, which follows modernization and expansion of irrigation systems. Moreover, qualitative changes are occurring within the structure of society, such as hastening of private assignment of water management. Therefore, new frameworks/ guidelines have been requested for local to regional water resources management (e.g. Biswas 2004). Furthermore, the target of IWRM is to focus on "quantity" over "quality."Water management must consider domestic and industrial water quality in addition to assessing water quantity for agricultural use when assessing global water resources dynamics.

The goal of C-09-Init is to present water resources management at the local level, which is the foundation of IWRM, to be a social implemented, and to develop the knowledge structure and ability for implementing this management among the concerned parties. In particular, we considers a management structure that reflects the relationship among various water users. Based on this specific content and the necessary conditions for establishing the management structure, the project aims to suggest desirable local water resources management guidelines through co-operation between science and society. Furthermore, the tools to implement techniques for a more proactive discussion and to achieve specific objectives will also be developed. Based on research results, information grounded in scientific evidence for further research will be presented to various stakeholders from policy makers to local end water users.

Finally, C-09-Init will 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.

○ Progress and Results in 2015

Overall progress

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.

Through these activities, C-09-Init aims at an assessment of the influence of man-made changes in the hydrological cycle of the environments as well as a response to problems that have risen because of environmental impacts. This is an essential topic in the Circulation Program. Moreover, with respect to local water and land management, C-09-Init aims to concretely work on the plans drafted in the Gaia Initiative as an Initiative-based Project. This states that “As human societies design their futures, they require best understandings of the Earth’s natural dynamism and the significance of human action within it. Therefore, the Gaia Initiative investigates of the physiospheric bases of humanity at multiple spatiotemporal scales; and it emphasizes on the description of physical standards related to boundaries and thresholds in order to allow the analysis of and best eco-technological adaptations to dynamic Earth environments.”

Individual results of survey and research

The following three points are described as basic results to the end of FR4. 1) We reorganized the project design according to PEC’ comments and focused on the cases in Indonesia and Turkey as major target areas for transdisciplinary studies. 2) Based on the results of our observational survey, we have started collaborative studies, such as meetings,workshops and participatory monitoring in South Sulawesi, Bali and Turkey in collaboration with various stakeholders. 3) Through these collaborative studies, we archived the improvement of water management in South Sulawesi,Indonesia by a series of collaborative meetings with stakeholders,establishment of a new “Forum DAS” preparatory committee in Bali, Indonesia,and the success of a pilot project of “night irrigation” for saving water and achieving higher production.

(1) Clarification of conventional water resources management systems in humid areas and attempts to co-creation of knowledge between science and society (Indonesia):

We further conducted hydrological observations and land use surveys of targeted watersheds in Bali and South Sulawesi, beginning in 2011, and clarified water use and balance in rice cultivation during the dry season.These studies revealed that water users cultivated paddy during the dry season considering their respective geographical conditions while empirically utilizing limited water resources. Moreover, we have established systems in South Sulawesi to realize “co-creation by science and society” supported by various stakeholders, including farmers, local municipalities, and a NGO. In Bali, we implemented a fact-finding survey on water governing structures whose basis is Subak and found that managing communities regarded as autonomous had changed into co-operative associations organized under public policies; and that public-financing systems prompted such dynamics. We have also started surveys on recent land use change under globalization and mass tourism. Subak is widely recognized as an ideal autonomous irrigation system (Geertz 1972, Lansing 1991, 2006; Ostrom 1992); however, we confirmed recent changes in the functions and roles of Subak. As outcomes of natural scientific surveys, isotopic analysis on various water origins in the whole watershed exhibited the importance of deep groundwater flow maintaining stable river flow during the dry period. The effects of the introduction of cash crops, such as clove and banana, on water balance and soil erosion were quantified by the field experiments. These results supported the people’s perception and recognition of recent problems because of land use change.

(2) Outcomes of the collaboration work with various stakeholders in Indonesia

1) Bali: The first stakeholders meeting in Bali was held in September 2013. Over 50 leaders of Subak in the Saba River watershed in the north of Bali Island and related government officials from various sectors attended the meeting. Most participants described problems that had recently arisen between Subak members and outsiders, such as illegally dumped waste associated with water pollution and illegal construction on irrigation canals. Because Subak comprises farmers, it was difficult to resolve these problems beyond Subak governance. Participants realized the necessity for communication beyond the Subak governance; therefore, we are now preparing comprehensive meetings on watershed management involving other stakeholders outside Subak. The second stakeholders meeting was held on October 2014. Based on the recognition of recent problems raised by rapid land-use change with urbanization and cash-crop introduction, the Forum DAS (river committee) preparatory committee was established,comprising heads of Subaks, officials and engineers in local governments,scientists, and NGO workers. After nine preparatory meetings held From December 2014 to August 2015, the Forum DAS was officially launched on October 22, 2015.

2) South Sulawesi: The absence of proper communication among water managers (gate operators on irrigation canals), who are employed by both the government and water users' associations, was clearly identified in the stakeholders' meeting in Sulawesi January 2014, in which approximately 100 leaders of farmers, water managers,and government supervisors participated. After this meeting, we supported autonomous discussion among water managers. All meetings, including small ones, were recorded to trace changes in awareness and behavior and to describe our actions to stakeholders. Through these meetings, a detailed water allocation schedule was established and shared with water managers and farmers, improving the performance of water allocation and consequently rice production in 2014. In 2015, we extended this "action-meeting series in collaboration with stakeholders" to other irrigation districts, resulting in success.

(3)Integrated understanding of the impacts of institutions, technologies and outlook on natural resources of water users related to water resources management(Turkey):

Since decentralization in the 1990s, Turkey has had governance problems such as an information division and unclear attribution of responsibility. In particular, excessive use of water and fertilizers has increased soil salinity in the government-initiated irrigation project in the Harran Plain. We have continued to observe water quality including salinity, hydrology, and land use changes; and have found that increasing numbers of farmers are growing citrus in the Seyhan Basin, because of increased price. This crop requires more water, and government subsidies are changing crop patterns in the Harran Plain. We have conducted a questionnaire survey regarding the willingness to pay and farmers' behaviours and their recognition of water use. The results revealed that most farmers are dissatisfied with the new water law and government policies. This law prevents farmers from communicating and building mutual trust with public sectors. In the first stakeholders meeting in March 2014, we attempted to promote mutual understanding among various stakeholders and stimulate them to proactively co-operate for better water management. After the meeting, a water users' association (WUA) consulted us with regard to avoiding excessive irrigation and resultant decrease in production. We proposed a night irrigation system. With operational support from an NGO and funding from the Coca-Cola Foundation, the WUA conducted a pilot project. The two-year project was very successful, achieving the irrigation water-saving (200 mm in 2014 and 260 mm in 2015) and higher crop production (15-18% in 2014 and 22-25% in 2015). The night irrigation project will be supported by UNDP in the following year.

(4) Development of tools for sharing information among stakeholders

We have been developing a GIS system(tentatively called "Atlas of Water Resources"), including land use change analyzed with satellite data, various statistics, and areas devastated by flooding and drought in the past. Both the hydrological model and GIS system have been used as tools in workshops to share water resources management information among various stakeholders..

○Project Members

◎ KUBOTA Jumpei (Research Institute for Humanity and Nature,Professor,Project Leader)
◎ RAMPISELA, Dorotea Agnes (Research Institute for Humanity and Nature,Associate Professor,Co-Project Leader)
NAKAGAMI Ken'ichi (Research Institute for Humanity and Nature/Ritsumeikan University,Visiting Professor/Specially Appointed Professor)
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<Indonesia>

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	GÜLTEKİN, Ufuk	(Çukurova University, Turkey,Assistant Professor)
	İBRİKÇİ, Hayriye	(Çukurova University, Turkey,Professor)
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	KAPUR, Selim	(Çukurova University, Turkey,Professor)
	KESKİNER, Demir Ali	(Çukurova University, Turkey,Graduate Student)
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	DEMIR, Hüseyin	(GAP Regional Development Administration, Turkey,Senior Engineer)
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<Echigawa>

○	AKIYAMA Michio	(The University of Shiga Prefecture,Professor)
○	NAKAMURA Kimihito	(Kyoto University,Associate Professor)
	MINAGAWA Akiko	(The University of Shiga Prefecture,Assistant Professor)
	ONO Nana	(The University of Shiga Prefecture,Assistant Professor)
	KASHIO Tamaki	(Lake Biwa Museum,Researcher)
	SHIBATA Yuki	(Toho University,Lecturer)

<Egypt>

○	TAKARA Kaoru	(Kyoto University,Professor)
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	ABE Ayako	(The University of Tokyo,Associate Professor)
	KAKUTA Ieko	(Asia University,Professor)
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<Global Model>

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GROENFELDT, David John	(Water-Culture Institute, USA,Director)

○ Future Themes

Through the research activities, the project has proposed 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.

Publications and outreach

we have extended local collaborative action research at each site and attempted to summarize our results and experiences with special emphasis on comparison and integration among case studies through various methods;international conferences (7th World Water Forum(April 2015, South Korea), 10th International Symposium in RIHN (June 2015, Japan), and EuroSoil 2016 (July 2016, Istanbul)), stake holder meetings (Bali: October 22,2015, Sulawesi: February 1, 2016, and Turkey: December 14 and 16, 2016), books(two books in English and one in Japanese, in preparation), articles, Guiding Manual (February 2016, Indonesia). Even after the project completion, local activities at all sites are expected to be continued by collaboration among stakeholders.

●Achievements

○Books

【Chapters/Sections】

- Akça, E. M. A. Çullu 2015 Improper Use of Turkey's Soil in Soil Atlas. Toprak Atlası. , pp.64-66. (in Turkish)
- Rampisela Dorotea Agnes, Yoshida Hidemi 2015 A Long-term Evaluation of Resettlement to Urban Areas: A Case Study of the Bili-Bili Dam in Indonesia Resettlement Policy in Large Development Projects. Fujikawa, R., Nakayama, M. (ed.) Routledge Studies in Development, Displacement and Resettlement. Routledge Taylor and Francis Group, UK.
- Pingping LUO, Apip, Kaoru Takara, Bin He, Weili Duan, Maochuan Hu and Daniel Nover 2015 Modelling Shallow Landslide Risk Using GIS and a Distributed Hydro-geotechnical Model. J. Li, X. Yang (ed.) Monitoring and Modeling of Global Changes: A Geomatics Perspective. . DOI: 10.1007/978-94-017-9813-6_11.
- Ono,N., Hayashi,K., Murakami,S 2015 Chapter 3 How to Prepare for Surveys of Regional Society and Local Community. Field work lesson note. Sun Rise shuppan, Shiga, pp.362-365. (in Japanese)
- Jumpei KUbota 2015,10 The Water Resources Governance in China -Introduction of Water Rights Trading-. Hideki Kitagawa and Jumpei Kubota (ed.) Watershed Governance and Environmental Policy in China. Hakuto Shobo, Chiyoda-ku, Tokyo. (in Japanese)

○Papers

【Original Articles】

- Kotera,A., Nagano,T.,Hanittinan,P., Koontanakulvong,S. 2016,01 Assessing the degree of flood damage to rice crops in the Chao Phraya delta, Thailand, using MODIS satellite imaging. Paddy and Water Environment 14 :271-280. DOI:10.1007/s10333-015-0496-9.(reviewed).

・Hamaguchi, T., Sumi, T., Tanaka, S. 2015,08 Parameter Design of Basic Section for Gravity Dam through Particle Swarm Optimization Approach considering Long-term Sediment Management under Climate Change. Proc. of AOGS2015, 2-7 Aug 2015. .

・Tanaka,K., Matsui,Y., Tanaka,S., Hamaguchi,T. 2015,08 Effects of the Resolution of GCM Output on the Snow Water Equivalent Estimation. Proc. of AOGS2015, 2-7 Aug 2015 .

・Kotera, A., Nagano, T., Berberoglu, S., and Cullu, M.A 2015,07 A global dataset of noiseless time-series vegetation and water indices for farmland analysis. Proceedings of Fourth International Conference on Agro-geoinformatics 2015 .(reviewed).

・Cetin, M., Ibrikci, H., Berberoglu, S., Fink, M., Nagano, T., Golpinar, M.S., Kubota, J., Goehmann, H. 2015,06 Sustainability of Agricultural Water Management in Large Scale Irrigation Schemes: A Case Study in Turkey. Proceedings of the 9th World Congress of the European Water Resources Association, Istanbul, Turkey, 10-13 June 2015 .

・Ibrikci, H.,Cetin, M., Berberoglu, S., Sagir, H., Karnez, E., Nagano, T., Fink, M., Kubota, J., Goehmann, H. 2015,06 Irrigation-induced groudwater pollution in Mediterranean Agriculture. Proceedings of the 9th World Congress of the European Water Resources Association, Istanbul, Turkey, 10-13 June 2015 .

・Chiba,T. Endo,K., Sugai,T., Haraguchi,T., Kondo,R., Kubota, J. 2015 Reconstruction of Lake Balkhash levels and precipitation/evaporation changes during the last 2000 years from fossil diatom assemblages. Quaternary International 397 :330-341. DOI:10.1016/j.quaint.2015.08.009.(reviewed).

・Yuan Wang, Xian Zhang, Kubota, J., Xiaodong Zhu, Genfa Lu 2015 A semi-parametric panel data analysis on the urbanization-carbon emissions nexus for OECD countires. Renweable and Sustainable Energy Reviews 48 :704-709.(reviewed).

・Weili Duan, Bin He, Takara,K., Pingping LUO, M. Hu, Nor Eliza ALIAS, and Daniel Nover 2015 Changes of precipitation amounts and extremes over Japan between 1901 and 2012 and their connection to climate indices. Climate dynamics . DOI:10.1007/s00382-015-2778-8.(reviewed).

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Stage: Full Research

Project No.: D-05

Project Name: Coastal Area-capability Enhancement in Southeast Asia

Abbreviated Title:

Project Leader: ISHIKAWA Satoshi

Research Axis: Diversity

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

Key Words: Southeast Asia, Coastal Area, Fisheries Resource Management, Rural Devleopment, QoL

○ Research Subject and Objectives

In recent years, there is a growing concern about the deterioration of marine ecosystems and resources. Especially, coastal area ecosystems have rapidly been worsening and destroyed, as they are affected from global environmental changes and intensive human activities in both land and sea areas. Many of those coastal areas holding high biological production supported by high biodiversity are located in tropical zones in developing countries, such as Southeast Asia. In Southeast Asia, coastal ecosystem services have fostered high cultural diversity. Hence, coastal areas are characterized by the close linkage between ecosystem and local people. The coastal area serves are bases of the livelihood of local people, and human intervention is deeply embedded in ecosystem. This linkage enhances the complexity and affects the vulnerability of the ecosystem in the region (Fig.1). However,conservation and management activities originated in temperate zone usually focus particular ecologies and commercial resources with little consideration of how multiple ecologies and livelihood strategies overlap in culturally diverse contexts, and so they cannot be easily applied to tropical coastal areas and there are no alternative theory and method to harmonize ecosystem conservation and rural livelihoods based on their complex intervention importance.

In this project, we are going to investigate the linkage between livelihoods and ecosystem health in coastal areas through holistic field surveys, in order to clarify the environmental problems and its causes based on chemical, biological, ecological, social and human science viewpoints. Then, we conduct several collaborative action researches with local community to solve the environmental problems based on our data and research result. Impact assessments and feedback practices to improve our action researches are performed through town seminars and discussion among researchers and local community.

Although community based participatory research and management actions have been highlighted as alternative trials of top-down management and rural development tool in developing countries, these activities are usually evaluated performance improvement, e.g., income generation, productivity, and cost efficiency. We try to identify key potential factors which enable the performance improvements through details of information and changes of livelihoods, behaviours and minds of collaborating community members and other stakeholders.

We call an integral of the potential factors as “Area-capability” that will be a new concept of evaluation and target for rural development. And our activities can provide how to conduct and evaluate “Area-capability” in research and participatory actions as new approach. Spreading the use and understanding of “Area-capability” may lead us to good relationship between humanity and nature.

Project Framework

To establish Area-capability concept and guideline, we treat three aspects; 1) Ecosystem production mechanisms and dynamics, 2) Development process of local community and environmental governance, and 3) Adaptive Technology and managements (Fig. 2). In order to elucidate these three aspects, we conduct the **holistic field researches** on the southeast Asian coastal areas in order to grasp the linkage between nature and human, and we also conduct **participatory action researches** in collaboration with local communities to verify the feasibility and acceptability of new concept and approach to local societies in Rayong(Thailand), Panay Is. (Philippines) and Ishigaki Is., (Japan)(Fig. 3). We also conduct reference surveys in Bandon bay (Thailand), Hue (Viet Nam), Mikawa bay(Japan)(Fig. 3). All data, information and progresses of the action researches are compiled into the database and reports for subsequent discussions. New concept and approach might be denied from existing academic disciplines as

illogical and/or unscientific, however, without new concept that can be recognized by ordinal people based on their ordinal sensuous and those can change human behaviours toward good interactions between human and nature, global environmental problems would be never solved.

The holistic researches comprise of five components; 1) Environmental survey, 2) Biodiversity survey, 3) Coastal resources survey, 4) Utilization of resources survey and 5) Social survey (Fig.4). Ecosystem production mechanisms and dynamics with identification of the biological and ecological important areas and species for local ecosystem are examined based on the results of Environmental, Biological and Coastal resource surveys using statistical, chemical, stable isotope, and molecular analyses in collaboration with taxonomic study and acoustic survey. Development process of local community, environmental governance and importance of the coastal resources for the local people are examined based on the results of utilization and social surveys carried out through interview/questionnaire surveys and anthropologic surveys. In the social survey, we treat economic condition, time allocation, food supply, education, health condition, participation to the community activities, indigenous knowledge, religious importance, and information gathering situation. Three participatory action researches are conducted; 1) Community-based set-net fishery installation in Rayong (Fig. 5), 2)Community-based re-stocking program in Batan bay in Panay Is. (Fig. 6), 3)Collaboration action among fishery, ecotourism and education in Ishigaki Is.and Mikawa Bay (Fig. 7). In these areas, there are local people's groups which already collaborated with some of our members and several researches on natural resources and livelihood have been conducted. All data and results of analyses were shared among members and localgroups through workshops, seminar and meetings and database in internet.

72 researchers from 17 universities and research institute (12 in Japan, 2 in Thailand, 2 in Philippines, one regional research center "Southeast Asian Fisheries Development Center: SEAFDEC") are participating in this project. They have different expertise and academic backgrounds of oceanography, biology, social science, agricultural sciences, civil engineering, economy, policy study, anthropology and area study.

The concept of "Area-capability" will be concretized and the guideline of its approach will be compiled based on the all experiences and achievements. And the guidelines will be informed and disseminated through ASEAN-SEAFDEC mechanisms and International Symposiums.

Future tasks

FR3:

In the third year of full research, we continue the interdisciplinary field surveys and collaborative action researches and analyses for collecting data and information of the linkage between human and nature.

Around Rayong beach in Thailand, we evaluate the negative impacts of oil spill accident on environment and livelihoods of local people. To do this, material flows and nutrient concentration along the Rayong beach will be conducted. We collect water, soil and biological samples from the beach and analyse them in RIHN. Biodiversity and food web survey will be performed based on the stable isotope and genetic analyses using the biological samples. Livelihoods and fishery activity survey including trading and marketing will be also conducted through interview and observation surveys of Set-net fishermen group and other villagers using the questionnaire and GPS. Statistic data and information, aerial photographs will be collected in recent 10 years for understanding the land use and demographic changes. All data and information including the analytical results are compared with former data that we had obtained in FR1 and 2. Besides, behaviour and minds changes of Set-net fishery group members will be examined to identify the effects from community based activity on social capitals, interests of environment, livelihoods, and management of natural resources.

Around Batan bay in Philippines, we investigate the extent of damage from super typhoon on ecosystem, buildings, infrastructure, health and minds, sense of values, community and businesses.

We will collect water, soil, mangrove, and aquatic organisms' samples around Batan Bay for nutrients and pollution evaluation. We will conduct chemical and stable isotope analyses of them in RIHN. We will record the extent of damages on mangrove forests, paddy fields, buildings, infrastructure, fishing gears, aquaculture ponds around Batan Bayand we will evaluate the relationships between geographical situation and damages concerning with the typhoon path. And we conduct interview with local people to get some information of evacuation actions and assistance each other and from governments. We will

conduct stock evaluation of shrimp in the bay and conduct stock enhancement through community based intermediate aquaculture with local community. We record the attitude, comments and behaviour the participants to the stock enhancement in order to identify the key factors of their collaborative activity.

In Ishigaki Island, Japan, we will make underwater map and material flow analyses of the island using stable isotope analysis. And we evaluate the food web and population structure of fish around the island to evaluate the linkage of materials between land and sea. These results will be informed to local people through town seminar and other workshops,to facilitate the conservation activity and future develop planning of the town.

We will elucidate the population structure of fishery important fish in South China Sea using genetic analysis to identify the management units of them, and grasp biodiversity of this area. In addition, we try to improve acoustic survey system which can be used in shallow sea area and to disseminate this system for ASEAN countries through workshops and publication of manuals.

○ Progress and Results in 2015

Achievements of holistic surveys

1) Environmental survey:

To grasp environmental conditions, we measured temperature, Dissolved Oxygen, pH, chlorophyll a Particulate organic matter (POM), Sedimentary organic matter(SOM), and nutrients (NO3, NH4), Acid volatile sulphide (AVS), ignition loss, Phytoplankton and mangrove biomasses at Rayong and Bandon in Thailand, Batan in Philippines, Mikawa in Japan during both rainy and dry seasons. Land use changes we reexamined by satellite image analyses have been conducted at Batan in Philippines and Bandon in Thailand. Concentration of 52 micro elements of water and soil samples collected from Batan and Rayong, were measured by Inductively Coupled Plasma Mass Spectrometry (ICP-MS), 7500cx (Agilent Technologies Inc.)in RIHN. All results were put on the GIS to identify biological ecological important areas. Food webs and material cycles were evaluated using stable-isotope analyses at Rayong, Batan and Bandon

2) Biodiversity survey:

In Southeast Asia, biodiversity including the taxonomic knowledge of fishery species are still unclear. So, we conducted taxonomic study through specimen collection making and genetic studies. We collected fish specimen of 1811 individuals from Philippines, 538 individuals from Thailand, 268 individuals from Malaysia.These specimens were recorded and donated into University of Philippine Visayas Museum and Thailand National Science Museum. For standardization of specimen collection, we published “Fish Collection Building and Procedures Manual,English edition” and “Fishes of Northern Gulf of Thailand”.

Using collected fish specimen, we analysed genetic diversity and differences of 7 fishery important species based on the mt DNA COI sequences analyses, and we identified the plural reproducible populations of Atule mate,Megalaspis cordyla, Rastrelliger kanagurta, Gerresfilamentosus in Southeast Asian Sea. For the more detailed genetic population identification, micro satellite DNA markers which can be used for various fish species were established using Next generation DNA analysing machine. Besides, species identification system based on the morphological features using photographs is now under construction. It can be easily identify the fish species using photographs by ordinal persons and this system will cultivate the interesting of biodiversity for ordinal persons.

3) Coastal resources survey:

To stock assessment of coastal fishery resources, new acoustic survey equipment and system were developed. Using this new system, fish stock assessments in Rayong we recarried out. Then, these data were used for the training course at Kasetsart University in Thailand for undergraduate students in collaboration with Southeast Fisheries Development Center.

The new buoyance control system of underwater robot was developed. And portable under water monitoring robot was made. This underwater robot was used for underwater ruins surveys and educational workshops for high school students in Ishigaki Is. in collaboration with Ishigaki city.

4) Utilization of resources survey

To understand the linkage between natural resources and livelihoods of coastal area, we conducted interview and observation survey using GPS system to collect data about fishing gear, fishing areas and operation, and target species, cost and benefit of 13 households in Rayong, 24 households in Batan. We

also collected weather conditions, and are analysing the impact of weather conditions on local fishermen's lives and their adaptations.

5) Social survey

In order to clarify the relationship among social situation, cultural regulation, job opportunity, social capital, and management of natural resources, we conducted household interview survey to collect information of jobs, time allocation, communication, compliance, health condition, educational background, community bonds etc. of 117 households in Rayong and 467 households in Batan. Besides, economic systems including funding, transportation, price making systems and market access were evaluated in both areas.

Achievementof action researches

1) Community-Based Set-Net Fishery in Rayong,Thailand:

Community-based Japanese-type Set-net fishery has been installed in Rayong. The community conduct management and maintenance of fishing gears and their own fish shops. All data of operation, fish catch and incomes have been recorded. Our project member input several technical supports for the management and operations. The transformations of fish catch, price,markets, and behaviours of community members and non-members who are living in Rayong were recorded.

2) Cooporative Stock Enahcement in Batan Bay,Philippines

Community-based stock enhancement of shrimpis conducting in Batan Bay. Intermediate shrimp aquaculture and surveillance have been conducted local community. Project member provide technical supports for aquaculture and monitoring environments.

3) Collaboration between Eco-tourisim and Fisheriesdevelopment in Ishigaki-Mikawa , Japan

Town seminar was held in collaboration with Junior Chamber International Japan, Yaeyama branch. We discussed how to harmonize conservation of coastal area and tourism development. And educational workshops for high school students in Ishigaki Is. was held in collaboration with Ishigaki city.

Generalization and concept development

To facilitate interdisciplinary discussions and activities, data sharing system through internet was established and the international seminar was held at Philippines in 2012 and at Thailand in 2013.To identify the key factors of "Area-capability", workshops were held in Japan,and five axes for evaluation of potentials of Area-capability, 1) Ecosystem health supported by biodiversity and biomasses, 2) Knowledge and interests of peoples on ecosystems, 3) Governance situation, 4) Strength of People's network and community, 5) Contacts between human and nature, were identified,tentatively.

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○ Future Themes

FR4:

Regarding the community based set-net fishery impacts on environment and social development, we will compiles the case study results as an installation manual books with good example of Rayong. We will publish the evaluation manual of stock enhancements for harmonising between environments and rural development based on the case study of Hamana Lake in Japan. And the technical guide book of the shrimp stock enhancement will be also published in English.

We will record the processes and changes of the environment and social aspect around Batan Bay in Philippines based on the field survey. And shrimp stock enhancement will be continued with the measurement of stock status and livelihoods changes.

Key factors identification of potentials for good practices in which people care the environment and their livelihood improvements, will be discussed on the workshops based on the data and information

FR5:

Regarding the impacts of community based stock enhancement on environment and social development, we will compiles the case study results as an installation manual books with good example of Batan Bay. Key factors of high resilience against natural disaster will be identified based on the records and data from Batan Bay area and the results will be published as a guide books for rural development. And all data, information and results, we try to clarify the “Area-Capablity” and publish a book of What is Area-capability, the concept and practices. And we will hold an international seminar of Area-capability as a new concept for evaluation of rural development with harmonizing conservation of environment to disseminate this new concept and approach.

●Achievements

○Papers

【Original Articles】

- ONO Rintaro, KATAGIRI Chiaki, KAN Hironobu, NAGAO Masayuki, YAMAMOTO Yuji, TAKEMURA Fumiaki, SAKAGAMI Norimitsu 2016,02 Discovery of Iron Grapnel Anchors in Early Modern Ryukyu and Management of Underwater Cultural Heritage in Okinawa, Japan. The International Journal of Nautical Archaeology :1-17. DOI:10.1111/1095-9270.12145.(reviewed).
- Chanakarn Sukudom, Methee Kaewnern, Idsariya Wudtisin, Takashi Yoshikawa, Yuki Okamoto, Kazuya Watanabe, Satoshi Ishikawa and Jintana Salaenoi 2015 Organic contents and pH profiles of sediments in cockle farm at Bandon Bay, Surat Thani Province. Khon Kaen Agricultural Journal 43(2) :265-276. (Other) (reviewed).

○Research Presentations

【Invited Lecture / Honoronary Lecture / Panelist】

- ISHIKAWA Satoshi Area-capability study for sustainable development in Coastal zone. ICFAS 2016, Navigating troubled waters: localizing pathways for a sustainable future, 2016,01,26-2016,01,28, Iloilo city Philippines.

Stage: Full Research

Project No.: R-07

Project Name: Desertification and Livelihood in Semi-Arid Afro-Eurasia

Abbreviated Title: Desertification in Afro-Eurasia

Project Leader: TANAKA Ueru

Research Axis: Resources

URL: http://www.kazehitotsuchi.com/

Key Words: Afro-Eurasia, Desertification, Poverty, Vulnerable people, Livelihood, Human-environment interrelations, Practical techniques for desertification control, Socio-ecological adaptability, Development assistance

○ Research Subject and Objectives

Research objectives

The objectives of this research are set as follows: 1) to deepen understanding of the social, cultural and ecological characteristics of targeted areas in semi-arid Afro-Eurasia as a premise to study on desertification; 2) to design and verify some practical techniques or approaches effective for desertification control in the context of rural development support; 3) to propose and implement some techniques and approaches to desertification control and rural development, paying special attention to vulnerable people. Special focus is given to vulnerable people and areas left behind in the trend of economic development and globalization.

Background

Desertification is one of the globally concerned problems/issues with complex phenomena related to land degradation and poverty in sub-humid, semiarid and arid areas of Afro-Eurasia. In ratifying the United Nations Convention to Combat Desertification (UNCCD) in 1994, the international community, including Japan, signed its commitment to solve the problems. More than twenty years has past, so far, there have been many efforts made by international organization, local government and NGO. The problems, however, still remain unsolved and become more serious year by year (UNDP, 2003; Easterly, 2006; Tollefson and Gilbert, 2012).

Difficulties:Why desertification control have not been successfully achieved and even became worse? It may be explained from the complexity in its causes, social and ecological condition, and diverse livelihoods of local people closely linking with poverty (Mainguet, 1994). As defined in UNCCD (1994), the causes of desertification are both climatic factors and human activities (Geist, 2005;Zdruli et al., 2010). Apart from the climatic factors, such as short and uneven distribution of rainfall, excess and fluctuating rain, and wind (Geist, 2005;Boken et al. 2005), primary causes of desertification are the daily activities to support people's livelihood and basic needs for survival, such as cropping, animal husbandry and gathering of fuel woods (Geist, 2005, O'Brien et al., 2010;Jana and Majumder, 2010). Difficulty of desertification control, it is to be carried out while maintaining the causes, i.e. daily livelihood activities.

Focus:Pillar actions for implementation for desertification control in the documents of UNCCD(1994), http://www.unccd.int/Lists/SiteDocumentLibrary/conventionText/conv-eng.pdf)are summarized into 'policy making', 'financial support', 'scientific and technical knowledge', 'capacity building (for officials)', 'education and training (for local people)' and 'extension of technology'. Among them, the most critical action should be 'scientific and technical knowledge', since it is directly reflected to the contents of 'capacity building', 'education and training' and 'extension of technology'.

Unfortunately, inadequate understanding about desertification is still remained, for example, an image of desertification as an expansion of desert land due to aridification. This is related to the confusion over "desertification vs desertization" (Kadomura etal., 1993). The framework of actions and implementation measures have already been maintained at international and government level, however, those at regions and community level are weak, especially in semi-arid Africa (Fig. 1). The project, therefore, puts major focus on the research to create realistic and practical 'scientific and technical knowledge' leading the actions at community level.

Perception and contribution to global environmental problems

Desertification is one of the problems at global concern and, at the same time, the phenomena of desertification are the combinations of accumulated causes and consequences at local and human-scale under complex socio-ecological environments. This means that solutions should be designed by the combination of the actions at local and human-scale.

Common activities of the entire project

1. To deepen the understanding of social and ecological characteristics of some targeted areas of Semi-Arid Afro-Eurasia as a premise to study on desertification

1-a. Identification of social and ecological characteristics of the targeted areas

1-b. Identification of causes and types of dominant desertification phenomena in relating with the changes of local livelihood under demographic and economic pressure, climatic trend and intervention by outsiders

1-c. Identification of mechanisms and processes of social and ecological adaptation being functioned under environmental and demographic changes

1-d. Identification of common features and specificity in the social ecological characteristics of the target areas through comparative studies for seeking the possibility of horizontal technology transfer

2. To design and verify some practical techniques/approaches effective for desertification control in the context of rural development assistance

2-a. Re-examination of conventional techniques/approaches to desertification control and rural development assistance

2-b. Collection of indigenous knowledge and techniques and its modification utilized for desertification control

2-c. Identification of the requisites and possibilities of technology transfer within/between Africa and Asia

2-d. Design and verification of some techniques/approaches effective for desertification control and improvement of livelihood security

3. To propose and implement some techniques/approaches to desertification control and rural development, with paying special attention to for vulnerable people

3-a. Provision of verified practical techniques/approaches,knowledge and experiences, and plan of implementation project(s) to relevant organizations

3-b. Dissemination of the study results through oral presentations(seminars, symposiums and workshops for wide range of audiences), posters, academic papers, publications, and advisories

○ Progress and Results in 2015

【General aspects of the project activities】

Project sites

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

Specific activities at each area

1. West Africa and Northeast Africa(so-called 'Sahel zone' of Africa)

1-a. Extension of some verified techniques of desertification control (Andropogon grass-band system, fallow-band system, extension method incorporated with social-network survey) collaborating with local NGO (Niger)

1-b. Monitoring of soil fertility maintenance and degradation process under different cultivation practices in semi-arid condition (Niger)

1-c. Cross-border migration, social and ecological adaptation and process of community formation (Niger, Burkina Faso and Togo)

1-d. Mechanisms and process of innovation by local people (Burkina Faso)

1-e. Influences of "Islam" in daily livelihood of urban and rural communities (Burkina Faso)

1-f. Background and conditions around street children as a vulnerable existence (Burkina Faso)

1-g. Advisory for aid organizations to make implementation project(Burkina Faso, Senegal)

1-h. Preliminary survey to identify possible area(s)/site(s) for the transfer of some verified techniques (Senegal, Sudan)

2. Southern Africa

2-a. Impact of transformation in local animal husbandry on peoples' livelihoods, communities, vegetation and land resources (Namibia)

2-b. Monitoring of soil fertility maintenance and degradation process under different cultivation practices in semi-arid condition (Namibia)

2-c. Changes of local livelihood activities and land use systems after compulsory trans-migration (Zambia)

2-d. Local rules in utilizing land resources and ecosystems (Zambia)

3. South Asia

3-a. Data-base of indigenous tools, its manufacturing processes, and literature of traditional farming systems to seeking appropriate techniques useful for rural development assistance in semi-arid Asia and Africa (India)

3-b. Co-existence of local livelihoods between the pastoralists and cultivators in highly populated area, Rajasthan and Tamil Nadu (India)

3-c. Seasonal movement of pastoralists and its contribution of soil fertility maintenance (India)

3-d. Preliminary survey to seek possibility technology transfer between India and Africa (India, Senegal)

4. East Asia

4-a. Requisites of resilience mechanisms in the pastoralists' livelihood to reduce vulnerability against natural disaster (Mongolia)

4-b. Indigenous knowledge/techniques of land resource management by pastoralists (Mongolia)

4-c. Preparation of a field experiment for re-appraisal of dry farming techniques described in antique books (China)

5. Inter regional sites

We make comparative studies on 1) Adaptation strategies in agro-pastoral systems between high/low population areas, tropical/temperate climate regions, and cultivation/pastoral system" and 2) Possibility of technology transfer, e.g. land use systems,restoration of degraded land, farming tools and soil management practices in Africa and Asia.

Project activities and the framework of UNCCD

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

【Progress】

1. To deepen the understanding of targeted areas in semi-arid Afro-Eurasia

Researches in Africa: Basic information related to social, cultural and ecological characteristics of the targeted areas are were collected. The causes and background of desertification were also identified. We paid special focus on resilience and adaptation strategies of local people and community to cope with extreme weather, such as drought and flooding, and social changes, such as influx of refugees and intervention through rural development activities by local government and aid-organizations.

Livelihood systems, social relations and coping behaviours during the year of crisis were documented in pastoralists' community in Burkina Faso (Young scientist award/Katakura Motoko award, Association of Arid Land Studies, Y. Ishimoto, 2014), inagro-pastoralists community in Niger (Young scientist award, Society of Agricultural Systems, Y. Sasaki, 2013; Best presentation award, Society of Agricultural Systems, Y. Komura et al., 2012), and in Namibia (Best poster award, Association for Arid Land Studies, K. Teshirogi, 2012). Soil fertility mechanism and its management practices are identified in sandy soils under semi-arid condition in the Sahel (Best poster award, 20th World Congress of Soil Science, H. Shinjo et al., 2014).

Situation of education and social support for children, including street children, in urban area of Burkina Faso were reported and pointed out that the realities were far different from our general understanding (Superior presentation award, African Educational Research Forum, T. Shimizu, 2013). Finding of a time-lag in behaviours and decision-making of local people when received exotic technique in the case of Burkina Faso was useful information to design rural development approach (Best presentation award, Society of Agricultural Systems, Y. Machi et al., 2014). We identified some requisites of resilience in rural communities of semi-arid Zambia through the coping behaviours in flooding year (Poster award, World Water Week 2012, Umetsu et al., 2012) and in the use of mobile-phones (Best poster award, Association for Arid Land Studies, Y. Ishimotoet al., 2013).

Researches in Asia: Indigenous knowledge and techniques, which give insights to identify the requisites of social and ecological adaptation of livelihood systems in semi-arid condition, were collected in India. The results are under compiling as electric data-base and an illustration book. Two best poster awards were respectively given to the studies on "situation of traditional animal-driven water well (Association for Arid Land Studies, H. Endo et al,2014)" and "agrarian changes and livelihood diversification (EMASS-2014, M. Jegadeesanet al., 2014) ".

Field experiment on "revival of traditional millet cultivation in semi-arid area" was conducted in Shanxi Province, China. It revealed that the traditional techniques established in 6th century are still inherited among local farmers. Toshare the research findings, we organized the Joint International Workshop on "Learning the history of dry farming in China (Aug 20, 2015)" in RIHN, Kyoto.

Livelihoods systems and peoples' behaviour in cool arid environment are identified in the field research in Mongolia. A best poster award was given to "factors to decide resilience in pastoralists' livelihood found after natural disaster (Society for International Development Studies, H. Nakamura, 2014)".

2. To design and verify some practical techniques/approaches

'Fallow-band system': Wind erosion is one of the causes of desertification/land degradation. Despite of many previous studies so far, situation of wind erosion was not successfully quantified. Bin the field studies in Niger, we made an apparatus to measure wind erosion, revealed its processes, and innovated a prototype technique for wind erosion control with adding a device to increase the motivation of local people. The technique is called 'fallow-band system' to control wind erosion and concurrently to improve crop yield (Fig. 4). These studies were highly evaluated with many academic awards (2012 SSPN award, K. Ikazaki et al.,2012; Best poster award, Society of International Development, U. Tanaka and K. Ikazaki, 2013; Best presentation award, 20th World Congress of Soil Science, K. Ikazaki et al.,

2014; Young Scientist award, Society of Soil Science and Plant Nutrition, K. Ikazaki, 2014; Achievement award for young scientists, Foundation of Agricultural Science of Japan, K. Ikazaki, 2014; Hitachi award of excellence/Environment Ministers' award, Tanaka et al,, 2014; Award of Excellence, Nikkei award for global environmental techniques, Tanaka et al.,2015).

'Contour-line of Andropogon' : We devised a practical technique which concurrently enables reduction of soil erosion by water, encouragement of water-harvesting to soil, and increase of household income (Fig. 5). The technique is basically a revival one based on some indigenous practices in Burkina Faso, such as Zai (planting pit) and Kukokse(line of grass), together with local people. It is one of the examples of co-designing and co-working to innovate techniques.

Improvement of agricultural extension method : Method to identify key human resources and vulnerable people in community has been strongly sought in technology dissemination. We devised an improved agricultural extension method incorporating some steps of 'social network survey' (Fig. 6, Fig. 7) and verified its applicability in Niger (Best poster award, Society for International Development Studies, Y. Sasaki, 2013).

3. To disseminate the knowledge, experiences and techniques/approaches

The technique 'fallow-band system' was implemented in Niger through JICA Grassroots Project (http://www.jica.go.jp/partner/kusanone/partner/niger_01.html)with the participation of 439 households in 75 villages, 23 districts and 5 regions at the ending in March, 2013. It was also trialled as a part of JICA Project (CODEVAL) in Senegal. Ministry of Environment of Japan published a technical brochure 'Lifestyle and Measures against Desertification (2013, in English, French and Japanese)' using our research results. In Oct 2015, Geography Teachers' Association of Victoria, Australia, inquired a permission to introduce the technique in the high school textbook.

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○ Future Themes

Sinceour project is entering its final year, we are accelerating the disseminationof our research results through publications, and international and domesticworkshops. For social implementation, we are providing some of the practicaltechniques developed in the project to the ‘Great Green Wall for the Sahara andthe Sahel Initiative’, an international desertification project initiated by theAfrican Union and other entities. We are also preparing proposals which should behelpful in linking our academic results to specific future socialimplementations.

●Achievements

○Books

【Authored/Co-authored】

・ISHIYAMA, Shun 2016,03 Environmental Anthropology of Sahelian Landlocked Country, Chad : Poverty, Conflict and Desertification. Field Note Series, Desertification and Livelihood in Semi-Arid Afro-Eurasia Project, 5. Field Note Series, Desertification and Livelihood in Semi-Arid Afro-Eurasia Project, RIHN, Kita-ku, Kyoto, 103pp. (in Japanese)

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Stage: Full Research

Project No.: E-05-Init

Project Name: Creation and Sustainable Governance of New Commons through Formation of Integrated Local Environmental Knowledge

Abbreviated Title: ILEK project

Project Leader: SATO Tetsu

Research Axis: Ecosophy program/OICOS initiative

URL: http://ilekcrp.org/

Key Words: knowledge production, adaptive governance, residential research, multi-scale translator,meta-analysis

○ Research Subject and Objectives

Research purpose:

Diverse ecosystem services should be managed as commons by collaboration of various stakeholders with different values and interests. This project focuses on the formation and circulation of a novel concept of local knowledge (Integrated Local Environmental Knowledge, ILEK) blending scientific and local daily-life knowledge productions. Diverse ecosystem services should be managed on the basis of collective knowledge base such as ILEK. We examine mechanisms to facilitate production and circulation of ILEK to understand ILEK-based adaptive governance mechanisms for creation and sustainable governance of such commons. This initiative-based project conducts meta-analysis and integrates a wide range of results of RIHN projects and locally accumulated knowledge through daily practices of stakeholders in various areas of the world, to understand formation mechanisms of ILEK and drivers of adaptive governance using ILEK as a knowledge base. Residential researchers living in local communities play important roles to produce ILEK essential for adaptive governance. Bilateral translators of knowledge promote circulation of ILEK among different stakeholders. The project invites these important actors in local communities to provide viewpoints of ‘knowledge users’ to elucidate production and circulation mechanisms of ILEK for sustainable adaptive governance of local commons. Analyses of circulation of knowledge across multiple scales by cross-level knowledge translators clarify cross-scale governance for solutions of global environment problems.

Background of research:

Bottom-up approaches driven by divers stakeholders of local communities are essential to solve diverse global environment problems including worldwide degradation of ecosystem services which comes up to the surface on the basis of locally specific problem structures. Scientific as well as various types of local knowledge systems are required for the stakeholders to effectively manage ecosystem services. Studies have been accumulated to describe characteristics and structures of these knowledge bases, but design-oriented analyses of production and circulation mechanisms of knowledge to contribute to adaptive governance of ecosystem services have not been conducted in detail. This research focuses on the roles and functions of residential researchers and bilateral knowledge translators as important actors to provide knowledge basis for decision makings and actions by local stakeholders, and production and circulation of the Integrated Local Environmental Knowledge (ILEK), a transdisciplinary blend of science and various types of local knowledge, to understand mechanisms to facilitate collaboration of diverse actors to achieve adaptive governance of local communities to design sustainable future.

Contribution to solutions of global environmental problems:

This research contributes to bottom-up solutions of diverse global environmental problems by clarifying adaptive governance systems of ecosystem services supported by production and circulation of the Integrated Local Environmental Knowledge (ILEK). It aims to clarify theory and approaches of solutions of global environmental problems from the viewpoints of knowledge users (stakeholders) to establish adaptive governance systems of diverse ecosystem services by effectively integrating scientific knowledge and various types of local knowledge deeply embedded in everyday life. These results will

contribute to formation of future visions of “science in/with society” and “society making full use of science” to support bottom-up solutions of diverse global environmental problems.

○ Progress and Results in 2015

Research plan:

This project effectively inherits research outcomes of cognitive sciences from previous RIHN projects and integrates them with various cases of issue-driven and solution-oriented science approaches from the world, which involve collaborative interactions between scientists and stakeholders to produce and utilize ILEK for creation and sustainable management of local commons. The project aims to elucidate pathways to promote science in/with society as well as to design social systems to make full use of science for solutions of diverse global environmental problems. The project analyzes scientific processes and outcomes of various cases of solution-oriented knowledge productions by residential and other types of researches including RIHN projects from the viewpoints of knowledge users, based on the hypothesis that the multiple roles and functions of important actors to produce and circulate ILEK support the adaptive governance of local communities for sustainable futures. We have established the preliminary conceptual models of ILEK-based adaptive governance based on the framing of local stakeholders and potential responses of stakeholder networks. In 2014, we aimed to elaborate these theoretical frames from meta-analysis of case studies and modeling to produce verifiable hypothesis for designing action-based verification processes. We also conducted analysis of roles and functions of bilateral knowledge translators in the contexts of cross-scale collaboration mediated by knowledge flow across multiple scale levels from local to global. Through the previous research, we recognized that local communities are almost always interacting with external actors and institutions including global and regional ones. Cross-scale translators are an important component of stakeholder networks in each local community. This observation led us to incorporate cross-scale analysis into each case study, and to avoid analyzing cross-scale governance independently in a separate research group. Action-based verification processes have started from FR3 in selected case study sites to incorporate cross-scale elements as much as possible. With the approaches integrating empirical studies, Action-based verification processes and theoretical analysis, the project aims to elucidate the way forwards toward solution of global environmental problems.

Research methods:

This initiative based project employs a unique transdisciplinary approach incorporating feedback loops connecting local empirical analyses and abstract theoretical levels. At the local empirical level, we identified 61 case study sites based on the presence of dedicated residential researchers or translators among project members closely collaborating with diverse stakeholders in each case study site. Fifteen sites of action-based verification have been extracted among the case study sites. Organizations and people working as a bilateral translator connecting multiple scales from global to local levels are reviewed for their knowledge production and translation, and cases of such cross-level knowledge translators are identified for cross-scale analysis. Project member scientists conduct co-design, co-production and co-delivery processes of transdisciplinary research through daily interactions with local leaders, decision makers, cross-level translators and other stakeholders. These localized research results are integrated by meta-analysis using semi-structured interviews, text analysis, GIS-based cluster analysis and conceptual as well as mathematical modeling to identify important drivers of adaptive governance. The scientists and stakeholders at the local level researches will be involved at the meta-level theoretical analysis through the deliberative stakeholder workshops planned in FR3 and 4. The workshop is designed to critically review and discuss the outcomes of theoretical meta-analysis to give feedback from the local perspectives to both theoreticians and empirical researches. These feedback at the workshop will be immediately brought back to local level research and actions by participating scientists and stakeholders deeply embedded to each case study sites. This two-tier structure of transdisciplinary approaches will enable the scientists and stakeholders to achieve close collaboration and mutual learning throughout the entire research processes to produce acceptable and applicable way forwards for designing sustainable societies at local as well as global scale levels.

Research organizations:

The research organization has been composed of Case Study, Social Experiment, Multi-scale Analysis, Theory and Modeling, and Managing groups together with thematic task forces (TFs) cross-cutting the research groups. The Case Study group with three working teams (East Asia: EU & North America: Developing Countries) conducts field research of diverse knowledge systems produced by RIHN projects and other researches in different localities of the world. We design and conduct action-based verification of hypothesis focusing on ILEK-based adaptive governance mechanisms to clarify drivers of adaptive societal changes. A part of Case Study group has been re-organized into Action-based Verification group in FR3. We also make a quest of mechanisms to facilitate cross-scale actions for global environment problems, by analyzing roles of bilateral translators across global, regional and local scales. Multi-scale Analysis group consisted of Top Down and Bottom Up teams was merged into Action-based Verification group to work together with other groups to elucidate dynamic translation and circulation of knowledge across different scale levels to facilitate cross-scale adaptive governance. Theory and Modeling group works together with other groups to conduct meta-analysis of the case studies to establish and elaborate parameters for modeling. The results are fed back to other groups to refine research strategies. In order to facilitate interactions among diverse project members with different academic background, the cross-cutting Task Forces (TFs) are organized at different levels of analyses, including Ethics of Design-oriented Science, ILEK Simulator, Environmental Governance, Transdisciplinarity, Residential Research, Sato-umi Fisheries Resource Management, Biosphare Reserves, and Resource Management Certification TFs. The Managing group coordinate diverse research activities of these groups and TFs, develop and improve basic concepts and strategies, and integrate research results for design of sustainable societies. Comprehensive understanding of adaptive governance mechanisms of commons is expected to be achieved with this integrative research design.

Research outcomes of the year 2014:

a) ILEK Triangle model

While collaborative research and actions were continued in each case study sites, preliminary analysis were conducted regarding knowledge production, circulation and utilization for local decision making and actions in 11 cases of RIHN research project to construct a conceptual model of ILEK-based local adaptive governance for meta-analysis and integration of case studies and cross-scale analysis. The model, named “ILEK Triangle”, is composed of interactive system of three important elements of ILEK-based adaptive governance (knowledge production, decision making and action at individual or small group level, and formal/informal institutional changes), driven by knowledge producers, knowledge users and translators. In this ILEK Triangle, ILEK productions were hypothesized to lead to dynamic changes of institutions toward sustainability through two different pathways: first, through changes of individual decision makings and actions resulting in adaptive changes of social systems, and second, through direct effects upon formal and informal institutions and collective knowledge systems in the community. In order to identify important drivers to mobilize this system, detailed analyses of interview records of RIHN project leaders were conducted. A set of hypothetical drivers were identified by these analyses, which were classified into five categories (below).

1. create and visualize values

Produced knowledge creates or visualizes new shareable values in local communities to mobilize collaborative actions.

2. create new linkages (local and cross-scale)

Produced knowledge creates new linkages among actors within and outside the community, including actors addressing broader issues.

3. provide options and opportunities

Produced knowledge expand options and opportunities for sustainable actions among stakeholders and mediates changes in environmental perception.

4. create collective actions

Produced knowledge creates collective actions, transforming existing local institutions or creating new ones.

5. appropriate translation

Knowledge translators (individual or organizational) mediate changes in individual actions or formal and informal social systems by appropriate selection, modification and reconstruction of knowledge.

b) Preliminary results of discourse analysis

We developed detailed interview protocol based on ILEK Triangle in March 2013 to extract perceptions of scientists and stakeholders collaborating in ILEK productions and community actions in case study sites with regard to important drivers of ILEK-based adaptive governance. More concise and user friendly self-evaluation questionnaire was also developed in 2013 by improving the interview protocol. Interview Specialists Group (ISG) was established and has accumulated interview records, including translators, knowledge producers, and 8 knowledge users. The interviewees commonly shared importance of opportunities to expand human networks by collaborative actions supported by ILEK, which were largely dependent on attributions of knowledge producers and translators, as well as knowledge itself. The analysis of participatory observations by Case Study and Action-based Verification group clarified that new values were created and visualized through the collaborative interactions, and options and opportunities also expanded as a result of collaboration. Various types of actions created by knowledge production and circulation effectively mobilized local institutions, thereby promoting decision making and actions. Translators played significant roles in collaborative networking by bridging gaps in knowledge hierarchy and providing legitimacy for different stakeholders to collaborate. This hypothetical drivers of knowledge-based adaptive governance should be verified in the remaining project periods by both empirical studies and theoretical modeling.

c) Progress in text analysis and theoretical modeling

Methods of computer-assisted text analysis based on the ILEK database launched have been developed to conduct quantitative and qualitative analyses of discourses of scientists, translators and stakeholders accumulated in the project research. Semantic network analysis methodologies have been developed to extract major concepts delivered in the narratives of various actors, and the changes of message structures according to time axes. We aim to improve this technique to provide data sets for mathematical modeling of dynamic changes of knowledge circulation networks in the adaptive governance processes.

Approaches of mathematical modeling of ILEK-based adaptive governance have been improved in the process of intensive interactions between theoreticians, empirical scientists and stakeholders. Particularly promising approaches include communication dynamics models analogous to evolutionary dynamics of knowledge as a meme, complex network models including asymmetric simple exclusion processes (ASEP) focusing on functions of bilateral translators in knowledge circulation networks (≈social network), and game theoretic models of exclusion mechanisms of free-riders in adaptive governance processes.

d) Academic and societal outputs

The basic concepts of the project including ILEK, residential researchers and bilateral knowledge translators, as well as methodological framework of the project were summarized and published in a book chapter in English (Sato, T, 2014, ″Integrated Local Environmental Knowledge Supporting Adaptive Governance of Local Communities”, Alvares, C. ed, Multicultural Knowledge and the University, Multiversity India, Mapusa, India, pp.268-273.). We organized the first ILEK project international symposium in September 2014 entitled ″Knowledge Translation:Bridging Gaps between Science and Society″, and an international symposium co-organized by University of Saskatchewan and Kyoto Model Forest Association titled ″International Symposium on Community-based Management of Forest Resources: Perspectives on culture, learning and adaptation in Canada and Japan″ in March 2015. The Resource Management Certification TF organised a symposium on ″Producing Intangible Values of Agriculture and Fisheries Products: Local certification and trust formation mechanisms″ in February 2015. In order to share general research outcomes of the project with various stakeholders to receive their input to the research processes, we had a deliberative workshop inviting 45 local stakeholders including residential as well as visiting researchers in January 2015.

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○ Future Themes

a) Meta-analysis and modeling

The improved version of self-evaluation questionnaire will be applied to case studies and social experiments to accumulate data to extract perceptions on ILEK-based adaptive governance among scientists and stakeholders collaborating in ILEK productions and community actions. A new project researcher in charge of case studies in developing countries will play a key role in meta analysis of case studies outside Japan, especially in developing countries. Text data of naturally spoken narratives and writings of important actors in case study and action-based verification sites will also be accumulated to provide resources for discourse analysis.

In FR4, we will improve analysis of these interview records and narrative data using conventional and computer-assisted discourse analysis to elaborate hypotheses on important drivers and processes of

ILEK-based adaptive governance. Computer-assisted analysis techniques including semantic network analysis will be further improved in close collaboration among modelers, database specialists and empirical scientists. Outcomes of these analyses will be successively delivered to the Theory and Modeling group to test various modeling approaches, and to the Action-based Verification group to promote verification of hypothesis in FR4. Research results are also applied to the design of ILEK Simulator scheduled to be launched toward the end of the project.

b) Case studies and Action-based Verification

FR4 will be a critical stage of the project to implement action-based verification processes at selected sites to verify focused hypotheses on drivers and processes of ILEK-based adaptive governance. The designs of verification processes on the bases of ILEK Triangle model has been completed at 15 sites to address questions related to characterization of drivers of knowledge-based adaptive governance. Each verification process is composed of attempted or ongoing actions delivered by knowledge producers or translators and expected societal changes observable within the project period. We will organize the Action-based Verification Group with project members committed to each sites to improve the design and implementation and to integrate results. Societal changes resulted from experimental actions can be measured by dynamism of stakeholder networks, changes in perceptions among stakeholders and scientists, and emergence of collaborative actions. Methodologies of qualitative and quantitative evaluation of social dynamism will be established and improved in FR4.

c) Stakeholder workshop at meta-analysis level

Stakeholder workshops will be an important component of two-tier transdisciplinary approach in the project. We completed the first deliberative workshop in September 2014 (within Japan), and are designing a series of localized workshops in the verification sites outside Japan in 2015. The WS will mainly invite scientists and stakeholders deeply embedded to each case study sites. The protocol basically follows those utilized in World Wide Views on Biodiversity project. The output of the WS have been analysed collaboratively by scientists and stakeholders to provide feedback to both academic and stakeholder communities at local and cross-scale levels.

d) ILEK Simulator as a societal output of the project

In its initial design, we assumed that the final societal output of ILEK project would be societal changes in each case study site directly delivered by project members deeply embedded in each community. However, as we found collaboration among diverse actors within and outside the community could be an important driver of adaptive governance, a mechanism to promote mutual learning and interaction among diverse case study sites over the world was desperately needed. Based on the Web GIS system and semantic network analysis protocols, we started designing a web-based ILEK Simulator as the societal output of the project. ILEK Simulator provides plausible options and tips of ILEK-based adaptive governance fitted to particular local settings, together with real-life examples of local collaborative activities in other sites sharing common characteristics. ILEK Simulator will open a new pathway to connect local communities in the world for collaboration in adaptive governance processes.

●Achievements

○Research Presentations

【Invited Lecture / Honoronary Lecture / Panelist】

・Koji Nakamura Twinning GIAHS sites: Collaboration in Human Capacity Building between the GIAHS Noto's Satoyama and Satoumi in Japan and GIAHS Ifugao Rice Terrace in the Philippines. GIAHS Steering and Scientific Committee Meeting, 2015,04,29, Rome, Italy .

Stage: Full Research

Project No.: R-08-Init

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

Abbreviated Title: WEF Nexus Project

Project Leader: Mkoto Taniguchi

Research Axis:

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

Key Words:

○ Research Subject and Objectives

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 managements 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 the vulnerability) by choosing management structures and policies that optimize both the water-food and water-energy connections in Asia-Pacific coastal regions. We define 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.

Group1 : Environmental governance, science in/for society, and co-design/co-production approaches, in particular emphasizing regional scale stake-holders such as GEC (Global Environmental Change) Asia Platform

Group2 : 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

Group3 : Biophysical measurements/analyses within the water-food (e.g., fisheries resources) nexus by using state-of-the-art geochemical, coastal oceanographic, geophysical, hydrologic, and ecological techniques including isotopic tracers to evaluate the linkages between land and ocean

Group4 : Social measurements/analyses of the water-energy-food relationships by use of community surveys, cost-benefit/efficiency analysis, and environmental valuation, based on sociology, economics, anthropology, psychology, and behavior-science methodologies

Group5 ：Development of integrated indicators/indices and network analyses based on principal component analyses (PCA), social network analyses, and factors weights determined by feedback from stakeholder meeting/workshop

Area ・Japanese site(1) Obama, Fukui ・Japanese site(2) Otsuchi, Iwate ・Japanese site(3) Beppu, Oita ・Canada study group ・America study group ・Indonesia study group ・Phillippine study group

○ Progress and Results in 2015

We address the hypothesis that water use for producing and consuming food and energy on land affects fishery production in coastal zones. To examine this theory, we address two primary objectives; 1)to understand the complexity of the WEF nexus system since the relationships of all three resources such as water-energy, water-food and/or WEF are interrelated and interdependent, which implies that the complexity of the nexus system has not yet been clarified; and 2) under scientific evidence and scientific uncertainty to create policy options to solve the identified nexus problems, that is, to reduce the number of trade offs among three resources and to mitigate potential conflicts among these resource users through transdisciplinary approaches. The water-energy-nexus team and water-food nexus team pursuit the former challenges, and the science in/for society team, the stakeholder analysis team and the interdisciplinary team engage in the latter challenges.

【To understand the complexity of WEF nexus system】

At the local level of WEF, as a result of collecting groundwater sample by depth from flowing artesian wells along coastal areas in Otsuchi which is a tsunami affected area, it turns out that aquifer levels declines in response to construction of seawalls and a water gate. Installing observation wells and long-term monitoring of groundwater levels is needed to understand the linkage between groundwater and the coastal ecosystem. Regarding the ground heat exchange system, asa result of gauging soil temperature in Obama and Otsuchi, it was revealed that the soil temperature in Obama is higher than that of Otsuchi. As previous studies show that the ground is warming, more work is needed to understand the interaction between soil temperature and the potential energy of soil. In Beppu, another finding of the WEF nexus shows that changes in the heat environment caused by hot spring drainage water from resorts and power generation affect river ecosystems, including non-native Tilapia habitat. We conducted a quantitative analysis of how much energy it is possible to produce per 1kg of water among small-scale hydro power, hot spring energy and shale gas.We found that shale gas most effectively uses this water to produce energy. We will continue investigating how to produce potential energy effectively using water,and continue to identify how to diversify among renewable energy sources.

As for the inter linkages between groundwater and fishery production, physical, chemical and biological surveys have been conducted at four project sites in Japan. As for the physical and chemical aspects, the ratio of submarine groundwater discharges (SGDs) in fresh water inflow was gauged along the coast of Hiji town in Beppu Bay, and the amount of nutrient supply derived from SGDs in the same area was estimated. Furthermore, it turns out that the radon concentration in river water and groundwater is higher in Otsuchi Bay in comparison with Obama and Hiji. From a biological point of view, a high abundance of crustaceans and fishes was observed at a southern coast of Otsuchi Bay, and higher a abundance and species diversity of invertebrates and fishes were observed at an area with high submarine groundwater discharge in Obama Bay and Beppu Bay. These results obtained to date show that inputs of nutritional matters of terrestrial origin through submarine groundwater increase biological production and biodiversity in coastal areas.

【Stakeholder analysis for transdisciplinary study】

At a regional scale, to clarify differences in public attitudes towards geothermal power and hot springs in three countries, we conducted a web questionnaire to the general public living in Japan, the Philippines and Indonesia. Characteristics of Japanese respondents in contrast to the other countries were as follows; most people were unfamiliar with geothermal power; less people were bothered by trade-offs between geothermal power and hot springs and the effect of community development than the other two countries; less people preferred to be involved in the construction process of geothermal power than the other two countries; and more people preferred a referendum to joint fact-finding of scientific evidence.

As a site-specific case study, we held stakeholder meetings regarding developing hot spring power generation in the hot spring resort area of Beppu. We discussed with local stakeholders and identified the tools, which will be used for making policy recommendations for sustainable development of hot springs. In addition, we conducted an online survey about how local social capital impacts local

resource management. There is also a trend that people who trust local people attended local resource management activities more; and people who have a close relationship with local people attended to local resource management activities more. We will continue analysing linkages between local social capital and local resource management activities.

【Developing methods for interdisciplinary and transdisciplinary studies】

We are developing and using various integrated methods to address the WEF nexus. We classified the integrated methods as qualitative and quantitative that contribute to both interdisciplinary and transdisciplinary research. Qualitative methods that we analysed consisted of Questionnaire Surveys, Ontology Engineering and Integrated Map, while quantitative methods included Physical Models, Benefit-cost analysis (BCA), Integrated Indices, and Optimization Management Models based on case studies from research sites in Japan and the Philippines. We discovered and identified how to use each method. Ontology Engineering would be the most useful for designing the project during initiation stage to build a list of common concepts of term; and the linkages of each term among stakeholders including researchers and practitioners. In addition, Ontology Engineering could be used at the policy planning stage to assess whether the policy/plan would coverall disciplines including natural sciences, social sciences and humanities, and sectors such as water, energy, and food (in order to address the key issues that were originally identified during the initiation stage). Questionnaire Surveys would be more useful for collecting information to analyse WEF inter linkages when few data exist; then, it would help to identify the key issues during the initiation stage. Integrated Maps can provide an opportunity to share knowledge showing actual conditions at a spatial scale among stakeholders during the policy planning stage. BCA and an Optimization Management Model would play important roles in clarifying trade-offs during the initiation stage, creating and providing policy options during the policy planning stage. Physical models are essential for understanding the WEF nexus systems; these can be developed to clarify inter linkages between physical conditions of water, energy and food, as well as human activities by working with social scientists. These models can be used to address key issues more holistically during the policy planning stage.Using an Integrated Index can be a discipline-free method, which could incorporate and integrate each result with different disciplines, then evaluate trade-offs during the policy planning stage.

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○ Future Themes

【To understand the complexity of WEF nexus system】

Regarding geothermal and ho tspring heat energy, further detailed research will be continued in Beppu, paying special attention to possible conflicts with tourism and other local industries in developing the energy. As for ground heat exchange systems, further research is needed to understand the interaction between soil temperature and the potential energy of soil in Otsuchi and Saijo, by applying

the procedure established in Obama. Cost-benefit analyses and life cycle assessment of raising agricultural products by utilizing ground heat will be carried out in Obama.

As for the interlinkages between groundwater and fishery production, field surveys within Japan will be continued in order to make a comprehensive evaluation of water and trophic flows between land and sea. At the Otsuchi site, total flux of nutritional matters will be evaluated. At the Obama site, spatial-temporal variability in physical and biological conditions around submarine groundwater seepages will be monitored at finer scales. At the Beppu site, trophic flow from materials to predators at higher trophic levels will be analyzed through field sampling and stomach contents analysis with application of carbon and nitrogen stable isotope analysis. At the Yuza site, a more quantitative evaluation of trophic flow will be conducted through surveys for abundance and biomass of plants and animals close to the submarine groundwater see pages. In addition to these samplings at Japanese sites, field surveys in the US will be conducted in the following fiscal year to make an international comparison.

【Stakeholder analysis for transdisciplinary study】

The research plan consists of the following three tasks; A: Comprehensive case analysis on participatory approaches, B: Case studies of participatory approaches in the local communities, C: Attitude and behaviour change analysis. Task C is to clarify points on communicating scientific evidence by attitude and behaviour change analysis using web-based deliberative experiments and questionnaires in a series of stakeholder meetings in the local communities. We conducted an online questionnaire with the general public living in Japan, the Philippines and Indonesia to clarify differences in public attitude regarding geothermal power and hot springs. In addition, we conducted questionnaire surveys in Obama City, Fukui, and Pajaro Valley, California to examine the possibility of problem solving based on these opinions. These implications will be used as inputs into Task B, which is to conduct case studies of participatory approaches in the local communities in Obama,Beppu, Otsuchi and the other sites within this project. We begin with stakeholder analysis and will then design and implement participatory approaches such as joint fact-finding and consensus conferences in the local communities to realize “co-design and co-product of science and society”. We focus on stakeholder analysis in Otsuchi and conduct some workshops on the linkage between water and energy with the results of task B and C over the past fiscal year.

【Developing methods for Interdisciplinary and transdisciplinary studies】

A remaining challenge is to develop integrated methods for linking the ideas and actions of various stakeholders from different sectors, while also considering distinct temporal and spatial scales, including vertical and horizontal dimensions. Ways of connecting local nexus issues within a community to broader national and global nexus issues (the vertical dimension) are often missing from site-specific case studies. At the same time, it is important to understand how an incident related to WEF resources and resource users in one case study area could affect other case study areas (the horizontal dimension). We should also consider how current events are likely to impact future WEF resources and resource users on a temporal scale. To address these challenges, it is possible to use a global model to set our site-specific case studies within a global context on a vertical spatial scale.Furthermore, the creation of future scenarios further integrating each integrated method mentioned above is a challenge,however this will make it possible to analyse WEF nexus on a temporal scale.

【International research collaboration for comparative study】

The U.S. group will be conducting a site reconnaissance with the water-food team to conduct biological sampling in areas of coastal submarine groundwater discharge in order to make an international comparison. Social conflicts in developing small hydro power will be examined in Otsuchi, Indonesia and the Philippines. In addition, we will convey and converse the methods which are now being developed by the interdisciplinary team in Japan to researchers abroad to conduct a comparison study and to create future scenarios using the same methods. An integrated index from the Philippines is now being developed and wewill convey this method to Indonesia during the next fiscal year. The BCA is approximately 90% complete for the US case, which quantifies the energy-water nexus surrounding the College Lake project and quantifies the economic value of sea-water intrusion prevention. An integrated physical model, which will apply hydrology,fisheries, geochemical and biochemical information in an interdisciplinary way,is now being developed in Obama and Beppu in Japan. Next fiscal year, we will apply the physical model in the US and Canada. Furthermore, to complete the transdisciplinary process,

decision makers should be able to employ this model along with other stakeholders, such as scientists and the business sector, to decide on optimal policies for sustainable water and ecological management.

●Achievements

○Papers

【Original Articles】

- Sugimoto, R., Tsuboi, T. 2016,01 Seasonal and annual fluxes of atmospheric nitrogen deposition and riverine nitrogen export in two adjacent contrasting rivers in central Japan facing the Sea of Japan. Journal of Hydrology: Regional Studies . DOI:10.1016/j.ejrh.2015.11.019.
- Sugimoto, R., Honda, H., Kobayashi, S., Takao, Y., Tahara, D., Tominaga, O., Taniguchi, M. 2016,01 Seasonal Changes in Submarine Groundwater Discharge and Associated Nutrient Transport into a Tideless Semi-enclosed Embayment (Obama Bay, Japan). Estuaries and Coasts 39(1) :13-26. DOI:10.1007/s12237-015-9986-7.(reviewed).
- Burnett, K., Wada, C., Endo, A., Taniguchi, M. 2015,12 The economic value of groundwater in Obama. Journal of Hydrology: Regional Studies . DOI:10.1016/j.ejrh.2015.10.002.(reviewed).
- Karen Ann B. Jago-on, Fernando P. Siringan, Rosana Balangue-Tarriela, Makoto Taniguchi, et al. 2015,12 Hot spring resort development in Laguna Province, Philippines: Challenges in water use regulation. Journal of Hydrology: Regional Studies . DOI:10.1016/j.ejrh.2015.11.020.(reviewed).
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・Endo, A. Concepts, Tools/Methods, and Practices of Water-Energy-Food Nexus. Belmont Forum Scoping Workshop, 2015,06,29-2015,07,02, Boulder in the US.

・Taniguchi, M. Evaluations of anthropological impacts on groundwater temperature. 26th IUGG General Assembly, 2015,06,24, Prague, Czech Republic.

・Baba, K. Developing a Policy Model for Resilient City; Implications from Applying Indicators, Status Report and Scenario Development to Japanese Cities. Resilient Cities 2015 (6th World Congress on Cities and Adaptation to Climate Change), 2015,06,10, Bonn, Germany.

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Stage: Full Research

Project No.: R-09

Project Name: Long-term Sustainability through Place-Based, Small-Scale Economies: Approaches from Historical Ecology

Abbreviated Title: Small-Scale Economies

Project Leader: HABU, Junko

Research Axis: Resources

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

Key Words: Small-Scale Economy; Diversity; Networks; Local Autonomy; Long-term Sustainability; North Pacific Rim

○ Research Subject and Objectives

(1) OBJECTIVES:

This project examines the importance of place-based, small-scale and diversified economies, particularly the importance of small-scale food production, circulation and consumption, for the long-term sustainability of human societies. For the purposes of this project, a "small-scale economy" is defined not 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 local or regional networks that enable production, circulation and consumption without precluding links to the outside economy. Long-term sustainability can be defined as "the capacity of humans to create, test out, and maintain abilities to adapt to environments" (Holling, Gunderson and Peterson 2002) over a span of anywhere from several hundred to several thousand years. The following working hypothesis begins our research: "Highly specialized subsistence (i.e., foodproduction) strategies 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 or examine the long-term impacts of the loss of subsistence/food diversity in relation to other environmental and cultural factors. To link these studies with the current discussion of the scale and methods of alternative food systems, ethnographic and ecological studies of contemporary small-scale food systems and communities are being conducted. In conjunction, studies of the past and present point to the future, as the research process also involves the collaborative design of ecologically sound and equitable food systems.

The theoretical genesis of this project is an approach of historical ecology (Balée 1992, 1998, 2006, 2010, Balée and Erickson 2006, Crumley 1994, Erlandson and Rick 2008, Kirch and Hunt 1997, Thomson and Waggoner 2013) that conducts comprehensive research into long-term and short-term cultural change while emphasizing the impact of human activities on the environment. In particular, this project proposes that high levels of **diversity, network** and **local autonomy**, all of which are strongly correlated with the **scale** of the system, are the keys to achieving long-term sustainability of socioeconomic systems. By integrating case studies on food diversity, the mobility of people, goods and information and the initiatives of local stakeholders in relation to the scale and resilience of societies and economies, this study aims to advance theories on the interrelationship between culture and environment by addressing climate change. Other cultural factors, including technological developments, sociopolitical structure and rituals/religion, are also taken into consideration.

(2) BACKGROUND:

This research aims to construct strategies for tackling global environmental problems associated with the rise of large-scale economic systems. These global environmental problems being addressed by this project include soil and water contamination, a decrease in biodiversity and long-lasting damage to ecosystems caused by large and homogenized food production. In the case of agriculture, the development of large-scale monoculture with applications of a large amount of pesticides and chemical fertilizers has resulted in serious soil contamination, water pollution, loss of biodiversity, and even the destruction of whole ecosystems. The predominant measures to deal with these global environmental problems are top-down regulations enacted by national/local governments and international agencies.

However, these regulations may not be sufficient when we consider long-term environmental effects on a time-span of hundreds or thousands of years. As an alternative approach, this project examines the past and present practice of place-based, smaller-scale food production systems, evaluates their advantages and limitations, and explores their future potentials (see also Capra 1997,2002).

(3) GEOGRAPHIC FOCUS

Geographically, our project focuses on the North Pacific Rim. In particular, we have identified northern Japan, with its solid archaeological record and its importance to contemporary food production in Japan, as the core area of our field research. The west coast of North America, with rich traditions of ethnographic and ecological investigation as well as active contemporary food/agriculture movements, will provide the main comparative case studies. These two regions share a number of characteristics in common, including climate, vegetation, fauna,and a high level of seismic activity. There are also cultural ties with historical depth as a result of the migration of anatomically modern humans after the late Pleistocene. Historically, the abundance of small-scale economies supported by marine food exploitation and intensive nut-collecting also characterizes these two regions.

(4) RESEARCH METHODS AND ORGANIZATION

The project consists of three research groups,each with several sub-projects:

I. Longue-Durée Group: Archaeological, historical and paleoenvironmental studies are used to test our working hypothesis listed above. Because of the long timespan, these studies are capable of addressing the relationships between the relevant factors mentioned above. These relationships include the long-term consequences of the loss of diversity and associated expansion of the scale of production, the importance of networks and changes in community and population size.

II. Contemporary Society Group: Ethnographic, sociological and agroecological studies of small-scale food production systems and their associated communities are conducted to understand the complex inter-relationships among cultural and natural contributors in contemporary urban and natural settings. Although the timespan examined by this second research group is much shorter than that of the first group, the results of our interviews and participant observations have revealed changes through time inpeoples' lifeways since the early 20th century. Chemical and biological analysis of soil, water and food provide direct evidence to evaluate the degree of human impacts on the environment.

III. Implementation, Outreach and Policy Proposal Group: Our emphasis on food diversity, network, and locally autonomous, small-scale production is being used to develop academic and public outreach programs for instigating and promoting place-based, small-scale, and diversified food production. In collaboration with educational programs, NPOs, NGOs and local community organizations, these programs develop alternative strategies to overcome problems and vulnerabilities of currently dominant large-scale, homogenous productions. Our ultimate goal is to make actionable contributions to local/national policies of rural/urban developments and food policy.

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○ Progress and Results in 2015

I. Longue-Durée Group

This research group tests our working hypothesis and examines the long-term impacts of the loss of subsistence/food diversity in relation to other environmental and cultural factors. All the sub-projects of this group have completed their data collection and moved on to the analysis and interpretation of the collected data. Several journal articles have been published, and many others are in preparation. Most of the results of our research are consistent with our initial hypothesis.

A. Japan

This team represents the flagship sub-project of our research. Using archaeological indicators for food/subsistence diversity, trade networks, social inequality, climate change and other socioeconomic/ environmental factors, this team has tested our main hypothesis primarily with data from the Tohoku region (the northern part of the Honshu Island) and Hokkaido, as well as from the Kanto and Chubu regions (central Honshu). Significant progress has been made over the past year in terms of identifying the timing of changes in food/subsistence diversity and settlement patterns on the basis of newly obtained AMS radiocarbon dates. GIS analyses are in progress to understand changes in settlement size and site distribution patterns. SPD (summed probability distribution) analysis of radiocarbon dates from the Hokkaido, Tohoku and Kantoregions have been conducted to simulate population dynamics of the Early to Late Jomon periods. Stable isotope analysis of skeletal remains for the past year has focused primarily on samples from the Tohoku region. Finally, but not least importantly, pollen analysis and alkenone SST (sea surface temperature) studies are in progress to nail down the timing of climate change in the study area. The results of these analyses are consistent with our hypothesis. We have also started analyses of pollen, phytolith, and diatom data from the Late and Final Jomon periods so that we can contextualize the results of our Early to Middle Jomon data in a broader timespan.

B. Comparative Studies

Five additional case studies provide comparative perspectives with which to further examine the mechanisms of long-term culture change. These case studies are from 1) California, 2) the Northwest Coast of North America, 3) the Canadian Arctic, 4) the Kurils and Eastern Hokkaido, and 5) the Russian Far East (Lake Baikal). Unlike the Japanese Jomon case, examples from California and the Northwest Coast seem to indicate that wide food diversity had allowed native communities in these regions to steadily increase in population thorough time until the time of the European contact. On the contrary, our case study from the Canadian Arctic indicates that the loss of food diversity with a focus on bowhead whaling was followed by a rapid population decrease. Given the limitations of available funding, case studies on the Kurils/Eastern Hokkaido and Lake Baikal have focused primarily on stable isotope analyses of strontium and lead to understand the movement of people in relation to changes in socioeconomic complexity.

II. Contemporary Society Group

As corollaries to our main hypothesis, this team addresses questions of 1) the positive role of small-scale and diversified production systems in relation to the environment and its changes through time, and 2) whether social networks associated with small-scale and diversified production increase the resilience of local communities, especially in times of disaster. Fieldwork has been conducted at both relatively traditional communities, including rural farming/fishing communities and indigenous communities such as Native American communities, and with alternative food producers such as organic farmers. Results of our research so far indicate the importance of traditional subsistence practices in maintaining resilient socioeconomic systems within local landscapes/seascapes on both sides of the North Pacific Rim. Our studies have also revealed critical historical differences between Japan and North America, particularly in that contemporary Japanese small-scale food production systems tend to

be rooted in rural communities that have never fully accepted large-scale operations,while small-scale food production movements in North America have emerged either as a resurgence of indigenous movements or in response to currently dominant large-scale operations.

A. Japan

A major focus of this team is on the interviews and participant observations of farming and fishing communities in Iwate and Fukushima Prefectures. In particular, we have chosen the Hei River Valley and the Kitakami Mountain areas as the main regional foci of our research. Results of our research have revealed how wide food diversity, which is often closely linked to increasing biodiversity as a result of human intervention in the environment, has been important to residents' everyday life. The use of a wide array of both wild and cultivated food is closely tied to intricate social networks, rich traditional ecological knowledge (TEK), and non-cash exchanges. Results of our interviews have revealed that changes through time in peoples' lifeways, since ca. the 1930s, reflect historic processes towards mass production, which caused many social and environmental problems, as well as residents' creative attempts to cope with these problems. The latter has had close ties with the consumer movements in Japan since the 1980s. About 70% of the necessary fieldwork in these regions have been completed, and we plan to finish the remaining fieldwork by summer 2016.

B. Comparative Studies

Research by this team has focused on a) indigenous communities on the West Coast of North America, b) organic food producers in California, and c) agroecological experiments in collaboration with scholars at the University of California, Berkeley. In collaboration with three Native American Tribes in California, the WukchumniYokuts, the Amah Mutsun, and the Coast Miwok, as well as with the Tlingit people in Alaska and the Canadian Arctic, our research team has conducted interviews and participant observation to record aspects of their TEK, including the use of wild food resources such as acorns and other nuts in the mountains and herring in the ocean, as a means of understanding how wide food diversity was maintained in their traditional lifeways. Our interviews have also revealed the symbolic importance of traditional foodways in re-establishing their cultural and ethnic identity. Results of these studies are being connected to our outreach efforts in the Third Research Group. Significant progress has been made in our fieldwork on small-scale organic farmers in California in urban and peri-urban settings. Results so far have indicated the merit of the recent organic food boom, as well as problems of conventionalization. We have also continued our agroecological experimental studies in collaboration with scholars at the University of California, Berkeley.

III. Implementation, Outreach and Policy Proposal Group

This research group identifies, proposes and implements social and environmental activities consistent with, and complementary to, research conducted by the two groups described above. In order to articulate the activities of this group, we have reorganized the structure of this group thematically as follows: **A) Promoting the Importance of Long-term Perspectives, B) Promoting Sustainable Fisheries, C) Promoting Sustainable Agriculture and Forestry, and D) Reviving Traditional Environmental Knowledge (TEK).** Activities related to Theme A include developing an Anthropocene curriculum with exhibition and seminar seriesco-organized by the House of World Cultures (HKW), Berlin, and the Max Plank Institute for the History of Science (MPWIG), Berlin. We are also in the process of collaborating with IHOPE (Integrated History and Future of People onEarth) to showcase our project as a case study for the IHOPE webpage. Activities for Themes B and C are the logical extensions of sub-projects related to indigenous and other traditional communities in Group II. Activities for Theme D include seminars and university classes about community gardens and urban organic farming in California by Prof. Miguel Altieri at UC Berkeley and in Kyoto by Prof. Ichiro Motono of Seika University, and an eco-literacy educational program with a focus on cherry salmon in the Hei River Area. Three workshops to link these activities back to the theoretical discussion of this project were held in February and March.

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TAKAHASHI, Satsuki (Sociology and Anthropology, George Mason University,Assistant Professor,Environmental Anthropology)
THORNTON, Thomas (Environmental Change Institute, University of Oxford,Associate Professor,Social and Cultural Anthropology)
YAMAGUCHI, Tomiko (College of Liberal Arts, International Christian University,Senior Associate Professor,Sociology)
YUMOTO, Takakazu (Primate Research Institute, Kyoto University,Professor,Ecology)

《Implementation, Outreach and Policy Proposal Group》

○ ALTIERI, Miguel	(Dept. of Environmental Science, Policy and Management, University of California, Berkeley,Professor,Agroecology)
□ CAPRA, Fritjof	(Center for Ecoliteracy,Chair of the Board of Directors,Physics)
CUTHRELL, Rob	(Dept. of Anthropology, Aechaeological Research Facility, University of California, Berkeley,Post-doctoral Researcher,Archaeology)
IIZUKA, Noriko	(Graduate School of Policy and Management, Doshisha University,Ph.D.Student,Environmental Policy and Management)
MATZEN, Sarick	(Dep.of Environmental Science, Policy, and Management, University of California, Berkeley,Post-doctoral Researcher,Environmental Ecology)
MIZUTANI, Shimon	(Tokyo University of Marine Science and Technology,Ph.D. Student,Environmental Ecology)
MOTONO, Ichiro	(Kyoto Seika University,Part-time Lecturer,Agriculture, Social Movement)
○ NILES, Daniel	(Research Institute for Humanity and Nature,Associate Professor,Human Environmental Geography)
PALLUD, Céline	(Dep.of Environmental Science, Policy, and Management, Berkeley, University of California,Associate Professor,Environmental Ecology)
○ SASAKI, Tsuyoshi	(Tokyo University of Marine Science and Technology,Associate Professor,Marine Science, Ecoliteracy)
SAWAGUCHI, Kayo	(NPO APAST,Assistant Director,Media presentation)

《Research Support》

KOBAYASHI, Yuko	(Research Institute for Humanity and Nature,Project Research Associate)
OJIKA, Yukari	(Research Institute for Humanity and Nature,Project Research Associate)
TAKEHARA, Mari	(Research Institute for Humanity and Nature,Project Research Associate)
TOMII, Noriko	(Research Institute for Humanity and Nature,Project Research Associate)

○ Future Themes

This academic year (FR3) is the final year of this three-year project. We plan to complete the remaining data analysis and publish the results of each sub-project in Group I (Longue-duree Group) and Group II (Contemporary Society Group). All the sub-projects in Group I have completed data collection, and data analysis is currently in progress. Sub-projects in Group II will continue supplementary data collection (primarily interviews) until Summer 2016.

Members of the sub-projects have been asked to incorporate discussions about how the levels of diversity, networks, local autonomy and scale of the economic activities were related to the resilience of the local socioeconomic systems in their case studies. Based on these results, we will have a series of workshops and symposia to further develop these discussions and link them to the broader theoretical frameworks of historical ecology, resilience theory and debates on human-ecodynamics as well as to evaluate the validity of these frameworks.

Key project members to facilitate these discussions in Group I include, but are not limited to, Kent Lightfoot, Ben Fitzhugh, Simon Kaner, James Savelle, Colin Grier, Enrico Crema, Hodaka Kawahata, and Minoru Yoneda. A major goal of this process is to demonstrate that archaeological and paleoenvironmental studies are relevant when thinking about global environmental issues in the future. This will also lead to activating the discussion on the relevance of archaeological study in the contemporary world.

For Group II, key players in our theoretical discussions include (again, are not limited to) William Balée, Thomas Thornton, Tomiko Yamaguchi, Mayumi Fukunaga, Satsuki Takahashi, and Leo Aoi Hosoya. A challenge to this group has been to bridge the gap between those working on traditional communities, including rural Japan and Native American communities, and those working on alternative food production systems,including organic agriculture. Progress in our field research, however, has revealed that there are many similarities in the way in which both types of small-scale economies are connected to the global economy, and that both types of case studies can be discussed in relation to our key concepts when thinking about long-term human impacts on the environment and the resilience of socioeconomic systems.

As discussed above, we have reorganized the structure of Group III (Implementation, Outreach and Policy Proposal Group) so that the contents will be more directly tied to the research activities of the first two groups. Research plans for this group include the continuation of the existing sub-

projects (e.g., agroecological programs by Miguel Altieri, Céline Pallud and Ichiro Motono, and the aquatic eco-literacy educational program at the Hei River Valley by Tsuyoshi Sasaki) and outreach activities that function as logical extensions of several sub-projects in Groups I and II.

●Achievements

○Books

【Authored/Co-authored】

・Alessa, Lilian, Colin Grier, et al 2015,05 Best Practices for Integrating Social Sciences into Social Ecological Systems Science: Future Directions for Building a More Resilient America . Center for Resilient Communities, University of Idaho, 50pp.

【Chapters/Sections】

・Grier, Colin and Bill Angelbeck 2015,08 Tradeoffs in Coast Salish Social Action: Balancing Autonomy, Inequality and Sustainability." Ed. . . . . Cambridge, England. (Currently under review) . Michell Hegmon (ed.) Tradeoffs in Archaeology. Cambridge World Archaeology. Cambridge University Press, Cambridge, UK.(Currently under review)

・Fitzhugh, Ben 2015,08 Going to School at Karluk One. Steffian, A. F.; Leist, M.; Haakanson Jr., S.; Saltonstall, P. (ed.) Kal'unek From Karluk: Kodiak Alutiiq History and the Archaeology of the Karluk One Village Site. University of Alaska Press, Fairbanks, AK.

○Papers

【Original Articles】

・Adachi, Kaori 2015,04 Analysis of Jomon Pottery from the 1964 Excavation of Location B of the Saibana Shell-Midden, Aomori Prefecture, Japan. Shigaku :569-599.(In Japanese).

・Altieri, M. and Nicholls, C. 2015,05 Agroecology and the design of climate change resilient farming systems. Agronomy for Sustainable Development .

・Ames, Kenneth. M., M.P. Richards, C.F. Speller, D. Y. Yang, R. L. Lyman, and V.L. Butler 2015,05 Stable isotope and ancient DNA analysis of dog remains from Cathlapotle (45CL1), a contact-era site on the Lower Columbia River. Journal of Archaeological Science 57 :268-282. DOI:10.1016/j.jas.2015.02.038.

・Cooper, Kory, Kenneth M. Ames and Loren Davis 2015,11 Cooper and Prestige in the Greater Lower Columbia Region, Northwestern North America. Journal of Northwest Anthropology 49(2) :143-166.(In press).

・Gakuhari, T., Komiya, H., Sawada, J., Anezaki, T., Sato, T., Kobayashi K., Ito, S., Kobayashi, K., Matsuzaki, H., Yoshida, K. and Yoneda, M 2015,08 Radiocarbon dating of one human and two dog burials from the Kamikuroiwa rock shelter site, Ehime Prefecture. Anthropological Science 123(2) :87-94. DOI:10.1537/ase.150309.(reviewed).

・Grier, Colin, Andrew Kliskey and Lilian Alessa 2015,11 Looking to the past to shape the future: Using paleodata to address social-ecological change and sustainability. Regional Environmental Change .

・Isaji, Y., Kawahata, H.,Ohkouchi, N., Murayama, M., and Tamaki, K. 2015,10 Varying response to the Indian monsoon throughout the past 220 kyr in the inner and outer region of the Gulf of Aden recorded in the deep-sea sediments. Journal Geophysical Research .

・Komiya, H., Sawada, J., Saeki, F. and T. Sato 2015,08 Morphological characteristics of buried dog remains excavated from the Kamikuroiwa Rock Shelter site, Ehime Prefecture, Japan. Anthropological Science 123(3) :73-85. DOI:10.1537/ase.150630.(reviewed).

・Masuda, R. and Sato T. 2015,08 Mitochondrial DNA analysis of the Jomon dogs from the Kamikuroiwa Rock Shelter site in Shikoku and the Higashimyo site in Kyushu, Japan. Anthropological Science 123(2). DOI:10.1537/ase.150111.(reviewed).

・Oishi, T., Hagiwara, M. 2015 A preliminary report on the distribution of freshwater fish of the Congo river: Based on the observation of local markets in Brazzaville, Republic of the Congo . African Study Monographs Supplementary Issue 51 :93-105.

・Sasaki, Tsuyoshi 2015 Self-Awareness at International Pacific Marine Educators Conference 2014 Japan. The Journal of Marine Education 29(2) :12 -17.

・Sato, T., Hashimoto, M., Abe, Y. and Ando, H. 2015,08 Re-discovery of the oldest dog burial remains in Japan. Anthropological Science 123(2) :99-105. DOI:10.1537/ase.150508.(reviewed).

・Thornton, Thomas. F. 2015,04 The Ideology and Practice of Pacific Herring Cultivation among the Tlingit and Haida. Human Ecology 43(2).

・Thornton Thomas. F. and H. Kitka Sr. 2015 An Indigenous Model of a Contested Pacific Herring Fishery in Siaka, Alaska. International Journal of Applied Geospatial Research 6(1) :94-117. DOI:10.4018/ijagr.2015010106.

・Yoshida, Akihiro, Yuichiro Kudo, and Kazutaka Shimada 2015,05 Impact of landscape changes on obsidian exploitation since the Paleolithic in the central highland of Japan. Vegetation History and Archaeobotany . DOI:10.1007/s00334-015-0534-y.

○Research Presentations

【Oral Presentation】

・Adachi, Kaori and Saori Oki Diversity and Sustainability of Regional Communities in Northern Tohoku, Japan, during the Middle-Late Jomon Periods. XIX INQUA 2015: Quaternary Perspectives on Climate Change, Natural Hazards and Civilization, 2015,07,26-2015,08,02, Nagoya Convention Center, Nagoya.

・Cuthrell, Rob An Integrative Historical ecological Approach to Reconstructing and Revitalizing Indigenous Land Stewardship on the Central California Coast. UC Santa Cruz Environmental Studies Seminar Series, 2015,11,09, UC Santa Cruz, CA, USA.

・Cuthrell, Rob Blending traditional knowledge and scientific research to revitalize Native stewardship at Quiroste Valley Cultural Preserve. The 30th Annual California Indian Conference, 2015,10,15-2015,10,17, University of California, Berkeley, CA, USA. (in Japanese)

・Cuthrell, Rob Healing Mother Earth Together: Building Partnerships to Improve Land Stweardship and Promote Cultural Revitalization. Symposium at the California Indian Conference, 2015,10,15-2015,10,17, University of California, Berkeley, CA, USA.

・Dolan, Patrick and Colin Grier Simulation and Calibration of Radiocarbon Dates: Alternative Approaches to Constructing Settlement Histories of Early Village Societies and an Application to an early Hunter-gatherer Village in southwestern British Columbia. 80th Annual Meeting of the Society for American Archaeology, 2015,04,16, San Francisco, CA, USA.

・Fitzhugh, Ben Exploring a coupled climate-ocean-human model for the late Holocene North Pacific Rim. XIX INQUA 2015: Quaternary Perspectives on Climate Change, Natural Hazards and Civilization, 2015,07,26-2015,08,02, Nagoya Convention Center, Nagoya.

・Fitzhugh, Ben Human Adaptation to North Pacific Islands in the Context of Atmospheric and Oceanic Variability. International Workshop “Climate Change and Food Diversity in the Past and Present: Comparative Studies on the North Pacific and Atlantic Coasts”, 2015,07,30, RIHN, Kyoto. (in Japanese)

・Fitzhugh, Ben Kodiak and the Kurils: A comparative approach to the sustainability of North Pacific maritime hunter-gatherers. 11th Conference on Hunting and Gathering Societies (CHAGS), 2015,09,07-2015,09,11, University of Vienna, Austria. (in Japanese)

・Fitzhugh, B., Yoneda, M., Habu, J., Taylor, J., Kamenov, G., Shinkai, R. and Krigbaum, J. Okhotsk culture mobility in the context of maritime subsistence and seasonally frozen coasts. ESSAS Annual Science Meeting ″Scientific Challenges in a Changing Arctic&Subarctic″, 2016,03,07-2016,03,09, Yokohama World Porters, Yokohama.

・Grier, Colin, Eric McLay and Michael P. Richards In Twos and Threes: Dating Multiple Samples and Materials to Address the Marine Reservoir Effect. 80th Annual Meeting of the Society for American Archaeology, 2015,04,15-2015,04,19, San Francisco, CA, USA.

・Habu, Junko Human Ecodynamics and Their Changes in Prehistoric Japan: Food Diversity, Climate Change and Long-term Sustainability of Hunter-Gatherer System. International Union for Quaternary Research Congress, 2015,07,26-2015,08,02, Nagoya Convention Center, Nagoya.

・Hamada, S., Thornton, T., Shinkai, R. and Habu, J. Economies in the North Pacific. ESSAS Annual Science Meeting "Scientific Challenges in a Changing Arctic&Subarctic", 2016,03,06-2016,03,06, Yokohama World Porpers, Yokoama.

・Hosoya, Leo Aoi, Oki Nakamura, Shinji Seguchi, Ayako Shibutani Japanese Jomon Hunter-Gatheres' Subsistence and Society: Chronological shifts in subsistence strategies on the basis of local characteristics of north Tohoku area. 11th Conference on Hunting and Gathering Societies (CHAGS), 2015,09,07-2015,09,11, University of Vienna, Austria. (in Japanese)

・Iizuka, Noriko, Ken-ichi Abe, Yuri Miyake, Kana Iwata Learning the Water, People and Diversity inspired by the UNEP Children's Paintings on the Environment. 26th Annual Meeting of the Japanese Society of Environmental Education, 2015,08,22-2015,08,23, Nagoya City University, Nagoya. (in Japanese)

・Kawahata, Hodaka Environmental change and its influence on human society in Japan during the last 3000 years. XIX INQUA 2015: Quaternary Perspectives on Climate Change, Natural Hazards and Civilization, 2015,07,26-2015,08,02, Nagoya Convention Center, Nagoya, Japan.

・Khenzykhenova, F. and Sato, T Ecosystem analysis of Baikal Siberia using Paleolithic faunal assemblages to reconstruct MIS3-MIS2 environments and Climates. XIX INQUA Congress: Quaternary Perspectives on Climate Change, Natural Hazards and Civilization, 2015,07,26-2015,08,02, Nagoya Convention Center, Japan.

・Lightfoot, Kent, Nick Tipon, Peter Nelson, Rob Cuthrell, Roberta Jewett, Paul Engel, Michael Grone, and Gabriel Sanchez Recent Research on Indigenous Landscape Management Practices in Point Reyes National Seashore. The 30th Annual California Indian Conference, 2015,10,15-2015,10,17, University of California, Berkeley, CA, USA.

・Matzen Sarick, Anders Olson, Céline Pallud Effects of fertilizer on arsenic accumulation in a hyperaccumulating fern: A two year phytoremediation field study. Soil Science Society of America, 2015,11,15-2015,11,18, Minneapolis, MN, USA.

・Matzen, Sarick, Anders Olson, Céline Pallud Optimizing arsenic phytoextraction from an urban brownfield: A two year field study. Goldschmidt Conference, 2015,08,16-2015,08,21, Prague, Czech Republic.

・Sasaki, Tsuyoshi Building process of Forest River Ocean MANABI Network System. 2015 Annual Meeting of Ichthydogical Society of Japan, 2015,09,04-2015,09,07, Kingrai University Nara Campus, Nara-City. (in Japanese)

・Shinoto, Maria, Tomokazu Onishi, Radegund Hoffbauer, Michael Raith, Johannes Sterba, Ute Knipprath, Naoko Nakamura, Kenji Kanegae Understanding the structure of Sueki kilns from comprehensive scientific analyses: Report on the excavation and analyses at the Nakadake Sanroku Sue Kiln Site Cluster in Minami-Satsuma, Kagoshima. The 32nd Annual Meeting of the Japan Society for Scientific Studies on Cultural Property, 2015,07,11-2015,07,12, Tokyo Gakugei University, Tokyo.

・Sasaki, Tsuyoshi Development Process of Watershed Resilient Community After 3.11 Japan Earthquake. 2015 National Marine Educators Association, 2015,06,29-2015,07,02, Newport, Rhode Island, USA.

・Savelle, James Prehistoric and Early Historic Whaling. The 11th Conference on Hunting and Gathering Societies (CHAGS), 2015,09,07-2015,09,11, University of Vienna, Austria.

・Schneider. D. Tsim After the Missions: Rethinking Native Communities in Colonial Marin County, California. The 30th Annual California Indian Conference, 2015,10,15-2015,10,17, University of California, Berkeley, CA, USA.

・Sternsdorff-Cisterna, Nicolas Healing the Land: Farming after Fukushima. American Anthropology Association Annual Meeting, 2015,11,18-2015,11,22, Denver, Colorado.

・Yamamoto, Naoto Jomon wetland sites on the east coast of the Noto Peninsula, Central Japan. XIX INQUA 2015: Quaternary Perspectives on Climate Change, Natural Hazards and Civilization, 2015,07,26-2015,08,02, Nagoya Convention Center, Nagoya, Japan.

・Yano, Kenichi, Oki Nakamura The Jomon of western Japan and European Mesolithic parallels: a Database Project and Study for Demographic Fluctuation. Mesolithic in Europe Conference, The Ninth International Conference on the Mesolithic in Europe, 2015,09,14-2015,09,18, University of Belgrade, Belgrade, Serbia.

・Yoshida, Akihiro, Yuichiro Kudo, Kazutaka Shimada, Jun Hashizume, Akira Ono Impact of landscape changes on obsidian exploitation since the Paleolithic in the central highland of Japan. XIX INQUA 2015: Quaternary Perspectives on Climate Change, Natural Hazards and Civilization, 2015,07,26-2015,08,02, Nagoya Convention Center, Nagoya, Japan.

【Poster Presentation】

・Fitzhugh, Ben, C. Bitz, K. Nagashima, J. Addison, B. Finney, N. Misarti, N. Harada, M. Etnier, C. West, and P. Anderson Holocene climate change and human adaptations to seasonally frozen seas and coasts of the N. Pacific. Ecosystem Studies of Subarctic Seas, Annual Meeting, 2015,06,15-2015,06,17, University of Washington, WA.

・Onishi, Tomokazu, Naoko Nakamura, Tomoe Sangawa Edible plants detected from researches of seed impressions on thepotteries at the periphery area of Kofun culture. The 32th Annual Meeting of the Japanese Association of Historical Botany, 2015,11,08, Hokkaido Museum, Sapporo.

・Sawaura, R., Sawada, J., Sato, T., Hirasawa, Y., Watanabe, T., Suzuki, T. and Natra, T. The Upper Paleolithic mammal remains and estimation of hunting seasons in the Shitsukari-Abe Cave, the northernmost part of Honshu, Japan. XIX INQUA 2015: Quaternary Perspectives on Climate Change, Natural Hazards and Civilization, 2015,07,26-2015,08,02, Nagoya Convention Center, Japan..

・Takahara, Hikaru, Ryoma Hayashi, Yaeko Igarashi, Arata Momohara, Nao Miyake, Naoki Sasaki, Shinya Sugita, Yoshihiko Tsumura, Akihiro Yoshida Vegetation map during the Last Glacial Maximum in Japanese Islands and its vicinity based on recent palaeoecological and genetic data. XIX INQUA 2015: Quaternary Perspectives on Climate Change, Natural Hazards and Civilization, 2015,07,26-2015,08,02, Nagoya Convention Center, Nagoya, Japan.

【Invited Lecture / Honoronary Lecture / Panelist】

・Habu, Junko Food Diversity and Long-term Sustainability, Lesson from Prehistoric Japan. Guanghua Humanity Foundation Academic Exchange Seminar, 2015,06,02, Fudan University, Shanghai, China.

・Habu, Junko Graduate Education in North America: Training a New Generation of Scholars in the Field of Archaeology, Anthropology, and Related Fields. Guanghua Humanity Foundation Academic Exchange Seminar, 2015,06,01, Fudan University, Shanghai, China.

・Habu, Junko Jomon Food Diversity, Climate Change and Long-term Sustainability: Lessons from Prehistoric Japan. , 2016,01,28, Willamette University, Oregon, USA.

・Habu, Junko Jomon Food Diversity, Climate Change and Long-term Sustainability: Lessons from Prehistoric Japan. , 2016,02,04, Arizona State University, USA.

・Hosoya, Leo Aoi Reconstructing Food Culture and the Society: The frontiers of archaeobotany and ethnoarchaeology of East Asian Neolithic. 54th Evolutional Biology Forum, 2015,09,21, Minzu University of China, Beijing, China.

・Iizuka, Noriko, Ken-ichi Abe Educating Civil Society in Water Ethics . Mainstreaming a New Water Ethic, Water Cultures, Justice and Equity (Theme 4.4), The 7th World Water Forum, 2015,04,12-2015,04,17, EXCO DIB-B102, Daegu, Korea.

・Iizuka, Noriko, Ken-ichi Abe Education for Children on Culture and Equity for Water. Citizen's Forum, The 7th World Water Forum, 2015,04,12-2015,04,17, HICO GHC106, Gyeongju, Korea. .

・Kawahata, Hodaka Environments experienced by our ancestors: the dispersal of Homo sapiens, immigration to Japanese islands and pollution at an ancient capital city. The 2nd China-Japan Joint Forum on Geochemistry and Cosmochemistry, 2015,09,24, .

・Kawahata, Hodaka Quantitative reconstruction of atmospheric temperature and its correlation with human activity in western Japan during the Holocene. The 8th International Congress of Asian Marine Geology, 2015,10,05-2015,10,10, Cheju Grand Hotel, Cheju, Korea.

- Kawahata. Hodaka Mass extinction in association with the high pCO2 at the P/E boundary and in near future due to ocean acidification based upon filed observation and culture experiments. GSK-Korea Society of Mineral Resources and Petroleum Engineering Joint Session, 2015,10,28-2015,10,20, Cheju Mariott Hotel, Cheju, Korea.
- Onishi, Tomokazu Haniwa in Southern Kyushu. The 30th National Cultural Festival in Kagoshima, Yokose kofun and Yamato plity, 2015,11,01, Osaki-Cho, Kagoshima. (in Japanese)
- Pallud, Céline, Sarick Matzen, Anders Olson Effect of soil texture on phytoremediation of arsenic-contaminated soils. American Geophysical Union, December 2015, San Francisco, CA, USA.
- Takahashi, Satsuki Fukushima Future: Nuclear Disaster and Politics of Tomorrow in Coastal Japan. Socio Cultural Workshop, 2015,10,29, The University of Michigan, MI, USA.
- Takahashi, Satsuki The Ontology of Fukushima Future. The STS Speaker Series, 2015,11,30, The University of Michigan, MI, USA.
- Weber, Andrzej.W. The importance of units of analysis in archaeology. Graduate student seminar, 2015,10,21, Department of Anthropology, University of Alberta, Edmonton, Canada. .
- Weber, Andrzej. W. Holocene hunter-gatherers of Cis-Baikal (Siberia): An individual life history and micro-sampling. , 2015,07,10, LAMPEA, Aix Marseille Université, Aix-en-Provence, France.

Stage: Full Research

Project No.: H-05

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

Abbreviated Title:

Project Leader: NAKATSUKA Takeshi

Research Axis:

URL:

Key Words:

○ Research Subject and Objectives

a) Research objectives and background

When we confront rapid environmental and/or climatic changes, what should we do? The most important subject in global environmental studies is not only to find methods for mitigating the changes,but also to ascertain ways to adapt to them. This project will seek ways to adapt from Japan's long history through precise reconstructions of past abrupt climate changes and subsequent responses of human society. By categorizing historical society-climate relations and synthesizing findings from many case studies, the objective of this project is to describe general social characteristics or modes associated with tolerance or vulnerability to abrupt changes.

To date, many paleoclimatologists and historians have stated the possibility that past changes in societies and civilizations might have been caused by climate changes based on the apparent coincidence between societal reformation and climate change (Yoshida and Yasuda, 1995; Fagan 2001, 2008; Diamond 2005;Parker 2013). Especially, recent paleoclimatological studies using tree ring and speleothem records have revealed the tight relations prevailing between the multi-decadal climate variability and the collapse of regional societies allover the world (Zhang et al., 2008; Buckley et al., 2010, Cook et al., 2004;2010). "Climate variations in the past" obviously differ from "human-induced environmental problems". However, we think that social responses to "climate changes", especially to multi-decadal climate variation, have the same characteristics as those to "global environmental change". Human societies often rely excessively on particular resources or technologies such as petroleum or nuclear power. Therefore, it is not easy for people to adapt to the world that is losing such resources and technologies.Similarly, human societies that have used to particular climate conditions leading to abundant crops for more than a few decades cannot adapt to drastic climate change easily. Common structures of "over adaptation" and "consequential failure of adaptation" must exist for global environmental problems and many historical examples of society-climate relations.

b) Research methods and organization

This project consists of three research steps. (1) Reconstruction and understanding of past climate variations during last several millennia over Japan in high temporal and spatial resolutions. (2) Categorization of society-climate relations by detailed chronological comparisons between climate and societal events. (3) Identification of common characteristics underlying tolerance and vulnerability of human societies against climate change beyond ages and areas.

Recent progress in studies of tree-ring width and cellulose oxygen isotope ratios (Cook et al., 2013; Yamaguchi et al., 2010;Li et al., 2011; Sano et al., 2012; 2013; Xu et al., 2011; 2013a; 2013b) allows accurate reconstruction of past climate variation at annual resolution in East Asia and Japan. In this project, high-resolution palaeoclimate data based on tree ring, documents, sediments, coral ring and speleothem are integrated to ensure the accuracy of climate reconstructions in and around Japan. The reconstructed past climate data have been evaluated together with modern climate analysts and modellers to understand modes and mechanisms of climate variations in the past.

Comparisons of the high-resolution paleoclimate data sets with huge numbers of paleographic and archaeological archives in Japan do not only enable us to elucidate cause-and-effect relationships when climate apparently influenced the societies,but also allow us to find cases when societies did not leave any significant signs due to climate variation. To categorize and integrate numerous cases of

climate-society relationships in Japanese history, we utilize both “narrative” and “statistical” approaches. While many members of historians and archaeologists in this project, covering all periods since Jomon to modern eras and all regions from southwest to northeast Japan, study individual cases of societal reaction to climate variation by traditional historical and archaeological methods, all individual cases are categorized statistically according to quantitative relationships between climate variation (cause) and societal outcome (result). Sizes of the climate impact on society, shown as ratios of the result against the cause, are further compared with varieties of social, economic and cultural parameters (factors),enhancing or reducing of climate impact on societies, to find common factors determining societal tolerance or vulnerability against climate change.

Until FR2, we have accumulated many high resolutions paleoclimate data sets,especially summer precipitation recorded by tree-ring oxygen isotope ratios,from various areas in Japan and Asia covering last 4,000 years. Those are enough for historians and archaeologists in this project to start investigations of societal responses to climate variations using local archives and/or nation-wide databases on historical events including climate disasters. On the other hand,we are now collecting and compiling many documentary records on inter-annual variations in local population, harvest, price, conflict, irrigation and flood controls as well as archaeological estimations on population, production, water control and warfare all over Japan, which are to be statistically compared with past climate data unravelled using proxy records during FR3 and 4.

By combination of the narrative and statistical approaches, we will elucidate characteristics or modes associated with social tolerance or vulnerability against climate changes and propose comprehensive ways to adapt to global environmental changes, including global warming.

○ Progress and Results in 2015

Because of the difficulty to mitigate global warming by reduction of CO2 emission, attentions have been increasingly paid to researches how we can adapt to the climate change (IPCC AR5 WG2, 2014).The adaptation strategy is not only based on technological and institutional innovations, but also covering socio-cultural transformation including changesin people’s beliefs, values and worldviews (O’Brien and Selboe, 2015). In human history, abrupt climate variations frequently occurred over the world. Because local people must have adapted to the climate, often resulting in collapse, but sometimes overcoming the difficulty, it is likely that we can learn many important lessons on the adaptation from history. However, previous studies on historical climate-society relations seem too ambiguous to ascertain cause-and-effect relationships partly due to dating uncertainties and insufficient paleoclimate data (Butzer, 2012; Hsiang et al., 2013). As the result, they do not find explicitly positive cases that climate changes did not influence societies seriously.

We started this project from reconstructing past climate in annual time resolution as precise as possible.Then, we compare the result with plenty of historical and archaeological evidences in Japan to elucidate both of positive and negative cases of the adaptation. Here, we will explain achievements in each of the three steps as follows.

Progress in Step 1: Reconstruction of Climate Variation

During FS, PR and FR1-2, we have established very long temperature and precipitation records over Japan mainly in summer, important for agricultural production (Fig. 2a&b). Although tree-ring based annual temperature records are still limited after 800 AD, sediment (alkenone)-based reconstruction over last 3000 years coincides well with tree-ring based temperature. Early modern historians have collaborated with climatologists to compile many diary weather reports and successfully elucidated climate during 17-19th centuries from diary to annual time resolution.

Clue to Step 2: Categorization of Climate-Society Relation

By comparison of newly obtained paleoclimate data with existing database of historical events and population inJapan, we have realized that there are apparent coincidences between multi-decadal climate variations and societal responses for all of early modern, medieval and prehistorical-ancient periods. The 10-20 years length of warmth often resulted in serious famines at following abrupt cooling episodes, possibly understandable by the scheme of a cycle consisting of over-adaptation to comfortable

climate and failure of adaptation to subsequent difficult climate. This finding indicates that it is worth investigating and comparing of many cases on societal responses against those multi-decadal climate variations beyond ages and areas.

Strategies of Step 2 & 3: Categorization and Integration of Climate-Society Relation

Historical and archaeological members have already studied individual cases of societal reaction to climate variation by traditional narrative approach. Besides in this project, a conceptual model is now planned to be applied to quantitative analyses of relations between climate variation (cause) and societal outcome (result) for all those cases to categorize magnitude of the climate impact on society at each case. The size of impact shown as the ratio of "result" against "cause", are further compared with various social, economic and cultural parameters (possible factors), enhancing or reducing of climate impact on societies, to find common factors determining societal tolerance or vulnerability against climate change.

○Project Members

◎ NAKATSUKA, Takeshi	(Research Institute for Humanity and Nature,Professor,Leader of the whole project)
○ SANO, Masaki	(Research Institute for Humanity and Nature,Senior Project Researcher,Sub leadr of the whole project)

Group of Paleoclimatology

○ YASUE, Koh	(Shinshu University,Associate Professor,Dendroclimatological and wood anatomical analyses in Japan and Asia)
○ ABE, Osamu	(Graduate School of Environmental Studies, Nagoya University,Assistant Professor,Coral analyses in Southwest Japan)
MITSUTANI, Takumi	(Nara National Research Institute for Cultural Properties,Visiting Researcher,Age determination of cultural properties in Japan using tree ring width)
SAKAMOTO, Minoru	(National Museum of Japanese History,Professor,Age determination of paleoclimate proxy materials using radiocarbon)
KAGAWA, Akira	(Forest and Forest Products Research Institute,Researcher,Development of analytical methods for isotopic ratios of tree-ring samples)
FUJITA, Koji	(Graduate School of Environmental Studies, Nagoya University,Associate Professor,Analyses of ice cores in Central Asia)
XU, Chenxi	(Institute of Geology and Geophysics Chinese Academy of Sciences,Associate Professor,Dendroclimatological and dendroarchaeological analyses using isotopes in Japan and Southeast Asia)
MORIMOTO, Maki	(Graduate School of Environmental Studies, Nagoya University,Part-time Researcher,Coral analyses in Southwest Japan)
KIMURA, Katsuhiko	(Faculty of Symbiosis Systems Science, Fukushima University,Professor,Dating of excavated wooden properties during Jomon, Yayoi and Kohun Era)
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TADA, Ryuji	(Graduate School of Science, University of Tokyo,Professor,Analyses of Varve Sediments in lake Suigetsu, Central Japan)
KUBOTA, Yoshimi	(National Museum of Nature and Science,Researcher,Paleoceanographic analyses around Japan using ocean sediment records)
TAGAMI, Takahiro	(Graduate School of Science, Kyoto University,Professor,Tree-ring and speleothem analyses in Japan and Southeast Asia)
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ZAIKI, Masumi	(Faculty of Economy, Seikei University,Associate Professor,Analyses of climate changes in Japan using old documentary records)
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SHO, Kenjiro	(Urban & Social Engineering, Nagoya Institute of Technology,Assistant Professor,Assessment of hydrological impacts of past climate change)
LI, Zhen	(Research Institute for Humanity and Nature,Research Associate,Reconstruction of past hydroclimate in Japan using tree-ring oxygen isotope ratios)
HAKOZAKI, Masataka	(National Museum of Japanese History,Specially Appointed Assistant Professor,Reconstruction of past climate in Japan using tree-ring width, density and oxygen isotope ratios)
LI, Qiang	(Institute of Earth Environment, Chinese Academy of Science,Associate Professor,Reconstruction of past climate in China using tree-ring width, density and oxygen isotope ratios)
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SAKASHITA, Wataru	(Graduate School of Science, University of Tokyo,Graduate Student,Reconstruction of past climate in Japan using tree-ring oxygen isotope ratios)
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Group of Climatology

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○ KURITA, Naoyuki	(Graduate School of Environmental Studies, Nagoya University,Associate Professor,Climatological assessment of proxy oxygen isotope data)
UEMURA, Ryu	(Faculty of Science, Ryukyu University,Associate Professor,Observation of spatial and temporal variability of precipitation isotope ratios)
WATANABE, Masahiro	(Atmosphere and Ocean Research Institute, University of Tokyo,Associate Professor,Climatological evaluation of past climate variations based on proxy records)
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OKAZAKI, Atsushi	(School of Engineering, The University of Tokyo,Graduate Student,Evaluation of proxy isotope data using general circulation models with isotope dynamics)
TORIDE, Kinya	(University of California, Davis,Graduate Student,General circulation modeling with assimilation of weather records in old diaries)

Group of Prehistorical & Ancient Era

○ WAKABAYASHI, Kunihiko	(History Museum, Doshisha University,Associate Professor,Analyses of social adaptations to climate changes during Yayoi Era)
○ HIGAMI, Noboru	(Aichi Prefectural Center for Archaeological Operations,Expert of Investigation,Analyses of excavated wooden properties during Yayoi and Kohun Era)
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BATTEN, Bruce	(Graduate School of International Studies, J. F. Oberlin University,Dean,Analyses of social responses to climate changes during Japanese History)
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ONBE, Shin	(Kumakogen Town Board of Education,Curator,Analyses of archaeological remains in the Seto Inland Sea during Jomon Era)
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Group of Early Modern Era

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KORIYAMA, Shiho	(Kasai City Board of Education,Part-time Researcher,Estimate of climate impacts in Early Modern feudal domains)

○ Future Themes

In this project, we plan to use a conceptual model for analysing quantitatively influences of climate variation on societal outcome and factors to determine magnitude of the impacts, in combination with the traditional narrative analyses by historians and archaeologists. To make those statistical analyses fruitful, it is necessary to collect data as many as possible. In fact, candidates of possible factors linking climate and society can be expanded to any socio-cultural properties, so that we need to find and create various historical databases during FR3 and 4.

Perspective of Data Collection

As for the data of climate variation (cause), we will reconstruct past summer temperature in annual time resolution before 800 AD quickly using newly obtained tree-ring samples in northern Japan, because tree-ring width and density in cold region are usually sensitive of summer temperature and spatial patterns in tree-ring oxygen isotope ratios may be also helpful to reconstruct past atmospheric pressure fields directly influencing summer temperature. We will apply “agricultural production” (effect), instead of “temperature” or “precipitation” (cause), to estimate the impact of climate variation to society because the agricultural impact of climate variations are different from region to region even within Japan. We will utilize the yearly crop yield estimation in early modern tax accounts (Menjyo) sent to each village from local lord and the direct measurement records of rice grain yield in a unit area (Tsubokari) as well as the modern agricultural statistics provided by Japanese Ministry of Agriculture, Forestry and Fishery to create equations for conversion of regional temperature and precipitation changes to potential changes in agricultural production there. There are tight correlations between rice yields and climate (temperature and precipitation) in eastern and western Japan, respectively.

As for the societal outcome (result), there are many reliable regional and local population datasets during early modern period (17-19th century), such as a national census every six years conducted by Tokugawa Shogunate and yearly village people register of religious faith and relationship (Shumon Aratame Cho) all over Japan. Although there are very few reliable documentary records on population before 16th century, archaeologists have been estimating local populations based on number of regional habitat and grave remains during last three millennia. Archaeological approach is extended to estimation of warfare frequency too, using excavated number of battle gears and injured bones. During medieval period from 9 to 16th centuries, we can utilize various kinds of digitalized database on palaeography by which we can illustrate temporal variations in number of famine and warfare per year.
As for the possible underlying factors to enhance or reduce the impact of climate variation to societies, we cannot foresee all potential factors at present. However, we have already compiled price of commodities, such as rice, at daily resolution during 18-19th century. Now, we are trying to collect various societal, economic, political and cultural data, which can cover many regions and/or periods, such as degree of market reliance by local government, amount of anti-famine public stock, number of literature publication, frequency of new law installation, establishment number of school, people’s literacy rates, religious distributions and so on.

Expected Results

Although we cannot anticipate detailed result of the statistical analyses at present, there are potentially important ages and areas for the analyses as follows.

Regional difference of coldness impacts in northeast Japan during early modern era.

People in northeast Japan suffered from periodical cooling and resultant crop failure in 18 and 19thcenturies. However, size of damages was completely different among local feudal domains, possibly reflecting the difference of socio-economic policies.

Temporal change in climate-society relationship during medieval period
Although enhancement of multi-decadal temperature variability caused large famines in 13th and 15thcenturies, famine drastically decreased in 14th century in contrast to the large temperature variations. Development of distribution system in late 13th century might have decreased famines next century, but induced new type of devastative urban famines in 15thcentury.

Contrast of ancient societal responses to climate variations between eras and countries
In archaeological viewpoints, Kofun era in Japan was more peaceful than older Yayoi era or countries in China at the same time interval, although climate variability did not change so large temporally and spatially.

Behind the three cases, there may be a common factor that is spatial connectivity between different regions through economy and/or politics. The comparative historical analyses by both narrative and statistical approaches beyond areas and ages may solve the questions.

●Achievements

○Books

【Chapters/Sections】

- Bruce L. Batten, Philip C. Brown 2015,04 Concluding Thoughts: In the Shadow of 3.11. Bruce L. Batten, Philip C. Brown (ed.) Environment and Society in the Japanese Islands: From Prehistory to the Present. Oregon State University Press, Oregon, U.S.A., pp.246-252.
- Bruce L. Batten, Philip C. Brown 2015,04 Introduction: Green Perspectives on the Japanese Past. Bruce L. Batten, Philip C. Brown (ed.) Environment and Society in the Japanese Islands: >From Prehistory to the Present. Oregon State University Press, Oregon, U.S.A., pp.1-18.
- T.Mikami, M. Zaiki, J. Hirano 2015,04 Chapter 10 A history of climatic change: a reconstruction of meteorological trends from documentary evidence. Bruce L. Batten, Philip C. Brown (ed.) Environment and Society in the Japanese Islands: From Prehistory to the Present. Oregon State University Press, Oregon, U.S.A., pp.191-212.

○Editing

【Editing / Co-editing】

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

○Papers

【Original Articles】

- Chenxi Xu, Huaizhou Zheng, Takeshi Nakatsuka, Masaki Sano, Zhen Li, Junyi Ge 2016,02 Inter- and intra-annual tree-ring cellulose oxygen isotope variability in response to precipitation in Southeast China. Trees . DOI:10.1007/s00468-015-1320-2.(reviewed).
- Takayanagi, H., R. Asami, T. Otake, O. Abe, T. Miyajima, H. Kitagawa, Y. Iryu 2015,12 Quantitative analysis of intraspecific variations in the carbon and oxygen isotope compositions of the modern cool-temperature brachiopod Terebratulina crossei. Geochimica et Cosmochimica Acta 170 :301-320.(reviewed).査読付.
- Ishikawa, N.F., M. Yamane, H. Suga, N.O. Ogawa, Y. Yokoyama, N. Ohkouchi 2015,11 Chlorophyll a-specific Δ14C, δ13C and δ15N values in stream periphyton: implications for aquatic food web studies. Biogeosciences 12 :6781-6789.(reviewed).

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・Jasechko, S., A. Lechler, F. S. R. Pausata, P. J. Fawcett, T. Gleeson, D. I. Cendón, J. Galewsky, A. N. LeGrande, C. Risi, Z. D. Sharp, J. M. Welker, M. Werner, K. Yoshimura 2015,10 Late-glacial to late-Holocene shifts in global precipitation δ18O. Climate of the Past 11(10) :1375-1393.(reviewed).

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・Feng Shi, Quansheng Ge, Bao Yang, Jianping Li, Fengmei Yang, Fredrik Charpentier Ljungqvist, Olga Solomina, Takeshi Nakatsuka, Ninglian Wang, Sen Zhao, Chenxi Xu, Keyan Fang, Masaki Sano, Guoqiang Chu, Zexin Fan, Narayan P. Gaire, Muhammad Usama Zafar 2015,08 A multi-proxy reconstruction of spatial and temporal variations in Asian summer temperatures over the last millennium. Climatic Change 131(4) :663-676. DOI:10.1007/s10584-015-1413-3.(reviewed).

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○Research Presentations

【Oral Presentation】

・Kaoru Kamatani, Masaki Sano, Takeshi Nakatsuka Climate-induced rice yield variations in Early Modern Japan (Edo era) recorded in Menjo (tax accounts to villages) and their implication for society-climate relationship in the past. The Third Conference of East Asian Environmental History (EAEH 2015), 2015,10,24, Kagawa University.

・Takeshi Nakatsuka Societal Adaptation to Climate Change-Integrating Palaeoclimatological Data with Historical and Archaeological Evidences in Japan-An introduction of an inter-disciplinary research project on Japanese environmental history. The Third Conference of East Asian Environmental History, 2015,10,22-2015,10,25, Takamatsu.

・Sano, M., Yasue, K., Kimura, K., Chen, S.-H., Chen, I.-C., and Nakatsuka, T. Societal responses to decadal-scale climate changes in Early Modern Japan revealed by tree-ring records and historical documents. The Third Conference of East Asian Environmental History (EAEH 2015), 2015,10,22-2015,10,25, Takamatsu.

・Keisuke ITOU, Noriyoshi TAMURA, Seibi NISHIYACH, and Takeshi NAKATSUKA Climate Changes as the Cause of Numerous Disasters in Medieval Japan. The Third Conference of East Asian Environmental History (EAEH 2015), 2015,10,22-2015,10,25, Takamatsu.

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・Sano, M., K. Yasue, K. Kimura, T. Nakatsuka Hydroclimate variability in southwestern Japan over the last 1500 years reconstructed from oxygen isotope ratios in tree rings. European Geoscineces Union (EGU) General Assembly 2015, 2015,04,12-2015,04,17, Vienna, Austria.

【Invited Lecture / Honoronary Lecture / Panelist】

・Takeshi Nakatsuka Analyses of Societal Adaptation to Climate Changes in the Past: Integrating Paleoclimatology with History and Archaeology in Japan. International Meeting of AJG (Association of Japanese Geographers) Study Group “History of Climate and Natural Disaster”, 2016,03,22, Shinjuku-ku, Tokyo.

・Takeshi Nakatsuka Climate variations in East Asia and Japan during the last two millennia. ILTS International Symposium on Low Temperature Science, 2015,11,30-2015,12,02, Sapporo.

・Takeshi Nakatsuka Recent development of proxy-based annually-resolved paleoclimatological datasets during last two millennia in Asia and world. The Third Conference of East Asian Environmental History, 2015,10,22-2015,10,25, Takamatsu.

Stage: Full Research

Project No.: D-06

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

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

Project Leader: OKUDA Noboru

Research Axis: Diversity Program

URL:

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

○ Research Subject and Objectives

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

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

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

○ Progress and Results in 2015

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

We also started the basic research on biodiversity, nutrient and human dimension in Silang-Santa Rosa sub-watershed of Laguna de Bay, the Philippines, to compare the watershed governance between two contrasting watershed societies (i.e., infrastructure-oriented vs.high-loading societies). In this sub-watershed, river waters were overwhelmingly rich in phosphate because of drastic population increase

under the recent economic development and incomplete sewage treatment systems, resulting in the extreme nutrient imbalance and biodiversity loss. Local communities used to utilize communal springs as commons decades ago. After establishment of tap water systems, however, most of them were degraded due to lack of social norms and morality. The drinking waters are derived from the shallow groundwater, so that the groundwater pollution is the recent concern of matter. Our preliminary inquiry surveys revealed that environmental consciousness of local communities has been distant from the nature of springs and streams under the economic development.

○Project Members

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○ Future Themes

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

●Achievements

○Books

【Chapters/Sections】

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○Research Presentations

【Oral Presentation】

・Ide, J., H. Somura, T. Nakamura, Y. Mori, I. Takeda & K. Nishida Spatial variations in river nitrate concentration from upper toward lower reaches in the hilly and mountainous area. The 127th Annual Meeting of the Japanese Forest Society, 2016,03,27-2016,03,30, Kanagawa, Japan.

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【Poster Presentation】

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【Invited Lecture / Honoronary Lecture / Panelist】

・Okuda, N. Biodiversity-driven Nutrient Cycling and Human Well-being in Social-Ecological Systems. 4th Future Earth in Asia Workshop "Perspectives from the South", 2015,11,19, Lecture Hall, RIHN, Kyoto.

Stage: Pre-Research

Project No.:

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

Abbreviated Title: FEAST Project

Project Leader: Steven R. McGreevy

Research Axis:

URL: http://www.chikyu.ac.jp/rihn/project/PR-2015.html

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

○ Research Subject and Objectives

Agrifood systems in Asia face a myriad of sustainability challenges related to declining environmental health (GHG, resource overuse, pollution, soil fertility), loss of diversity (biological, cultural, knowledge), and the deterioration of small-scale farming due to globalizing market forces. On the consumption side, over-reliance on globalized food flows limit consumer agency and decrease food security and sovereignty, while diets composed of more processed food create public health impacts (rise in diabetes, obesity). The ways in which food is provided, consumed and governed need urgent change.

The project takes an action research approach to explore the realities and potential for sustainable agrifood transition at sites in Japan, China, Thailand, and Bhutan with significance for the entire region. We will analyze patterns of food consumption, food-related social practices and their socio-cultural meanings, consumer-based agency to change deeply held-cultural notions and physical systems, and food system mapping specific to the national, regional, and local production, distribution, and consumption contexts. Building upon that work, we will partner with stakeholders to vision plausible futures and to initiate food democracy-oriented experiments and actions. The project will co-design and co-produce knowledge and mechanisms that challenge the logics of the market by valorizing the non-economic qualities of food and agriculture that improve quality of life, and engage society in a public debate on our relationship with food and nature that questions shared beliefs and reacclimatizes consumers as citizens and co-producers in the foodscapes around them.

The FEAST project has the long-term goal of catalyzing sustainable agrifood transition processes at the various research sites. The research activities themselves will produce four types of knowledge relevant to fostering said processes: 1) contextual knowledge of contemporary national, regional, and local food systems necessary for a holistic understanding of food production, distribution, and consumption; 2) co-produced visions of alternative food consumption and production practices and transition plans identifying research, education, and policy needs; 3) modeling and scenario-based knowledge to inform coinciding deliberation and planning processes; 4) and knowledge related to two intervention strategies- social learning and market transparency- on the execution and effectiveness of workshop-based consensus building toward collective action and market-oriented information-providing tools (eco-label, food LCA smartphone app). A large portion of activities are based in action research and many final outputs are geared primarily for public use. In concrete terms, the focus on collective vision making, deeper understanding of social contexts in the actual carrying out of food-related consumption and production practices, and the creation of new, empowered institutions to implement co-created plans and food policy into the future enable this project to have real-world impact beyond the five-year period.

This project identifies with the domain of “Ecosophy” and the “Ethos” and “Oikos” initiatives.

○ Progress and Results in 2015

The project is arranged into five “working groups,” each with its own “work package” to carry out over the five year period. The five working groups are 1) Food System Mapping & Modeling; 2) Ethics & Consumption Practices; 3) Agro-ecological Food Provisioning Futures; 4) Supporting Tools for

Sustainable Regions; 5) Transparent Food Chains. Each working group has two chairs that oversee research activities on the ground and assist in planning and managerial processes. The working groups interface directly with site-based stakeholders in ad-hoc organizations that are in the process of being solidified.

The project scope has decreased to reflect the availability of budget and comments from evaluators: the original six working group structure has decreased to five; specific research activities have been scaled back in overseas sites; and the overall number of research staff to be hired will be fewer, which will impact the overall degree to which we can accomplish the original research goals.

Each project working group had specific topics needing to be addressed during the pre-research phase and a variety of research outputs both delivered and forthcoming. An overview of these topics and outputs are given here.

WG1: Food System Mapping & Modeling

WG1 is to provide contextual information (statistical and spatial) on existing and potential food systems and food consumption at the local, regional, and national level for each site. In order to judge the relative sustainability of said systems, we needed to define what we were looking for. To those ends, we conceived the notion of "holistic local food security" to include both physical capacities to produce and access food in an environmentally-friendly way as well as the socio-economic factors of overall well-being, food sovereignty, and producer livelihoods. Data is also needed to better understand patterns of consumption at each locality and a survey is planned to allow for that. Finally, WG1 researchers were to form stronger ties with stakeholders in Japan and abroad.

FEAST co-hosted an International Seminar entitled "Food, Risks, and Sustainability: AnAsian Perspective" at Hong Kong Polytechnic University where the concept of "holistic local food security" was presented for debate. A conceptual paper is forthcoming on the topic that builds on the work of Michael Carolan's "human and food index" (Carolan 2013).This contribution to the project is significant because it begins to define the frames and specific data indicators for a "sustainable foodscape." The concept is meant to act as a entry point for engaging stakeholders in workshops carried out by WG2 and inform the discussion on sustainability indicators for agriculture in WG4. FEAST members built strong ties with Chulalongkorn and Mahidol Universities in Bangkok for future collaboration. Thai colleagues co-hosted a FEAST project seminar in January entitled: "Sustainable Food System Planning in Asia-Orientations and Examples from the Field" that was attended widely by Thai graduate students who will play a critical role in organizing participatoryGIS data collection. In order to collect baseline data on consumer eating habits and patterns of food consumption specific to target sites in Japan, an online survey (n=1300) was developed and carried out at all three sites in Japan (Kyoto, Nagano City, Noshiro City) in March 2016.

WG2: Ethics & Consumption Practices

WG2 leads the action research interventions to create communities of practice and food governance and had two research goals for the year: 1) to better understand action-research workshop-based protocols and pedagogies through a review of existing initiatives and 2) investigate food policy councils through site visits and intensive fieldwork. Fieldwork in Toronto and Kentucky on the history and development of food policy councils at those sites was integral to beginning a discussion on the kind of strategy needed for co-initiating similar governance structures in Japan. Namely, the preconditions, possibilities, and restrictions to creating food policy councils, including an understanding on the sense of urgency,representation, role of government, responsibility, and scale were considered. A review paper on food policy council development using the case studies and its relevance to food system change and governance in Asian settings is forthcoming. Three experimental workshops were held during the PR phase to experience different forms of facilitation, group discussion formats, and general structuring of formal and informal in-workshop pedagogies. These experiences led to the development of a "stakeholder workshop plan" that to be drafted in the coming months. Contact was made with city council and other members of local government in each of the three Japan sites. In Noshiro City, Akita Prefecture, WG2 members and the PL met with the mayor and received his promise of support for the project in the city.

WG3: Agro-ecological Food Provisioning Futures

WG3 addresses three problems facing food provisioning: 1) What role will traditional agrifood systems and knowledge play in the future?; 2) What are the ways in which new farmers can be supported and

encouraged to farm?; 3) How can consumers contribute to the sustainable management of sources of wild food? Fieldwork and case study reviews were used to bring further clarity to these research questions over the PR. A FEAST project seminar entitled “Supporting new farmers: A comparison of knowledge dynamics in America and Japan” invited representatives of Kyoto Prefecture to share on the formal support structures that new farmers can utilize and followup fieldwork was conducted.Research results on farmer support structures will be presented at next years International Rural Sociological Association conference-“Nurturing Future Farmers: Comparative Analysis of the Support System for Beginning Farmers between Japan and the United States.” Fieldwork at the newly certified Wakayama GIAHS site was conducted in March to make initial contact.

WG4: Supporting Tools for Sustainable Regions

WG4 explores tools for integrating ecologically sound production practices with unique market support structures to improve regional economic conditions in Japan. Two exploratory reviews were conducted: 1) a structured review of over 250 agriculture-related ecological labels in Japan and 2) a broad overview of international conventions on sustainable agricultural production with special emphasis the metrics used by multi-stakeholder initiatives’ in defining ecological, social, and economic sustainability. The review of eco-labels is

being compiled into a paper in Japanese and forthcoming next year. The metrics analysis will be used as a starting point from which to develop. A paper survey to gauge consumer response to certain kinds of ecological labels and sustainability metrics will be conducted in Kameoka City, Kyoto Prefecture (n=350).

WG5: Transparent Food Chains

WG5 sets out to develop a smartphone app that tells the backstory of food products using LCA data. A review of four European food LCA apps under the title of “The story behind the scans: A review of food LCA smartphone apps and their impact on consumers and industry” was presented at the American Center for Life Cycle Assessment Conference and reactions to the presentation were quite positive. The research will be submitted for publishing in the near future. Initial discussions on the creation of a LCA-based food app will be conducted on January 21st with a team of experts on agriculture, fisheries, refrigeration, retail (AEON), processing (Ajinomoto), and carbon. Follow-up meetings are scheduled in Tokyo and greater involvement of the food industry is anticipated.

○Project Members

◎ MCGREEVY, Steven Robert (RIHN,PL,WG1-5)
○ AKITSU, Motoki (Kyoto University,Co-chair,WG2)
○ SHIBATA, Akira (Ritsumeikan University,Co-chair,WG4)
○ TAMURA, Norie (RIHN,Co-chair,WG3)
○ SUDO, Shigeto (National Institute for Agro-Environmental Sciences,Co-chair,WG4)
○ INABA, Atsushi (Kougakuin University,Chair,WG5)
○ TACHIKAWA, Masashi (Ibaraki University,Co-chair,WG2)
○ HARA, Yuji (Wakayama University,WG1)
○ TSUCHIYA, Kazuaki (Tokyo University,Co-chair,WG1)
○ KISHIMOTO-MO, Ayaka (National Institute for Agro-Environmental Sciences,WG4)
○ TANAKA, Keiko (University of Kentucky,WG2)
○ NAKAMURA, Mari (Nagoya Bunri University,WG2)
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KOBAYASHI, Mai (RIHN,WG3)
RUPPRECHT, Christoph D.D. (RIHN,WG1)
SHIRATO, Yasuhito (National Institute for Agro-Environmental Sciences,WG4)
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NILES, Daniel (RIHN,WG3)
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TANABIKI, Yusuke	(Ritsumeikan University,WG4)
IWAHASHI, Ryo	(Kyoto University,WG2)
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HAYASHI, Kiyotada	(National Agriculture and Food Research Organization,WG5)
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KATO, Koichi	(Seikatsu Club Consumers' Cooperative Union,WG2, WG5)
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SUGIMOTO, Ikuo	(Citizens Environmental Foundation, Kyoto,WG2, WG5)
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KANTAMATURAPOJ, Kanang	(Mahidol University,WG2)
WIBULPOLPRASERT, Suwit	(International Health Policy Program Foundation (Ministry of Public Health, Thailand),WG2)
KOOHAFKAN, Abolghassem Parviz	(World Agricultural Heritage Foundation,WG3)
ZHOU, Sheng	(Shanghai Academy of Agricultural Sciences,WG4)
AUGUSTIN-JEAN, Louis	(The Hong Kong Polytechnic University,WG1)
CHOW, Sungming	(The Hong Kong Polytechnic University,WG1)
CHHETRI, Rekha	(Royal University of Bhutan,WG3)
□ ZHANG, Lei	(Renmin University of China,Project Advisor)
□ COHEN, Maurie J.	(New Jersey Institute of Technology,Project Advisor)
□ JUSSAUME, Ray	(Michigan State University,Project Advisor)

○ Future Themes

Specific plans for Full Research year one (4.2016-3.2017) are outlined as follows.

WG1 & WG2 - WG1 has the most important job of FR1 in that it will collect and process data on actual and potential national, regional, and local food supplies, agricultural production, and food consumption (including POS data) to create interactive GIS-based "foodshed maps" useful for planning, modeling, and public education for the three Japan sites (Kyoto, Noshiro, Nagano). These maps and additional data analysis of each site's "holistic local food security" are then handed over to WG2 to be used in multi-stakeholder workshops at each of the three Japan sites. WG1, WG2, and local stakeholders will then collaborate on the writing of a report specific to each site with the tentative title of "Our Food System: Present and Future"- this report will be published and distributed widely at the site to generate greater local involvement in the FEAST project process. After further experimentation with workshop formats and pedagogies, WG2 will also draft a workshop manual to be updated as further workshops are conducted. In FR1, WG2 will expand its local networks at each of the three sites and host workshops with selected stakeholders and seminars and workshops for the general public. A stakeholder forum is hoped to be formalized at each site to take part in long-term monitoring exercises, such as reflective journal writing, surveys, and data collection on shopping and eating habits. This data will be fed back into the WG1 for future modeling scenarios. WG1 will also begin food system mapping in Chiang Mai, Thailand similar to that in Japan to provide insights into current

production, distribution, and consumption patterns and particular focus will be given to public health and ecological problems exacerbated by rapid urbanization.

WG3 – FR1 will mainly involve field work, case study analysis, and networking. Field work will commence at GIAHS sites in Japan and China, and around the Bhutanese city of Thimphu. The goal of this work will be to assess the livelihood of farmers and the condition of rural farming communities. A modified version of the sustainable livelihoods framework will be used to assist in this process (Hutton et al. 2015). Further inquiry into new farmer support structures will take place at sites in Japan and current research results will be presented at the International Rural Sociological Association conference.

WG4 – This working group will complete its review of sustainable agriculture metrics and indicators pertaining to ecological, economic, and social impacts from available sources. This work will then be presented to WG2 and WG3 at the end of FR1 to initiate a discussion on developing indicators on justice, care, and landscape aesthetics. These results will feed into preliminary designs for a local ecological food label to be used in Kameoka City, Kyoto. Marketing analysis will gauge consumer reaction.

WG5 –Food LCA and sustainability assessment data collection and analysis will prioritize certain target foods, namely those with the high impact (dairy, meat, etc.) or opaque production processes (processed snacks, drinks). A graduate student from Kogakuin University in Tokyo will be hired to assist in the data compilation process. The WG5 team will expand to include more players from the food industry and seek their cooperation in the app development process. We will also approach the popular “Cookpad” app to see if there is interest in collaboration. An app developer will be selected through a “contest/ competitive” format.

More general plans include:

-In order to assist research activities, FEAST will hire a total of four research staff to be based at RIHN, one senior researcher and three project researchers, over the next few months. Each researcher will have expertise pertaining to a specific working group. An international call for applicants is currently underway.

-A total of six project members will attend the Second International Conference of the Sustainable Consumption Research and Action Initiative (SCORAI) and host two sessions to introduce FEAST to the SCORAI community.

-FEAST is working with the Future Earth Asia Regional Centre based at RIHN to create a knowledge-action network (KAN) on sustainable consumption and production. This close involvement will give FEAST the chance to interact with experts in the field and invite constructive criticism and advice on FEAST research. We hope to use the KAN as a sounding board or ad hoc advisory board for the FEAST project and disseminate research results within the greater Future Earth network.

-Promotional materials (website, pamphlets, etc.) will be designed in the spring of 2016.

The project has brought greater clarification to the Futurability Initiatives mission to theorize and realize real-world impacts from research outputs via the strong emphasis on transition and social change. It has linked with international research initiatives and aligned itself over the next five years to have relevance for the Sustainable Development Goals and Future Earth. In the future, the project hopes to take a role in Future Earth Knowledge Action Networks, either in the nascent “Transformation to Sustainability” KAN or help to create a KAN on sustainable consumption and production. It is also hoped that the project will foster a stronger presence for RIHN in the local community of Kyoto.

●Achievements

○Books

【Authored/Co-authored】

・Nishiyama, Mima 2015 Social business that connect villages and cities and revitalize rural areas.. Tsukuba Shoubo Publishers (in Japanese)

【Chapters/Sections】

・Imaizumi, Aki & Motoki Akitsu 2015 What are the Moral Codes for Seed-Saving?: From the Interviews with Practitioners in Japan.. Soraj Hongladarom (ed.) Food Security and Food Safety for the Twenty-first Century: Proceedings of APSAFE2013. Springer, pp.229-240.

・Cohen, Maurie J. 2015 Toward a post-consumerist future? Social innovation in an era of fading economic growth.. Lucia A Reisch & John Thogersen (eds) (ed.) Handbook of Research on Sustainable Consumption. Edward Elgar, pp.426-439.

○Editing

【Editing / Co-editing】

・Kennedy, Emily Huddart, Maurie J. Cohen, and Naomi Krogman. (ed.) 2015 Putting Sustainability into Practice: Applications and Advances in Research on Sustainable Consumption. Edward Elgar,

○Papers

【Original Articles】

・Kobayashi, Mai, Chhetri, Rekha & Katsu Fukamachi 2015 Transition of Agriculture Toward Organic Farming in Bhutan. Himalayan Study Monographs 15 :66-72.(reviewed).

・Augustine-Jean, Louis 2015 When Risks Turn to Uncertainties. Insights from the Food Market in China and Japan. China Journal of Social Work 8(3) :247-267.(reviewed).

Stage: Feasibility Study

Project No.:

Project Name: Developing a new usage of isotope tools for transdisciplinary approach to environmental studies

Abbreviated Title:

Project Leader: Ichiro Tayasu

Research Axis:

URL:

Key Words:

○ Research Subject and Objectives

The RIHN considers that the global environmental issues find their roots in human culture. Environmental degradation can be understood as an imbalance in the interaction between human beings and natural systems. In the historical point of view, regulations have been issued to protect society from environmental pollution. Environmental monitoring of chemical or biological substances has been undertaken for this kind of problems. On the other hand, under the dynamic planet, knowledge and evidence about the physical, ecological and social mechanisms that underpin global and regional environmental changes need to be combined (Future Earth 2014).

Knowledge Action Network, which aims at analyzing, understanding and enabling transformations to sustainability, requires applicability to adaptive monitoring, which combines knowledge and action in local society. Among various approaches that can be applicable to the research, we focus on isotope tools. This approach has successfully been applied to many previous projects in RIHN. Furthermore, the fact that RIHN is equipped with advanced isotope ratio mass spectrometers and elemental analysis systems confirms the advantage of adopting the approach and developing a new type of application of isotope tools for transdisciplinary approach.

An original approach adopted here is to use “Multi-Isoscapes” (multi-layered mapping of isotopic data using geographic information system) together with various stakeholders. In applying the approach, we collaborate with research project members in RIHN, outside of RIHN and various stakeholders to co-design theresearch and work together. The co-production of isotopic data and “Multi-Isoscapes” includes educational activities in local schools, providing an opportunity to cooperate in research activity.

Recognition of Earth as an integrated system drew attention to the need to integrate approaches from different disciplines to tackle scientific questions about the complex processes making up the Earth system. The process of co-creation of knowledge consists of three fundamental steps throughout which both academia and stakeholders are involved to varying degrees: co-design, co-production and co-dissemination (Mauser et al. 2013). This project aims to apply “Multi-Isoscapes” method as adaptive monitoring approach to research areas in the RIHN, in order to revitalize RIHN’s research resources and to establish Knowledge Action Network leading to the basis of sustainable earth society.

○ Progress and Results in 2015

The Center-core member (Tayasu, Shin and Nakano) interviewed all PIs of current research projects (8 FR and 1 PR) in September-October 2015. All PIs acknowledged the utility of isotope tools in the research of environmental issues. Especially, the following PIs are willing to collaborate with the “Isotope Tools” project; Profs. Okuda, Nakatsuka, Taniguchi, and Habu.

In discussing with the PIs, we found that future collaborations with upcoming IS/FS projects should be considered when their proposals are submitted to RIHN. Early stage is desired to consider potential collaborations with the “Isotope Tools” project.

We visited most of the research sites together with the researchers, collaborators and citizens, depending on the specificity of sites. We discussed how to start co-production in the forthcoming year.

(a) The Lake Biwa and the watershed: Collaborations with Prof. Okuda and the members of D-06 project.

(b) Otsuchi Area: Collaborations with Prof. Taniguchi and the members of R-08 project.

(c) Ono Area:Collaborations with Ono City.

(d) Saijo Area: Collaborations with Prof. Taniguchi and the members of R-08 project.

(e) Chikusa river watershed: Collaborations with Prof. Ohkushi, Kobe University anda Nonprofit Organization.

(f) Hei river and Tohoku region: Collaborations with Prof. Habu and the members of R-09 project.

(g) Laguna de Bay in the Philippines and the watershed:Collaborations with Prof. Okuda and the members of D-06 project.

○Project Members

◎	TAYASU, Ichiro	(Research Institute for Humanity and Nature,Professor,Leader, Developing isotope tools for environmental studies)
	NAKANO, Takanori	(Research Institute for Humanity and Nature,Professor,Developing isotope tools for environmental studies)
	SHIN, Ki-Cheol	(Research Institute for Humanity and Nature,Assistant Professor,Developing isotope tools for environmental studies)
	KONDO, Yasuhisa	(Research Institute for Humanity and Nature,Associate Professor,Developing GIS platform of isotope tools for environmental studies)

○ Future Themes

The core project is designed to work collaboratively with research project members in RIHN, outside of RIHN, and various stakeholders. Thus, the Core project is not an independent project.During the Core project FS, we have developed collaborative relationships with the research teams about feasibility of the method. The most important point of the project is strong connection with local researchers and various stakeholders, including local government, local students, citizens, NPOs, and so on.

As a result, the PEC evaluated that our project needs to be improved, and we consider it important to make more strong proposal to be feasible for a Core project FR in the fiscal year 2017.

Stage: Feasibility Study

Project No.:

Project Name: Developing an information service to support the global environmental research based on societal collaborations in the era of open science

Abbreviated Title: Open Science Core FS

Project Leader: Yasuhisa Kondo

Research Axis: Core Program

URL: http://www.chikyu.ac.jp/rihn/project/CFS-2015-03.html

Key Words: Open science, open research data, ideathon, unconference

○ Research Subject and Objectives

1) The contents of the methodology which the Core Project seeks to establish

This Core Project develops a methodology to accumulate, share, and reuse environmental knowledge and information produced by fieldwork-based research projects of the Research Institute of Humanity and Nature (RIHN) and other institutions in order to accelerate scientific and social innovations to solve environmental issues at both global and regional scales in collaboration with societal stakeholders in more efficient and effective manner. To this end, we apply the concepts of open science, in which research outputs are broadly shared with society and not only the academic communities.

2) Necessity, utility, and the background of the methodology to solve global environmental issues

The mention of the open scientific research data in the 2013 G8 Science Ministers Statement (Foreign & Commonwealth Office of the United Kingdom, 2013) promoted the acceptance of open science. In 2015, the Cabinet Office of Japan defined open science as "a new approach to promoting innovation through knowledge creation in science and technology," and promoted access to and use of publicly funded research results such as scientific papers and their underlying data by the scientific community, various industries, and the general public alike (Cabinet Office of Japan, 2015). This policy may soon impact the activities of the RIHN, which is funded by governmental agencies such as the Ministry of Education, Culture, Sports, Science and Technology of Japan (MEXT); the Japan Society for the Promotion of Science (JSPS); and the Japan Science and Technology Agency (JST). Implementation of this governmental policy trend may allow the RIHN to advance open science in the field of global environmental studies, particularly through a transdisciplinary approach.

As society becomes more accustomed to the concepts of open science and the widespread sharing of scientific data, striking research developments and innovations are expected to occur more frequently as agents based in different areas from those generating data produce new interpretations and discoveries. These agents may include government staff, local residents, skilled volunteers (pro bonos), and science communicators, as opposed to conventional researchers working at universities or research institutions. On the other hand, environmental issues are characterized by multiscalar spatio-temporal complexes of anthropogenic and environmental factors. Consequently, scientific data gathered from empirical fieldwork are likely to be both dispersed and localized. Such disparity of data makes it difficult to visualize causal connections between agents, events, and/or background factors in an integrative manner beyond individual studies at a specific spatio-temporal scale. It is therefore necessary to consider the transdiscipinary innovations in environmental research that are likely to be produced through the integrative analysis of dispersed data, using both theoretical and practical approaches.

○ Progress and Results in 2015

1) Research Organization

The Open Science Core FS established a bilateral partnership with the Nutrient Cycling Project (D-06), the Area Capability Project (D-05), and the Small-scale Economy Project (R-09) to conduct action research. It also invited Yasuhiro Murayama (National Institute of Information and Communications Technology/International Counsel for Science World Data System (ICSU-WDS)), Asanobu Kitamoto (NII), and Yuzo Marukawa and Hirofumi Teramura (National Museum of Ethnology) to the FS meeting to exchange ideas.

Furthermore, the FS successfully connected with the open science community in Japan, comprising researchers, administration officials, university research administrators, librarians, journal publishers, and other stakeholders, by hosting a workshop and participating in five workshops organized by the NII, the ICSU Committee in Data for Science for Technology (CODATA), and World Data Center for Geomagnetism of Kyoto University.

The Data Construction Core FS launched a bilateral collaboration with the Desertification Project (R-07) and the Historical Climate Adaptation Project (H-05) in addition to the Area Capability and Small-scale Economy projects. It is also liaising with the Kyoto University Research Coordination Alliance (KURCA).

It should also be noted that both Core FSes established a strong tie with the Ontology Core Project and the Environmental Isotope Core Project.

2) Results

This Core Project was jointly been proposed by two Feasibility Studies (FSes) from the Center's Informatics Unit---the Open Science Core FS directed by Yasuhisa Kondo and the Data Construction Core FS by Tatsuki Sekino---in accordance with the suggestion from the Project Review Task Committee (PRT) on the occasion of the annual general meeting in November 2015.

In October 2015, the Open Science Core FS held a workshop, at which were presented current issues on the development of international open science policy (Yasuhiro Murayama), the importance of data citation as "standing on the shoulder of giants" (Asanobu Kitamoto), the concept of a forum-style museum being developed by the National Museum of Ethnology (Yuzo Marukawa), and current issues in the RIHN projects mentioned above. The discussion implied that this Core Project should focus on a bi-directional collaboration with different areas of society, such as education, and the capacity building of human resources to promote open scientific research data. This workshop was followed by an ideathon with Women Who Code Tokyo, a female pro bono group specializing in information and communication technologies to develop ideas regarding information services that this Core Project could help develop. This ideathon resulted in the concept of developing a web application to promote the recycling of removed waterweed as compost in the Lake Biwa area in collaboration with the Nutrient Cycling Project, Shiga Prefectural Office, and local residents (Kondo et al. 2015).

On the other hand, the Data Construction Core FS created activity diagrams for the above-mentioned research projects. This pilot research confirmed the feasibility that the retrieval and visualization of object-activity relationships facilitated stakeholders' better understanding of the issues and accelerated the reuse of disclosed research data.

Furthermore, a joint unconference, a style of group discussion for which topics were chosen by participants on site, was held in early February 2016 to highlight the current issues of open science.

3) Feasibility Towards Core Project Full Research

Discussions with the collaborators and PRT referees consolidated the importance of the bottom-up approach used by the RINH to promote open science in global environmental studies as an interdisciplinary and transdisciplinary research domain. In particular, they found advantages in the development of theory, methods, and human resources to recycle and integrate multiscalar and dispersed research data in environmental studies. It was also clear that the liaison with the RIHN research projects and the Center, as well as the open science community in Japan, had fully been developed. Joining the Open Science and Data Construction FSes, as well as the liaison between the two other Core Projects, would consolidate the transdisciplinary research platform of the RIHN. Based on these achievements, this Core Project was evaluated as highly feasible. However, it failed to transfer to a Full Research Project at the stage of the Project Evaluation Committee meeting.

○Project Members

AMANO, Eriko	(Open science theories)
ASANO, Satoshi	(Research Institute for Humanity and Nature,Project Researcher,Feasibility study of application development by civic tech)
HABU, Junko	(Research Institute for Humanity and Nature,Professor,Application of open data to RIHN's research projects)

HAYASHI, Kazuhiro	(National Institute of Science and Technology Policy,Senior Research Fellow,Open science policy)
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KITAMOTO, Asanobu	(National Institute of Informatics,Associate Professor,Open science theories)
◎ KONDO, Yasuhisa	(Research Institute for Humanity and Nature,Associate Professor,Project coordination)
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KOMURA, Itsumi	(Osaka University Library,Librarian,Role of data librarians in open science)
MARUKAWA, Yuzo	(National Museum of Ethnology,Associate Professor,Open data in museums)
MURAYAMA, Yasuhiro	(National Institute of Information and Communications Technology,Director,International trends in open science)
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TAYASU, Ichiro	(Research Institute for Humanity and Nature,Professor,Application of open research data to isotope environmental science)
TERAMURA, Hirofumi	(National Museum of Ethnology,Assistant Professor,Feasibility study of field research data recycling)
YASUTOMI, Natsuko	(Research Institute for Humanity and Nature,Assistant Professor,RIHN Archives)

○ Future Themes

Upon completion of this Core Project, the impact of open science was expected to transform the global environmental studies research community by visualizing the research processes of the RIHN and associated research agents in a more transparent way and by realizing the sharing of theories, methods, and practical tips with various stakeholders. Moreover, integration of the dispersed information on individual subjects by different projects or researchers would result in an increasing number of social and scientific innovations. These transformations will certainly benefit the progress in global environmental research by contributing to providing wider options for political decision, for instance.

Tools, services, and practical theory and methods developed by this Core Project would successively be packaged and served by an operational project (known as jigyō) of the RIHN Center (hereafter referred to as "the Center"), with outputs from other Core projects incorporated. Spin-off applications and research projects were also expected. Visualization of object-activity relationships in various spatio-temporal domains would illustrate an entire map of the global environmental issues, which the RIHN has been seeking as its primary mission.

In the fiscal year 2016, a Core Project FS titled "Visualizing and filling gaps of knowledge information between actors in the research to solve social issues" will jointly proposed by this Core Project FS and another FS titled "Designing common language and common theoretical basis on global environmental studies" (directed by Terukazu Kumazawa).

●Achievements

○Papers

【Original Articles】

・Yasuhisa Kondo, Satoshi Ishikawa, Mami Enomoto 2015,12 Developing an information service to support global environment research through collaboration with pro bonos. IPSJ Symposium Series 2015(2) : 131-138. (in Japanese) In Japanese with English abstract.

・Yasuhisa Kondo, Takehiro Miki, Taichi Kuronuma, Takashi Oguchi 2015,08 On-site digital heritage inventory development at Bat, Oman. ISPRS Annals of the Photogrammetry, Remote Sensing and Spatial Information Sciences II-5/W3 :145-152. DOI:10.5194/isprsannals-II-5-W3-145-2015.(reviewed).This work is distributed under the Creative Commons Attribution 3.0 License.

○Research Presentations

【Oral Presentation】

・Hideyuki Onishi Landscape Shift in the Indigenous Village by Communism as Modernization:A Case Study on Two Nanai Villages in Amur Region. Association for East Asian Environmental History (EAEH) 2015: : The Third Conference of East Asian Environmental History, 2015,10,22-2015,10,25, Kagawa University, Takamatsu, Japan.

・Hideyuki Onishi Subsistence Activities of Indigenous People Before and After the Collapse of the Soviet Union: A Case Study of Two Nanai Villages in Amur Region. Conference on Hunting and Gathering Societies (CHAGS) 11, 2015,09,07-2015,09,11, University of Vienna, Vienna, Austria.

【Poster Presentation】

・Toshikazu Seto, Yoshihide Sekimoto, Shusaku Higashi A Study of the Development and Distribution of Open Geospatial Data in Japanese Local Governments. FOSS4G Seoul, 2015,09,14-2015,09,19, Seoul, South Korea.

【Invited Lecture / Honoronary Lecture / Panelist】

・Kazuhiro Hayashi Recent state of policy development and research activities in Japan for sharing research outputs. The International Chemical Congress of Pacific Basin Societies 2015, 2015,12,15-2015,12,20, Honolulu, Hawaii, USA.

・Kazuhiro Hayashi Potential of open science to change the framework of manufacturing beyond industry 4.0. 28th International Microprocesses and Nanotechnology Conference, 2015,11,10-2015,11,15, Toyama International Conference Center, Toyama, Japan.

・Yasuhisa Kondo Open science in the context of transdisciplinary research. CS-DC '15 e-conference, 2015,09,30-2015,10,01, Tempe, Arizona, USA.Invited talk at the Open Systems Exploration e-session.

Stage: Feasibility Study

Project No.:

Project Name: Designing Common Language and Common Theoretical Basis on Global Environmental Studies

Abbreviated Title: common language and theoretical basis

Project Leader: Terukazu KUMAZAWA

Research Axis:

URL:

Key Words:

○ Research Subject and Objectives

1) The contents of the theory and methodology which the Core Project seeks to establish

This core project aims at designing common language and common theoretical basis on global environmental studies. The knowledge which contributes to solving global environmental issues is produced in academic communities as well as designed and produced in the process of collaboration with stakeholders. This means the research process of the global environmental studies by means of transdisciplinary approach, but what functions as a mechanism in this collaboration process?

This core project focuses on exploring this collaboration mechanism as well as on contributing to the smooth communication with researchers and stakeholders by referring the common knowledge. The research process of this project is organized as follows. First, we is propose common manners to make a collaboration process smooth. Second, we develop common language. Third, we construct linkage model between cases by means of common language. Through these series of works this core project will realize the development of the methodology as a basis for solving global environmental issues in collaboration between science and society.

2) Necessity, utility, and the background of the theory and methodology to solve global environmental issues

The mode of the global environmental studies are in the stream from knowledge-first approach to process-oriented approach (Miller(2013)). The development to assess collaboration process appropriately is necessary in interdisciplinary approach which constitutes the theoretical basis of the global environmental researchand in transdisciplinary approach by which researchers and practitioners tackles issues together (Stokols et al.(2010)). For such assessment we need a kind of design principle for collaboration process design, but such principles have not been established in the field of global environmental research yet.

Therefore, this research makes it a goal to establish the design principles through discussing the collaborative seeking process reflecting philosophy and ethics domains of the sustainability of the social-ecological systems. As Tachimoto (2012) discussed, there have been discussions to an extent from the model synthesis perspective. These discussions were conducted as part pf constructing the framework of the design science, which is one of the main concepts in the Second Period Medium- Term Programs of the Research Institute for Humanity and Nature (RIHN).

However, the ways of designing spaces for dialogue and of constructing knowledge structure has not been sufficiently discussed yet in RIHN. The novelty of this research approach can be found in terms that the approach in the context of constructionism is fused with the model based synthesis approach.

○ Progress and Results in 2015

1) Research Question

The research question of this core project is what functions as a mechanism in this collaboration process of the global environmental studies in the context of transdisciplinary approach.

Knowledge is represented through various ways of expression in the interdisciplinary or transdisciplinary approach in global environmental researches. For example, questions and goals can be formats of expression, while a framework figure is a more structural way of expression. Furthermore, it is also no wonder that the ways of expression is illustrations or videos. The appropriate combination of such expression ways is considered to enable a collaboration process to be made smooth. But in the first place we need understanding whether these expression ways have to be based on some basic design or format of knowledge or not. This is an essential and fundamental question to discuss design of the

global environmental studies. This core project calls such design formats or principles of collaboration process design the theoretical basis of the global environmental research.

This theoretical basis requires that it provides the manners to make collaboration processes smooth as well as systematizes the global environmental studies. On a parallel with discussing the theoretical basis, the development of some kinds of common language is necessary to describe such common manners and systems. But the development of the common language does not intend to force us to talk by using the common language, but aims at referring to the common language in order to compare terms or frameworks used in individual academic communities mutually.

Focusing on the research titles of the RIHN research projects, for example, the 'key concepts' such as 'Area Capability' and 'Human-Environmental Security' are so difficult to understand though they stand for the originality of these research issues. Such obscurity makes our understanding about the research project overviews hard. If we represent these key concepts by the combination of terms in the common language, it will enables us to understand the key concepts easier and to grasp them in relation to other key concepts. As a result, such systematization will contribute to understanding the overall picture of the global environmental studies which RIHN is attempting to show.

2) Research Structure / Organization that Your Core Project has established thus far.

(1) Collaboration with the RIHN research projects:

The principal investigator of this core project FS is involved in the "Human-Environmental Security in Asia-Pacific Ring of Fire: Water-Energy-Food Nexus" FR, the "Lifeworlds of Sustainable Food Consumption and Production: Agrifood System in Transition" PR and the "Local Standard in Globalization: Social Inclusive Approaches towards Transformation of Local Communities" FS. This situation means that this core project FS succeeded in collaborating with the project proposals based on all of the GAIA, OIKOS and ETHOS, which are the futurability initiatives of RIHN.

We focused on "the ontological framework to analyse the sustainability of the social- ecological systems" proposed by Elinor Ostrom (2007, 2009) as a common analytical framework of these project proposals. By constructing the ontology to describe the analytical framework we defined and classified the concepts which constitute the basic framework of the global environmental studies (Kumazawa et al. (2014.06)). Now we are improving the ontology of the global environmental studies from the aspect of the Water-Energy-Food Nexus as a collaboration of the "Human-Environmental Security in Asia-Pacific Ring of Fire: Water-Energy-Food Nexus" FR and information division.

(2) Situation of collaboration with other research institutes and researchers of such institutes:

Through the projects of the Grants-in-Aid for Scientific Research (KAKENHI) the principal investigator of this core project FS is in collaboration with the researchers of the following universities and research institutes:

a) The Institute of Scientific and Industrial Research, Osaka University (ISIR)
b) Center for Environmental Innovation Design for Sustainability, Osaka University (CEIDS)
c) Graduate School of Policy Science, Ritsumeikan University
d) Disaster Prevention Research Center, Aichi Institute of Technology
e) Lake Biwa Environmental Research Institute, Shiga Prefectural Government

(3) Situation of collaboration with the related stakeholders

The principal investigator of this core project is sufficiently in cooperation with local governments and citizen groups in the suburban areas of Kyoto City through the following activities:

a) The member of organizers of the "Round Table for the Future in Takashima" facilitated by the Center for Citizen Collaboration and Communication of Takashima (Takashima City, Shiga Prefecture)

b) Supporting the series of the workshops involving the groups of field activities in, which were implemented to formulate the Kizugawa City Action Plan for Maintaining Regional Cooperation on Biodiversity (Kizugawa City; Kyoto Prefecture) (Kumazawa et al.(2015.05))

3) Research Result of Your Core Project FS

(1) Extracting the issues to discuss the systematization of the sustainability science and environmental studies domain

This core project FS held the research meetings twice to review the existing literatures in the field of the sustainability science and global environmental studies and to discuss based on these literatures. In the first meeting we extracted the following three issues: 'research perspective', 'difference of the starting points by individual academic communities' and 'security of falsifiability and responsibility of researchers'. According to these extracted issues, in the second meeting we deepened the understanding about how to be knowledge produced in the cooperation of the society.

(2) Holding the seminars to define the basic terms used in the global environmental research

This core project held the seminars titled “Theory and practice of ontology engineering” twice. We deepened the understanding about the description of the target world from the aspect of ontology engineering towards providing the common definition of the basic terms in the field of the global environmental studies.

(3) Discussing the roles the common language plays and the possibility of utilizing the ontology engineering approach

This core project discussed the roles of the common language in the process of synthesizing knowledge through the workshop experiments for research development. The experiments were implemented in collaboration with the “Human-Environmental Security in Asia-Pacific Ring of Fire: Water-Energy-Food Nexus” FR (Kumazawa et al. (2016)). Now we are conducting the works to find the research questions hidden in the discussion under the research collaboration process. The procedure of the work is conducted as follows. First, the necessary terms to deliberate the global environmental research are extracted from the dialogs in the workshops. Second, the common properties included in multiple terms are systematized as a concept in the ontology.

○Project Members

◎ Terukazu KUMAZAWA (RIHN Center,Assisstant Professor,management, collaboration design research, development of global environmental studies ontology)

○ Future Themes

1) Publishing a review paper dealing with the discussion about systematization and collaboration design in the sustainability science and environmental studies domain

It is necessary to implement a lot of literature reviews to deepen understanding of systematization and collaboration design in the sustainability science and environmental studies domain. Based on these reviews we should submit a review paper to an international journal of the sustainability science and environmental studies field. Through the publishing this review paper the position of this research proposal in this field will be established.

We need the following three issues after the issue 1).

2) Proposing common manners to make collaboration process smooth

This core project first extracts the condition to make communication in the process of collaboration process smooth through seeking the collaboration mechanism. Second, we propose the common manners reflecting this condition. Concretely, we implement research development workshops to propose the new research issues of which the research seeds are derived from the outcomes of the finished research projects.

In the courses of these workshops we hold sub events dealing with particular expression ways. For example, we focus on utilizing video and illustration, proposing questions and goals and designing framework figures in the sub events. We record the events and analyse the processes of the events.

We first hold the workshops which only experts participate in as part of the interdisciplinary approach. Second, we hold the workshops which both experts and non-experts participate in as part of the transdisciplinary approach. Third, we discuss the difference between the interdisciplinary and transdisciplinary approach in communication, and finally clarify the conditions to make the communication smooth.

3) Developing common language

This core project focuses on ontology engineering as a method fulfilling the requirement of the common language. Ontology engineering is one of the basic technology, which provides common terms, concepts and semantics. We first extract the concepts used in the RIHN research project including “Human-Environmental Security in Asia-Pacific Ring of Fire: Water-Energy-Food Nexus” and “Lifeworlds of Sustainable Food Consumption and Production: Agrifood Systems in Transition”, which are in collaboration with this core project FS. Second, we incorporate the extracted concepts in the ontology of the global environmental studies. We are also planning to increase the target research projects in series. As for the key concepts standing for the individual research projects, the key concepts of all the projects regardless of running or finished ones are incorporated into the ontology.

4) Constructing linkage model between cases by means of common language

This core project build the website from which we release the developed ontology. Through the concepts in this ontology the websites and web databases related to the RIHN research projects and the websites of local governments, environmental NGOs/NPOs and community organizations are mutually linked. For this purpose, we extract necessary link information and makes a database of the link information. In addition, the ontology is linked with the web databases inside or outside of RIHN. The web-based tool

implemented through these works for linkages is used experimentally in the collaboration process with researchers and practitioners, and finally proposed as a linkage model between cases by means of common language.

●Achievements

○Papers

【Original Articles】

- Keishiro Hara・Terukazu Kumazawa・Michinori Kimura・Kazutoshi Tsuda 2015,11 Participatory approach in vision setting: emerging initiatives in local municipalities in Japan. Sustainability Science First online(07 November 2015) :1-11. DOI:10.1007/s11625-015-0347-z.(reviewed).
- Aiko Endo・Kimberly Burnett・Pedcris M. Orencio・Terukazu Kumazawa・Christopher A. Wada・Akira Ishii・Izumi Tsurita and Makoto Taniguchi 2015,10 Methods of the Water-Energy-Food Nexus. Water 7(10) : 5806-5830. DOI:10.3390/w7105806.(reviewed).

○Research Presentations

【Oral Presentation】

- Michinori Kimura, Jageyu Kim, Takashi Iwakawa, Terukazu Kumazawa Examination of the Roundtable technique for Sustainable Society regional vision realize - A Case Study of Shiga Prefecture Takashima of "Takashima future-Roundtable" -. 9th International Symposium on "Environmentally Conscious Design and Inverse Manufacturing" (EcoDesign2015), 2015,12,02-2015,12,04, Tokyo.

【Poster Presentation】

- Terukazu Kumazawa, Keishiro Hara, Yasuhisa Kondo Interdisciplinary research development in global environmental issues using experiments with ontology engineering. Japan Geoscience Union Meeting 2015, 2015,05,24-2015,05,28, Makuhari Messe International Conference Hall, Chiba, Japan.

Incubation Studies

Social optimization of water-energy nexus in small-scale distributed system for poverty alleviation

KANEKO Shinji (Graduate School for International Development and Cooperation , Hiroshima University)

It is desirable strategy for rural poor households in disadvantaged areas of developing countries to pursue sustainable development while harmonizing local environment and locally utilizing renewable natural resources as much as possible. As one of possible means to move forward, we focus on integrated system of multiple uses between renewable energy and water resources, as propagated by "water-energy nexus". This IS research project, thus, broadly examined scope and framework for studying optimal scale of the system from various disciplinary perspectives including both technical and non technical factors, whereas the efficiency is regarded as comprehensively as possible. As outcome of the examination, the followings were discussed and reflected in the research plan of the next step: (i) technically larger system would be preferable, whereas socially smaller system would be preferable; (ii) technically optimal design of the system is different among stages of development, maintenance and operation; (iii) benefit measurement requires careful treatment of selection biases; (iv) there might be threshold that discontinuously increase the benefits; and (v) social capital or altruistic behavior has important implications to introduction of public goods in isolated rural communities.

Transformational change of regional society with high-pollutant risk by transdisciplinary approach and sustainable remediation technology

SAKAKIBARA Masayuki (Graduate School of Science and Engineering, Ehime University)

The aims of IS research are as follows: ① to examine how areas at risk of high levels of pollution can respond adaptively to such risk, and ② to investigate how communities can be transformed, using a transdisciplinary approach based on an integrated science-humanities perspective, collaborations with stakeholders, and the introduction of sustainable 'green' technology using plants.

In this IS research, preparations have begun for study enforcement of the case studies in various regions. Accordingly, Kotomobagu City in North Sulawesi Province has been added as a new case study, and a literature review of traditional community organization in Indonesia has been completed. In addition, we have engaged in comprehensive dialogue with various stakeholders in artisanal and small-scale gold mining (ASGM) areas in the North Gorontalo Regency and Bone Bolango Regency in Gorontalo Province, and have started dialogue with various stakeholders in the ASGM area in the Bombana Regency in Southeast Sulawesi Province. The results of this study are expected to provide substantial new knowledge on the mitigation of pollution.

Interdisciplinary Comparative Research of Human Uniqueness: Re-interpreting the Formation of Ancient Civilizations from Cognitive (Brain, Genome) Sciences and Global Environmental Studies

SUGIYAMA Saburo (Graduate School of International Cultural Studies, Aichi Prefectural University)

We need to analyze the formation process of human's unique civilizations to better understand global environmental problems and to establish sustainable societies since ecological conditions substantially changed as civilizations formulated. Only modern humans successfully peopled all over the world and drastically increased their population that shifted existing natural environments. Human's unique nature, collaborative behavior principles, and their social organizations were among main factors which fundamentally triggered environmental changes. The study examines social evolutionary processes mainly from the time of plant/animal domestications, through the formation of ancient states and social complexities, to better understand modern environmental issues from long-term historical transdisci-

plinary perspectives that would be essential to build "Future Earth". We first dedicated to discussions on theories and strategies with experts in DNA, bacteria, brain sciences, archaeology, anthropology, ecology and astronomy in terms of "human uniqueness", and selected specific research questions and target area/time for our FS proposal. Our FS will focus on the Mexican central highlands and Andes areas in Peru, places of origins for ancient civilizations in the New World to run comparative studies in the following stages.

Mathematical-geographical Modelling on Divergencies of Humanity and Nature in Early and Pre-modern Worlds

MURAYAMA Satoshi (Faculty of Education, Kagawa University)

The purpose of this research is to reveal the historical process of the separation of humans from nature based on a comparative environmental history approach. We will employ mathematical-geographical modelling to identify the underlying mechanism, present a future vision of local environments and conduct action research based on and to reinforce our findings. In fiscal year 2015, we had intense discussions to clarify the concept of this research project and checked whether the proposed NaMAC cycle would function. First, we performed a nationwide review of the preservation status of topographic-historical sources, such as Gunson-shi and Koukoku-chishi from early modern Japan and verified the effectiveness of mathematical-geographical modelling at an academic level in an area in Kyoto which was known as Otagi-gun, early modern Amakusa and Aki-gun in Tosa. Then, in order to confirm the strong relevance with action research, we conducted a couple of fieldworks in Otagi-gun and deepened our partnership with the Satoumi project in Hinase, Okayama, which is one of the most successful practices derived from local environmental history. We also selected areas for international comparative research and sought collaboration with overseas researchers.

Co-creating the Spatially-explicit Integrated Knowledge for Climate Change Adaptation of Local Communities

YOSHIDA Takehito (Graduate School of Arts and Sciences, The University of Tokyo)

Climate change including temperature warming, precipitation change and ocean acidification has various impacts on our human society, such as natural disasters, food production, water use, health and biodiversity, threatening directly and indirectly the existence of the society. Promoting the adaptation to climate change risks in the local communities is the ultimate goal of the project, and we set the two research objectives to realize the goal; 1) integrated analysis of climate change risks and their visualization, and 2) co-creation of climate change adaptation based on the spatially-explicit integrated knowledge of climate change risks. During the Incubation Study phase, we reviewed researches on climate change risks in different areas of expertise in order to define the research needs for the integrated analysis of climate change risks in local communities. We also developed the core concept of the project and considered the possibility of the implementation of climate change adaptation in the candidate local communities.

Exploratory Studies on Human Adaptation Mechanism to Modern Plague

YAMAMOTO Taro (Institute of Tropical Medicine, Nagasaki University)

This research aims to evaluate how environmental change affects the micro-ecosystem within our body, resulting in, what's so called, modern plagues such as obesity, diabetes mellitus, allergy, inflammatory bowel diseases, and autism. Based upon such evaluation, we are to understand the comp I ex interaction between macro (outside) – and micro(inside)-(our)ecosystem. During last one year as a period of IS, we have been establishing the basic framework of ground rules for that understanding. As a result, collaboration between medicine, molecular biology, anthropology

and archeology gets this IS moving forward, suggesting that the phenomenon being considered as noise play an important role in such interaction. In addition, it lets us reconsider that we never live alone both in macro-environment and micro-one.

Study on Causality between Economic Globalization and Local Environments by the Multi-framing Approach

OKI Kazuo (Institute of Industrial Science, The University of Tokyo)

Southeast Asia has a large capacity of population aliment due to rich water resources and food. The large population has supported the rapid urbanization driven by economic globalization. As a result, some environmental problems in urban area have become serious such as the tight balance of water supply-demand and increase of exhausted environmental loads. In rural area, due to the paradigm shift in agriculture from subsistence to cash crop farming, some environmental problems have been arising; soil erosion because of forest cultivation driven by farmland expansion and water pollution because of excessive input of fertilizers and pesticides. The relations between economic globalization and these local environmental problems, however, have not been revealed clearly. Therefore, stakeholders do not have the common realization of their weight and range of responsibility for local environmental problems, so that an effective framework of problem solving has not been established.

In this IS project, we reviewed the relations between scales and framework of problem solving in previous studies and existing institutions concerning local environmental problems related to water use and food production.

Assessing and Predicting Fluctuations in the Functional Diversity of Satoyama Paddy Landscapes in East Asia's Monsoon Region: Towards the Creation of New Satoyama in Response to the Transformation of Rural Society

HOMMA Kosuke (Faculty of Agriculture, Niigata University)

This study aims to evaluate maintenance and management systems for *satoyama* ecosystems in East Asian countries, and to present prescriptions for the ongoing maintenance of *satoyama*'s diverse functionality within the contemporary social context. During IS term, we performed seven meetings, investigated domestic and international trends in researches involving this project, and reconstructed a framework by clarifying problems and establishing study methods. In addition, we went to Thai and Laos to select research sites suitable for pursuing this project and investigated the current farming methods and agricultural product marketing in these areas. Moreover, we built up partnerships with several researchers and a research organization in the study areas. We believe these activities will enhance the originality and feasibility of our project.

Completed Research (CR) Follow-up Grants

These grants allow CR Project Leaders or team members to disseminate their research results to both the academic community and the general public, to contribute to the RIHN Archive, and to incubate new research ideas for future development as RIHN projects.

Outreach Activity for Network Development in Malaysia

SAKAI Shoko (Center for Ecological Research, Kyoto University)

We visited Kuching, Sarawak, Malaysia to organize the international symposium "Frontier in Tropical Forest Research: Progress in Joint Projects between the Forest Department Sarawak (FDS) and the Japan Research Consortium for Tropical Forests in Sarawak (JRCTS)" hosted by JRCTS and FDS. At the symposium we introduced results of our studies, and also shared perspectives about seeds of future researches and capacity building. We also visited University of Sarawak and discussed about potential research plans and exchanges of researchers and students.

Support for the 9th National Health Research Forum of Lao PDR in 2015

MOJI Kazuhiko (Graduate School of International Health Development, Nagasaki University)

The 9th National Health Research Forum (NHRF) of Lao PDR was held at Vientiane on October 13 and 14, 2015, organized by the National Institute of Public Health (NIOPH), Ministry of Health. A total of 149 researchers and policy makers attended the forum and 34 oral presentations and 26 poster presentations were made. The First National Health Research Forum was held in 2007 in Vientiane, eight years ago when the RIHN Ecohealth Project was at the preparation stage. Prof. Dr. Boungnong Boupha, Dr. Kongsap Akkhavong, and her/his staff and the RIHN project members wished to promote health and environmental research in Lao PDR, through communication and exchange of scientific findings and ideas, sharing research information and seeking possibility for future collaboration by organizing the annual NHRF. The NHRFs has played a very important role in promoting health research in Lao PDR and in building research capacity of many domestic researchers as well as international researchers.

Network Development for Establishing an Integrated Management Model of R. Syr Darya with Special Emphasis on Environmental Preservation

KUBOTA, Jumpei (RIHN)

After the collapse of the former USSR and the independence of present central Asian countries, conflicts and lack of coordination on resources and environmental issues have been arisen among countries. The aim of this research is to develop the research network which originally was founded in the RIHN's Ili Project, and to extend its activities with various stakeholders in central Asia. In 2015, we investigated present status and opinions of international organizations on Aral Sea conservation: International Fund for Saving the Aral Sea (IFAS) and Interstate Coordination Water Commission (ICWC) in Tashkent. We had interviews with Mr. Shukhrat Talipov, vice president of IFAS and Dr. Vadim Sokolov of ICWC. We discussed the future possibility of stakeholders' network in Central Asia. We organized a special session on Aral Sea in the World Congress of International Council for Central and East European Studies in Makuhari on August 8, 2015.

Network Development for Establishing an Integrated Management Model of R. Syr Darya with Special Emphasis on Environmental Preservation

The Establishment of the Occasion on Opinion and Information Exchange for Rural Development, Environmental Conservation and Health Promotion in Highland Mountainous Village

OKUMIYA Kiyohito (Center for Southeast Asian Studies, Kyoto University)

We conducted the research work as well as co-working activities with villagers individual will in order to come true the virtuous circle of economy, environment, and health. In this fiscal year, we brought the sample of guidebook at the village, and made an interview with 11 people who were willing to work for rural development to identify the background of returning to the home village. We added and modified the existing list of property, address, and occupation of dwelling villagers compared with previous list made in 2010. The disclose of the information and communication from the website of Facebook page was set up by both counterpart and our research team as our contribution work. As a result, the contents of the business varied from 30s, 40s and 50s of managers respectively and nine of eleven informants took a consideration of returning to the home village. Modified list indicated that the depopulation of hamlet close to urban city of this region was much bigger than remote ones and percentage share of dwelling people confined to the level of 30%. It resulted in the serious hollowing out and appeared the critical needs of rural development independently.

Evaluation of Social Experiment for Sustainable Risk Management

KADA Ryohei (Shijonawate Gakuen University)

By inviting Ms. Buen from the Philippines, we held a special seminar, discussing about the follow-up study of trans-sectoral, trans-disciplinary research on resource conservation. Ms. Buen will present a paper on Yaman ng Lawa (Blessing of the Lake, in Tagalog) experiences in Calamba City, especially with respect to the challenges of adaptive community participation in lake resource conservation for sustainable livelihood in Laguna de Bay, as she has been very active as project coordinator of Yaman ng Lawa collaborative research project with RIHN, UP Los Banos and Laguna Lake Development Authority for 2011-14.

Developing a New Framework for Forest Resource Management in Semi-arid Land: By Seeking an Appropriate Way of Utilization of Indigenous and Alien Species in Eastern Sudan

NAWATA Hiroshi (Faculty of International Resource Science, Akita University)

This project aims to set a new framework for forest resource management in arid land, by seeking an appropriate way of utilization of indigenous and alien species in eastern Sudan, to contribute livelihood improvement at local level.

Developing City Sustainability Index (CSI) System and Implementation of Case Method

Muramatsu Shin (Institute of Industrial Science, The University of Tokyo)

We have carried out two activities: development of additional indicators in City Sustainability Index system, and implementation of case method education for Jakarta city sustainability in Bogor Agricultural University.

We have added 10 additional indicators, and re-evaluated 18 megacities based on updated data. We found 5 sustainable megacities: Karachi, Mumbai, Jakarta, Dhaka, and Cairo. Karachi is the most sustainable city, although its standardized total value of maximization indicators is the 11th largest of 18 megacities which include non-sustainable ones.

We have created a case of Jakarta city sustainability that is able to be used in case method education. We provided

a provisional educational workshop in Shiga University and the University of Tokyo, and an educational workshop in Bogor Agricultural University. 46 students in Bogor Agricultural University participated in it. Based on an analysis of questionnaire survey, we figured out several positive educational effects. For example, they have considered economic and social aspects in addition to environmental dimension in terms of sustainability after the workshop we provided.

Centers for Research Development (CRD) and Promotion (CRP)

The Center for Coordination, Promotion and Communication (CCPC), which was established in 2007, has been responsible for cross-project, cross-domain investigation, research and support that concerns the entire institute. In order to intensify its function, CCPC divided into two centers, namely the Centers for Research Development (CRD) and Promotion (CRP) in 2013.

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. 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

The CRD and CRP also collaborate with the research department and administrative office to coordinate the task forces, working groups and administrative units involved in RIHN's ordinary operation and special events.

● Key Research Tasks

In RIHN's second phase, the Core Research Hub has been established within the CRD. It focuses on the realization of the Futurability Initiatives by conjoining the existing RIHN Domain Programmes through a set of cross-cutting initiatives towards transdisciplinary field of Environmental Humanics of the Earth System. At present, it has nurtured three Initiative-based Research Projects, "Designing Local Frameworks for Integrated Water Resources Management", "Creation and Sustainable Governance of New Commons through Formation of Integrated Local Environmental Knowledge", and "Human-Environmental Security in Asia-Pacific Ring of Fire: Water-Energy-Food Nexus".

● Building Research Data Networks

The CRD and CRP play a key role in facilitating RIHN's environmental networking and communication, especially between academic institutions, cultural institutions, and the general public. It is involved in the creation and maintenance of Asian environmental databases and project archives. It also supports the development of environmental studies curricula in Japan's public elementary, junior high and high schools.

The CRP and CRD promote cooperation between RIHN and research institutes both at home and abroad. One such activity is the repository for the global environmental studies (tentative name), a project to create environmental information networking nodes among a number of research institutes.

● Facilities and Equipment

The Survey and Analysis Unit in CRP maintains eighteen laboratories in the ground level of its main building, including specialized facilities for DNA and stable isotope analysis and mass spectrometry, as well as several rooms for chemical and biochemical analysis, microscopy, incubation, hazardous materials, fieldwork preparation, sample preparation and cold storage.

Outreach Programs and Events

1. RIHN International Symposium

RIHN 10th International Symposium

In order to diffuse the findings of an FR projects concluding in March 2016, the RIHN 10th International Symposium "Beyond Stakeholder Engagement: The people, cultures, institutions, and ecologies of new water governance" was held on 17-19 June 2015 at the RIHN Lecture Hall. The details of the symposium are as follows.

<Wednesday 17 June>

Opening Session

Chair: MCGREEVY, Steven R. (RIHN)

- Opening Remarks: KUBOTA Jumpei (Deputy Director-General, RIHN)
- Objectives of the Symposium: ABE Ken-ichi (RIHN)
- Keynote Address 1: Water Governance in the Face of Global Change: From understanding to transformation
  Claudia PAHL-WOSTL (University of Osnabrück, Germany)
- Keynote Address 2: Transforming Scientific Knowledge in 'Dialogical Tools' for Environmental Resources Management
  Marco TODERI (Marche Polytechnic University, Italy)

Session 1: Examining Local Water Management: Cases from Indonesia, Turkey and Japan

Chairs: HAMASAKI Hironori (Nagasaki University, Japan) & NAGANO Takanori (Kobe University, Japan)

- Scientific Reality of Hydrological Traits and Human Mindset on Water and Land Use in the Upstream Saba River Basin, Bali
  OUE Hiroki (Ehime University, Japan)
- Channelling People, Science and Water: Transdisciplinary in practice, Indonesia
  Dorotea Agnes RAMPISELA (RIHN)
- Irrigation in Turkey: Remedy or misery?
  Erhan AKCA (Adiyaman University, Turkey)
- Water Management Related to Sustainability and Human Wellbeing: Beyond the IWRM from local water sustainability
  NAKAGAMI Ken'ichi (Ritsumeikan University, Japan/ RIHN)
- Discussion

<Thursday 18 June>

Session 2: Knowledge Co-production in Water Governance: Stories from the field

Chair: ABE Ken-ichi (Symposium Chairperson, RIHN), Daniel NILES (RIHN) & Steven R. MCGREEVY (RIHN)

<Stories from the Field>

- The Power of Dialogical Tools in Water Resource Governance
  KOTERA Akihiko (RIHN)
- Motivating Farmers toward Environmental Conservation Practices
  HASHIMOTO (WATANABE) Satoko (RIHN)
- Gaps in Mutual Understanding in Interviews
  SEKINO Nobuyuki (RIHN)
- Lessons Learned in Co-producing Knowledge: Establishing the Saba River Basin Community, Bali
  KATO Hisaaki (RIHN)
- Towards New Local Water and Environment Policy in Saijo City, Ehime Prefecture
  MASUHARA Naoki (RIHN)

<From Stories to Lessons in Social Learning from the Field>

Panelists: Claudia PAHL-WOSTL, Marco TODERI, KOTERA Akihiko, HASHIMOTO (WATANABE) Satoko, SEKINO Nobuyuki, KATO Hisaaki, MASUHARA Naoki

Moderator: Steven R. MCGREEVY (RIHN)

Session 3: Re-thinking the Role of Culture in Resource Governance

Chair: ONISHI Yuko (RIHN)

- Local Governance, Livelihoods and Climate Change: Lessons from swidden communities in Vietnam
  Moira MOELIONO (Center for International Forestry Research, Indonesia)
- "Tirta Budaya Situ": A new concept for urban lake water culture
  Ami Aminah MEUTIA (Osaka University, Japan/ RIHN)
- Culture as Vehicle to Rehabilitation and Leverage to Sustainable Resource Use
  Anne MCDONALD (Sophia University, Japan)
- A Values Approach to Solving the Water Crisis
  David GROENFELDT (Water-Culture Institute, USA)

<Friday 19 June >

Session 4: Beyond Stakeholder Engagement: Reflection and proposals

Chairs: Daniel NILES (RIHN) & Steven R. MCGREEVY (RIHN)

- Synthesis of Days 1 & 2
  Remarks
  Claudia PAHL-WOSTL(University of Osnabrück, Germany)
  Marco TODERI(Marche Polytechnic University, Italy)
  KUBOTA Jumpei(RIHN)
- Roundtable Discussion: Nurturing social learning in Asian contexts
- Next Steps, Proposals Discussion
- Closing Remarks
  YASUNARI Tetsuzo (Director-General,RIHN)

2. RIHN Public Seminars

In order to present RIHN research activity in a manner that accessible to the general public, since November 2004, RIHN has offered public lectures. Six seminars were held in 2015 at the RIHN lecture hall and the Heartpia Kyoto.

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

The 62nd Public Seminar	30 April, 2015 Food Diversity and Rise and Fall of Cultures: Environmental Issues from Archeological Viewpoint HABU Junko (RIHN)
The 63rd Public Seminar	19 May, 2015 Kyoto and Blessing of Mother Lake OKUDA Noboru (RIHN)
The 64th Public Seminar	20 November, 2015 Water Quality Mapping with Citizens NAKANO Takanori (RIHN)

The 65th Public Seminar	4 December, 2015 Network of Living Organisms Revealed by Stable Isotope Ratios TAYASU Ichiro (RIHN)
The 66th Public Seminar	4 February, 2016 "Heart, Life, Environment" - A Discussion with High School Students Second-year students at Kyoto Prefectural Rakuhoku High School
The 67th Public Seminar	25 March, 2016 Water Quality Mapping with Citizens-2: Diagnose Water in Kyoto NAKANO Takanori (RIHN)

3. RIHN Kids Seminar

In order to enhance community relations, RIHN has held public lectures for children in neighboring elementary schools since 2010. The fiscal year 2015 seminar was held as below.

The 6th Kids Seminar "Wonder of Fish in Ancient Lake Biwa"
Date: 31 July, 2015
Venue: RIHN
OKUDA Noboru (RIHN)

4. RIHN Open House

In order to introduce RIHN's research projects and facilities to the surrounding community, RIHN has opened our buildings to the public once a year since 2011. Several interesting events such as joint experiments, public talks, exhibitions, and games were conducted in order to deepen our interaction with local citizens in fiscal 2015.

Date: 31 July, 2015
Venue: RIHN

5. RIHN Area Seminars

The RIHN Area Seminars offer an opportunity for RIHN research staff to gather with regional intellectuals and local citizens to consider problems related to the environment and culture of each area of Japan. The first seminar was held in 2005. The fiscal year 2015, two seminars were held as below.

The 15th RIHN Area Seminar
"How to Take Advantage of "NOSARI": The Futurability of Amakusa City"
Date: 19 January, 2016
Venue: Amakusa Cultural Exchange Center (Amakusa city, Kumamoto)

The 16th RIHN Area Seminar
"The Futurability of Kitagatako : How to Use Lake Surroundings"
Date: 6 March, 2016
Venue: Seifu-so (Awara city, Fukui)

6. RIHN Tokyo Seminar

In order to gain the attention of researchers and the general public and to promote research cooperation and development, RIHN periodically holds seminars in Tokyo. We invite renowned Japanese researchers as well as public officials to discuss RIHN research project objectives and findings. The seminar was held in fiscal 2015 as below.

7th Tokyo Seminar

"When a Man Look up to Sky – Nature as Culture"
Date: 29 January, 2016
Venue: Yurakucho Asahi Hall

7. The Earth Forum Kyoto; Special Session and International Symposium

RIHN, Kyoto Prefecture, Kyoto City, Kyoto University, and Kyoto Prefectural University co-host this forum in order to clearly convey our message of the importance of environmental issues to the world. The symposium was held in fiscal 2015 as below.

The Earth Forum Kyoto

Special Session: 12 December, 2015
Venue: International Science Innovation Building, Kyoto University
International Symposium: 13 February, 2016
Venue: Kyoto International Conference Center

8. The Earth Hall of Fame KYOTO

The Earth Forum Kyoto invites world-renowned experts and activists to discuss the environmental and cultural bases of more responsible human societies. The Earth Hall of Fame Kyoto Award is given to those who have made exemplary contributions to the protection of the global environment. Organizers of the event are the International Institute for Advanced Studies, the Kyoto International Conference Centre, and RIHN.

The 2015 recipients of the Earth Hall of Fame Kyoto Award:
Dr. David Takayoshi Suzuki (Biologist, Environmental Activist, and Emeritus Professor at the University of British Columbia)
Severn Cullis-Suzuki (Culture and Environment Activist, Writer)
Dr. Herman E. Daly (Emeritus Professor at the University of Maryland)

9. RIHN Seminars

RIHN Seminars are invited talks by esteemed Japanese or foreign researchers. The seminars provide opportunities for RIHN scientists to learn of the latest topics and research directions in a variety of fields; they also often are a first step toward future research collaborations between RIHN researchers and those of other institutions. Seminars are held several times a year.

The 110th	13 May, 2015 Current Issues on the Open Science and Future Directions in Data Platforms for Global Environment Studies KITAMOTO Asanobu (Associate Professor, National Institute of Informatics)
The 111th	11 June, 2015 Challenge and Practice Connecting Science and Politics: From 30 Years Research in Lake Biwa and 8

Years Experience as Governor of Shiga Prefecture
KADA Yukiko (University President, BIWAKO SEIKEI SPORT COLLEGE)

The 112th 16 June, 2015
The importance of small scale fisheries and their operations in Thailand
BOUTSON Anukorn (RIHN Visiting Research Fellows, Lecturer Department of Marine Science Faculty of Fisheries Kasetsart University (Thailand))

The 113th 15 July, 2015
Sharing in the New Economy: An Alternative for a Sustainable Future?
COHEN Maurie (Professor, New Jersey Institute of Technology)

The 114th 27 July, 2015
Quantification of Water Balance in Subak Managed Paddy Field in Saba Watershed
SAPTOMO, Satyanto Krido (RIHN Visiting Research Fellows, Bogor Agricultural University)

The 115th 6 August 2015
Institutions, Ownership Rights and Natural Resource Maintenance: Resilience Lessons from the Japanese Past
BROWN Philip C. (RIHN Visiting Visiting Researcher)

The 116th 2 September, 2015
Geographical Pattern of Global Warming and Associated Change in Water Availability
MANABE Syukurou (Princeton University)

The 117th 14 September, 2015
The perspectives of mesology as an integrated study of the human environment
BERQUE Augustin (RIHN Visiting Research Fellows, Professor, École des hautes études en sciences sociales in Paris (EHESS))

The 118th 16 September, 2015
Challenges of small scale fisheries in the Philippines: the case of Batan Bay
MONETCLARO Harold M. (Assistant Professor, Institute of Marine Fisheries and Oceanology College of Fisheries and Ocean Sciences, University of the Philippines Visayas)

The 119th 28 September, 2015
Lessons from Integrated Local Environmental Knowledge and practices of Lake Malawi riparian communities to achieve sustainable development: Challenges and Opportunities
PEMBA Dylo (Associate Professor Department of Biology University of Malawi, Chancellor College Republic of Malawi)

The 120th 29 September, 2015
Development of integrated indices for Indonesia Water-energy-food Nexus: case of Jatiluhur/Citarum basin
PAWITAN Hidayat (Professor Department Geophysics & Meteorology, Faculty of Mathematics and Natural Sciences, Bogor Agricultural University, Indonesia)

The 121th 1 October, 2015
Theory and practice of ontology engineering
MIZOGUCHI Riichiro (Research Professor, Japan Advanced Institute of Science and Technology (JAIST))

The 122th 29 October, 2015
On the relation of Imanishi's "renatured science" (shizengaku 自然学) with mesology (in Japanese)
BERQUE Augustin (RIHN Visiting Research Fellows, Professor, École des hautes études en sciences sociales in Paris (EHESS))

The 123th 9 February, 2016
Deep Mapping the Reducción: Building Digital Humanities Collaborative Tools for Mapping the General Resettlement of Indians in the Viceroyalty of Peru
WERNKE Steve (Associate Professor, Department of Anthropology, Vanderbilt University, USA)

The 124th 24 February, 2016
"Transdisciplinarity - Fundamentals, Misunderstandings, Obstacles, and Potential"
SCHOLZ Roland (Professor Emeritus, Institute for Environmental Decisions, Swiss Federal Institute of Technology Zurich)

The 125th 24 March, 2016
"Norse settlers in the North Atlantic: history, archeology and paleoclimate"
BRADLEY Raymond S. (Distinguished Professor Director, Climate System Research Center University of Massachusetts Amherst)

10. Lunch Seminars (Danwakai)

Lunch Seminars allow all RIHN research staff, including visiting professors, part-time researchers, foreign researchers and so on, to freely present their individual research to their colleagues in an informal and supportive forum. As these seminars promote creative thinking and constructive debates, they are held on a biweekly basis.

No.253 19 May, 2015
CRP as a gold mine of information: Research resources stored in the Informatics Unit
KONDO Yasuhisa (Associate Professor), YASUTOMI Natsuko (Assistant Professor)

No.254 2 June, 2015
Inferring the historical process by which the present distribution of organisms have been shaped on the basis of DNA analysis
MUTO Nozomu (Project Researcher)

No.255 7 July, 2015
Flood disasters and transformations of adaptation behavior in crop production in the Indo-China Megadelta Zone, perceived by the satellite remote-sensing
KOTERA Akihiko (Senior Project Researcher)

No.256 21 July, 2015
The earth from isotopic point of view
TAYASU Ichiro (Professor)

No.257 4 August, 2015
Introduction of nitrogen, oxygen stable isotope ratio measurement system of the nitrate ion using the denitrifying bacteria method
Yoshimizu Chikage (Center Researcher)

No.258 25 August, 2015
Submarine Groundwater Discharge in Obama Bay
HONDA Hisami (Project Research Associates)

No.259 15 September, 2015
Mountain and Atmosphere and Alpine plant (and me) -Water and nutrient dynamics on Mt. Tateyama in the Northern Japan Alps-
UEHARA Yoshitoshi (Project Research Associates)

No.260 6 October, 2015
Catchment vegetation, calcium dynamics, and invertebrate community in a calcium poor environment-

OHTA Tamihisa (Center Research Associates)

No.261 20 October, 2015
Global environmental issues from ecological point of view
ISHII Reiichirou (Associate Professor)

No.262 17 November, 2015
The last blitz of CRH
HANDOH Itsuki C. (Specially Appointed Associate Professor)

No.263 12 January, 2016
The economic activities in dagaa processing industry in Zanzibar: focusing on the changes in the business practices among actors
FUJIMOTO Mariko (Project Researcher)

No.264 19 January, 2016
The potential of tree-ring cellulose δ18O in different species as climate proxy and hydroclimate variability over last two and a half centuries inferred from oxygen isotope records of fir in southwestern Japan
LI Zhen (Project Research Associates)

No.265 16 February, 2016
"Action research" approach in environmental studies- research activities in the ecological-recycling project
ASANO Satoshi (Project Researcher)

No.266 1 March, 2016
Legal regulation and enforcement against farmers' opportunistic behavior on biodiversity
NISHIMURA Takeshi (Center Researcher)

No.267 15 March, 2016
Today's lunch is Combo B? Trying alternative methods of presentation and dialogue
KITAMURA Kenji (Project Researcher)

No.268 29 March, 2016
The 1st RIHN herbivorous men Championship
MATSUBAYASHI Jun (Center Research Associates)

11. RIHN Annual Open Meeting

RIHN research and office staff and outside research collaborators gather to review the year's progress. All project leaders present their research findings and accomplishments and receive questions from the floor.

Attracting 312 attendees in its three-day duration, the annual meeting generates dialogue between RIHN researchers and improves general awareness of RIHN's progress and evolution within the larger fields of environmental research.

Date: 25-27 November, 2015
Venue: Co-op inn Kyoto

12. Press Conferences

RIHN periodically holds official press conferences in order to release information on its academic activities, research projects, symposia, publications and latest environmental findings. As a public institution with a public mandate, such activities provide an important link between RIHN and the citizenry. Two press conferences were held in fiscal 2015.

13. Publications

13-1. RIHN Series

The RIHN Series was developed to publish books introducing RIHN's research results to the general public. The following titles were published in fiscal year 2015.

"Field kara Kangaeru Chikyu no Mirai"
Edited by SEKINO Tatsuki, March 2016 (in Japanese).

13-2. RIHN Science Series

"The Wisdom of the Shikwasha — Language, nature and lifestyle interactions in Oku-Yambaru"
Edited by ONISHI Masayuki, MIYAGI Kunimasa

13-3.Others

"Sharing Water -Co-designing Sustainable Futures through local water resources management (Mizu Wo Wakatsu)" Edited by KUBOTA Jumpei

"International Certification for Sustainable Resource Management: Ecolabels Linking the Global and the Local" Edited by OMOTO Suzuko, SATO Tetsu and NAITO Daisuke

"Living and nature of coastal community in Higashi-Hazu" Edited by ISHIKAWA Ssatoshi, YOSHIKAWA Takashi

"Field Guide to Biodiversity of Higashi-Hazu Tidal Flat in Mikawa Bay" Edited by ISHIKAWA Ssatoshi, NIKI Masato and YOSHIKAWA Takashi

13-4. RIHN News: Humanity & Nature Newsletter

This periodical communicates RIHN identity and latest news to specific research communities. The newsletter is published in an A4 format with easy-to read content. Issues 54-59 were published in fiscal 2015.

Individual Achievements

A	ABE, Ken-ichi	Professor
	ADACHI. Kaori	Project Researcher
	AKIMICHI, Tomoya	Visiting Professor
	Ami Aminah, Meutia	Visiting Researcher
	ASANO, Satoshi	Project Researcher
B	BERQUE, Augustin Laurent Pierre	Visiting Research Fellow
	BOUTSON, Anukorn	Visiting Research Fellow
C	CHAN, Sarah	Visiting Researcher
	COHEN, Maurie Jeremy	Visiting Research Fellow
D	DAHLAN, Mohammad Zaini	Visiting Researcher
E	ENDO, Aiko	Associate Professor
	ENDO, Hitoshi	Project Researcher
F	FUJIMOTO, Mariko	Project Researcher
	FUKUSHIMA, Atsuko	Project Research Associate
	FUNAKAWA, Shinya	Visiting Professor
	FUNAMIZU, Naoyuki	Visiting Professor
G	GUTSCHER, Heinz Georg	Visiting Research Fellow
H	HABU, Junko	Professor
	HANDOH, Itsuki C.	Specially Appointed Associate Professor
	HASHIMOTO, Watanabe Satoko	Project Researcher
	HAYASHI, Kengo	Visiting Researcher
	HIMIYAMA, Yukio	Visiting Professor
	HIROSE, Mikiko	Project Research Associate
	HIYAMA, Tetsuya	Visiting Professor
	HONDA, Hisami	Project Research Associate
	HONMA, Saki	Project Research Associate
I	ICHIE, Tomoaki	Visiting Associate Professor
	ISHIDA, Takuya	Project Researcher
	ISHII, Reiichiro	Associate Professor
	ISHIKAWA, Satoshi	Associate Professor
	ISHIMOTO, Yudai	Visiting Researcher
	ISHIYAMA, Shun	Project Researcher
	ISOKAWA, Aki	Project Research Associate
	ITOU, Keisuke	Project Researcher
J	JIANG, Hong-wei	Research Fellow, NIHU Center for Area Studies
K	KAJITANI, Shinji	Visiting Professor
	KAKIKOKA, Ryo	Project Research Associate
	KAMATANI, Kaoru	Project Researcher
	KANEKO, Nobuhiro	Visiting Professor
	KANIE, Norichika	Visiting Professor
	KATO, Hisaaki	Project Research Associate
	KATO, Satoko	Project Research Associate
	KATO, Yoshikazu	Center Researcher
	KIHIRA, Tomoe	Project Research Associate
	KIKUCHI, Naoki	Associate Professor
	KISHIMOTO, Sayaka	Center Research Associate
	KITAMURA, Kenji	Project Researcher
	KITOLELEI, Jokim Veu	Project Research Associate
	KOBAYASHI, Yuki	Project Researcher
	KOBAYASHI, Yuko	Project Research Associate

	KONDO, Yasuhisa	Associate Professor
	KOTERA, Akihiko	Senior Project Researcher
	KOYAMA, Masami	Project Research Associate
	KUBOTA, Jumpei	Professor
	KUMAZAWA, Terukazu	Assistant Professor
	KUSAGOU, Takayoshi	Visiting Professor
	KUSAKA, Soichiro	Visiting Researcher
	KUSANO, Yukiko	Center Research Associate
L	LI, Zhen	Project Research Associate
M	MALLEE, Henricus Paulus	Professor
	MARES, Emmanuel Bernard	Center Research Associate
	MASUHARA, Naoki	Project Researcher
	MATSUBAYASHI, Jun	Center Research Associate
	MATSUI, Takeshi	Visiting Professor
	MC GREEVY, Steven Robert	Associate Professor
	MIKI, Hiroshi	Project Researcher
	MIMURA, Yutaka	Center Research Associate
	MIYAZAKI, Hidetoshi	Project Researcher
	MIZUNO, Kei	Project Researcher
	MIZUNO, Kosuke	Visiting Professor
	MONICA, Paola Parada Lizano	Visiting Researcher
	MONTECLARO, Harold Modoc	Visiting Research Fellow
	MURAMATSU, Shin	Visiting Professor
	MUTO, Nozomu	Project Research Associate
N	NAITO, Daisuke	Project Researcher
	NAKAGAMI, Ken'ichi	Visiting Professor
	NAKAMURA, Ryo	Visiting Researcher
	NAKANO, Takanori	Professor
	NAKATSUKA, Takeshi	Professor
	NAWATA, Hiroshi	Visiting Professor
	NILES, Daniel Ely	Associate Professor
	NISHIMURA, Takeshi	Center Researcher
O	OH, Tomohiro	Project Researcher
	OHTA, Tamihisa	Center Research Associate
	OISHI, Takanori	Project Researcher
	OJIKA, Yukari	Project Research Associate
	OKA, Masami	Center Research Associate
	OKAMOTO, Takako	Project Research Associate
	OKAMOTO, Yuki	Project Researcher
	OKUDA, Noboru	Associate Professor
	OKUMIYA, Kiyohito	Visiting Associate Professor
	OMOTO, Reiko	Project Researcher
	ONBE, Shin	Project Researcher
	ONISHI, Yuko	Assistant Professor
	OSADA, Yutaka	Center Research Associate
P	PAWITAN, Hidayat	Visiting Research Fellow
	PEMBA, Dylo Foster	Visiting Research Fellow
R	RAMPISELA, Dorotea	Associate Professor
S	SAITO, Yu	Center Researcher
	SANO, Masaki	Senior Project Researcher

	SAPTOMO, Satyanto Krido	Visiting Research Fellow
	SATO, Tetsu	Professor
	SEKINO, Nobuyuki	Project Researcher
	SEKINO, Tatsuki	Professor
	SHIMADA, Nahoko	Center Research Associate
	SHIMIZU, Takao	Project Researcher
	SHIN, Kicheol	Assistant Professor
	SHINKAI, Rika	Project Researcher
	SHIRAIWA, Takayuki	Visiting Associate Professor
	SUNANO, Yui	Project Researcher
T	TAKAGI, Akira	Visiting Associate Professor
	TAKEHARA, Mari	Project Research Associate
	TAKEMURA, Shion	Project Researcher
	TAKESHIMA, Hirohiko	Specially Appointed Assistant Professor
	TANAKA, Ueru	Associate Professor
	TANIGUCHI, Makoto	Professor
	TAYASU, Ichiro	Professor
	TERADA, Masahiro	Visiting Associate Professor
	TERAMOTO, Shun	Project Research Associate
	TESHIROGI, Kouki	Project Researcher
	TOMII, Noriko	Project Research Associate
	TSUSHIMA, Akane	Project Researcher
U	UCHIDA, Rieko	Project Research Associate
	UCHIYAMA, Junzo	Visiting Associate Professor
	UEHARA, Yoshitoshi	Project Research Associate
W	WATANABE, Kazuo	Senior Project Researcher
X	XU, Chenxi	Project Researcher
Y	YAMADA, Kyota	Project Research Associate
	YAMADA, Makoto	Project Researcher
	YAMAMOTO, Mami	Project Research Associate
	YASUNARI, Tetsuzo	Director-General
	YASUTOMI, Natsuko	Assistant Professor
	YATAGAI, Akiyo	Visiting Associate Professor
	YONEMOTO, Shohei	Visiting Professor
	YOSHIMIZU, Chikage	Center Researcher

※Job titles listed above are as of 31 March, 2016.
(For those who retired in the middle of fiscal 2015, the job titles of that time are listed.)

ADACHI, Kaori

Project Researcher

[Professional Career]

Research Fellow of Japan Society for the Promotion of Science(2010)
Research associate, Graduate School of Letters, Keio University(2012)

[Higher Degrees]

Ph.D. (History, Keio University, 2014)
M.A. (History, Keio University, 2008)

[Fields of Specialization]

Archaeology
Ethno-Archaeology

[Academic Society Memberships]

The Society of Archaeological Studies
The Paleological Association of Japan
The Archaeological Society of Nippon
Japanese Archaeological Association
Japan Association for Quaternary Research
The Homepage of Hokkaido Archaeological Association
The Mita Historical Society
The Archaeological Society of Waseda University

—Achievements—

[Papers]

[Original Articles]

・ADACHI, Kaori 2015,04 Analysis of Jomon Pottery from the 1964 Excavation of Location B of the Saibana Shell-Midden, Aomori Prefecture, Japan.. Shigaku 84(1-4) :569-599.(reviewed).

HABU, Junko

Professor

Born in 1959.

[Professional Career]

Professor, Research Institute for Humanity and Nature, Kyoto, Japan (2014)
Professor, Department of Anthropology, University of California, Berkeley (2010)
Associate Professor, Department of Anthropology, University of California, Berkeley (2002)
Assistant Professor, Department of Anthropology, University of California, Berkeley (1996)
Faculty Lecturer, Department of Anthropology, McGill University(1994)
Full-time Research Associate (joshu), Faculty of Science, The University of Tokyo (1984)

[Higher Degrees]

Ph.D. (Archaeology, Department of Anthropology, McGill University, 1996)
M.A. (Archaeology, Division of History, Keio University, 1984)

B.A. (Archaeology, Department of Ethnology and Archaeology, Division of History, Keio University, 1982)

[Academic Society Memberships]

American Anthropological Association
Society for American Archaeology
Sigma Xi
American Geophysical Union
Indo-Pacific Prehistory Association
Society for East Asian Archaeology
Japanese Archaeological Association
Society of Archaeological Studies of Japan
The Anthropological Society of Nippon
Japan Association for Quaternary Research
Japanese Society for Scientific Studies on Cultural Property
Kagoshima Archaeological Association
Association for Edo Period Archaeology

—Achievements—

[Papers]

[Original Articles]

・Shinkai, R., Kanno, T., Yamamoto, N., Habu, J., Matsui, A., McLaren, D., Croes, D. 2015,12 Excavation of a prehistoric wet site on Triquet Island in British Columbia, Canada. Quarterly of Archaeological Studies 62(3) :16-20. (in Japanese)

[Research Presentations]

[Oral Presentation]

・Fitzhugh, B., Yoneda, M., Habu, J., Taylor, J., Kamenov, G., Shinkai, R. and Krigbaum, J. Okhotsk culture mobility in the context of maritime subsistence and seasonally frozen coasts. ESSAS Annual Science Meeting "Scientific Challenges in a Changing Arctic&Subarctic", 2016,03,07-2016,03,09, Yokohama World Porters, Yokohama.

・Habu, Junko Human Ecodynamics and Their Changes in Prehistoric Japan: Food Diversity, Climate Change and Long-term Sustainability of Hunter-Gatherer System. International Union for Quaternary Research Congress, 2015,07,26-2015,08,02, Nagoya Convention Center, Nagoya.

・Habu, Junko Human Ecodynamics and Their Changes in Prehistoric Japan: Food Diversity, Climate Change and Long-term Sustainability of Hunter-Gatherer System. International Union for Quaternary Research Congress, 2015,07,26-2015,08,02, Nagoya Convention Center, Nagoya.

・Habu, Junko Sedentism, Subsistence Specialization and Human Impacts on the Environment: A Case Study from the Jomon Period, Northern Japan. International Workshop "Climate Change and Food Diversity in the Past and Present: Comparative Studies on the North Pacific and Atlantic Coasts", 2015,07,30, RIHN, Kyoto. (in Japanese)

・Hamada, S., Thornton, T., Shinkai, R. and Habu, J. Economies in the North Pacific. ESSAS Annual Science Meeting "Scientific Challenges in a Changing Arctic&Subarctic", 2016,03,06-2016,03,06, Yokohama World Porpers, Yokoama.

[Invited Lecture / Honoronary Lecture / Panelist]

・Habu, Junko Graduate Education in North America: Training a New Generation of Scholars in the Field of Archaeology, Anthropology, and Related Fields. Guanghua Humanity Foundation Academic Exchange Seminar, 2015,06,01, Fudan University, Shanghai, China.

・Habu, Junko Food Diversity and Jomon Archaeology. , 2015,12,04, Korekawa Archaeological Institution. (in Japanese)

・Habu, Junko Food Diversity and Long-term Sustainability, Lesson from Prehistoric Japan. Guanghua Humanity Foundation Academic Exchange Seminar, 2015,06,02, Fudan University, Shanghai, China.

・Habu, Junko Jomon Pit-dwellings, Sedentism, and Food Diversity. The 80th Annual Meeting of Society for American Archaeology, 2015,04,16, San Francisco, California, USA.(Presentation given on behalf of the author).

・Habu, Junko Jomon Food Diversity, Climate Change and Long-term Sustainability: Lessons from Prehistoric Japan. , 2016,01,28, Willamette University, Oregon, USA.

・Habu, Junko Jomon Food Diversity, Climate Change and Long-term Sustainability: Lessons from Prehistoric Japan. , 2016,02,04, Arizona State University.

・Habu, Junko Jomon Food Diversity, Climate Change and Long-term Sustainability: Lessons from Prehistoric Japan. , 2016,01,28, Willamette University, Oregon, USA.

ISHIDA, Takuya

Born in 1986.

—Achievements—

[Papers]

[Original Articles]

・Nakagawa M., Hori M., Umemura M., Ishida T. 2016,02 Relationships of wood density and wood chemical traits between stems and coarse roots across 53 Bornean tropical tree species. Journal of Tropical Ecology . DOI:10.1017/S0266467416000018.(reviewed).

・Ishida T., Tayasu I., Takenaka C. 2015,10 Quantitative Reconstruction of Sulfur Deposition Using a Mixing Model Based on Sulfur Isotope Ratios in Tree Rings. Journal of Environmental Quality . DOI: 10.2134/jeq2014.11.0506.(reviewed).

・Ishida T., Tayasu I., Takenaka C. 2015,07 Characterization of sulfur deposition over the period of industrialization in Japan using sulfur isotope ratio in Japanese cedar tree rings taken from stumps. Environmental Monitoring and Assessment . DOI:10.1007/s10661-015-4678-0.(reviewed).

ISHIYAMA Shun

Project Researcher

Born in 1965.

[Academic Career]

Graduate School of Letters(Comparative Studies of Humanities and Social Sciences), Nagoya University, D. Course (2006)

Graduate School of Humanities and Social Sciences, Shizuoka University,M.A.Cource(2000)

Tokyo University of Agriculture (1989)

[Professional Career]

Staff, NGO Action for Greening Sahel(1993)
Staff, NPO Mori no Enerugi Foramu (2004)
Lecturer(Part-time), Fukui Prefectural University (2006)
Staff, NPO Echizen(2007)
Project researcher, Research Institute for Humanity and Nature (2008-)

[Higher Degrees]

Ph.D.(Nagoya University, 2015)
M.A.(Shizuoka University, 2000)
B.A.(Tokyo University of Agriculture, 1989)

[Fields of Specialization]

Cultural Anthropology
Development Anthropology

[Academic Society Memberships]

Japan Association for African Studies
Japanese Society of Cultural Anthropology
The Japanese Association for Arid Land Studies
Japan Association for Nilo-Ethiopian Studies

—Achievements—

[Books]

[Authored/Co-authored]

・ISHIYAMA, Shun 2016,03 Environmental Anthropology of Sahelian Landlocked Country, Chad : Poverty, Conflict and Desertification. . Field Note Series, Desertification and Livelihood in Semi-Arid Afro-Eurasia Project, RIHN, 5. Desertification and Livelihood in Semi-Arid Afro-Eurasia Project, RIHN, Kita-ku, Kyoto, 103pp. (in Japanese)

[Chapters/Sections]

・ISHIYAMA, Shun 2016,03 Irrigated Datepalm Cropping at Saharan Oasis : An Understanding on Agricultural History by integrated Method. ISHIKAWA, H., KOMATSU, K. FUJIMOTO, T. (ed.) African History of Foods and Agriculture. Showado, Sakyo-ku, Kyoto, pp.115-134. (in Japanese)

・ISHIYAMA, Shun 2016,03 Energy Issues from a rural Perspective. NAWATA. Hiroshi (ed.) 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. Shokadoh Book Sellers, Kamigyo-ku, Kyoto, pp.89-99.

[Papers]

[Original Articles]

・Shamik CHAKRABORTY, YASUDA Hiroshi, Abhik CHAKRABORTY, NABETA Hajime, KAWAI Takayuki, ISHIYAMA Shun 2015,09 The Nile and Recent Changes in Its Basin Environment: Evidences from Literature. Journal of Resources 6(5) :345-352.(reviewed).

[Research Presentations]

[Oral Presentation]

・Ishiyama, S. Changes of Oasis Life in Algerian Sahara -Water Supply, Farm Expansion and Habitations Movement, A Case Study of In Belbel. Colloque International sur La Foggara, Algeria, Adrar.

[Poster Presentation]

- ISHIYAMA, Shun, ISHIMOTO, Y., INAI H., KADOMURA H., SAKAI, M., JEGADEESAN, M. Livelihood Strategies under the Extreme Weather in African-Asian Drylands, Toward Inter Reagional Comparison. 26th Conference of the Japanese Association of Arid land Studies, 2015,05,23-2015,05,24, Akita City, Akita Prefecture. (in Japanese)
- ISHIYAMA, Shun Southward Migration of Kanemubu People in Lake Chad Area. 26th conference of the Japanese Association for Arid Land Studies, 2015,05,23-2015,05,24, Akita City, Akita Prefecture. (in Japanese)

KITAMURA, Kenji

Project Researcher

[Higher Degrees]

Ph.D.(Simon Fraser University, 2010)

Master of Applied Science(University of New South Wales, 1999)

—Achievements—

[Research Presentations]

[Oral Presentation]

- Kitamura, Kenji, and Maureen G. Reed Options and opportunities to collaborate for sustainability of the Redberry Lake Biosphere Reserve. Annual General Meeting of the Canadian Association of Geographers, 2015,06,01-2015,06,05, Vancouver, Canada.
- Kitamura, Kenji, and Tetsu Sato Integrated Local Environmental Knowledge for Actions Aimed at Encouraging Adaptive Societal Change: Community Initiatives in the Nishibetsu Watershed, Japan. The 15th Biannual Global Conference of the International Association for the Study of the Commons, 2015,05,25-2015,05,29, Edmonton, Canada.

[Invited Lecture / Honoronary Lecture / Panelist]

- Kitamura, Kenji What is the ILEK Project? How can we collaborate with Model Forests and Biosphere Reserves?. Prince Albert Model Forest Board of Directors' Meeting, 2015,05,20, Prince Albert, Canada.

KONDO Yasuhisa

Associate Professor

Born in 1979.

[Academic Career]

Department of Archaeology, The University of Tokyo, PhD course (2006-2009)

Department of Archaeology, The University of Tokyo, master course (2002-2005)

Department of Archaeology, The University of Tokyo, undergraduate course (1998-2002)

[Professional Career]

Associate Professor, Research Institute for Humanity and Nature (2014)
JSPS Research Fellow (PD), Tokyo Institute of Technology (2011)
Project Researcher, The University Museum, The University of Tokyo (2010)
Visiting Scholar, Center for Spatial Information Science, The University of Tokyo (2010)
JSPS Research Fellow (PD), The University of Tokyo (2009)
JSPS Research Fellow (DC2), The University of Tokyo (2008)

[Higher Degrees]

Ph.D. (The University of Tokyo, 2010)
M.A. (The University of Tokyo, 2005)

[Fields of Specialization]

Archaeology
Spatial Information Science
Geography

[Academic Society Memberships]

International Association of Geomorphologists
Computer Applications and Quantitative Methods in Archaeology (CAA)
CIPA Heritage Documentation
European Geosciences Union (EGU)
Japan Geoscience Union (JpGU)
GIS Association of Japan (GISA)
The Association of Japanese Geographers (AJG)
Anthropological Society of Nippon
Society of Archaeological Studies
Japan Society for West Asian Archaeology (JSWAA)
Japanese Palaeolithic Research Association (JPRA)

[Awards]

CSIS DAYS 2011 Presentation Award (2011)
Japanese Society for Archaeological Informatics Katata Award (2008)

—Achievements—

[Editing]

[Editing / Co-editing]

- Yasuhisa Kondo (ed.) 2015,11 . Newsletter, IAG Working Group on Geoarchaeology, 16. IAG Working Group on Geoarchaeology, Kyoto, 33pp.
- Yasuhisa Kondo (ed.) 2015,06 Bat Digital Heritage Inventory Project Report of the 2014-15 Seasons. , 111pp. Unpublished report submitted to the Ministry of Heritage and Culture, Sultanate of Oman.

[Papers]

[Original Articles]

- Yasuhisa Kondo, Satoshi Ishikawa, Mami Enomoto 2015,12 Developing an information service to support global environment research through collaboration with pro bonos. IPSJ Symposium Series 2015(2) : 131-138. (in Japanese) In Japanese with English abstract.
- Yasuhisa Kondo 2015,10 An ecological niche modelling of Upper Palaeolithic stone tool groups in the Kanto-Koshinetsu region, eastern Japan. The Quaternary Research 54(5) :207-218.(reviewed).

・Yasuhisa Kondo, Takehiro Miki, Taichi Kuronuma, Takashi Oguchi 2015,08 On-site digital heritage inventory development at Bat, Oman. ISPRS Annals of the Photogrammetry, Remote Sensing and Spatial Information Sciences II-5/W3 :145-152. DOI:10.5194/isprsannals-II-5-W3-145-2015.(reviewed).This work is distributed under the Creative Commons Attribution 3.0 License.

[Review Articles]

・Yasuhisa Kondo 2015,11 Activity report 2014-2015. Newsletter, IAG Working Group on Geoarchaeology 16 :3-8.

[Research Presentations]

[Oral Presentation]

・Yasuhisa Kondo Developing a geodatabase to understand historico-geographical processes of reducción. International Symposium Rethinking Forced Resettlement in the Colonial Andes, 2015,11,06-2015,11,08, Jean and Alexander Heard Library, Vanderbilt University, Nashville, Tennessee, USA.

・Yasuhisa Kondo, Takehiro Miki, Taichi Kuronuma, Takashi Oguchi On-site digital heritage inventory development at Bat, Oman. CIPA 2015, 2015,08,31-2015,09,05, China University of Technology, Taipei, Taiwan. DOI:10.5194/isprsannals-II-5-W3-145-2015.

・Yasuhisa Kondo, Katsuhiro Sano, Takayuki Omori, Ayako Abe-Ouchi, Wing-Le Chan, Seiji Kadowaki, Masaki Naganuma, Ryouta O’ishi, Takashi Oguchi, Yoshihiro Nishiaki, Minoru Yoneda A combination of ecological niche models and cost surface analysis figures out routes and rapidity of the dispersal of early modern humans. XIX INQUA 2015, 2015,07,26-2015,08,02, Nagoya International Conference Center (Nagoya, Japan).

・Takashi Oguchi, Hiroki Kobayashi, Yuichi S. Hayakawa, Toshikazu Seto, Yasuhisa Kondo, Rene Mendoza Developing a system of geospatial data sharing and visualization for disaster management in the Philippines. Japan Geoscience Union Annual Meeting 2015, 2015,05,24-2015,05,28, Makuhari Messe (Chiba, Japan).

[Poster Presentation]

・Yasuhisa Kondo, Takehiro Miki, Tara-Beuzen-Waller, Stéphane Desruelles, Atsushi Noguchi, Taichi Kuronuma, Éric Fouache Mapping facilities for control of flood waters at Bronze Age and Islamic oasis settlements in the interior of Oman. XIX INQUA 2015 Nagoya, 2015,07,26-2015,08,02, Nagoya International Conference Center (Nagoya, Japan).

[Invited Lecture / Honoronary Lecture / Panelist]

・Yasuhisa Kondo Open science in the context of transdisciplinary research . CS-DC ’15 e-conference, 2015,09,30-2015,10,01, Tempe, Arizona, USA.Invited talk at the Open Systems Exploration e-session. View the presentation video with either Firefox or Google Chrome..

KOTERA, Akihiko

Born in 1972.

—Achievements—

[Papers]

[Original Articles]

・Kotera,A., Nagano,T.,Hanittinan,P., Koontanakulvong,S. 2015,04 Assessing the degree of flood damage to rice crops in the Chao Phraya delta, Thailand, using MODIS satellite imaging. Paddy and Water Environment (in printing). DOI:10.1007/s10333-015-0496-9.(reviewed).

KUBOTA, Jumpei

Professor

Born in 1957.

[Academic Career]

Department of Forestry, Faculty of Agriculture, Kyoto University, D. Course (1987)
Department of Forestry, Faculty of Agriculture, Kyoto University, M. Course (1983)
Department of Forestry, Faculty of Agriculture, Kyoto University (1981)

[Professional Career]

Professor, Research Institute for Humanity and Nature (2012)
Associate Professor, Research Institute for Humanity and Nature (2002)
Associate Professor, Faculty of Agriculture, Tokyo University of Agriculture and Technology (1997)
Assistant Professor, Faculty of Agriculture, Tokyo University of Agriculture and Technology (1989)
Assistant Professor, University Forest, Kyoto University (1987)

[Higher Degrees]

D. Agr. (Kyoto University, 1987)
M. Agr. (Kyoto University, 1983)

[Fields of Specialization]

Hydrology
Forest Hydrology
Erosion Control Engineering

[Academic Society Memberships]

The Japanese Forestry Society
The Japan Society of Hydrology and Water Resources
The Japan Society of Erosion Control Engineering

[Awards]

Water Environment Federation Excellence Award, McKee Groundwater Protection, Restoration, Sustainable Use Medal (2009)

—Achievements—

[Books]

[Chapters/Sections]

・Jumpei KUbota 2015,10 The Water Resources Governance in China -Introduction of Water Rights Trading-. Hideki Kitagawa and Jumpei Kubota (ed.) Watershed Governance and Environmental Policy in China. Hakuto Shobo, Chiyoda-ku, Tokyo. (in Japanese)

KUMAZAWA Terukazu

Assistant Professor

Born in 1974.

[Higher Degrees]

Dr of Engineering

[Fields of Specialization]

Environmental planning

Regional informatics

—Achievements—

[Papers]

[Original Articles]

・Keishiro Hara・Terukazu Kumazawa・Michinori Kimura・Kazutoshi Tsuda 2015,11 Participatory approach in vision setting: emerging initiatives in local municipalities in Japan. Sustainability Science First online(07 November 2015) :1-11. DOI:10.1007/s11625-015-0347-z.(reviewed).

・Aiko Endo・Kimberly Burnett・Pedcris M. Orencio・Terukazu Kumazawa・Christopher A. Wada・Akira Ishii・Izumi Tsurita and Makoto Taniguchi 2015,10 Methods of the Water-Energy-Food Nexus. Water 7(10) : 5806-5830. DOI:10.3390/w7105806.(reviewed).

[Research Presentations]

[Oral Presentation]

・Michinori Kimura, Jageyu Kim, Takashi Iwakawa, Terukazu Kumazawa Examination of the Roundtable technique for Sustainable Society regional vision realize - A Case Study of Shiga Prefecture Takashima of "Takashima future-Roundtable" -. 9th International Symposium on "Environmentally Conscious Design and Inverse Manufacturing" (EcoDesign2015), 2015,12,02-2015,12,04, Tokyo.

・Terukazu Kumazawa, Takanori Matsui, Keishiro Hara, Shuji Kurimoto Collaborative approach to assessment of social-ecological systems based on ontology engineering. The 15th Biennial Global Conference International Association for the Study of the Commons (IASC2015), 2015,05,25-2015,05,29, Shaw Conference Centre, Edmonton, Alberta, Canada.

[Poster Presentation]

・Terukazu Kumazawa, Keishiro Hara, Yasuhisa Kondo Interdisciplinary research development in global environmental issues using experiments with ontology engineering. Japan Geoscience Union Meeting 2015, 2015,05,24-2015,05,28, Makuhari Messe International Conference Hall, Chiba, Japan.

MASUHARA, Naoki

Project Researcher

Born in 1974.

[Higher Degrees]

Master of Political Science(Waseda University, 2000)

[Fields of Specialization]

Public Administration
Local Government Studies
Environment and Energy Policy
Citizen Participation Studies

—Achievements—

[Papers]

[Original Articles]

・Baba, K., Takatsu, H., Kito, M., Kawai, Y., Noritake, T., Masuhara, N., Kimura, M. and Tanaka, M 2015,07 Examing Harmonious Coexistence of Geothermal Resource between Small Power Generation and Hot Spring Utilization by Stakeholder Analysis; A Case Study of Beppu. Journal of Society of Environmental Sciences Japan 28(4) :316-329. (in Japanese) (reviewed).

・Naoki Masuhara 2015,05 Local Governments as Demand side of Energy and Renewable Energy Issue. Toshi Mondai (City Issue) 106(5) :64-73. (in Japanese)

[Review Articles]

・Baba, K. and Masuhara, M. 2015,11 Report on the Special session “Trans-disciplinary Approach for Water-Energy-Food Nexus Issue: A Case Study in Obama City, Fukui Prefecture” at the annual meeting of Society of Environmental Sciences Japan 2015. Journal of Society of Environmental Sciences Japan 28(6) :457-461. (in Japanese)

[Research Presentations]

[Oral Presentation]

・Naoki Masuhara Possibility for problem solving based on interests of local citizen: examples of Obama City and the Pajaro Valley, California. Annual Meeting of Society of Environmental Sciences Japan 2015, 2015,09,07-2015,09,08, Suita City, Osaka. (in Japanese)

[Poster Presentation]

・Naoki Masuhara Current State and Future Possibility of Renewable Energy Projects that utilize Local Governmental Assets. 12th Poster Session of Environmental Information Science, 2015,12,01, Tokyo, Japan. (in Japanese)

MCGREEVY, Steven R.

Associate Professor

Born in 1978.

[Academic Career]

Division of Natural Resource Economics, Graduate School of Agriculture, Kyoto University (2008-2012)
College of Continuing Education, University of Minnesota (2002-2004)
St. John's University- Collegeville, MN (1997-2000)

[Professional Career]

Lecturer, Seisen Jogakuin College (2007)
Monbukagakusho Scholar, Graduate School of Agriculture, Kyoto University (2009)
Lecturer, Nagano National College of Technology (2011)
Assistant Professor, Research Institute for Humanity and Nature (2013~)

[Higher Degrees]

D.Ag. (Kyoto University, 2012)
M.LS. (University of Minnesota-Twin Cities, 2004)
B.A.: Major- Biology; Minor- Environmental Studies (St. John's University- Collegeville, MN, 2000)

[Fields of Specialization]

Rural Sustainable Development
Environmental Sociology

[Academic Society Memberships]

Japan Biochar Association
International Biochar Initiative
Japanese Association for Rural Studies
Rural Sociology Society
International Association for the Study of the Commons

—Achievements—

[Papers]

[Original Articles]

・[Report] McGreevy, Steven R. (ed.) 2016,03 Future Earth Knowledge-Action Network (KAN) on Sustainable Consumption and Production. Exploratory Workshop on the Establishment of a SCP KAN.. :1-33.With Contributions from Maurie J. Cohen (NJIT, SCORAI), Magnus Bengtsson (IGES), Hein Mallee (RIHN), and Mai Kobayashi (RIHN).

・[Article] McGreevy, Steven R., Shibata, Akira, Tanabiki, Yusuke. 2016,02 Cultivating a Career: Makoto Ogawa recalls a lifetime of work on charcoal, fungi, and plant growth interaction.. Biochar Journal .

・[Newsletter] McGreevy, Steven R. 2015,09 京都府と地球研との地域連携の可能性. Humanity & Nature RIHN Newsletter (56) :2-6.Interviewer..

・[Newsletter] McGreevy, Steven R. 2015,07 工業化した食農システムを再考する. Humanity & Nature RIHN Newsletter :2-5. (in Japanese) Interviewee.

[Research Presentations]

[Oral Presentation]

・McGreevy, Steven R. Scaling down deep: Reflections on inhabiting sustainable transformative change.. Future Earth in Asia International Workshop. "Transformations to Sustainability: Moving from Knowledge to Action", 2015,11,14, Research Institute for Humanity and Nature.

・McGreevy, Steven R. & Atsushi Inaba The story behind the scans: A review of food LCA smartphone apps and their impact on consumers and the industry.. American Center for Life Cycle Assessment International Conference XV, 2015,10,08-2015,10,10, University of British Columbia.

・McGreevy, Steven R. Towards a definition of holistic local food security in Asia. International Symposium on Food, Risks and Sustainability: An Asian Perspective, 2015,07,05-2015,07,07, The Hong Kong Polytechnic University.

[Invited Lecture / Hononorary Lecture / Panelist]

・McGreevy, Steven R. A Humble Science: Toward Consensus Building Through Visions, Values, and Transformations. Inaugural Ritsumeikan University Osaka Ibaraki Campus and Regional Information Research Center Symposium, 2015,05,30, Ritsumeikan University, Ibaraki Campus.. (in Japanese) Panelist.

NAKANO Takanori

Professor

Born in 1950.

[Academic Career]

Department of Geology, Faculty of Science, University of Tsukuba, D.Course(1982)
Department of Geology, Faculty of Science, Tokyo University of Education, M.Course(1977)
Department of Geology, Faculty of Science, Tokyo University of Education(1974)

[Professional Career]

Professor, Research Institute for Humanity and Nature(2004)
Associate Professor, Institute of Geoscience, University of Tsukuba(1992)
Assistant Professor, Institute of Geoscience, University of Tsukuba(1982)

[Higher Degrees]

D.Sc(University of Tsukuba, 1982)
M.Sc.(Tokyo University of Education, 1977)

[Fields of Specialization]

Isotope Environmental Studies

[Academic Society Memberships]

The Society of Resource Geology
The Geological Society of Japan
Japanese Association of Hydrological Sciences
The Society of Economic Geologist

[Awards]

Ecological Research Award(2009)

—Achievements—

[Papers]

[Original Articles]

- Yamada Y, Fukuda T, Omori K. and Nakano, T. 2015 Origin of particulate organic matter in a river with remarkable water pollution in、Shikoku Island, Japan. Limnology 16 :127-137.(reviewed).
- Segawa, T., Sugiyama, N.,, Kinoshita, T., Nakano, T., Nagaosa, K.,, Greenidae, D. and Kato, K. 2015 Microbes in Groundwater of a Volcanic Mountain, Mt. Fuji; 16S rDNA Phylogenetic Analysis as a Possible Indicator for the Transport Routes of Groundwater. Geomicrobiology Journal 32(8) :677-688. DOI:10.1080/01490451.2014.991811.(reviewed).
- S., Phan, H.M. H, Iwai, Y., Itoh, A., Aoki, H. and Nakano T. , V6, 20-30 doi: 2015 Longtime behavior of cesium (Cs) in natural spring drinking water. . Sustainability of Water Quality and Ecology 6 : 20-30. DOI:10.1016/j.swaqe.2015.04.001.(reviewed).
- Kusaka, S., Uno, K. T., Nakano, T., Nakatsukasa, M. and Cerling, T.E. 2015 Carbon isotope ratios of human teeth record the evidence of terrestrial resource consumption during the Jomon period, Japan.. American Journal of Physical Anthropology 158(2) :300-311. DOI:10.1002/ajpa.22775.(reviewed).
- Shin, Ki-choel, Anma, R., Nakano, T., Orihashi, Y. and Ike, S. 2015 The Taitao ophiolite-granite complex: a ridge-trench intersection oceanic lithosphere on-land and origin of calc-alkaline I-type granites Episode. 38(4) :285-297.(reviewed).
- Yoshioka, Y., Nakamura, K., Nakano, T., Horino, H., Nakano, T., Shin、K.C., and Kawashima, S. 2015 Evaluation of groundwater qualities in a paddy-dominated alluvial fan.. Water Science & Tachnology, Water Supply 15(6) :1236-1243. DOI:10.2166/ws.2015.088.(reviewed).
- Koshikawa、Kanao, M., Watanabe, M., Shin, K.H. Nishikioria, T., Takamatsua, T., Hayashi, S. and Nakano, T. 2015 Using isotopes to determine the contribution of volcanic ash to Sr and Ca in stream waters and plants in a granite watershed, Mt. Tsukuba, central Japan. Environmental Earth Sciences .(reviewed).
- Nakano, T. 2015 Potential of stable isotope ratios of geological origin in earth environmental studies. Proceedings of the Japan Adademy, Ser. B 92.(reviewed).

NILES, Daniel

Associate Professor

Born in 1971.

[Academic Career]

Ph.D.(Graduate School of Geography, Clark University, Aug 1999-May 2007)

Seminar in College Teaching(Interdisciplinary Unit, Clark University, June-July 2006)

Certificate program in Wood Technology (3 of 4 semesters completed)(Laney College (Peralta Community College District, California), Jan 1998-May 1999, Jun-July 2000)

B.A. in Community Studies (High Honors)(University of California, Santa Cruz, Aug 1989-Mar 1994)

[Professional Career]

RIHN Communications Coordinator/PASONA(October 2008-March 2009)

RIHN Contract Worker(August 2008)

MINPAKU Visiting Researcher(1 June 2008-31 March 2009)

Lecturer, Department of Geography, Clark University(August-December 2006)

Editorial Assistant, The Geographical Review (June 2005-July 2006)

Research Assistant, Prof. Turner(August-December 2000)

Research Assistant, Profs. Turner and Kasperson(August-December 1999)

ESL Teacher(March 1998-January 1999)
Research Assistant, Professor Carter Wilson(August 1996-January 1997)

[Higher Degrees]

Ph.D.(Graduate School of Geography, Clark University, Aug 1999-May 2007)
B.A. in Community Studies (High Honors)(University of California, Santa Cruz, Aug 1989-Mar 1994)

[Fields of Specialization]

Geography

[Awards]

Full Tuition Fellowship, Graduate School of Geography, Clark University, 1999-2007
Biodiversity Conservation Award, Regional Environmental Council, Worcester, MA 2005
Pruser-Holtzsauer Award, Graduate School of Geography, Clark University, 2002
Community Service Award, City of San Francisco, CA 1995
Dean's Undergraduate Award, University of California, Santa Cruz, 1994
Highest Honors, Department of Community Studies, University of California, Santa Cruz, 1994
Senior Thesis Honors, Department of Community Studies, University of California, Santa Cruz, 1994
Community Service Award, Crown College, University of California, Santa Cruz, 1994

—Achievements—

[Books]

[Authored/Co-authored]

・Niles, Daniel and Ken-ichi Abe 2015 Humanity and Nature in the Japanese Archipelago. RIHN

[Papers]

[Review Articles]

・Abe, K. and Niles, D. 2015 Interview with C.W. Nicol. Humanity and Nature Newsletter 53(March). (in Japanese)

OKUDA Noboru

Associate Professor

Born in 1969.

[Professional Career]

Lecturer, Mie University, Department of Liberal Arts (1998)
Postdoctoral fellow, Ehime University, Department of Biology and Earth Science (1998)
Research Fellow, Ehime University, Center for Marine Environmental Studies (2002)
Associate Professor, Kyoto University, Center for Ecological Research (2005)
Invited Associate Professor, Research Institute for Humanity and Nature (2013)
Associate Professor, Research Institute for Humanity and Nature (2014)

[Higher Degrees]

B.S. (Science University of Tokyo, Department of Biological Science, 1992)
M.S. (Ehime University, Department of Biology, 1994)
Ph.D. (Kyoto University, Department of Biology, 1998)

[Academic Society Memberships]

The Ichthyological Society of Japan
The Ecological Society of Japan
Japan Ethological Society
Society of Evolutionary Studies
The Japanese Society of Fisheries Science
The Japanese Society of Limnology

[Awards]

Best Poster Award for International Symposium “Long-term Variations in the Coastal Environments and Ecosystems” held in Ehime University (2004)
Young Ichthyologist Award 2005 from The Ichthyological Society of Japan (2005)
CHED REPUBLICA AWARDS 賞(2016)

—Achievements—

[Papers]

[Original Articles]

・Itoh, M., Y. Kobayashi, T.-Y. Chen, T. Tokida, M. Fukui, H. Kojima, T. Miki, I. Tayasu, F.-K. Shiah & N. Okuda 2015,07 Effect of interannual variation in winter vertical mixing on CH4 dynamics in a subtropical reservoir.. Journal of Geophysical Research: Biogeosciences 120(7) :1246-1261. DOI: 10.1002/2015JG002972.(reviewed).

・Kakioka, R., T.Kokita, H.kumada, K.Watanabe & N.Okuda 2015,07 Genomic architectue of habitat-related divegence and signature of directional selection in the body shapes of Gnathopogon fishes.. Molecular Ecology 24(16) :4159-4174. DOI:10.1111/mec.13309.(reviewed).

・Cabanillas-Terán, N., P. Loor-Andrade, J. Marin & N. Okuda 2015,04 Algal diversity drives trophic niche partitioning between sympatric grazers in marine rocky reefs. CENTER FOR ECOLOGICAL RESEARCH NEWS, KYOTO UNIVERSITY 129 :13-13.(reviewed).

[Research Presentations]

[Oral Presentation]

・Ide, J., H. Somura, T. Nakamura, Y. Mori, I. Takeda & K. Nishida. Spatial variations in river nitrate concentration from upper toward lower reaches in the hilly and mountainous area. The 127th Annual Meeting of the Japanese Forest Society, 2016,03,27-2016,03,30, Kanagawa, Japan.

・Ide, J., H. Somura, T. Nakamura, Y. Mori, I. Takeda & K. Nishida Spatial variations in concentration and nitrogen and oxygen stable isotopes of river nitrate in a hilly and mountainous area, western Japan. The 4th International Conference on Forests and Water in a Changing Environment, 2015,07,06-2015,07,09, Kelowna, BC, Canada.

・Cid, A.P., U. Song, I. Tayasu, J. Okano, H. Togashi, N.F. Ishikawa, A. Murakami, T. Hayashi, T. Iwata , K. Osaka, S. Nakano & N. Okuda Spatial distributions of REE, heavy metals and oxygen isotope of phosphate in the Yasu river, Shiga, Japan. JpGU Meeting 2015, 2015,05,24-2015,05,28, Makuhari Messe. (in Japanese)

・Okuda, N., A. P. Cid, I. Tayasu & J. Ide Phosphate oxygen isotope analysis to study phosphorous cycling. JPGU 2015, 2015,05,24-2015,05,28, Chiba City.

[Invited Lecture / Honoronary Lecture / Panelist]

・Okuda, N. Biodiversity-driven Nutrient Cycling and Human Well-being in Social-Ecological Systems. The 4th International Workshop on Future Earth in Asia, 2015,11,19, RIHN, Kyoto.

ONISHI Yuko

[Academic Society Memberships]

The Association of Japanese Geographers
The Society of Agricultural Meteorology of Japan
Japan Geoscience Union
Society for Conservation Biology
British Ecological Society
International Biogeography Society
American Geographical Union

—Achievements—

[Research Presentations]

[Oral Presentation]

・Onishi, Y. Developing Japan Strategic Research Agenda through transdisciplinary priority setting. WINTech 2016 - Solving Global Issues: Innovation Ecosystem with Advanced Renewable Energy in Future City, 2016,03,16, Kobe.

・Onishi, Y. Environmental information infrastructure strategies in Future Earth. JPGU Meeting 2015, 2015,05,27, Chiba.

SAITOH Yu

Born in 1979.

—Achievements—

[Papers]

[Original Articles]

・Saitoh, Y., Ishikawa, T., Tanimizu, M., Murayama, M., Ujiie, Y., Yamamoto, Y., Ujiie, K., and Kanamatsu, T. 2015 Sr, Nd, and Pb isotope compositions of hemipelagic sediment in the Shikoku Basin: Implications for sediment transport by the Kuroshio and Philippine Sea plate motion in the late Cenozoic. Earth and Planetary Science Letters 421 :47-57.(reviewed).

SEKINO, Tatsuki

Proffesor

Born in 1969.

[Academic Career]

Department of Zoology, Faculty of Science, Kyoto University, D. Course (1998)

Department of Biology, Faculty of Science, Shinshu University, M. Sc. (1993)
Department of Biology, Faculty of Science, Shinshu University (1991)

[Professional Career]

Professor, Center for Research Promotion, Research Institute for Humanity and Nature (2016)
Associate Professor, Research Promotion Center, Research Institute for Humanity and Nature (2002)
Researcher, Research Division, International Lake Environmental Committee Foundation (2001)
COE Scientist, Center for Ecological Research, Kyoto University (1999)

[Higher Degrees]

D. Sc. (University of Kyoto, 1998)
M. Sc. (University of Shishu, 1993)

[Fields of Specialization]

Information Science
Limnology
Ecology

[Academic Society Memberships]

Information Processing Society of Japan
Japanese Society of Limnology
Ecological Society of Japan

[Awards]

IPSJ Yamashita SIG Research Award (2015)

—Achievements—

[Papers]

[Original Articles]

- Sekino, T. 2015,12 Linked data about calendars and their usage. IPSJ Symposium Series 2015(3) : 191-198. (in Japanese) (reviewed).
- Sekino, T. 2015,12 Time Information System on the Web. Proceedings of ANGIS Taipei Meeting 2015 . (reviewed).
- Sekino, T. 2015,12 Construction of Temporal Information Platform and its Utilization - Knowledge Processing by Time. Joho Chishiki Gakkaishi 25(4) :303-314. DOI:http://doi.org/10.2964/jsik_2015_027.
- Sekino, Tatsuki 2015,08 Database of Lunisolar Calendar after Meiji Era in Japan. IPSJ SIG Technical Reports 2015-CH-107(1) :1-4. (in Japanese)

[Research Presentations]

[Oral Presentation]

- Sekino, T. Time Information System on the Web. ANGIS Taipei Meeting 2015, 2015,12,04-2015,12,06, Academia Sinica, Taiwan.
- Sekino, T. Spatiotemporal Data Management on Cultural Information. IWASTCS2015: International Workshop on Application of Science and Technology for Cultural Studies, 2015,11,13, Princess Maha Chakri Sirindhorn Anthropology Centre, Bangkok.

SHIN Ki-Cheol

Assistant Professor

[Higher Degrees]

PhD (University of Tsukuba, 2008)

[Fields of Specialization]

Igneous petrology

Isotope Geochemistry

[Academic Society Memberships]

The Society of Resource Geology

The Geochemical Society of Japan

Discussion Group for Plasma Spectrochemistry

[Awards]

Resource Geology The Best Article award (2010)

—Achievements—

[Papers]

[Original Articles]

- Masanori Kurosawa, Kimikazu Sasa, Ki-Cheol Shin, Satoshi Ishii 2016,03 Trace-element compositions and Br/Cl ratios of fluid inclusions in the Tsushima granite, Japan: Significance for formation of granite-derived fluids. Geochimica et Cosmochimica Acta 182 :216-239.(reviewed).
- Masami Kanao Koshikawa, Mirai Watanabe, Ki-Cheol Shin, Tatsuhiro Nishikior, Takejiro Takamatsu, Seiji Hayashi, Takanori Nakano 2016,03 Using isotopes to determine the contribution of volcanic ash to Sr and Ca in stream waters and plants in a granite watershed, Mt. Tsukuba, central Japan. Environtal Earth Sciences 75(501) :1-13. DOI:10.1007/s12665-015-5097-9.(reviewed).
- Ki-Cheol Shin, Ryo Anma, Takanori Nakano, Yuji Orihashi, Shin-ichi Ike. 2015,12 The Taitao ophiolite-granite complex: a ridge-trench intersection oceanic lithosphere on-land and origin of calc-alkaline I-type granites. Episode 38(4) :285-299.(reviewed).
- Y. Yoshioka, K. Nakamura, H. Horino, T. Nakano, K. C. Shin and S. Kawashima 2015,12 Evaluation of groundwater qualities in a paddy-dominated alluvial fan. Water Science & Technology: Water Supply 15(6) :1236-1243.(reviewed).

TANIGUCHI Makoto

Professor

Born in 1959.

[Academic Career]

University of Tsukuba, Japan Ph.D. Hydrology (1987)

University of Tsukuba, Japan M.S. Hydrology (1984)

University of Tsukuba, Japan B.S. Geosciences (1982)

[Professional Career]

Research Institute for Humanity and Nature, Associate Professor (2003 - 2007)

Department of Earth Sciences, Nara University of Education, Professor (2000 - 2003)

Department of Earth Sciences, Nara University of Education, Associate Professor (1993 - 2000)

Department of Earth Sciences, Nara University of Education, Research Associate (1988 - 1990)
Division of Water Resources, CSIRO, Australia, Visiting Scientist (1987 - 1988)

[Higher Degrees]

D.Sc (The University of Tsukuba,1987)
M.Sc.(The University of Tsukuba,1984)

[Fields of Specialization]

Environmental dynamic analysis
Hydrology/Weather/Oceanic physics

[Academic Society Memberships]

American Geophysical Union
International Association of Hydrological Sciences
International Association of Hydrogeology
Japanese Association of Groundwater Hydrology
Japanese Association of Hydrological Science
Japan Society of Engineering Geology
The Japan Society of Hydrology and Water Resources
The Association of Japanese Geographers
The Japanese Society of Limnology

[Awards]

Award of 7th Japanese Association of Limnology (Yoshimura Prize, 2005)
Research award from the Association of Japanese Geographers (1987)

—Achievements—

[Papers]

[Original Articles]

- Gurdak, J., Geyer, G., Nanus, L., Taniguchi, M., Corona, C. 2016,02 Scale dependence of controls on groundwater vulnerability in the water-energy-food nexus, California Coastal Basin aquifer system. Journal of Hydrology: Regional Studies . DOI:10.1016/j.ejrh.2016.01.002.(reviewed).
- Yamada, M., Shoji, J., Ohsawa, S., Mishima, T., Hata, M., Honda, H., Fujii, M., Taniguchi, M. 2016,02 Hot spring drainage impact on fish communities around temperate estuaries in southwestern Japan. Journal of Hydrology: Regional Studies . DOI:10.1016/j.ejrh.2015.12.060.(reviewed).

[Research Presentations]

[Poster Presentation]

- Taniguchi, M. Impacts of geothermal energy developments on hydrological environment in hot spring areas. American Geophysical Union, 2015,12,18, Moscon Center, USA.

[Invited Lecture / Hononorary Lecture / Panelist]

- Taniguchi, M. Global Environmental Change: Future Earth Project. WINTEC2016, 2016,03,15, Kobe University, Kobe.
- Taniguchi M Groundwater studies in Asia for global sustainability. Keynote speech at International Association of Hydrogeology 2015 Asia-Pacific Regional Meeting, 2015,04,09, Lotte City Hotels Jeju, Jeju, Korea.

TAYASU Ichiro

Professor

Born in 1969.

[Academic Career]

Department of Zoology, Graduate School of Science, Kyoto University, Doctor Course(1997)
Department of Zoology, Graduate School of Science, Kyoto University, Master Course(1994)
Department of Zoology, Faculty of Science, Kyoto University(1992)

[Professional Career]

Professor, RIHN Center, Research Institute for Humanity and Nature (2016)
Professor, Center for Research Promotion, Research Institute for Humanity and Nature (2014)
Associate Professor, Center for Ecological Research, Kyoto University (2003)
Assistant Professor, Research Institute for Humanity and Nature (2002)
Postdoctoral Research Fellow (Research Abroad) of the Japan Society for the Promotion of Science; Laboratoire d'Ecologie des Sols Tropicaux, Institut de Recherche pour le Developpement (2000)
Postdoctoral Research fellow (PD) of the Japan Society for the Promotion of Science; Laboratory of Forest Ecology, Graduate School of Agriculture, Kyoto University, Japan (1997)

[Higher Degrees]

Ph.D (Kyoto University, 1997)
M Sc. (Kyoto University, 1994)

[Fields of Specialization]

Isotope Ecology
Animal Ecology
Freshwater Ecology
Soil Ecology
Isotope Environmental Science

[Academic Society Memberships]

Ecological Society of Japan
The Japanese Society of Limnology
The Japanese Society of Soil Zoology
The International Union for the Study of Social Insects
Japan Geoscience Union
Advancing the Science of Limnology and Oceanography

[Awards]

16th Inoue Research Award for Young Scientists (1999)

—Achievements—

[Papers]

[Original Articles]

・Haraguchi, T.F. and Tayasu, I. 2016,01 Turnover of species and guilds in shrub spider communities in a 100-year post-logging chronosequence.. Environmental Entomology 45 :117-126. DOI:10.1093/ee/nvv142.(reviewed).

・Akamatsu, F., Suzuki, Y., Kato, Y., Yoshimizu, C. and Tayasu, I. 2016,01 A comparison of freeze-dry and oven-dry preparation methods for bulk and compound-specific carbon stable isotope analyses: examples using the benthic macroinvertebrates Stenopsyche marmorata and Epeorus latifolium.. Rapid Communications in Mass Spectrometry 30 :137-142. DOI:10.1002/rcm.7421.(reviewed).

・Ishida, T., Tayasu, I. and Takenaka, C. 2015,11 Quantitative reconstruction of sulfur deposition using a mixing model based on sulfur isotope ratios in tree rings.. Journal of Environmental Quality 44 :1800-1808. DOI:10.2134/jeq2014.11.0506.(reviewed).

・Itoh, M., Kobayashi, Y., Chen, T-Y., Tokida, T., Fukui, M., Kojima, H., Miki, T., Tayasu, I., Shiah, F-K. and Okuda, N. 2015,07 Effect of inter-annual variation in winter vertical mixing on CH4 dynamics in a subtropical reservoir.. Journal of Geophysical Research-Biogeosciences 120 :1246-1261. DOI:10.1002/2015JG002972.(reviewed).

・Ishida, T., Tayasu, I. and Takenaka, C. 2015,07 Characterization of sulfur deposition over the period of industrialization in Japan using sulfur isotope ratio in Japanese cedar tree rings taken from stumps.. Environmental Monitoring and Assessment 187 :459. DOI:10.1007/s10661-015-4678-0.(reviewed).

・Ishikawa, N.F., Tayasu, I., Yamane, M., Yokoyama, Y., Sakai, S. and Ohkouchi, N. 2015,05 Sources of dissolved inorganic carbon in two small streams with different bedrock geology: insights from carbon isotopes.. Radiocarbon 57(3) :439-448. DOI:10.2458/azu_rc.57.18348.(reviewed).

TERADA Masahiro

Visiting Associate Professor

[Higher Degrees]

M.Lit(Osaka University,1998)

[Fields of Specialization]

History

Metahistory

—Achievements—

[Books]

[Chapters/Sections]

・Masahiro Terada 2016,01 “Anthropocene Discourse as a Historical Narrative”. Humanity & Nature. Research Institute for Humanity and Nature, Kyoto, pp.11. (in Japanese)

・Masahiro Terada 2015,12 ″Kobe as a Place of Memories: Conflicts and Reconciliation of Public, Collective, and Individual Memories″. Shuhei Kimura and Hiromu Shikizu(ed.) (ed.) Towards New Humanity, Towards New Society: Recreate the Story of Reconstruction. Area Studies for Disaster Management, Vol.5. Kyoto University Press, Kyoto, pp.115-160. (in Japanese)

[Papers]

[Original Articles]

・Masahiro Terada 2015,04 “Pubic Memory of Natural Disasters in Modern/ Contemporary Japan from the View Point of Milieu: Comparative Study on Topoi and Architecture of Museum and Memorial of the Great Kanto Earthquake and the Great Hanshin Earth Quake”. Hanoi National University (ed.) Disaster and its Recovery. Collection of Japanese Studies, Vol.5. World Press, Hanoi, Vietnam, pp.147-168. (in Japanese)

[Research Presentations]

[Oral Presentation]

・Masahiro Terada “Nature, Artificiality, and Becoming: Anthropocene/ Technosphere Thesis as a Historical Narrative”. [Workshop] Conceptualizing the persistence of human-environmental knowledge through time, objects, and landscapes, 2016,02,23, RHIN, Kyoto.

・Masahiro Terada ″100 Years of Food Narrative: Quest for Long-life Narrative″. FEAST (Lifeworlds of Sustainable Food Consumption and Production: Agrifood Systems in Transition, RIHN Pre Research Project) Annual Assembly, 2016,02,07, RHIN, Kyoto.

・Masahiro Terada “The Anthropocene concept and Japanese historical narrative: Becoming, nature, and artificiality” . Preparatory meeting for the “Anthropocene Seminar2/ Technosphere Issue”, 2015,10,01, Berlin: Max Planck Institute für Wissenschaftsgeschichte.

・Masahiro Terada “The Anthropocene concept and Japanese historical narrative:Becoming, nature, and artificiality”. #1Anthropocene Workshop, 2015,09,17, Kyoto: Research Institute for Humanity and Nature.

・Masahiro Terada ″Problematics of the Poetics of Aristoteles” . Pattern Language Research Meeting, 2015,08,10, RHIN, Kyoto.

・Masahiro Terada “When landscape recovers, soul will recover”. Research meeting for disaster and rehabilitation, 2015,07,25, Kyoto: Center for the Integrated Area Studies, Kyoto University. (in Japanese)

・Masahiro Terada Current Situation of Environment Studies in Berlin. Report Meeting for Current Research Mission of Global Environment Studies 2014, 2015,05,07, Kyoto: Research Institute for Humanity and Nature.

YASUNARI Tetsuzo

Director-General

Born in 1947.

[Professional Career]

Director-General, Research Institute for Humanity and Nature (4/2013-)

Designated Professor, Hydrospheric Atmospheric Research Center (HyARC), Nagoya University. (4/2012-3/2013)

Professor, Hydrospheric Atmospheric Research Center (HyARC), Nagoya University. (8/2002-3/2012)

Leader, Global COE program “From Earth System Science to Basic and Clinical Environmental Studies” (2009-2012)

Leader, the 21st Century COE Program ″The Sun-Earth-Life Interactive System (SELIS)″ (2003-2008)

Visiting Professor, Department of Earth & Planetary Science, the University of Tokyo. (4/2003-3/2006)

Professor, Climatology & Meteorology, University of Tsukuba. (4/1992-7-2002)

Associate Professor, Climatology & Meteorology, University of Tsukuba. (6/1990-3/1992)

Assistant Professor, Climatology & Meteorology, University of Tsukuba. (8/1984-8/1985)

Visiting Scientist, Department of Meteorology, Florida State University (8/1984-8/1985)

Research Associate, Center for Southeast Asian Studies, Kyoto University. (4/1977-3/1982)

[Higher Degrees]

D.Sc., Meteorology & Climatology (Kyoto University, 1981)

M.S., Meteorology (Kyoto University, 1974)

[Fields of Specialization]

Meteorology

Climatology
Climate systems studies

[Academic Society Memberships]

The Association of Japanese Geographers
Meteorological Society of Japan
Japan Society of Hydrology and Water Resources
The Japanese Society of Snow and Ice
American Geophysical Union
American Meteorological Society

[Awards]

Chichibuno-Miya Memorial award (as a group member) 1980
Yamamoto Prize, Meteorological Society of Japan 1981
Research Award (Gakkai-sho), Meteorological society of Japan 1986
Nikkei Prize for Global Environmental Study and Technology 1991
Fujiwara Prize, Meteorological Society of Japan 2002
International Award, Japanese Society of Hydrology and Water resources 2006
Meritorious Deed Award, Japan Society of Hydrology and Water Resources 2014
Japan Geoscience Union Fellow 2015

—Achievements—

[Editing]

[Editing / Co-editing]

・Michael Manton, Tetsuzo Yasunari, Ailikun, Hein Mallee, Rodel Lasco, Ramachandran Ramesh (ed.) 2015 Initial Strategic Research Plan for Future Earth in Asia. China Meteorological Press, 116pp.

[Papers]

[Original Articles]

・Fujinami, H., T. Yasunari and T. Watanabe 2015 Trend and Interannual Variation in Summer Precipitation in Eastern Siberia in Recent Decades. International Journal of Climatology . (reviewed).

[Review Articles]

・A. P. Dimri, D. Niyogi, A. P. Barros, J. Ridley, U. C. Mohanty, T. Yasunari and D. R. Sikka 2015 Western Disturbances: A Review. Reviews of Geophysics .(reviewed).

[Research Presentations]

[Invited Lecture / Honoronary Lecture / Panelist]

・Tetsuzo Yasunari Future Earth: its importance and implication in Asia. The 13th International Conference on the Atmospheric Sciences and Application to Air Quality (ASAAQ13), 2015,11,11, Kobe International Conference Center, Hyogo .

・Tetsuzo Yasunari Sustainable and resilient urban-rural system as a key issue of Future Earth in Asia. International Symposium on Co-design for Urbanization in China and the Asia-Pacific Region, 2015,10,23, Xiamen, China .

・Tetsuzo Yasunari Climate Change and Disaster Risk Reduction Management. STS Forum, 2015,10,05, Kyoto International Conference Center.

・Tetsuzo Yasunari RACC7 Report to STS plenary. RACC7, 2015,10,03, Kyoto International Conference Center.

・Tetsuzo Yasunari Future Earth: towards global sustainability of THE ANTHROPOCENE?. Future Earth with INQUA, 2015,07,28, Nagoya Congress Center, Aichi .

・Tetsuzo Yasunari Future Earth: its importance and implications in Asia. 26th IUGG General Assembly, 2015,06,23, Prague, Czech Republic .

・Tetsuzo Yasunari Monsoon Asia as a key region for Future Earth. AGU Chapman Conference, 2015,06,15, Hong Kong, China .

YASUTOMI Natsuko

Assistant Professor

Born in 1973.

[Academic Career]

Department of Earth and Planetary Science, Graduate School of Science, The University of Tokyo, D.Course(2003)

Department of Earth and Planetary Science, Graduate School of Science, The University of Tokyo, M.Course(1998)

Faculty of Science, Kyoto University(1997)

[Professional Career]

Assistant Professor, Research Institute for Humanity and Nature (2010)

Senior Project Researcher, Research Institute for Humanity and Nature(2010)

Project Researcher, Research Institute for Humanity and Nature(2009)

Researcher, Core Research for Evolutional Science and Technology (CREST), Japan Science and Technology Agency(2003)

[Higher Degrees]

D. Sc. (The University of Tokyo, 2003)

M. Sc. (The University of Tokyo, 1998)

[Fields of Specialization]

Meteorology

Climatology

[Academic Society Memberships]

Meteorological Society of Japan

Japan Geoscience Union

Japan Society of Hydrology and Water Resources

American Geophysical Union

American Meteorological Society

[Awards]

JMSJ Award (2013)

International Award of the Japan Society of Hydrology and Water Resources (2015)

—Achievements—

[Research Presentations]

[Poster Presentation]

・Natsuko Yasutomi Estimated changes in climatological mean temperature in highland region of South Asia by increasing observational data input. 12th Annual meeting of Asia Oceania Geosciences Society, 2015,08,03-2015,08,07, Singapore.

Appendix 1 Number and Affiliation of Project Members

Project Number	Title of the project	Total	RIHN	University / College			Inter-University Research Institute	Public Institution	Private Institution	Others	Overseas Institution
				National	Public	Private					
C-09-Init (FR5)	Designing Local Frameworks for Integrated Water Resources Management	86	5	16	4	7	0	3	2	1	48
D-05 (FR4)	Coastal Area Capability Enhancement in Southeast Asia	154	12	63	0	25	0	11	0	1	42
R-07 (FR4)	Desertification and Livelihood in Semi-Arid Afro-Eurasia	31	6	13	2	3	0	3	2	1	1
E-05-Init (FR4)	Creation and Sustainable Governance of New Commons through Formation of Integrated Local Environmental Knowledge	143	10	49	3	18	0	15	16	1	31
R-08-Init (FR3)	Human-Environmental Security in Asia-Pacific Ring of Fire: Water-Energy-Food Nexus	85	9	22	6	8	0	11	3	1	25
R-09 (FR2)	Long-term Sustainability through Place-Based, Small-scale Economies: Approaches from Historical Ecology	80	5	18	1	13	1	5	0	2	35
H-05 (FR2)	Societal Adaptation to Climate Change: Integrating Palaeoclimatological Data with Historical and Archaeological Evidences	75	6	29	3	17	5	6	3	2	4
D-06 (FR1)	Biodiversity-driven Nutrient Cycling and Human Well-being in Social-Ecological Systems	92	6	31	10	15	0	17	3	2	8
E-06-Init (PR)	Life-worlds of Sustainable Food Consumption: Agrifood Systems in Transition	48	4	19	1	6	0	4	5	0	9
Individual Collaboration FS (KAJITANI)	Local Standard in Globalization: Social Inclusive Approaches towards Transformation of Local Communities	31	2	10	1	5	0	1	7	0	5
Individual Collaboration FS (KANEKO)	Food Sovereignty, Sustainable Agriculture and Fukushima Contamination	12	0	8	0	1	0	0	3	0	0
Individual Collaboration FS (FUNAKAWA)	Integrative Study on the Linkage of Agricultural Activities and Environmental Degradation through Systematic Analysis, Research and Improving Practices, and Reintegration	13	2	2	3	0	1	1	0	0	4
Institutional Collaboration FS (MIZUNO)	Toward the Regeneration of Tropical Peatland Societies: Establishment of an International Research Network and Proposal for the Future	23	3	11	1	0	0	2	1	0	5

Institutional Collaboration FS (FUNAMIZU)	Value-based Sanitation: Sanitation Value Chain for Human Happiness and Resources Management	15	0	9	2	0	0	1	0	0	3
Institutional Collaboration FS (ICHIE)	Evaluation and Use of Non-monetary Benefits from Protected Tropical Rain Forest Areas in Southeast Asia	11	0	9	0	2	0	0	0	0	0
Initiative-based FS (HANDOH)	Co-Creating Heuristic and Autonomous Risk-Recognition System and Value-Action Networking for Futurability	31	0	14	2	4	0	2	2	1	6
	Total	930	70	323	39	124	7	82	47	12	226

As of 31 March, 2016

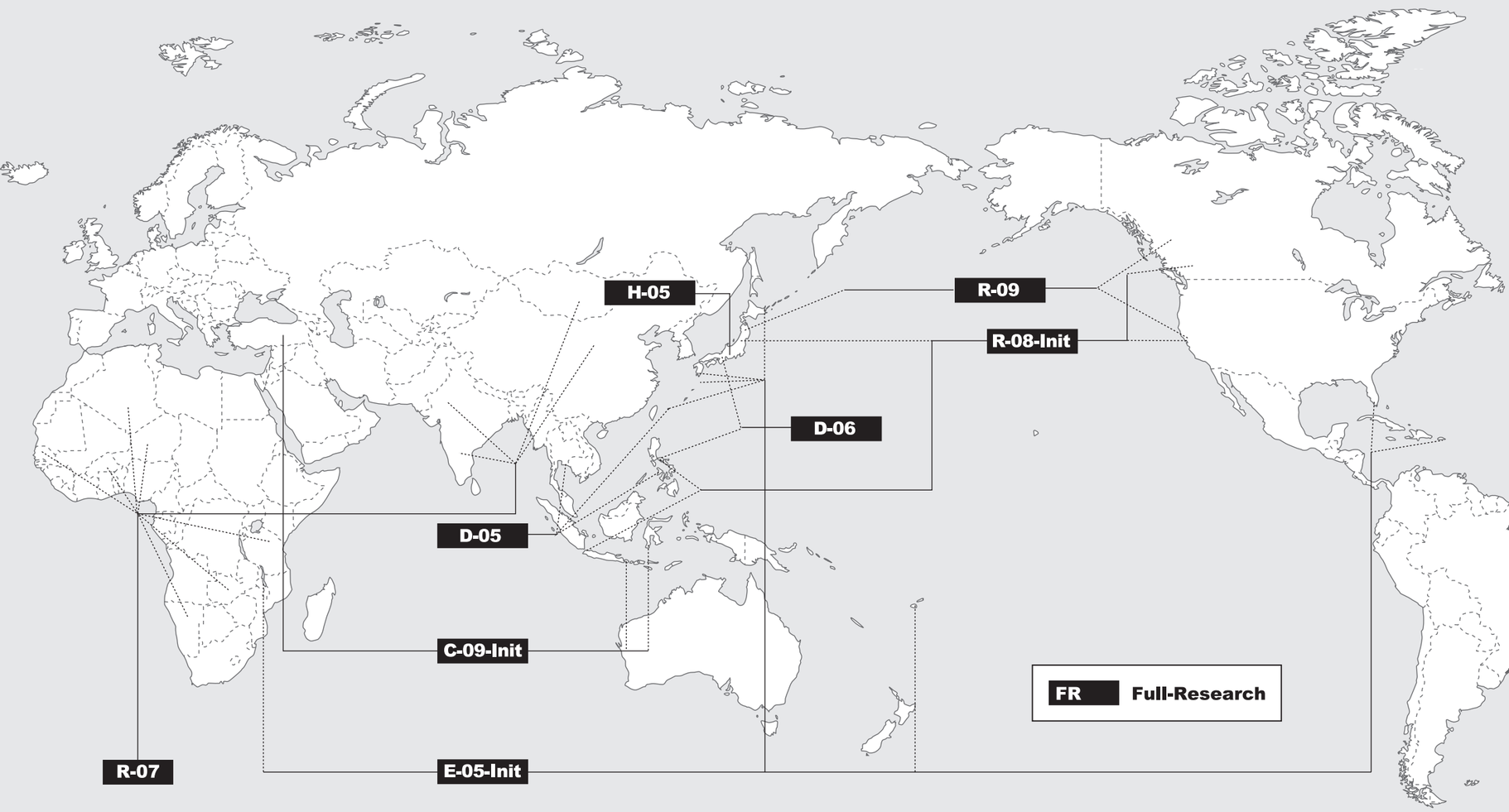
Appendix 2 Research Fields of Project Members

Project Number	Title of the Project	The Number of Projects Members				Research Background of Project Members
		Natural Sciences	Humanities	Social Sciences	Total	
C-09-Init (FR5)	Designing Local Frameworks for Integrated Water Resources Management	60	10	16	86	(Natural Sciences) Farming System research, Aguriculture, Water Resource Engineering, Water Environmental Engineering, Irrigation and drainage, Soil Science, Geology, Water quality Engineering, Physical Engineering, Medical Science, Irrigation Engineering, Regional informatics, Hydrology, Remote sensing, Aguricultural Engineering, Aguricultural Environmental Engineering, Aguricultural Environmentalinformatics, Climatology, Ecology Engineering, Environmental informatics, Hydrological modelling, Global hydrology, Regional Environmental hydrology, Hydrospheric Atmospheric System, Agrometeorology (Humanities) Archaeology, Cultural Anthropology, Anthropology, Economic geography, Development Anthropology, Geography, Hisotry of Islamic art and culture, Water Resource Management (Social Sciences) Environmental Policy, Environmental Sociology, Policy Science, Management, Sociology, Environmental Science, Environmental Planning, Social development study, Aguricultural Economics, SocioEconomics, Regional development Planning
D-05 (FR4)	Coastal Area Capability Enhancement in Southeast Asia	114	13	27	154	(Natural Sciences) Tropical forest research, Fish Ecology, Fish taxonomy, Population genetics, Genetics, Fisheries Science, Ichthyology, Costal Ecology, Molecular Ecology, Planktology, Robotics, Resource Geology, Fishing gear, Water quality analysis, Seedling production, Genetic analysis, Marine Engineering, Telemetry, Sandy beach ecoSystem, Aquaculture, Ecology, Fish behavior, Marine Ecology, Fisheries research, Biology, Environmental Studies, Water environment Studies, Environmental Science, Molecular phylogenetics, Costal Environmental research, Aquatic Ecology, Conservation Ecology, Software Engineering, Coral reef Ecology, Fishery research, (Humanities) Cultural Anthropology, International fisheries development Studies, Area Studies, SATOUMI SATOYAMA, Area development Studies, Ecological Anthropology, Village development, Sociology of fishing communities, Regional development Studies, Underwater Archaeology, Archaeology, Sociology, Cultural Anthropology, Anthropology, Social Anthropology, (Social Sciences) Economics, Regional development, Fisheries Economics, Regional Economics, Resource Management, Traditional technique, Tourism study, Area Studies, Village development, Fish catching and Environmental linkage
R-07 (FR4)	Desertification and Livelihood in Semi-Arid Afro-Eurasia	18	7	6	31	(Natural Sciences) Agronomy, Boundary Aguriculture, Remote Sensing, Soil Ecology, Soil Science, Weed Science, Meteorology, Natural Geography, Regional Architecture、Environmental Soil Science, Plant Nutrition, Zootechny, Geology, Agricultural Ecology, Agricultural Culture, Ethnogeography, Development Anthropology, Afro Eurasia Arid Region Area Studies (Humanities) Ethnoarchaeology, Cultural Anthropology, Ethnic Geography, African area Studies, Archaeology, Environmental Anthropology, (Social Sciences) Rural development Studies, Social development Studies, Rural Economics, Area Studies, Social Anthropology, Aguricultural culture
E-05-Init (FR4)	Creation and Sustainable Governance of New Commons through Formation of Integrated Local Environmental Knowledge	55	22	66	143	(Natural Sciences) Local Environmental Science, Landscape Ecology, Statistical Physics, Governance Theory, Science and Technology Studies, Fishery Management, Theoretical Biology, Game Theory, Satoyama Management, Complex Systems Theory, Wildlife Management, Resource Management, Sanctuary Management, Ecology, Mathematical Biology, Soil Hydrology, Satoumi Governance, Coastal Management, Residential Research, Satoyama Restoration, Renewable Energy, Nature Restoration, Ecodystem Management, Agroecodystem, Knowledge Theory, Watershed Management, Natural Energy, Plant Ecology, Geology, Forest Ecology, Geography (Humanities) Science Ethics, Folklore, Governance Theory, Ecological Anthropology, Social Anthropology, Hisotry, Japanese Hisotry (modan), Knowledge Studies, Sanctuary Management, Anthropology, Geography (Social Sciences) Governance Theory, Resource Management, Environmental Ethics, International Law, Environmental Economics, Fishery Resource Management, Environmental Sociology, Residential Research, Conservation Theory, Agroecosystem, Network Theory, Biodiversity Policy, Political Science, Social pPychology, Environmental Governance, Ocean Policy, Environmental NGO Theory, Coastal Management, African Area Studies, Environmental Law, Commons,
R-08-Init (FR3)	Human-Environmental Security in Asia-Pacific Ring of Fire: Water-Energy-Food Nexus	49	8	28	85	(Natural Sciences) Hydrology, Hot Spring Science, Energy Science, Thermal Energy, Aguricultural Water Utilization, Bioresource Ecology, Model of Connectivity of Hills, Humans and Oceans, Geothermal Science, Estuary Ecology, Geothermal energy, Coastal Fisheries, Bioresource Science, Marine/Coastal Geology, Geology, Water - Energy Nexus, Coastal Oceanography, Hot Spring/Ecology/Energy, Hot Spring/Groundwater, Coastal Protection, Marine Ecology, Envitonmental Science, Satoumi Resource Ecology, Fisheries, Hydroelectric Power, Fisheries Ecology, Groundwater Management, Geochemistry, Geoscience, Geothermal Energy, Geothermal Energy Policy, Biomass, Water Quality, Hydrological System Analysis, Hydrogeology, Limnology, Gravity Measurement and Geothermal Modelling, Seismology, Engineering Seismology, Geotechnical Engineering (Humanities) Environmental Governance, Operations Management, Local Knowledge, Graphic Design, Resource Studies, Societal Action, Psychology, Ecological Anthropology, Ethnobiology, Human Ecology (Social Sciences) Environment and development, Conservation Ecology, Environmental Planning, Global Environmental Policy, Fishery Resource, Coastal Sociology, Public Policy, Regional Studies, Environmental Policy, Policy process, International relations, Fishery Economics, Environmental Economics, Sociology, Economics, Environmental governance, Behavioral social Science, Integrated water Resources Management, Cultural Anthropology , Environment-economy Assessment, Climate Change Policy, Public Administration, Ocean Policy, Social Networking Theory, Crust Research, Physical Modelling, Environmental Conservation by Companies and Citizens
R-09 (FR2)	Long-term Sustainability through Place-Based, Small-scale Economies: Approaches from Historical Ecology	24	20	36	80	(Natural Sciences) Oceanography, Aquatic Marine Environmental Education Research, Global Environmental Oceanography・Paleoenvironment, Stable Isotope Ecology, Botanical Archaeology, Anthropology, Agroecology, Physical Anthropology, Environmental Archaeology, Environmental Ecology, Biological Anthropology, Biological anthropology (Human Evolution), Paleobotany, Paleoclimatology, Ecology, Isotope Analysis, Animal Archaeology, Soil Ecology, Physics (Humanities) Archaeology, Museology, Cultural Property, Palaeoenvironmental Studies, Archaeobotany, Osteoarchaeology, Prehisoty, Geological Archeology, Japanese Archeology, Prehistoric Archeology, Ethnic Archeology (Social Sciences) Environmental Anthropology, Historical Ecology, Human Environmental Geography, Silviculture, Political Ecology, Archaeobotany, Zooarchaeology, Anthropology, Ethnology, Hunter-gatherers Studies, Political Economy, Sociology, Cultural Anthropology, Urban Ethnography, Integrated Policy Science, Paleoecology, East Asian Archaeology, Bioarhaeology, Archaeology, Cultural Ecology, Evolutionary Ecology, Dissemination and Enlightenment of Environmental Issues, Area Studies, Lifelong Learning, Environmental Archaeology, Food Culture, Peace Studies, Political Ecology, Social and Cultural Anthropology, Earthquake Disaster Studies, Sociology of Science and Technology, Ecological Anthropology, Indigenous People Archaeology, Agriculture, Cooperative Movement, Social Movement, Archeology (West Coast of Northen America)
H-05 (FR2)	Societal Adaptation to Climate Change: Integrating Palaeoclimatological Data with Historical and Archaeological Evidences	32	39	4	75	(Natural Sciences) Palaeoclimatology, Dendrochronology, Historical Climatology, Wood Anatomy, Palaeoceanography, Dating Method, Plant Ecology, Isotopic Meteorology and Climatology, Climate Dynamics・Climate Modeling, Earth System Dynamics, Wood Science, Isotope GeoChemistry, Glaciology, Hydrology, Geochronology, Earth Dynamics, GeoChemistry, Forestry, Environmental Studies, Radiocarbon chronology, Climatology, Glaciology (Humanities) Japanese Early Modern Age Hisotry, Archaeology, Japanese Early Modern Age Urban Hisotry・Comparative Studies of Historical Documents, Prehistorical Archaeology, Japanese Middle Age Hisotry, Japanese Archaeology, Theoretical Archaeology, Japanese Hisotry, Vegetational Hisotry, Edo-era Hisotry, Japanese Early Modern Hisotry, Hisory of Ryukyu, Japanese Early Modern Age Emperor Studies/Economic Hisotry, Archaeology (Prehistoric-chronology), Archaeology (Yayoi-era), Prehisotry, Human Informatics, Japanese Ancient Hisotry, Japanese Religious Hisotry, Japanese Middle Age Hisotry (Shoena Manor/Village/Environment), Feudal Domain Hisotry (Social Sciences) Japanese Economic Hisotry・Historical Demography, Environmental Policy, Japanese Early Modern Age Economical and Social Hisotry
D-06 (FR1)	Biodiversity-driven Nutrient Cycling and Human Well-Being in Social-ecological Systems	73	2	17	92	(Natural Sciences) Ecological Science, Plant Ecology, Satellite Ecology, Stable Isotope Ecology, Community Ecology, Water Weed Resource Circulation, Fish Genetics and Breeding Science, Freshwater Biology, Fish Ecology, Phycology, Ecological Stoichiometry, Marine EcoSystem Engineering, Aquatic Biology, Hydrosphere Ecology, Plant Physiological Ecology, Ecology, Mathematical Biology, Evolutionary Biology, Microbial Ecology, Fungal Diversity, BiogeoChemistry, Chemical Oceanography, Applied Ecology, Molecular Ecology, Forest Ecology, Hydrology, Ecological Genetics, Aquatic Ecology, Forest Hydrology, Conservation Ecology, Fungology, Geophysics, Lake Synthetic Science, Integrated Lake Basin Management, Plankton Ecology, Analytical Chemistry, Environmental Economy, Environmental Sociology, Environmental Aguriculture, Environmental Microbiology, Environmental Conservation, Forestry and Environmental Studies, Hydrosphere Chemistry, Fisheries, Hydrological Science, Mineral Nutrient Circulation in Groundwater, Benthic Animal Diversity, Freshwater Ecology, Environmental Analytic Chemistry, Spatial Statistics, Underwater Acoustic Studies, River Basin Conservation (Humanities) Historical Geography (Social Sciences) Environmental Policy, Rural Sociology, Environmental Sociology, Industrial Ecology, Ecological Economics, Applied Economics, Quantitative Sociology, Social Psychology, Sociology, Environmental Economy, Environmental Measures, Regional Planning
E-06-Init (PR)	Life-worlds of Sustainable Food Consumption: Agrifood Systems in Transition	21	9	18	48	(Natural Sciences) Soil Science, Agrifood Social Science, Rural Sociology, Food System Science, Farm Management, Regional Studies, Water Quality Monitoring, Agroforestry, Environmental Aguriculture, Food Science, Material Circulation Estimation, Radiation Control, Modelling, Green Space Planning, Environmental Energy Science, Public Health, Social Ecological System, EcoSystem, Farming and Fishing Village Studies, Carbon Dynamics in Soil (Humanities) Environmental Sociology, Social Statistics, Regional Policy and Planning, Environmental Logic, Anthropology, Cultural Anthropology, Hisotry, Political Economy, Science and Technology Studies (Social Sciences) Environmental Sociology, Environmental Planning, Food Policy, Rural Planning, Innovation Studies, Management Theory, Global Agricultural Economics, Agrifood Social Science, Economic Sociology, Agrifood System, Geology, Science and Technology Studies, Environmental Policy, Sociology, Food Sociology, Fisheries Sociology, Policy Science
Individual Collaboration FS (KAJITANI)	Local Standard in Globalization: Social Inclusive Approaches towards Transformation of Local Communities	3	14	14	31	(Natural Sciences) Landscape Planning, Regional Development, Aguriculture, Ecological Anthropology (Humanities) Philosophy, Comparative Culture, Architectual Hisotry, Religion, Human Geography, Art Anthoropology, Climatology, Semiotics, Communication, Environmental Hisotry, Disaster Hisotry, Public Space Studies, Food Philosophy, Creative Writing, Environmental Humanities, Architectural Education (Social Sciences) Environmental Planning, Regional Economy, Regional Society, Medical Sociology, Bereavement,Community Construction, Quantitative Research, Popular Culture, Business Administration, Local Community, Law, International Law, Political Science, Design Foundation, Information Design, Financial System, Urban Regeneration, Regional Vitalization, Regional Development, Life and Design, Urban Policy, Environmental Impact Assessment, Environmental Policy, Biological Resource Education, Regional Administration
Individual Collaboration FS (KANEKO)	Food Sovereignty, Sustainable Aguriculture and Fukushima Contamination	5	6	1	12	(Natural Sciences) Soil Ecology, Crop Science, Weed Science, Geoponics, Forest Environmental Information, Biomass Energy, Forest Ecology Management, Aguricultural education, Organic Aguriculture, Aguricultural Economy (Humanities) Landscape Architecture, Regional Economics (Social Sciences) Food Economics, Aguricultural Policy, Aguriculture Management, Regional Vitalization, Social Risk Studies,
Individual Collaboration FS (FUNAKAWA)	Integrative Study on the Linkage of Aguricultural Activities and Environmental Degradation through Systematic Analysis, Research and Improving Practices, and Reintegration	9	2	2	13	(Natural Sciences) Environmental Aguriculture, Community Development, Ecology, Aguricultural Ecology, Mineralogy, Botany, Aguriculture, Environmental Science, Aguricultural Ecology (Humanities) Ecological Anthropology, Anthropology (Social Sciences) Environmental Economics, Aguricultural Economy
Institutional Collaboration FS (MIZUNO)	Toward the Regeneration of Tropical Peatland Societies: Establishment of an International Research Network and Proposal for the Future	18	1	4	23	(Natural Sciences) Environmental Anthropology, Environmental Resource Geology, Political Ecology, Atmospheric Chemistry, Agrometeorology, Land Use and Land Resources Management, Hydrology, Biogeochemistry, Plant Ecology, Forest Ecology, Soil Science, Physical Geography, Ecology, Policy Research (Humanities) Social Anthropology (Social Sciences) Area Studies(Indonesia), Economic Hisotry, Political Science, Local Wood Use, Area Studies
Institutional Collaboration FS (FUNAMIZU)	Value-based Sanitation: Sanitation Value Chain for Human Happiness and Resources Management	7	3	5	15	(Natural Sciences) Sanitary Engineering, Chemical Engineering, Environmental Engineering, Water treatment Engineering, Public health microbiology (Humanities) Agricultural Economics, Cultural Anthropology (Social Sciences) African Political Science, Development Economics, Community Participation, International Health, Sociology
Institutional Collaboration FS (ICHIE)	Evaluation and Use of Non-monetary Benefits from Protected Tropical Rain Forest Areas in Southeast Asia	5	5	1	11	(Natural Sciences) Forest Physiological Ecology, Natural Environmental Policy (Biodiversity/Protected areas), Forest Ecology, Forest Biology, Ecology, Entomology, Conservation Ecology (Humanities) Southeast Asian Area Studies (Social Sciences) Economies, Biocultural Diversity, Environmental Economics, Economic Sociology, Resource Strategy, Geo-restriction Strategy
Initiative-based FS (HANDOH)	Co-Creating Heuristic and Autonomous Risk-Recognition System and Value-Action Networking for Futurability	18	3	10	31	(Natural Sciences) Earth Systems Science, Environmental Science, Environmental Impact Assessment, Civil Environmental System, Organic Geochemistry, Water Conservarion, Behavioral Ecology, International Aguricultural and Environmental Science, Ecological Hydrology, Energy Science, Biological Response to Environmental Stresses, Fish Infectious Diseases, Atmospheric Science, Material-cycle Science, Visualization, Microbial Ecology, Analytical Chemistry, Embryo Culture, Biogeochemistry, Physical Oceanography (Humanities) Religion, Environmental Economics, Environmental Thought, Environmental Ethics (Social Sciences) Pollution Hisotry, Regional development, International Law, Environmental Law, Environmental Economics, Education of the Handicapped, Bitcoin, Economics, Human Rights Law, Environmental Welfare
	Total	511	164	255	930	

As of 31 March, 2016

Research Project Sites

Appendix 3



Full-Research

C-09-Init **Designing Local Frameworks for Integrated Water Resources Management**
○Turkey, Indonesia

D-05 **Coastal Area Capability Enhancement in Southeast Asia**
○Coastal states of Southeast Asia; Ishigakijima, Japan

R-07 **Desertification and Livelihood in Semi-Arid Afro-Eurasia**
○Senegal, Niger, Burkina Faso, Namibia, Zambia, Sudan, Tanzania, India, Mongolia, China

E-05-Init **Creation and Sustainable Governance of New Commons through Formation of Integrated Local Environmental Knowledge (ILEK project)**
○Yakushima, Shiretoko, Shiraho, Ishigaki-city, Ayacho, Miyazaki, Japan; Fiji; Virgin Islands of the United States; Sarasota Bay, Florida; Lake Malawi, Malawi

R-08-Init **Human-Environmental Security in Asia-Pacific Ring of Fire: Water-Energy-Food Nexus**
○Japan, Indonesia, Philippines, Canada, USA

R-09 **Long-term Sustainability through Place-Based, Small-scale Economies: Approaches from Historical Ecology**
○Japan, USA

H-05 **Societal Adaptation to Climate Change: Integrating Palaeoclimatological Data with Historical and Archaeological Evidences**
○Japan

D-06 **Biodiversity-driven Nutrient Cycling and Human Well-being in Social-Ecological Systems**
○Philippines, Japan