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## Message from the Director-General

The Research Institute for Humanity and Nature was established in April 2001 by the Government of Japan to promote integrated research in the field of global environmental studies. As a national institute, RIHN solicits, develops, hosts, and funds fixed-term research projects on pressing areas of interaction between humanity and nature. RIHN thus promotes coordinated, problem-centered, context-specific, and multi-dimensional science. RIHN projects can last from three to five years; they are always multidisciplinary and employ multiple methodologies, and they are supposed to offer solutions to the problems under through trans-disciplinary approach with various stakeholders of the society.

As of the end of FY2013 RIHN has completed twenty-five research projects, each of which has established extensive research networks in order to make important contributions in its area of specialization. RIHN synthesized and published the key research findings and contributions of its first decade (2001-2011) as the *RIHN Encyclopedia of Global Environmental Studies*. Also, as part of the synthesis and new contribution of RIHN as an inter-university research institute corporation, since 2012 we established the Repository for Humanity and Nature, which is an effort to improve interdisciplinary resource sharing through semantic technology.

As part of RIHN's international activities, RIHN has established the Future Earth Unit, which will contribute to the overall research and outreach activity of Future Earth, a new global environmental research initiative for global sustainability. This unit aims to promote the goals of Future Earth in Asia, including the role of the Future Earth Asian Regional Hub.

This annual report describes the updated outcome of these activities of RIHN for the FY2013.

YASUNARI Tetsuzo  
Director-General  
Research Institute for Humanity and Nature



## Research Activities

### ● Full Research

<b>Project No.</b>	<b>C-07 (Project leader: HIYAMA Tetsuya)</b>	<b>p. 6</b>
<b>Project Name</b>	Global Warming and the Human-Nature Dimension in Siberia: Social Adaptation to the Changes of the Terrestrial Ecosystem, with an Emphasis on Water Environments	
<b>Project No.</b>	<b>C-08 (Project leader: MURAMATSU Shin)</b>	<b>p. 13</b>
<b>Project Name</b>	Megacities and the Global Environment	
<b>Project No.</b>	<b>C-09-Init (Project leader: KUBOTA Jumpei)</b>	<b>p. 20</b>
<b>Project Name</b>	Designing Local Frameworks for Integrated Water Resources Management	
<b>Project No.</b>	<b>D-05 (Project leader: ISHIKAWA Satoshi)</b>	<b>p. 28</b>
<b>Project Name</b>	Coastal Area Capability Enhancement in Southeast Asia	
<b>Project No.</b>	<b>R-05 (Project leader: NAWATA Hiroshi)</b>	<b>p. 36</b>
<b>Project Name</b>	A Study of Human Subsistence Ecosystems in Arab Societies: To Combat Livelihood Degradation for the Post-oil Era	
<b>Project No.</b>	<b>R-06 (Project leader: KADA Ryohei)</b>	<b>p. 50</b>
<b>Project Name</b>	Managing Environmental Risks to Food and Health Security in Asian Watersheds	
<b>Project No.</b>	<b>R-07 (Project leader: TANAKA Ueru)</b>	<b>p. 53</b>
<b>Project Name</b>	Desertification and Livelihood in Semi-Arid Afro-Eurasia	
<b>Project No.</b>	<b>R-08-Init (Project leader: TANIGUCHI Makoto)</b>	<b>p. 60</b>
<b>Project Name</b>	Human-Environmental Security in Asia-Pacific Ring of Fire: Water-Energy-Food Nexus	
<b>Project No.</b>	<b>E-05-Init (Project leader: SATO Tetsu)</b>	<b>p. 68</b>
<b>Project Name</b>	Creation and Sustainable Governance of New Commons through Formation of Integrated Local Environmental Knowledge	

### ● Pre Research

1. NAKATSUKA Takeshi (RIHN)  
Societal Adaptation to Climate Change: Integrating Palaeoclimatological Data with Historical and Archaeological Evidences

### ● Initiative Feasibility Studies

1. MCGREEVY, Steven R.  
\*Lifeworlds of Sustainable Food Consumption: Agrifood Systems in Transition
2. MCLELLAN, Benjamin Craig  
\*Co-designing Futurable Anthropospheric Energy Systems

### ● Feasibility Studies

1. ISHIKAWA Mamoru (Hokkaido University)  
Improving Environmental Literacy to Promote Self-Sustaining Communities
2. ONISHI Masayuki (RIHN)  
Biocultural Diversity in the Asia-Pacific: Linking Community-based Participatory Research and the Transmission of Ecological Knowledge to Future Generations
3. OKUDA Noboru (Kyoto University)  
Biodiversity-driven Nutrient Cycling in Social-ecological Systems: New Measures of Ecosystem Health
4. KISHITA Yusuke (Osaka University)  
Design and Integrated Assessment of Regional Anthropospheric Energy System
5. TANAKA Masakazu (Kyoto University)  
A Transdisciplinary Study of the Environmental Impact of Military Activities
6. HABU Junko (University of California, Berkeley)  
Long-term Sustainability through Place-based, Small-scale Economies: Approaches from Historical Ecology

### ● Incubation Studies

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1. UBUKATA Fumikazu (Okayama University)  
Understanding “Securitization of Nature”: History, Mechanism and Impact to Society and Nature
2. TACHIIRI Kaoru (Research Institute for Global Change)  
Global warming countermeasures by fusion of traditional knowledge and modern science: on regional and global scales
3. OKI Kazuo (The University of Tokyo)  
Breaking the vicious cycle of poverty and environmental degradation—Income inequality and its environmental impacts between urban and rural areas in South East Asian countries –
4. MIZUNO Kosuke (Kyoto University)  
Study on Humanosphere Sustainable Development Through the Rehabilitation of Tropical Peat Wet Land Based on the Creation of People’s Forest
5. USHIDA Kazunari (Kyoto Prefectural University)  
Microorganisms, as Potent Indicators of Human Interactions on the Nature  
—Human-borne transition of functional diversity of environmental microorganisms and its effect on human society –
6. NILES, Daniel (RIHN)  
The Social-Ecology of Food Security
7. FUNAKAWA Shinya (Kyoto University )  
Integrative analysis on the linkage of modernization and environmental degradation in tropical agriculture
8. KANEKO Nobuhiro (Yokohama National University)  
Global bioelement management to avoid the food risks
9. KAJITANI Shinji (The University of Tokyo)  
Environmental Problems in the Linkage between Local and Broad Areas  
—Cooperative Research on the Basis of Actual Life and Philosophical Dialogue
10. KIMURA Kazuhiko (Miyagi University)  
Understanding regional environmental resources and its application to agriculture and fishery in Minamisanriku town
11. KANEKO Satoshi (Nagasaki University)  
Global environment and health: method development of Human Dimension Big Data for trend analysis on health

**● Completed Research (CR) Follow-up Grants****p. 86**

1. UMETSU Chieko (Nagasaki University)  
Building resilience network in Southern Africa and organization of Lusaka Workshop
2. OKUMIYA Kiyohito (Kyoto University)  
The wisdom of the aged: Learning from the high-altitude elderly
3. KUBOTA, Jumpei (RIHN)  
Network Development for establishing an integrated management model of R. Syr Darya with special emphasis on environmental preservation
4. SATO Yo-Ichiro (Kyoto Sangyo University)  
Startup of consortium for in-situ conservation of wild rice
5. SHIRAIWA Takayuki (Hokkaido University / RIHN)  
Operation of the Amur Okhotsk Consortium as a multilateral academic network
6. MOJI Kazuhiko (Nagasaki University)  
Co-hosting of the 7th National Health Research Forum of Lao P.D.R., and its related field activities
7. YAMAMURA Norio (Doshisha University)  
Classification and global distribution of ecosystem networks
8. YOSHIOKA Takahito (Kyoto University)  
MATSUSHIMA Kenta (Kyoto University)  
Application of the environmental scenario which the revival of the stricken area

**Stage: Full Research****Project No.: C-07****Project Name: Global Warming and the Human-Nature Dimension in Siberia : Social Adaptation to the Changes of the Terrestrial Ecosystem, with an Emphasis on Water Environments****Abbreviated Title: RIHN Siberia Project****Project Leader: HIYAMA, Tetsuya****Research Axis: Circulation****URL: <http://www.chikyu.ac.jp/siberia/>****Key Words: Global Warming, Water Cycle, Carbon Cycle, Permafrost, Former Inhabitant, Reindeer, Social Adaptation****○ Research Subject and Objectives**

## a) Research objectives and background

Global warming will likely transform Siberian environments. Early evidence indicates that water and carbon cycles are undergoing rapid change (Ohta et al., 2008; Iijima et al., 2010), with potentially grave impact on Siberian flora and fauna. Human inhabitants, who have adapted to great changes in social structure and environment in the past (Nakada, 2012; Yoshida, 2012), will be forced to adapt again, but to a cascading series of environmental changes whose dimensions are understood only in outline. Local inhabitants depend on agriculture, stockbreeding and on fragile transport, building and water infrastructure. Human survival skills and adaptive capacity to environmental changes depend on unique social structures, history and culture, which have undergone Russian socialistic modernization. Regional climate in Siberia are based on energy and water exchanges and thus on changes in surface reflectance of snow, ice and vegetation coverage. Such changes should be monitored continuously as long as possible. The Lena River Basin in Eastern Siberia is covered in larch forest but receives little precipitation (Ohta et al., 2001; 2008). The area is an ideal setting in which to study the effects of climate warming, as the forest-permafrost symbiosis (Zhang et al., 2011) is extremely susceptible to abnormal variations in temperature and precipitation.

We have started monitoring of energy and water exchanges between larch forest and the atmosphere since 1998 at Yakutsk, middle part of the Lena River Basin in Eastern Siberia (Ohta et al., 2001). This monitoring revealed that the region suffered from extraordinary high precipitation in late-summer through winter from 2005 to 2008 (Hiyama et al., 2013). This resulted in not only permafrost degradation (Iijima et al., 2010), but also changes in terrestrial ecosystems and hydrological elements in the region (Shiklomanov and Lammers, 2009; Brutsaert and Hiyama, 2012; Zhang et al., 2013).

## b) Research methods and organization

This research project takes natural and social science perspectives on three aspects of climate-associated environmental change. It is designed to: 1) describe current variation in water and carbon cycles and predict likely variation in the near future; 2) make field observations of the effect of carbon and hydrologic variability in Eastern Siberian landscapes, and identify key exchanges or driving forces; and 3) examine the capability of the multi-ethnic Siberian peoples, and their distinct social economies, to adapt to predicted change in their climate and terrestrial ecosystems. Three research groups are organized (Fig. 1) in order to realize these goals. They are the Siberia bird's-eye group (Group 1), the Water cycle and ecosystem interaction group (Group 2), and the Human ecology group (Group 3). This project is jointly conducted by Japanese and Russian universities and research institutes.

**○ Progress and Results in 2013**

Two interdisciplinary research achievements, which are foci from FR3 to FR5, are as follows.

## 1) Adaptations of local residents living along the Lena River to seasonal river floods

Arctic sea ice extent in summer, especially in the Eurasian continent side, has been decreasing partly owing to global warming. As a result, cyclones have been frequently appeared in summer over the region. Such cyclones easily propagate to Siberia (Zhang et al., 2013), and they derive plenty of precipitation in the region. Meteorological data revealed summer precipitation around upper and middle



parts of the Lena River Basin became drastically high from 2005 to 2008 as well as in 2012. Consequently around Yakutsk, capital city of the Sakha Republic of the Russian Federation, summer river floods appeared and they derived severe damages to local farmers and cattle-horse pastoralism.

On the contrary, the Lena River derives spring ice breaking floods every year. Theoretically the spring ice breaking floods become severe in case former winter temperature was low and current spring temperature rise is very gradually. In such case, spring floods derive severe damages to local residents living along the Lena River.

Using archival sources, remotely sensed data, and numerical simulations, we revealed decadal (and/or historical) changes in spring- and summer-river floods of the Lena River. We found that local residents were damaged from spring ice breaking floods almost every year after 1998. We also investigated local people's perceptions as well as local government's adaptation strategies for such spring- and summer-river floods. Interestingly spring floods have been recognized as benefits except in case they severely damaged to the villages along the Lena River (Takakura, 2013). This is because spring floods derive nutrient rich water to the river sandbanks, on which the farmers cultivate pastures for cattle-horse pastoralism. While on the contrary, in case summer river floods appear, it has been recognized as hazards. This is because it submerges the pasture completely for a long duration in summer, and it made impossible to get hay for cattle-horse.

We additionally found that increased floods disrupt cold-weather transport via ordinarily frozen rivers and warm-weather transport over land. As result we note that local communities locating very far from the capital city (Yakutsk) are increasingly remote and difficult to access. Consequently, disaster vulnerability has increased in such region and thus their adaptation become more difficult.

Therefore, migrations of villages were applied as one of the adaptation strategies to prevent spring river floods and the remoteness. Because local peoples prefer to live along the river to do their subsistence activities, those peoples and the government agreed to apply seasonal migrations. On the other hand, both local peoples and the government have no adaptation ways for the summer river floods. We therefore propose development of information transmission (communications) on river flood (to prevent spring river floods) as well as improvement of distribution network of hay (to adapt summer river floods) as suitable adaptation strategies for their sustainable cattle-horse subsistence activities along the Lena River.

## 2) Adaptations of keepers and/or hunters of reindeers to social-environmental changes

Interviews with keepers of domestic reindeer revealed that current climate change has not severely damaged their operations. It appears that so far they have been able to successfully adapt to changes in climate, especially in Eastern Siberia. This related to resilient use of microhabitat of the domesticated reindeers around the camping sites. While on the contrary, they were severely impacted by social changes following the collapse of the former Soviet Union. The keepers do not feel air temperature rise (warming) but do feel (remember) heavy rainfall and/or flood events as recent climate change. They fear waterlogging in lower land, especially around flooding plain of small rivers. Additionally, the keepers pointed out increase of carnivore (such like) wolf around their camping sites. They also said recent climate changes affect degradation of reindeer moss in winter, so that birth-rate and weight of reindeers tend to decline.

We also tracked and documented the migration routes and seasonal behaviours of wild reindeers. In this project, we successively tracked routes of wild reindeers using an ARGOS satellite system. MODIS satellite showed that reindeer have moved along rivers and through zones of better vegetation conditions, while avoiding increasingly common forest fires. Migration distance was very similar to those documented in North America and North Europe. Seasonal behaviours in Siberian wild reindeers were also similar to those in North America and North Europe. The seasonal behaviours are classified into summer breeding season, winter hibernating season, and other migration seasons.

System dynamics (SD) model was applied in order to diagnose and propose adaptation strategies for keepers of domestic reindeers and/or hunters of wild reindeers to social-environmental changes. In order to keep wild reindeer population, it is better to establish sanctuary in winter hibernating place. And in order to protect reindeer keeping, as one of the very important subsistence activities in Siberia, governmental subsidies should be provided to the keepers of reindeers and to hunters of carnivore.

## 3) Summary

Human - nature interaction owing to climate change (climate warming and waterlogging) as well as social change (economy-orientation and collapse of the former Soviet Union) has been successfully described. It shows reindeer-related subsistence activities and river flood impacts to the local residents. Adaptation strategies are proposed for both issues.

### ○Project Members

- ◎ HIYAMA Tetsuya ( Research Institute for Humanity and Nature, Associate Professor, Management of Project, Analysis of permafrost and groundwater )
- YAMAGUCHI Yasushi ( Nagoya University, Professor, Analysis of the changes in the land cover using satellite data )
- SASAI Takahiro ( Nagoya University, Assistant Professor, Analysis of carbon exchanges using the terrestrial biosphere model )
- INOUE Gen ( Atmosphere and Ocean Research Institute, The University of Tokyo, Visiting Professor, GOSAT data analysis )
- MAKSYUTOV Shamil ( National Institute for Environment Studies, Chief Researcher, Carbon budget estimation from GOSAT and other observation data )
- SAKAI Toru ( National Institute for Agro-Environmental Sciences, Researcher, Flood monitoring using satellite remote sensing )
- KIM Heonsook ( National Institute for Environment Studies, Researcher, Inverse model analysis of GOSAT data )
- KANZAWA Hiroshi ( Nagoya University, Professor, Scenario of global warming in Siberia )
- SATO Hisashi ( Nagoya University, Associate Professor, Ecological modeling )
- OHTA Takeshi ( Nagoya University, Professor, Analysis of water energy and carbon cycles in forests, water balance analysis in a basin scale )
- OSHIMA Kazuhiro ( JAMSTEC, Researcher, Climate Analysis in Siberia )
- KOTANI Ayumi ( Nagoya University, Assistant Professor, Analysis of atmospheric boundary layer and forest responses to environmental changes )
- SUGIMOTO Atsuko ( Hokkaido University, Professor, Reconstruction of past changes in environment and vegetation activity )
- TEI Shunsuke ( Hokkaido University, Ph D Candidate, Reconstruction of past changes in environment and vegetation activity )
- KODAMA Yuji ( National Institute of Polar Research, Associate Professor, Analysis of snow accumulation processes )
- YAMAZAKI Takeshi ( Tohoku University, Associate Professor, Analysis of land surface processes using a land surface model )
- YONENOBU Hitoshi ( Naruto University of Education, Associate Professor, Reconstruction of past tree grow rate and past climate )
- HATTA Shigemi ( Tomakomai National College of Technology, Associate Professor, Runoff analyses for continental-scale river basin )
- YAMAMOTO Kazukiyo ( Nagoya University, Associate Professor, Analysis of vegetation phenology using satellite data )
- PARK Hotaek ( JAMSTEC, Senior Researcher, Analysis of snow accumulation processes )
- MAXIMOV Trofim C. ( Insitute for Biological Problems of Cryolithozone, SD, RAS, Head researcher, Analysis of photosynthesis in boreal forests )
- KONONOV Alexander V. ( Insitute for Biological Problems of Cryolithozone, SD, RAS, Researcher, Analysis of photosynthesis in boreal forests )
- MAXIMOV Ayal ( Insitute for Biological Problems of Cryolithozone, SD, RAS, Researcher, Analysis of photosynthesis in boreal forests )
- SHEPELEV Victor ( Melnikov Permafrost Institute, SD, RAS, Vice-Director, Dynamics of suprapermafrost and intrapermafrost groundwater in permafrost region )
- FEDOROV Alexander ( Melnikov Permafrost Institute, SD, RAS, Head researcher, Landscapes (forest) disturbance and permafrost dynamics )
- GOTOVSEV Semen ( Melnikov Permafrost Institute, SD, RAS, Head researcher, Thermo-erosional gullies in permafrost region )
- KOLESNIKOV Alexander ( Melnikov Permafrost Institute, SD, RAS, Researcher, Dynamics of suprapermafrost and intrapermafrost groundwater in permafrost region )
- GAGARIN Leonid ( Melnikov Permafrost Institute, SD, RAS, Researcher, Dynamics of suprapermafrost and intrapermafrost groundwater in permafrost region )
- TAKAKURA Hiroki ( Tohoku University, Professor, Related analysis of freezing water environmental use and an occupation in the rural society of the Lena middle region; Relational analysis of an occupation pattern and environmental change in East Siberia )

- OKUMURA Makoto ( Tohoku University, Professor, Survey and analysis of the history and technology of transportation in East Siberia )
- YOSHIDA Atsushi ( Chiba University, Professor, Analysis in Relationship between Subsistence System Patterns and Environmental Changes in West Siberia )
- NAKADA Atsushi ( Hokkaido Museum of Northern Peoples, Chief Curator, Analysis in Relationship between Subsistence System Patterns and Environmental Changes in Southern Siberia )
- IKEDA Tohru ( Hokkaido University, Professor, Animal resource use and environmental analysis in Eastern Siberia )
- TATSUZAWA Shiro ( Hokkaido University, Assistant Professor, Ecological study of wild/domestic reindeer in Eastern Siberia )
- ISHI Atsushi ( Tohoku University, Associated professor, Analysis of society and development in Sakha Republic from the international viewpoint )
- SASAKI Shiro ( National Museum of Ethnology, Professor, Analysis in Relationship between Subsistence System Patterns and Environmental Changes in Yakutia )
- EHARA Sayuri ( Sapporo Otani University, lecture, Environmental recognition of Sakha people in Eastern Siberia )
- IGNAT' EVE Vanda B. ( Humanitarian Research Institute, Sakha Republic Science Academy, Professor, Sociological survey and relational analysis of society and development in Sakha Republic. )
- SARDANA Boyakova ( Humanitarian Research Institute, Sakha Republic Science Academy, Professor, History of Infrastructure and Transportation System in East Siberia )
- FUJIWARA Junko ( Research Institute for Humanity and Nature, Researcher, Cultural anthropology focusing to shamanism )
- YAMADA Hitoshi ( Tohoku University, Associate professor, Mythology, folklore of Siberia )
- EBATA Fuyuki ( Niigata University, Associate professor, Linguistics of Sakha Republic )
- NAGAYAMA Yukari ( Hokkaido University, Assistant Professor, Environmental recognition of native people in Eastern Siberia )

### ○ Future Themes

Future research issues in this project are to co-design and to co-produce next new trans-disciplinary results with local residents as well as the governments.

### ● Achievements

#### ○ Papers

##### 【Original Articles】

- Ohta T, Kotani A, Iijima Y, Maximov TC, Ito S, Hanamura M, Kononov AV. Maximov AP 2014, 01 Effects of waterlogging on water and carbon dioxide fluxes and environmental variables in a Siberian larch forest, 1998 - 2011.. *Agricultural and Forest Meteorology* 188 :64-75. (reviewed).
- Kotani, A., Kononov, A., Ohta, T., and Maximov, T. 2013, 11 Temporal variations in the linkage between the net ecosystem exchange of water vapour and CO<sub>2</sub> over boreal forests in eastern Siberia.. *Ecohydrology* . DOI:10.1002/eco.1449. (reviewed).
- Hiyama, T., Asai, K., Kolesnikov, A.B., Gagarin, L.A. and Shepelev, V.V. 2013, 09 Estimation of residence time of permafrost groundwater in the middle of the Lena River basin, eastern Siberia. *Environmental Research Letters* 8 :035040. DOI:10.1088/1748-9326/8/3/035040. (reviewed).
- Hiyama, T., Ohta, T., Sugimoto, A., Yamazaki, T., Oshima, K., Yonenobu, H., Yamamoto, K., Kotani, A., Park, H., Kodama, Y., Hatta, S., Fedorov, A.N. and Maximov, T.C. 2013, 07 Changes in eco-hydrological systems under recent climate change in eastern Siberia. *IAHS Publication* 360 :155-160. (reviewed).
- Yamazaki, T., K. Kato, T. Ito, T. Nakai, K. Matsumoto, N. Miki, H. Park and T. Ohta, 2013, 06 A Common Stomatal Parameter Set to Simulate the Energy and Water Balance over Boreal and Temperate Forests.. *Journal of Meteorological Society of Japan* 91 :273-285. DOI:10.2151/jmsj.2013-303. (reviewed).
- Fedorov, A.N., Gavriliiev, P.P., Konstantinov, P.Y., Hiyama, T., Iijima, Y. and Iwahana, G. 2013, 04 Estimating the water balance of a thermokarst lake in the middle of the Lena River basin, eastern Siberia. *Ecohydrology* . DOI:10.1002/eco.1378. (reviewed).

- Nakai T., Y. Kim, R. C. Busey, R. Suzuki, S. Nagai, H. Kobayashi, H. Park, K. Sugiura, A. Ito, 2013 Characteristics of evapotranspiration from a permafrost black spruce forest in interior Alaska.. *Polar science* 7 :136-148. (reviewed).
- Park H., J. Walsh, A. N. Fedorov, A. B. Sherstiukov, Y. Iijima, and T. Ohata, 2013 The influence of climate and hydrological variables on opposite anomaly in active-layer thickness between Eurasian and North American watersheds. *Cryosphere* 7(2) :631-645. DOI:10.5194/tc-7-631-2013. (reviewed).
- Walsh J., H. Park, W. L. Chapman, and T. Ohata, 2013 Relationships between variations of the land-ocean-atmosphere system of northeastern Asia and northwestern North America.. *polar science* 7 : 188-203. DOI:10.1016/j.polar.2013.05.002.. (reviewed).

## ○Research Presentations

### 【Oral Presentation】

- Saito, A., Kotani, A., Ohta, T., Iijima, Y., Primary factors in interannual variation of latent heat fluxes from overstory and understory in Siberian larch forest. The 125th Japan Forestry Society, 2014, 03, 26-2014, 03, 30, 大宮.
- Maksyutov S.S., V. Sedykh, I. Kleptsova, A. Frolov, A. Silaev, E. Kuzmenko, S. Farber, N. Kuzmik, V.A. Sokolov, A. Fedorov, S. Nikolaeva Mapping forest succession types in Siberia with Landsat data. American Geophysical Union Fall Meeting, 2013, 12, 09-2013, 12, 13, San Francisco, U.S.A..
- Park H. and H. Yabuki, Warming-induced changes of the hydrologic system in the terrestrial Arctic.. AGU2013, 2013, 12, 11, San Francisco, USA.
- Saito, A., Kotani, A., Ohta, T., Maximov, T.C., Kononov, A.V., Changes in latent heat fluxes from overstory and understory vegetation with appearance of dead trees in eastern Siberian larch forest. Meteorological Society of Japan 2013 Autumn meeting, 2013, 11, 19-2013, 11, 21, Sendai city.
- Okumura Makoto Adaptation Strategies for Risk and Uncertainty: The Role of an Interdisciplinary Approach including Natural and Human Sciences. RIHN 8th International Symposium "Risk Societies, Edge Environments: Ecosystems and Livelihoods in the Balance", 2013, 10, 24-2013, 10, 24, Kyoto, Japan.
- Fujiwara, J. Flood risk and migration in the Republic of Sakha (Yakutia).. RIHN 8th International Symposium "Risk Societies, Edge Environments: ecosystems and Livelihoods in the Balance, 2013, 10, 23-2013, 10, 25, Kyoto, Japan.
- Tetsuya Hiyama, Toru Sakai, Shamil Maksyutov, Heonsook Kim, Takahiro Sasai, Yasushi Yamaguchi, Atsuko Sugimoto, Shunsuke Tei, Takeshi Ohta, Ayumi Kotani, Kazukiyo Yamamoto, Takeshi Yamazaki, Kazuhiro Oshima, Hotaek Park, Trofim C. Maximov, Alexander N. Fedorov Global warming and changes in Siberian terrestrial environments. 2nd International Conference on "Global Warming and the Human-Nature Dimension in Siberia: Social Adaptation to the Changes of the Terrestrial Ecosystem, with an Emphasis on Water Environments", 2013, 10, 08-2013, 10, 11, Lecture Hall, National Academy of Republic of Sakha (Yakutia), Yakutsk, Russia.
- Maksyutov, S. and Sedykh, V. Forest mapping using Landsat data in Lar' yegan basin. 2nd International Conference on "Global Warming and the Human-Nature Dimension in Siberia, 2013, 10, 08-2013, 10, 11, Yakutsk, Russia.
- Sakai, T. The impact of flood over the Lena river. 2nd International Conference on Global Warming and the Human-Nature Dimension in Siberia, 2013, 10, 08-2013, 10, 11, Yakutsk, Russia.
- Yamaguchi, Y., Chen, X., and Yamamoto, K. Comparison of vegetation changes in Siberia detected by SPOT-vgt and MODIS data. 2nd International Conference on Global Warming and Human-Nature Dimension in Siberia, 2013, 10, 08-2013, 10, 11, Yakutsk, Russia.
- Yoshida, R., M. Sawada, T. Yamazaki, T. Ohta and T. Hiyama, Estimation of regional water cycle changes by various land-cover-change scenarios in eastern Siberia. 2nd International Conference on Global Warming and the Human-Nature Dimension in Siberia, 2013, 10, 08-2013, 10, 11, Yakutsk, Russia.
- Nagayama, Y. Indigenous Weather Knowledge in Kamchatka.. 2nd International Conference on "Global Warming and the Human-Nature Dimension in Siberia, 2013, 10, 08-2013, 10, 11, Yakutsk, Russia.
- Yoshida A. Reindeer herding and Environmental Change in the Kobyai and Olenek districts. 2nd International Conference "Global Warming and the Human Nature Dimension in Siberia, 2013, 10, 08-2013, 10, 11, Yakutsk, Russia.

- Oishi Yuka Reindeer Herding of Northern Khanty and Forest Nenets in the Post- soviet Era.. 2nd International Conference on "Global Warming and the Human-Nature Dimension in Siberia, 2013, 10, 08-2013, 10, 11, Yakutsk, Russia.
- Yamazaki, T. Long-term simulation of soil condition and energy flux in eastern Siberian taiga forests. 2nd International Conference on Global Warming and the Human-Nature Dimension in Siberia, 2013, 10, 08-2013, 10, 11, Yakutsk, Russia.
- Ebata, Fuyuki The nature words in Sakha, compared with other Turkic languages.. 2nd International conference on Global Warming and the Human-Nature Dimension in Siberia, 2013, 10, 08-2013, 10, 11, Yakutsk, Russia.
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**Stage: Full Research**

**Project No.: C-08**

**Project Name: Megacities and the Global Environment**

**Abbreviated Title:**

**Project Leader: MURAMATSU, Shin**

**Research Axis: Circulation**

**URL: <http://www.wuuhp.iis.u-tokyo.ac.jp/chikyuken/eng/index.html>**

**Key Words: Megacity, developing country, built environment, natural environment, social environment, city sustainable index, scenarios**

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## ○ Research Subject and Objectives

### a) Research objectives and background

The objectives of this project are to develop measures that will promote improvement in the future potential of megacities in developing countries of tropical regions, which have grown to enormous proportions, and at the same time promote improvement in the local environment of residents of those cities while solving global environmental problems, and to make recommendations to society.

In 2008, for the first time in history, the world's urban population accounted for more than half of the world's total population, and this growth is continuing. Consequently, it is predicted that the impact of cities on the global environment will increase more and more. On the other hand, cities offer their residents a unique physical and mental richness and should be viewed as places for considering global environmental issues, conceiving solutions, and developing methods that will realize these.

While it is certain that discussion of urban and global environmental problems in recent years has steadily deepened, a number of fundamental problems regarding this discussion exist. Foreexample, 1) discussion of environmental problems from the outset generally fail to indicate the extent of the impact cities have on the global environment; and 2) the characters of the world's cities tend to be regarded in a uniform way without giving due consideration to their diversity in terms of regional differences and stage of economic development. 3) As a result, impact mitigation measures for the global environment tend to focus on uniform technical approaches worldwide, such as the development of low-carbon cities. 4) Moreover, there is a tendency to separate discussion on measures to address global environmental problems and their relationship with the benefits of residents in cities and other areas in terms of poverty, economics, amenities, and non-urbanization, for example.

At RIHN, prior to this research project there had been no previous projects on the study of cities themselves. Therefore, in April 2010 we launched this project targeting megacities with populations of 10 million or more and conspicuous population growth in recent years. As the actual place for conducting field work, we chose the metropolitan area of Jakarta because of the similarity of its ecosystems with those in certain parts of Japan, its solid economic growth, and as a place where it is easy to conduct joint research.

### b) Research methods and organization

- Research organization

To conduct research on problems described in the background of the project, we formed six research groups: 1) the Megacity History Group to research the diversity of cities in a global time-space context, 2) the Urban Economy Group, Urban Environment Group and Jakarta City History Group to research the economics, environment and history of the greater Jakarta area, 3) the Urban Policy Group to study ways of reflecting the research results in urban policies, and 4) the Supervisory Group to manage the overall project activities.

- Research methods and goals

1) Based on methods of urban history and social science, the Megacity History Group has been conducting research to (1) redefine what a city and what a megacity are, (2) work out ways of



evaluating these, (3) classify megacities, and (4) review the relationship of existing cities with the global environment.

2) Based on urban environmental studies, the Urban Environment Group undertook investigative research of (1) the natural environment (biodiversity, heat environment, flood risk) of greater Jakarta and (2) the built environment (construction materials, energy consumption, level of satisfaction with everyday life), while the Urban Economy Group (3) researched the history of development of the steel industry and its relationship with environmental policy from a social science perspective, and the Jakarta City History Group (4) adopted historical methods to research changes in the city of Jakarta over the past 400 years in terms of land use, population, flood countermeasure and other aspects as objectives of each group.

3) Based on methods of urban planning, the Urban Policy Group consolidated results from the above groups to (1) formulate a scenario up until the year 2050 of the city of greater Jakarta as a whole, and to (2) present a number of dwelling models.

4) The Supervisory Group was assigned the tasks of (1) coordinating and managing the research of the above five groups, and (2) nurturing new research seeds that will be needed in the future.

### ○ Progress and Results in 2013

Already four years have passed since FR1 of this project. Here we detail the results we have achieved to date through research in this project and areas where we have yet to achieve results based on the four questions we stated at the beginning (in RESEARCH OBJECTIVES AND BACKGROUND).

#### 0) Research Premises

To establish coherence throughout the project, we reviewed the (1) definition of a city as a premise for this research, and determined it to be an area having a population density of 2,000 or more per square kilometer. Because this definition of a city was based on a current population standard, however, we had to give further thought about the extent to which it could be historically

retrospective. As a unit for urban analyses, we also developed (2) residential environment types that classified urban built-up areas of 250m x 250m according to population density, building height, and planned/unplanned. This made it possible to analyze cities in greater detail than existing land use maps. Moreover, because the existing definition of a megacity as a city with a population of 10 million and over was not clear, we undertook the task of redefining what a (3) megacity signified. On the basis of this new definition, we found that in cities with populations of four million and over in comparison with cities with populations of less than four million, the diversity of residential environment types found in those cities varied. In addition to recognizing the 18 existing cities with populations of 10 million or more as megacities, we also found that 35 cities with populations of four million or more and not more than 10 million are similar in character to megacities.

#### 1) What kinds of impacts do cities have on the global environment?

We began our research with the value judgment that whatever was beneficial for both cities and the global environment was desirable. Therefore, to consider beneficial measures, instead of simply considering research that shed light on global limitations attributable to cities, we established (1) a CSI (city sustainable index) for assessing the efficiency of cities by analyzing the impact of cities on the environment and the social and economic benefits from cities based on a number of indicators relating to the environment (global environment and urban environment), the economy and society. This CSI consists of two types of indicators: restricting indicators that restrict environmental impacts caused by cities, and maximizing indicators for strongly inducing social and economic benefits. At present we have already conducted 18 megacity assessments using five restricting indicators and seven maximizing indicators. We believe this research to be the most essential research in considering cities in relation to the global environment.

#### 2) How varied are the world's cities in their stages of regional and economic development?

To answer this question, we undertook (1) a comparison of 18 megacities based on criteria such as topography, climate, city configuration, type of residential environment, and methods of communications, etc. As a result of this research, we found it was possible to classify the 18



megacities into about five types: 1) Monsoon Asia type (Tokyo, Shanghai, Jakarta, Dhaka, etc.); 2) Yellow Belt type (Beijing, Delhi, Cairo, etc.); 3) Euro-American type (New York, Los Angeles), 4) Tropical Africa type (Lagos); and 5) Latin American type (Mexico City, Sao Paulo, etc.)

3) How varied should measures for mitigating impacts on the global environment be for each region?

From our field work in greater Jakarta, we found that the monsoon Asia type of megacity is characterized by its establishment in a rice-producing region that incorporates farmland and farming villages as it expands outwards to mildly undulating areas, is located in areas with high temperatures, high humidity and heavy rainfall, and has a strong sense of community. In the monsoon Asia type megacity, four types of residential environments exist simultaneously: rural village area, urban village area, high-rise residential area, and planned residential area types). Unlike megacities in other areas, megacities at different stages of economic development exist in monsoon Asia type megacities. Therefore, we are beginning to believe that measures used in Tokyo may also be of assistance in greater Jakarta, and that research results in Jakarta may have applicability in cities such as Dhaka.

4) How can we simultaneously provide solutions for global environmental problems and benefits for residents of cities and other areas (including poverty, economies, and amenities)?

Using data resulting from research in greater Jakarta to date, we have been attempting to verify an urban configuration that will be compatible with the global environment for megacities of monsoon Asia, which are set to expand to areas including rice-producing areas in mildly undulating terrain. (1) In our preparation of Megacity Scenario 2050, we assessed the extent of the environmental impacts of the polycentric city, monocentric city, and city with urban sprawl respectively in efforts to contribute to the training of local administrators. Our research to date indicates that switching to a polycentric configuration with a historic core has relative advantages in terms of environmental and urban amenities. Furthermore, we are presenting (2) proposals for an eco-urban house for each of the four types of residential environments with a view to mitigating environmental impacts and improving comfort. In specific terms, we are currently formulating plans to i) actually build together with residents an urban village-type community center in a residential area of the poorest segment of the population. We are also planning ii) a new rural village residential model and iii) high-rise residential model that emphasize landscaping, as well as an open-space mid-rise complex residential model.

5) How can we return our research results to society?

Rather than confining the results of our research to the academic world, we perceive the scope of this project as extending to the development of methods for funneling the results back to the broader society itself. As noted earlier, local residents and local university students are involved in the (1) cooperative construction of an urban village-type community center, and we consider at present its role as a place of education. Moreover, in Jakarta at present we are also (2) conducting and analyzing urban environmental literacy education for elementary school students. In addition, after integrating collected data, we have also commenced the (3) development and installation of a megacity geographical information system (Megacity GIS) that can be accessed from anywhere.

## ○Project Members

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## ○ Future Themes

### Research Plan

#### FR5 (2014)

Since next fiscal year is the final year of the project, we will not only complete the objectives of the project, but also set new goals for the further development of the project in the future.

#### 1. Completion of the project goals

##### 1) Assessment of the burden of cities on the global environment and benefits from cities

(1) Completion of the CSI (city sustainability index): We will strive to make visible the efficiency of all 18 megacities so that they can be assessed according to approximately 20 indicators which people in general will be able to understand.

##### 2) Diversity of cities

(1) Comparison of the 18 megacities: We will undertake field studies of Cairo and megacities in South America that have not yet been studied in efforts to clarify more exhaustively the characters of megacity types.

(2) Comparison of urban efficiency according to scale of population: The majority of the world's 290,000 cities have populations of approximately 20,000. Using the CSI for smaller cities, we will assess urban efficiency by making comparisons of cities with varying population sizes. In doing so, we hope to be able to arrive at a relatively better understanding of the meaning of megacities.

##### 3) How varied should measures for mitigating impacts on global environment be for each region?

(1) We will clarify more exhaustively the commonalities and differences of megacities in monsoon Asia. We will continue to undertake field research in Tokyo and Osaka as we have until now, and we will clarify the characters of megacities in monsoon Asia such as Dhaka, Jakarta, Manila, Tokyo, and Osaka, as well as the logic linking these.

##### 4) Measures for both the mitigation of global environmental problems and benefits for urban residents

(1) Completion of a “Megacity Scenario 2050” : In autumn 2014 we will hold a joint workshop based on the Megacity Scenario 2050 in greater Jakarta with the participation of a local university and government, and we will establish the direction of future cooperative measures with local communities.

(2) Realization of an eco-urban house for each type of residential environment: In Jakarta we will continue activities to realize new residential models with emphasis on landscaping as well as open-space mid-rise complex housing models.

5) Returning research results

(1) University study program: We will create an eco-urban house design program for tertiary-level study.

(2) Completion of a megacity geographical information system (Megacity GIS): We will complete the Megacity GIS which will come packaged with data of greater Jakarta data, and commence use of it.

(3) Publication of “Global Environment and Megacities” works: We will summarize and organize the results of the project and publish them as books.

2. New objectives for further development of the project

1) Exploring partnerships with megacities in monsoon Asia: We will create a platform for application of research results obtained in Jakarta to other megacities in monsoon Asia such as Dhaka, Manila, Bangkok, and Kolkata.

2) Efforts to disseminate eco-urban houses: We will promote efforts to disseminate eco-urban residential designs by holding an exhibition on eco-urban housing in greater Jakarta and later take this exhibition to other cities.

● **Achievements**

○ **Books**

**【Authored/Co-authored】**

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○ **Editing**

**【Editing / Co-editing】**

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- YAMADA, K., FUKAMI, N., etc. (ed.) 2013, 04 The report for the Conference on the Cities of whole Earth and History. vol. 8.9.10. ,

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**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, Bayesian ANthro-Socioeconomic-Hydrological systems Evaluation Emulator (BANSHEE), Water Consilience**

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### **○ Research Subject and Objectives**

As a background of this project, the concept of Integrated Water Resources Management (IWRM) was proposed in the 1990s under worldwide growing environmental awareness and has been recognized as a fundamental principle for comprehensively performing water resources management, in which various sectors and many stakeholders are involved. However, challenges related to the implementation of IWRM in local communities and effective assessment of the influence of human activities on the water environment still remain. IWRM has focused on integrating sectors/organizations that govern various resources, such as surface water and groundwater; however, there appears to be a lack of systematic flexibility for the function of infrastructure on the demand side because a variety of requests on the users' side, and their historical and cultural backgrounds have not been considered. In addition, 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 in the field of local-to-regional water resources management. Furthermore, the target of IWRM is to move from "quantity" to "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 become a social implementation, and to develop the knowledge structure and faculty to implement this management by the concerned parties in these regions. In particular, C-09-Init considers a management structure that reflects the relationship among various water users. Based on such specific content and the necessary conditions for establishing the management structure, the aim of the project is to suggest desirable local water resources management guidelines through co-creation of "Wisdom of Land and Water Management" as a result of co-operation between science and society. The tools to implement the techniques for a more proactive discussion and specific goals will also be developed. Furthermore, C-09-Init will assess the influence of local water resources management on global water resources dynamics through a local water budget and virtual water trade. Based on such research results, information grounded in scientific evidence for a future study will be presented to various stakeholders from policymakers to water end-users in local level.

Based on the above background and goals, C-09-Init will present implementable solutions to the following problems of various stakeholders: **a. changes in water resources dynamics due to changes in local water usage; b. environmental problems of agricultural land (soil salinization and ecosystem changes); c. development of new water resources due to increase in water demand; and d. water resources management to maximize and guarantee ecological services in targeted environments.** In addition, water resources governance will be co-created through scientific and societal practices to achieve these goals. The following results will be returned to the local communities, and they will be instrumental in working toward a solution for the environmental problems: **a. efficacy evaluation for local water resources management; b. assessment of the relationship between local water resources management and water usage/environment; c. necessary conditions for local desirable water resources management; d. contents and**

rules of wisdom that support local desirable water resources management; e. assessment of the influence of local water resources management on global water resources dynamics.

### ○ Progress and Results in 2013

#### Overall progress

We established several study sites in Indonesia, Turkey, Egypt, and Japan to accomplish the goals of C-09-Init. Among these study sites, cases in Indonesia and Turkey provided a geographical and hydrological contrast between humid and semi-arid to arid regions, respectively, under the growing demand for water resources associated with rapid economic growth, while the Japanese case was considered a steady or decreasing demand for water resources. According to the comments provided by the Project Evaluation Committee (PEC) last year, we decided to focus on the cases in Indonesia and Turkey, with special emphasis on conducting co-creation studies with various stakeholders, because Indonesia and Turkey provide a simple hydrological contrast between humid and arid regions and their differences in history and culture provide for a comparative study in terms of water management structure. We held stakeholders meetings in both areas to re-identify problems and seek new ways of establishing proper water resources management and solving associated problems. Throughout these activities, we analyzed changes in stakeholders' behavior and decision-making processes to evaluate the methodology for a transdisciplinary study.

#### Individual results of survey and research

(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, which began in 2011, and clarified water use and balance in rice cultivation during the dry season. These studies showed that water users cultivated paddy during the dry season and respective geographical conditions while empirically utilizing the limited water resources. In Bali, we implemented a fact-finding survey on water governing structures whose basis is Subak and clarified that managing communities regarded as autonomous had altered into co-operative associations organized under public policies, and public-financing systems prompted such dynamics. In addition, we traced a change that functions of Subak seemed to contribute to suppressing soil erosions. We have structured systems in South Sulawesi to execute "co-creation by science and society" supported by various stakeholders, including farmers, local municipalities, and an NGO.

(2) Outcomes of Stakeholders meeting in Indonesia

Stakeholders meetings were held in Bali and South Sulawesi. Over 50 leaders of Subak in the Saba River watershed in the north of Bali Island and related government officials from various sections attended the meeting. Most participants stated 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 consists of farmers, it was difficult to solve these problems beyond the governance of Subak. Participants realized the necessity for communication beyond the Subak governance; hence, we are now preparing comprehensive meetings on watershed management involving other stakeholders outside Subak. In addition, we have started an investigation on land use changes in the area, focusing on farmers' behavior and decision-making processes as background of the problems.

The lack of proper communication among water managers (gate operators on irrigation canals), which are employed by both the government and water users associations, was clearly identified in the stakeholders meeting in Sulawesi, in which almost 100 leaders of farmers, water managers, and government supervisors participated. After this meeting, we supported the autonomous discussion among water managers. All meetings, including the small ones, were recorded to trace changes in awareness and behavior and to describe our actions to stakeholders.

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

After decentralization in the 1990s, Turkey has governance problems such as an information division and unclear attribution of responsibility. In particular, excessive use of water and fertilizers has caused increased soil salinity in the government-initiated irrigation project in the Harran Plain. To date, we have continued to observe water quality including salinity, hydrology, and land use changes. We found that increasing numbers of farmers are growing citrus in the Seyhan Basin, since its price goes up,



which requires more water, and that government subsidies are changing crop patterns in the Harran Plain. We have conducted a questionnaire survey about the willingness to pay and farmers' behavior 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. Thus, in March, 2014, we held stakeholders meetings in both Adana and Harran to promote mutual understanding and trust among various stakeholders and to stimulate them to proactively co-operate for better water management.

(4) Examination of water resources management by clarifying water users' recognition of allocation and understanding water quality characteristics(the Echi River):

We conducted hydrological observations in command areas of the Eigenji Dam and clarified local differences in water use in each community as a result of spatial analysis of irrigation systems(including GIS), measurement of water levels in paddy plots, and analysis of irrigation and drainage water quality (including groundwater). Moreover, by comparison of water use between FR2 (ordinary rainfall) and FR3 (less rainfall), a hearing survey showed that urgent responses to water shortage are different in each community and organization.

(5) Historical elucidation of local water resources management based on reconstructions of stream flow and evaluation of irrigation improvement projects (Egypt):

We developed a historical approach based on local irrigation management from ancient to modern basin irrigation. We developed a flood model and executed trial calculations to replicate stream flow, water depths, and periods of flood inundation in the Nile delta area. We clarified the impacts of development on irrigation improvement projects conducted over the last 40 years through material analysis, which treated such impacts as a multi-layered mechanism of institutionalization. We simultaneously prepared an observation system to estimate the relationship of this mechanism to actual water resources allocation and agricultural production in the region.

(6) Development of tools for sharing information among stakeholders

We conducted an uncertainty assessment and parameter sensitivity analysis on the global water resources prediction. We have also been developing a GIS system (tentatively called "Atlas of water resources" ), which includes land use change analyzed by satellite data, various statistics, and areas devastated by past flood and drought. Both the hydrological model and the GIS system are being utilized in workshops as tools to share information about water resources management among various stakeholders.

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**○ Future Themes****Overall plan**

In FR4, we will transfer the knowledge and methods related to land-water management, which are clearly specified by co-creating “Wisdom of Land and Water Management” into cross-sectional practice over science and society. We will propose and implement local water resources governance as a social outcome while proposing pro-humanistic global water resources assessment for implementing IWRM as an academic goal.

**Individual survey and research plans**

(1)Indonesia: We will attempt to integrate users’ actions and behaviors on land and water management and the governing mechanism that has been organized while promoting further analysis of the realities surrounding water resources through hydrology and land use observations in the target basins. We will further deepen our analysis of water users associations in South Sulawesi while centering on the analysis of Subaks in Bali. In addition, we will practice “co-creation of science and society” in

South Sulawesi, which has established well-organized systems, and develop the local water governance that we experimentally produced in FR2 in cooperation with stakeholders.

(2)Turkey: We aim at solution-oriented research activities through co-design and co-production with societal stakeholders. In particular, we will focus on how we can transfer knowledge from governmental agencies and scientists toward farmers in a more practical, effective way. In the academic sense, we aim to integrate the hydrology and land cover results from the targeted basins and the outcomes of socioeconomic analysis based on questionnaire surveys of stakeholders. In a social perspective, we will consider what role WUAs should play by reviewing legal materials related to land and water management.

(3)Japan (Echi River Basin): Based on the findings obtained up to FR3 and questionnaires that will be conducted, we will extract some communities and tertiary blocks that have problems related to water use as well as those that can manage water well as reference areas to clarify water utilization characteristics and the knowledge of land and water management. These surveys will enable us to identify the relationships between water management modes and the hydrological environment, as well as the factors for establishing proper water management.

(4) Integration: We focused on people's behaviors and decision-making process on land and water management to integrate the outcomes from each study site. We will analyze these people's actions and will try to model these processes. In addition, we will evaluate our methodologies for co-creating "Wisdom of Land and Water Management" as a result of co-operation between science and society. Based on the research results, data grounded in scientific evidence for the study of futurability will be presented to various stakeholders from policy makers to local end water users.

## ●Achievements

### ○Papers

#### 【Original Articles】

- Setiawan, B.I., Imansyah, A., Arif, C., et al. 2013,12 Effects of Groundwater Level on CH4 and N2O Emissions under SRI Paddy Management in Indonesia. *Journal of Taiwan Water Conservancy* 61(4) : 135-146. (reviewed).
- Nagano, T. and Kotera, A. 2013,10 Recent Trend of Drought Cociliation and Agricultural Water Use in Japan. *Proceeding of 1st World Irrigaton Forum and 64th IEC Meeting of ICID* .
- Cetin, M., Flugel, W.A., Ibrikci, H., Nagano, T., Tilkici, B., et al. 2013,10 Sustainability of Agricultural Water Management: A Case Study in Southern Turkey. *Proceedings of 1st Worlrs Irrigation Forum and 64th IEC Meeting of ICID* .
- Ibrikci, H., Cetin, M., et al. 2013,10 Integrated Water and Nitrogen Management in a Large Scale Irrigated Area in Southern Turkey. *Proceeding of 1st Irrigation Forum and 64th IEC Meeting of ICID* .
- Nagano, T., Cetin, M., Tilkici, B., et al. 2013,04 The Use of Isotope Techniques for Diagnosis of Agricultural Drainage: A Case Study in Akarsu Irrigation District, Turkey. *Proceeding of Aqua con Soil 2013* .

### ○Research Presentations

#### 【Oral Presentation】

- Setiawan, B.I., Imansyah, A., Arif, C., Watanabe, T., Mizoguchi, M. and Kato, H. Paddy Growth and GHG Emission in SRI Paddy Fields Subjected to Lowering Groundwater Level. *The 12th Conference of International Society of Paddy and Water Environment Engineering (PAWEES 2013): Agricultural Water and Rural Environment for the future, 2013,10,30-2013,11,01, Cheongju, South Korea.*
- Arif C, Mizoguchi, M., Setiawan, B.I. and Watanabe. T. Determining Optimal Soil Moisture for Irrigated Rice in Indonesia with System of Rice Intensification. *The 12th Conference of International Society of Paddy and Water Environment Engineering (PAWEES 2013): Agricultural Water and Rural Environment for the future, 2013,10,30-2013,11,01, Cheongju, South Korea.*

- Setiawan, B.I., Imansyah, A. and Watanabe, T. Characteristics of CH<sub>4</sub> and N<sub>2</sub>O Emission under Various Water Levels in Paddy Fields. The First World Irrigation Forum and 64th International Executive Council Meeting of ICID, 2013, 09, 30–2013, 10, 03, Mardin, Turkey.
- Ibrikci, H., Cetin, M., et al. Integrated Water and Nitrogen Management in a Large Scale Irrigated Area in Southern Turkey. The First World Irrigation Forum and 64th International Executive Council Meeting of ICID, 2013, 09, 30–2013, 10, 03, Mardin, Turkey.
- Nagano, T. and Kotera, A. Recent trend of drought conciliation and agricultural water use in Japan. The First World Irrigation Forum and 64th IEC Meeting of ICID, 2013, 09, 30–2013, 10, 03, Mardin, Turkey.
- Hashimoto, W.S., Nakamura, K. and Watanabe, T. Relationship between water quality characteristics and water use in the area agricultural water is repeatedly used. The annual convention of the Japanese Society of Irrigation, Drainage and Rural Engineering in 2013, 2013, 09, 04, Setagaya-ku, Tokyo (in Japanese).
- Nagano, T., Cetin, M., Tilkici, B., Kume, T., Watanabe, T., Berberoglu, S., Kapur, S. and Akca, E. The Use of Isotope Techniques for Diagnosis of Agricultural Drainage: A Case Study in Akarsu Irrigation District, Turkey. Aqua con Soil 2013–The 12th International UFZ-Deltares Conference on Groundwater-Soil-Systems and Water Resource Management, 2013, 04, 16–2013, 04, 19, Barcelona, Spain.
- Ibrikci, H., Cetin, M., et al. Fertilizers Impacts on Nitrogen Budget under Irrigation in Mediterranean Region of Turkey. The 13th International Symposium on Soil and Plant Analysis, 2013, April 2013, Queenstown, New Zealand.

#### **【Poster Presentation】**

- Nakagiri, T., Hashimoto, W.S., Kato, H., Sutoyo, Oue, H., Rampisela, D.A., Setiawan, B.I. and Mizutani, M. Basic diagnose of the present situation of surface water quality environment in Kampili Irrigation Area. Indonesia Sulawesi Stakeholders Meeting, 2014, 01, 08–2014, 01, 09, Makassar, Indonesia.
- Nakagiri, T., Hashimoto, W.S., Kato, H., Sutoyo, Oue, H., Rampisela, D.A., Setiawan, B.I. and Mizutani, M. Basic diagnose of the present situation of ground water quality environment around Renggang in Kampili area. Indonesia Sulawesi Stakeholders Meeting, 2014, 01, 08–2014, 01, 09, Makassar, Indonesia.
- Hashimoto, W.S., Nakamura, K., Hamasaki, H., Imagawa, C., Kato, H. and Watanabe, T. The Characteristics of Water Quality in Agricultural Area Reusing Drainage Water. The 1st World Irrigation Forum, 2013, 09, 30–2013, 10, 03, Mardin, Turkey.
- Cetin, M., Flügel, W.A., Ibrikci, H., Nagano, T., Tilkici, B., et al. Sustainability of Agricultural Water Management: A Case Study in Southern Turkey. The First World Irrigation Forum and 64th International Executive Council Meeting, 2013, 09, 30–2013, 10, 03, Mardin, Turkey.
- Saptomo, S.K., Setiawan, B.I., Budiasa, I.W., Sutoyo, Liyantono, Arif, C., et. al. Jaringan Pemantauan Iklim dan Lahan secara Online di DAS Saba. Indonesia Saba Watershed Stakeholders' Conference, 2013, 09, 08–2013, 09, 09, Bali, Indonesia.
- Sutoyo Pergeseran Musim Hujan di DAS Saba Tahun 1989–2012. Indonesia Saba Watershed Stakeholders' Conference, 2013, 09, 08–2013, 09, 09, Bali, Indonesia.
- Arif, C., Setiawan, B.I., Saptomo, S.K., Sutoyo, Liyantono, Budiasa, I.W., et al. Analisis Kebutuhan Air Tanaman di DAS Saba berdasarkan Data Monitoring. Indonesia Saba Watershed Stakeholders' Conference, 2013, 09, 08–2013, 09, 09, Bali, Indonesia.
- Liyantono, Setiawan, B.I., Saptomo, S.K., Rampisela, D.A., Irsyad, F., Gardjito, Nakagiri, T. and Watanabe, T. Perubahan Penggunaan Lahan dan Pergeseran Musim di DAS Janeberang. Indonesia Saba Watershed Stakeholders' Conference, 2013, 09, 08–2013, 09, 09, Bali, Indonesia.
- Sutoyo Perubahan Penggunaan Lahan di DAS Saba Tahun 2000–2008. Indonesia Saba Watershed Stakeholders' Conference, 2013, 09, 08–2013, 09, 09, Bali, Indonesia.

- Ogalelano, Y.G., Nakagiri, T., Oue, H., Rampisela, D.A., Laban S. and Kato H. Possibilities of Approach Integrating RS Multi-Data Analysis and GIS for Water Resources Management and Environmental Monitoring - The Case study of Bili-Bili Irrigation System, Indonesia. The 20th CERes International Symposium on Microsatellites for Remote Sensing (SOMIRES 2013) and The 231th RISH Symposium, 2013, 08, 08-2013, 08, 09, Chiba, Japan.

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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 Development, QoL**

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### ○ 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 as a base 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 improvement through details of information and changes of livelihoods, behaviours and mind 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 resources 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 restocking 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 local groups 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 Bay and 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 2013

### 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 (NO<sub>3</sub>, NH<sub>4</sub>), 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 were examined by satellite image analyses have been conducted at Batan in Philippines and Bandon in Thailand. Concentration of 52 microelements 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 mtDNA COI sequences analyses, and we identified the plural reproducible populations of *Atula mate*, *Megalaspis cordyla*, *Rastrelliger kanagurta*, *Gerres filamentosus* in Southeast Asian Sea. For the more detailed genetic population identification, microsatellite DNA markers which can be used for various fish species were established using Next generation DNA analysing machine. Besides, a 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 were carried 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.

### Achievement of 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) Cooperative Stock Enhancement in Batan Bay, Philippines

Community-based stock enhancement of shrimp is 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-tourism and Fisheries development 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-netfishery impacts on environment and social development, we will compile 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 compile 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-Capability" 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.

**Stage: Full Research****Project No.: R-05****Project Name: A Study of Human Subsistence Ecosystems in Arab Societies: To Combat Livelihood Degradation for the Post-oil Era****Abbreviated Title: Arab subsistence project****Project Leader: NAWATA Hiroshi****Research Axis: Resources****URL: <http://arab-subsistence.jzz.jp/>****Key Words: Arab societies, Alien invasive species control, Environmental impact assessment, Human life support mechanisms, Post-oil era, Universal access to scientific data****○ Research Subject and Objectives****【Research Objectives】**

This project examined life support mechanisms and self-sufficient modes of production among Arab peoples who have survived in dryland environments for more than a millennium. Using the research results, we proposed a scientific framework to strengthen subsistence productivity and combat livelihood degradation in local Arab communities in preparation for the post-oil era.

**【Background】**

Japan and the oil-rich countries of the Middle East have put excessive pressures on the earth's energy, water, and food resources. In prioritizing economic prosperity, these countries have exploited irreplaceable resources, such as fossil fuel and fossil water. Schemes to plant alien species have also placed stress on local ecosystems. This pattern of development has increased social and economic differences within the Middle East just as the region faces a turning point in modern oil-based industrial development. Fossil fuel-based interdependencies must now be transformed into new relations that can support viable future societies.

This project was focused on human subsistence ecosystems of the region: low energy-intensity life-support mechanisms and modes of production, such as hunting, gathering, fishing, herding, farming, and forestry. In doing so it also reflected on the role of advanced technologies in economic development, and measures adopted thus far to combat desertification. Field research investigated keystone species, ecotones, and traditional knowledge and examined the sustainability of subsistence economies under site-specific conditions.

**【Research Methods】**

Field surveys were conducted in semi-arid lands between the Nile River and the Red Sea in Sudan, with the Red Sea coast, Butana area, and Nile River areas as the main survey areas. Additional surveys were conducted at the Sinai Peninsula in Egypt, the Red Sea coast in Saudi Arabia, and a Saharan oasis in Algeria. We compared keystone species, ecotones, and traditional knowledge and examined differences in the sustainability of subsistence economies under site-specific conditions.

We developed and implemented our study of human subsistence ecosystems around three main areas:

- 1) comprehensive measures to control the alien invasive species mesquite
- 2) assessment of the environmental effects of development programs in coastal zones of the arid tropics to prevent the emergence of new environmental problems
- 3) sharing of research results to support local decision making.

Our research method combined two main approaches:

- (1) analysis of subsistence ecosystems, focusing on keystone species such as camels, date palm, dugong, mangrove, and coral reefs

(2) examination of the sustainability and fragility of Arab societies, focusing on the ecotones such as wadi beds, riverbanks, mountainsides, and seashores.

#### 【Project Organization】

The members of this project included social and natural scientists, members of local NGOs and project managers, who were divided into four study groups: 1) Alien invasive species control group, 2) Coastal zone environmental impact assessment group, 3) Support for local decision making group, and 4) Local ecosystems comparative studies group.

##### (1) Alien invasive species control group

In the 1980s, mesquite (*Prosopis* spp.) was considered an ideal tree for combating desertification due to its high capacity to stabilize sand dunes, survive inhospitable environments, and provide fuel, timber, fodder, and edible pods. However, although mesquite seedlings failed to establish on sand dunes, they became well established within oases, where they lowered water tables and suppressed native vegetation. The invasion of mesquite has not only changed regional ecosystems, but has also led to livelihood degradation in local communities.

The interdisciplinary research teams developed comprehensive measures to control this invasive species. These teams were comprised of specialists from various backgrounds including scientists based at universities and institutions; members of nongovernmental organizations (NGOs); consultants; project managers of international organizations and development institutions; and local people with various social roles, including tribal leaders, technicians, and villagers.

##### (2) Coastal zone environmental impact assessment group

Mangrove ecosystems in the coastal zones of the arid tropics can be important sources of energy for surrounding terrestrial ecosystems. These areas are rich in biodiversity, and great potential exists for seafood and pastoral food production by reforesting mangroves to sustain fish nurseries and provide safe foraging sites. One of the most interesting aspects of food habits along the coastal zone of the arid tropics is the local dependence on hunting, gathering, and fishing of sea products (fish, shellfish, dugong, dolphin, and sea turtles). Therefore, in terms of arid land food production, we considered the potential of sea product development as a principal element of future diets.

On the other hand, the conversion of sea water to fresh water in coastal zones presents a large development frontier. However, it may also lead to environmental degradation as highly concentrated saline water is released into the sea. Many coastal towns and cities have developed solar-powered desalination plants, which have made agriculture and forestation possible in remote areas. We examined this issue and compiled information to help guard against new environmental problems arising from development.

##### (3) Support for local decision making group

Researchers must widen the public domain for scientific findings and provide universal and equitable access to scientific data and documents. However, relatively few research results are accessible to local people in local languages, with the exception of some brochures and books published and distributed by international organizations.

This situation reduces the usefulness of research results in local decision making as well as in national policy development. Thus, to support local decision making, we planned to provide our research information through print and digital devices in Japanese (to create a bridge between Japanese and Arab societies), English (the common language of science communities), and Arabic (the common language of local communities in the study region).

##### (4) Local ecosystems comparative studies group

In human subsistence ecosystems (social ecosystems) in Arab societies, camels, date palm, dugong, mangrove, and coral (reefs) are assumed to be key stone species. These species support diverse communities, and their extinction could lead to the disappearance of other species, including even



human communities. The survival of these species likely depends greatly on wise uses of combinations of environmental factors in ecotones, a socio-ecological niche in dryland environments of the Middle East.

The study group on human subsistence ecosystems in Arab societies examined Arab communities and Islamic civilization from the viewpoint of energy flow.

## ○ Progress and Results in 2013

Major Achievements:

When this full research (FR) project started in 2008, oil consumption in Egypt had just started to exceed its production there. What this means is that Egypt has arrived at its oil peak, when oil demand exceeds production, and is now rushing into the “post-oil” era. The fact that the “Arab Spring” occurred right after its oil peak is not just a coincidence. The coastal zone has been the new frontier for human habitat in recent decades and has been damaged by the construction of ports, oil refineries, military bases, and tourism facilities. This project compiled practical instructions for recovering the natural environment through mangrove plantations in order to provide local people and administrators, along with other Arab and non-Arab societies worldwide, with the possibility of alternative choices.

In this regard, the separation of Sudan into Sudan and South Sudan in 2012 forced Sudan into the “post-oil” era, and there is an urgent need to build a new industry and stimulate economic recovery. Study of the management and utilization of the alien invasive species mesquite attracted the attention of federal and state governments as offering a source of local energy and feed/food to combat the livelihood degradation resulting from the invasion of mesquite.

The study outcome can be summarized as follows: 1) ten volumes of Arab Subsistence Ecosystems are started to be published in Japanese, as the main body of the research; 2) the research results were represented in the exhibition *Surviving in the Desert* at the National Museum of Nature and Science, Tokyo; 3) Japanese citizens gave feedback on the post-oil era; 4) the scientific data were made available universally by publishing the results in several languages in the Arab Subsistence Monograph series; and 5) the research results were implemented through development projects and protected area management in Arab societies.

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

In human subsistence ecosystems (social ecosystems) in Arab societies, camels, date palms, dugongs, mangroves, and coral (reefs) are believed to be keystone species. These species support diverse communities, and their extinction could lead to the disappearance of other species, including human communities. The survival of these species is likely to depend on the wise use of combination of environmental factors in ecotones, a socio-ecological niche in the arid Middle East environment (Nawata 2010).

The ten volumes of Arab Subsistence Ecosystems containing our results are on the following: 1) interrelationships between humanity and nature, 2) date palms, 3) mangroves, 4) the alien species mesquite, 5) camels, 6) coral reefs, 7) dugongs, 8) sorghum and millet, 9) motivated practitioners and local communities, and 10) is the modern human really a keystone species? Volumes 1 and 10 contain scientific syntheses.

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

The exhibit *Surviving in the Desert: Strategies of Humans, Plants, & Animals* ran at the National Museum of Nature and Science, Tokyo, from November 2013 to February 2014. Research results and materials collected in this project were on display, including a book called *Desert History* (Nawata & Shinoda eds. 2014), illustrating the relationship between humans and nature focusing on the strategies of humans, animals and plants use to share water. The book was in full color and 474 page long.

We organized twenty-seven gallery talks, symposia and lectures to communicate with Japanese citizens. More than one hundred thousand visitors have visited the exhibit. This helped a wide range of Japanese citizens to understand the project results.

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



A RIHN book series Human Resources and Engineering in the Post-Oil Era: A Search for Viable Future Societies in Japan and Oil-Rich Countries of the Middle East was edited by the Project Leader and Project Researcher, based on feedback from Japanese citizens on the post-oil era, after attending three RIHN Open Seminars for the public on “How will you live without oil?” presented between 2009 and 2011 (Ishiyama & Nawata eds. 2013).

The book had been displayed (stacked one on top of the other) for more than 6 months at one of the biggest bookshops in Tokyo. One book review said: “This book took the initiative in examining renewable human resources and engineering to get ready for the post-oil era” (June 5, 2013, Environment Newspaper).

#### 4) Publication of the Arab Subsistence Monograph series in multi-languages

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

In the pre-research (PR) year, we published A Study of Human Subsistence Ecosystems with Mangrove in Drylands: To Prevent a New Outbreak of Environmental Problems (Nawata ed. 2008). Our extensive communication network provided access to a variety of information, such as the proper scientific terminology in Arabic, and the optimum size of photos and figures for practical use in the field. Based on this input, we decided to revise the book under the new title Dryland Mangroves: Frontier Research and Conservation, in the Arab Subsistence Monograph series (Nawata ed. 2013).

#### 5) Research implementation through development projects and protected area management in Arab societies

The results of the study were applied as part of the Japan International Cooperation Agency (JICA) project “Capacity Development Project for the Provision of Services of Basic Human Needs in Kassala” (2011-2013) in cooperation with the Sudan University of Science and Technology (SUST). We organized a training course on mesquite management and utilization for outreach workers from the Technology Transfer and Extension Administration (TTEA), State Ministry of Agriculture, Forestry and Irrigation, Kassala State, in December 2011, June 2012, and November 2012. The contents were based on Japanese and Sudanese research. The results were immediately presented at an international conference and published in an academic book (Mendez-Vilas ed. 2012).

In collaboration with the Red Sea University, we proposed a management plan for the Dongonab Bay Marine Protected Area to the Ministry of the Environment, Sudan, because there are no field data. Our dataset has a high value with regard to the co-existence of a nature reserve and local subsistence in that it provides the identification of important dugong habitat, dugong travel patterns, and diving profiles.

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## ○ Future Themes

We continue to publish multilingual books as Arab Subsistence Monograph Series (Shoukadoh Book Sellers), and a series of books in Japanese “Human subsistence in Arab Societies” (Rinsen Book Co.) to conclude the study results and pass them on to the local society.

## ● Achievements

### ○ Books

#### 【Chapters/Sections】

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## ○Editing

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- Nawata, H. and K. Shinoda (ed.) 2014 *Desert History: Strategies of Humans, Animals, and Plants for Sharing Water.* Tokai University Press, Kanagawa, 474pp. (in Japanese)
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## ○Papers

### 【Original Articles】

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#### **【Review Articles】**

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#### **○Research Presentations**

##### **【Oral Presentation】**

- Badreldinn Khalafalla Adam, Kotaro Ichikawa, Abdelmoneim Karamalla Gaiballa, Moamer Eltayeb Ali "Current status and distribution of dugongs (Dugong dugon) in Sudan. RIHN 8th International Symposium "Risk Societies, Edge Environments: Ecosystems and Livelihoods in the Balance", 2013,10,23-2013,10,25, RIHN, Kyoto.
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**Stage: Full Research**

**Project No.: R-06**

**Project Name: Managing Environmental Risks to Food and Health Security in Asian Watersheds**

**Abbreviated Title: LakeHEAD (Food Risk Project)**

**Project Leader: KADA Ryohei**

**Research Axis: Resources Program**

**URL: <http://www.chikyu.ac.jp/rihn/project/R-06.html>**

**Key Words: Ecological risk, Food and health security, Watershed management, Payment for Ecosystem Services, GIS based Risk Mapping**

## ○ Research Subject and Objectives

Objective

The general objective of this research is to study how ecological risks affect the sustainable linkage between agricultural and aquatic foods and public health. The study will focus on the social and natural science perspectives in a Southeast Asian watershed. Ecosystem services have been deteriorating owing to deforestation, increased human settlement, agricultural activities, and industrial development, which have caused significant ecological risks such as floods, soil erosion, and water pollution in Southeast Asia. Furthermore, ecological risks critically affect agricultural and marine foods, which public health heavily depends on. Food risks result from inadequate food supply as well as poor-quality and contaminated food, which significantly contribute to public health risks.

The project has four principal objectives: 1) to document the current levels and pathways of heavy metals pollution in the aquatic resources of Laguna Lake; 2) to investigate the health condition of local residents and their perception of food risks; 3) to analyze the ecological effects of agrochemical inputs, and their cumulative impact on food production and relation to subsequent ecosystem deterioration; and 4) to describe land use changes in the Laguna Lake area and their impact on water and material cycles, including impacts on sedimentation, groundwater level, and its quality.

Research Organization

Five research teams are comprised mainly of researchers at RIHN, Yokohama National University and University of the Philippines; they work in collaboration with government agencies such as the Laguna Lake Development Authorities (LLDA) and local government units. The Environmental Risk Assessment Team identifies the exact sources of, and factors responsible for, particular pollutants in the food chain, utilizing stable isotope and other analytical techniques. The Socio-Economic Evaluation Team explores how market- and nonmarket-based instruments can be used to improve water quality, food security and public health. The Health Risk Evaluation Team describes human nutrition, history of disease, and life expectancy in the region, especially in relation to socio-economic dynamics. The Payment for Ecosystem Services (PES) Team investigates the design of ecosystem service payment programs. The GIS-based Risk Mapping Team supports the entire research project by creating a spatially-explicit database of key variables associated with risk in the food chain.

## ○ Progress and Results in 2013

The major research outcome in 2013, as the final year of Full Research, can be summarized as follows:

### Environmental Risk Assessment:

Analysis of multiple elements of water and sediment samples were performed in Laguna de Bay and its watershed. [The heavy metal concentration is generally high in river waters compared to lake waters. Human activities such as urban development and industry in the western region as well as an open garbage dumpsite, located upstream of the watershed, could be major sources of pollutants and may help identify the close linkage between environmental degradation and food-health security. AGIS-based risk mapping and flood resilience study have also been conducted in the Santa Rosa sub-watershed.

**Health Risk Evaluation:**

A series of cross-sectional studies were conducted to determine the relationship between specific exposures (socio-economic, nutrition, exposure to environmental pollutants; water, sanitation, and hygiene; and health systems) and certain health outcomes. Lead has been identified as a pollutant that causes negative impacts such as chronic poisoning and affects children's intelligence quotient as well as other abilities.

**Designing Payment for Ecosystem Services (PES):**

The primary objective of the PES group is to investigate the design of a cost-effective PES program to achieve sustainable watershed management in the Laguna de Bay region in the Philippines. Our results show that there is significant variation in farmers' opportunity cost of PES participation. This suggests that PES should have a flexible payment mechanism to ensure the cost-effectiveness of resource conservation programs.

**Conducting "Yaman ng Lawa (YNL)" Social Experiment:**

The "Yaman ng Lawa" (YNL, blessings of lake in Tagalog) Program has been conducted since April 2012. It is a trans-disciplinary watershed research project that involves participatory and community-based social action research incorporating local knowledge. The program has been challenged to combat lake degradation and to restore local fish habitat and population as well as the livelihood of fisher folks. This project has inspired the renewal of the practice of the traditional "Bayanihan Spirit" (Collective Volunteerism).

**Project Members**

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- YAOTA Kiyoyuki ( Research Institute for Humanity and Nature, Researcher, Spatial Econometrics, GIS, Remote Sensing )
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### ○ Future Themes

The following topics are among the most important issues to be further researched:

The ultimate goal of this project is to translate scientific evidence regarding environmental risks into specific policies or programs at different levels to reduce pollutants and human waste. One of the approaches explored by this project includes working closely with the local government units as critical political entities to formulate and implement policies to address human waste issues. In Santa Rosa City, the mayor is supportive of the project and has shown very strong commitment and political will to implement and adopt LakeHEAD-initiated activities and strategies to manage environmental risks to food and health security.

The health damage caused by exposure to heavy metals is chronic in nature. When health symptoms manifest, the disease is usually in the later stages and some irreversible health damage might have occurred already. Therefore, preventive measures for heavy metal exposure through environmental and food risks are very important aspects of this project. We have identified significant health risks due to heavy metals associated with long-term fish consumption, which has been validated by relatively low IQ scores of children with blood lead levels  $>10\mu\text{g}/\text{dL}$ . An initial measure to prevent damage was to engage the stakeholders in discussing environmental health issues through the community forum in 2012.

We consider that the implementation of this project in the Philippines is very timely because it started at a time when decision makers in local and national governments were fully aware of the importance of environmental health and the need to restore the damaged environment in the Laguna Lake region. The support of local government executives at the project sites is overwhelming, which motivates the project researchers and scientists. In addition, the present manager of the Laguna Lake Development Authority is supportive of the project; incidentally, he is the adviser to the Philippine president on environmental issues.

PES (payment for ecosystem services) has been widely recognized as a viable option to mitigate land-related non-point source pollution including water quality issues. Our research results strongly indicate that a well-designed PES can mitigate the problem at lower costs. PES analysis has been conducted through collaboration with other teams, including environmental and health risk teams. PES-based policy analysis is also expected to contribute to the reduction of various risks and to water quality improvement of Laguna de Bay.

**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 the understanding of social and ecological characteristics of some targeted areas of Semi-Arid Afro-Eurasia as a premise to study on desertification; 2) to design and verify some practical techniques/approaches effective for desertification control in the context of rural development assistance; 3) to propose and implement some techniques/approaches to desertification control and rural development, with paying special attention to for 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, semi-arid and arid areas of Afro-Eurasia. After the ratification of the United Nations Convention to Combat Desertification (UNCCD) in 1994, the international community, including Japan, signed its commitment to solve the problems. Twenty years have passed. So far, there have been many efforts made by international organization, local government and NGOs, however, the problems still remain unsolved and become more serious year by year. Why desertification have not been prevented and even became worse? It may be explained from its causes closely linking with poverty. As defined in UNCCD (1994), the causes of desertification are both climatic factors and human activities. If the latter are carefully focused, the causes are the daily activities to support people's livelihood and basic needs for survival, such as cropping, animal husbandry and gathering of fuel woods. Nobody can force them to stop the livelihood activities of local people for desertification control. Difficulty of desertification control may also be explained from the complexity. Climatic factors include short and uneven distribution of rainfall, excess rain and flooding, and wind. Livelihood activities are varied under different landscape, soils, vegetation, food customs, traditions of techniques, socio-economic condition and so on. Susceptibility of land resources and ecosystems under the pressure of human activities and the impact of climatic factors are also different for each place. Thus, desertification can be considered as a sum of these combinations.

### 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.

## ○ Progress and Results in 2013

Project research takes place in the Sahel of West Africa (Burkina Faso, Niger and Senegal), Northeast Africa (Sudan), Southern Africa (Namibia and Zambia), South Asia (India) and East Asia (Mongolia and, hopefully, China), as shown in Figure 3, where socio-ecological condition and land resources are degraded due to demographic pressure and uncertain socio-economic conditions happened under extreme weathers.



Major research activities are 1) Innovation of practical techniques for desertification control and improvement of household economy, 2) Extension of verified techniques, e.g. fallow-bans system, contourlines of *Andropogon* and extension method incorporated with social network survey, and 3) Studies on vulnerable people, as well as 4) local livelihood systems, e.g. agro-pastoral system, adaptation strategy to climatic and economic fluctuation, Islam in rural development context in West Africa. In Southern Africa, studies on 1) Monitoring of soil degradation and recovery processes, e.g. changes of nutrient status and organic matters under different farming practices and 2) Resilience of agro-pastoral system, e.g. behavior of grazed animals and its impact on land resources, conflict between cultivators and pastoralists, and socio-ecological adaptation are implemented. In South Asia and East Asia, 1) Resilience of agro-pastoral systems, e.g. coping behavior of local people in the years of crisis and 2) Inventory of indigenous farming techniques, knowledge and tools and 3) Re-appraisal of traditional dry-farming techniques are focused.

#### **Design of practical technique with local people**

Many techniques have been introduced to control desertification to date, but unfortunately most are not adopted by local people. New techniques, however scientifically sound and rational, may not match the needs and situation of local people if they are too expensive or require too much time or labor. Some techniques are highly dependent on materials and machinery from outside that may not be locally available. Together with volunteer villagers in Niger and Burkina Faso, we designed an alternative technique using local materials and indigenous knowledge to control soil erosion and increase household income. The technique is called "Contour lines of *Andropogon*". *Andropogon* (*Andropogon gayanus* Kunth) is a wild perennial grass found everywhere in the Sahel and utilized as a material to construct granaries and housing. The plant stalk and woven mats are sold in local markets, and the income is sometimes equivalent to the price of 1 to 2 months of grain for consumption. When used to control soil erosion, the plant is transplanted to a pit with manure, an indigenous technique known as "Zai". Manure application to the wild grass, a newly adopted practice, increases plant productivity and harvest of stalk. Planting along the contour line reduces soil erosion by intercepting surface runoff water. This technique is also helpful for vulnerable people, such as elders and widows, who have no land or compete with the others to collect wild *Andropogon*. This is a typical example of designing a practical technique, which satisfies desertification control and improvement of local livelihood, combined with indigenous knowledge, locally available materials and experiences of outsiders.

#### **Improvement of extension method incorporated with social-network survey**

The project successfully conducted the extension of the 'fallow-band system' in Niger under the collaboration with Global Environmental Forum (GEF, a NPO in Tokyo) and JICA in 2010 through 2013. Follow-up survey in one village, however, revealed that the technique was accepted and practiced by the limited households, not by the entire village. To identify the reasons, the project applied social-network survey to visualize the networks of information, confidence, opinion leaders, and vulnerable people. Through this research, one idea was spin off. It is a modification of conventional extension method, by incorporating a technique of social network survey as a component, to improve the efficiency with feasible cost and labors.

#### **Project Members**

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## ○ Future Themes

### 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 socio-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 socio-ecological adaptation being functioned under environmental and demographic changes
  - 1-d. Identification of common features and specificity in the socio-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

### 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, socio-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 literatures 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 (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)
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.

## ● Achievements

### ○ Books

#### 【 Authored/Co-authored 】

- Oyama, S. 2013 Land rehabilitation technology created in droughts and famine in Sahel zone of West Africa: Resource efficiency of urban trash in Hausa farming society. . Nature and Society Research Series, Geography on Livelihood., vol. 4. Kaisei-sha, Otsu City (in Japanese) T. Yokoyama ed. .

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- Ando, K., Shinjo, H., Noro, Y., Takenaka, S., Miura R., Sokotela, S.B., Funakawa, S 2014 Short term effects of fire intensity on soil organic matter and nutrient release after slash-and-burn in Eastern Province, Zambia. *Soil Science and Plant Nutrition* .(reviewed).in press.
- Ishimoto, Y., Miyazaki, H., Seto, S., Tanaka, U. 2013,12 Safety Net of Agro-pastoralists in the Sahel: Survival Devices Embedded in Food Consumption System. *Sand Dune Research* 60(2) :73-78. (in Japanese)
- NAKAMURA, Hiroshi 2013,11 Natural Disaster on 2009-2010 and Herders' Behavior in Dundgobi Pref., Mongolia. *Papers on environmental information science* 27 :237-242. (in Japanese) (reviewed).
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- Ishimoto, Y., Miyazaki, H., Seto, S., Umetsu, C., Tanaka, U. 2013,09 Resilience of Agro-pastoralists Livelihood System in the Sahel : A Case of Introduction of Migration in I-village, Northeastern Burkina Faso. *Journal of Arid Land Studies* 23(2) :73-77. (reviewed).
- Sakurai, Takeshi 2013,08 Africa' s Economic Growth and Its Food Production. *Josuiikai Newsletter* (993) :36-38. (in Japanese)
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- Oyama, S. 2013 "Frog in the boiled water":Water and life in the Sahel region of West Africa. . *Ethnology Quarterly (Kikan Minzokugaku)* 145 :52-59. (in Japanese)
- Hidetoshi MIYAZAKI, Yudai ISHIMOTO, Ueru TANAKA, Chieko UMETSU 2013,08 THE ROLE OF THE SWEET POTATO IN THE CROP DIVERSIFICATION OF SMALL-SCALE FARMERS IN SOUTHERN PROVINCE, ZAMBIA. *African Study Monographs* 34(2) :119-137. (reviewed).

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- Yuji TAKENOSHITA, Nobutaka KAMEI, Kae AMO, Takao SHIMIZU 2013,12 Forum for "Studies on African Childhood": School Education and Traditional Education in Francophone Africa. *Journal of African Studies* (83) :37-51. (in Japanese)

## OResearch Presentations

### 【Oral Presentation】

- NAKAMURA, Hiroshi Natural Disaster on 2009-2010 and Herders' Behavior in Dundgobi Pref., Mongolia. The 27th Academic Conference of Papers on Environmental Information Science, 2013,12,06, Nihon University (Chiyoda City). (in Japanese)
- NAKAMURA, Hiroshi Analysis of Developing Herder's Resilience to Natural Disaster in Mongolia. The 24th Conference of The Japan Society for International Development, 2013,11,30-2013,12,01, Osaka University (Suita City). (in Japanese)
- Takao SHIMIZU Quranic School as Traditional Education on Inland West Africa 2: Case Study on Fakara region. 12th Africa Educational Research Forum , 2013,10,25-October 2013, Waseda University, Tokyo. (in Japanese)
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- Hirohiko ISHIKAWA, Weiqiang MA Comparison of GSMaP Mvk Data With Surface Data at Semi-Arid Regions in Africa. The 10th Annual Meeting of Asia Oceania Geosciences Society, 2013,06,24–2013,06,28, AOGS, Brisbane, Australia.
- NAKAMURA, Hiroshi Herder's transition of Economic Class and Labor after Natural Disaster. The 14th Spring Conference of The Japan Society for International Development, 2013,06,08, Utsunomiya University (Utsunomiya City). (in Japanese)
- Yuji TAKENOSHITA, Nobutaka KAMEI, Kae AMO, Takao SHIMIZU, Nobuhide SAWAMURA Forum for "Studies on African Childhood": School Education and Traditional Education in Francophone Africa. 50th Japan Association for African Studies, 2013,05,25–2013,05,26, The Tokyo University, Tokyo. (in Japanese)
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- K.P. Singh, H. Miyazaki, H. Endo, J.S. Kharakwal, Ueru Tanaka SAVE THE INDIGENOUS AGRICULTURE TECHNIQUES (Special Reference to Rajasthan). National Seminar on Traditional Storage Technology and Agricultural System, 2013,10,27–2013,10,28, Udaipur, India..
- Hidetoshi MIYAZAKI, KP Singh, H. ENDO, U. TANAKA Soil Fertility Management for Smallholder Farmer in Semi Arid Tropics: In case of South Rajasthan.. National Seminar on Traditional Storage Technology and Agricultural System, 2013,10,27–2013,10,28, Udaipur, India.
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- Oyama, S. Conflict in Africa and "African potential" for achieving coexistence based on indigenous knowledge and institutions.. Geographical Union (IGU2013) Regional Conference Joint Session , 2013,08,05, Kyoto International Conference Center, Kyoto.

#### **【Poster Presentation】**

- Yuko SASAKI The Extension Method of Practical Technique to Control Wind Erosion at Rural Areas in Niger, West Africa.. GCOE-ARS Final Symposium 2013, 2013,12,01–2013,12,03, Uji Campus, Kyoto University.
- Yuko SASAKI, Ueru TANAKA, Kenta IKAZAKI, Hitoshi SHINJO, Satoshi TOBITA Lessons learnt from the extension of practical technique to control wind erosion with improvement of crop performance in Niger, West Africa.. Conference on Desertification and Land Degradation , 2013,06,17–2013,06,18, Ghent, Belgium.
- Hidetoshi MIYAZAKI, Y. ISHIMOTO, U. TANAKA, C. UMETSU Transformation of the ownership of indigenous trees as common resources - a case study in the semiarid tropics of Zambia -. IASC2013 (International Association for the Study of the Commons 2013), 2013,06,03–2013,06,07, Kitafuji, Japan.
- Ueru Tanaka, K. Ikazaki, Y. Sasaki, H. Shinjo, S. Tobita Practical technique and extension method for improvement of crop performance with wind erosion control.. UNCCD 2nd Scientific Conference, 2013,04,09–2013,04,12, Bonn, Germany.

**【Invited Lecture / Honorary Lecture / Panelist】**

- Sakurai, Takeshi and Ryo Inoue Demand for Mineral Resources in Sub-Saharan Africa and Poverty Reduction among Rural Households: The Case of Gold Rush in Burkina Faso. 2014 Annual Conference of the Agricultural Economics Society of Japan, 2014,03,29-2014,03,30, Kobe University, Kobe. (in Japanese)
- Shinjo, H. How do we deal with soils in semiarid tropics of Africa?. The 197th seminar of African area studies organized by The Center for African Area Studies, Kyoto University, 2013,07,18, Kyoto University, Kyoto.
- Ishimoto, Y. Safety Net of Agro-pastoralists in the Sahel. Symposium in the 59th Academic meeting for Japanese Society of Sand Dune Research, 2013,07,04-2013,07,05, Tokyo Institute of Technology (Tokyo). (in Japanese)
- Sakurai, Takeshi and Ryo Inoue Development of the Rural Economy of Burkina Faso in 30 Years: Have They Escaped from the Poverty?. IER Seminar, Institute of Economic Research, 2013,07,03, Hitotsubashi University, Kunitachi. (in Japanese)
- Sakurai, Takeshi Africa's Economic Growth and Its Food Production. Hitotsubashi University Open Course, 2013,05,16, Josuikaikan Hall, Chiyoda-ku, Tokyo. (in Japanese)

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**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: Makoto Taniguchi**

**Research Axis: Resources**

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

**Key Words:**

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### ○ 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 • Phillipine study group

## ○ Progress and Results in 2013

### Group 1

Frameworks of the science in society at local scale are established during 2013. Continuous processes of co-designing with various stakeholders including government, business sectors, citizen, have been made at Obama, Fukui, Japan. Co-design in California, British Columbia, Philippine, and Indonesia are under various stages depending on the issue. Identifications of stakeholders have been made at Obama, Beppu, and Otsuchi. For regional and global scales for science and society, various nexus on water-energy-food with different stakeholders are searched and to be made collaborative relationship with those groups.

### Group 2:

Preliminary studies were carried out, namely assessing the potential of unutilized energy and possible conflicts in implementing the energy in each study site, as described as follows in detail.

(1) Studies in primary sites domestic in Japan: Various physical measurements were performed in several sites in Obama City, Fukui Prefecture, to assess quantitatively the possibility of enhancing exploitation of geothermal and ground water heat. In Beppu City, Oita Prefecture, several sites were chosen to measure gravity and other physical parameters to prepare for assessing the potential of geothermal and hot spring power generation in the following fiscal year. In consort with Group 4, Kirishima City, Kagoshima Prefecture was selected as a secondary site of this study to compare the existing cases about geothermal and hot spring power generation with those in Beppu City.

(2) Collaborative studies with groups in overseas: Preliminary meetings about future study frameworks and plans were held with counterparts of this project in Indonesia and Philippines, in both of which have a large potential and advanced cases of geothermal power generation. In California, USA, in which water is often a bottleneck of water-energy-food nexus, Managed Aquifer Recharge (MAR) has been tried to be optimized to acquire agricultural and domestic non-commercial water. Through discussions with counterparts of this project in USA, Pajaro Valley was chosen as a primary site to study water-energy-food nexus in California in detail from the following fiscal year.

### Group 3:

In FY2013, field survey and interview were conducted at three main sites (Otsuchi, Iwate Pref., Obama, Fukui Pref. and Beppu, Oita Pref.) and a secondary site (Yuza, Yamagata Pref.). At Otsuchi, physical and biological surveys were conducted under collaboration with Atmospheric and Ocean Research Institute, Tokyo University. Submarine groundwater discharge and occurrence of crustaceans and fishes were observed at a southern coast of Otsuchi Bay. At Obama, physical and biological surveys including fish sampling were conducted under collaboration with Obama Fisheries High School. At Beppu and Yuza, physical and biological surveys including underwater observation of marine organisms (including crustaceans and fishes) were conducted under collaboration with Hiji Town Sea Farming Center, Oita Pref. and Yuza Town Office, Yamagata Pref., respectively. Preliminary field surveys and observations were conducted at several sites within Japan since it was the first year of the project.

### Group 4:

Firstly, we collected around twenty cases which some participatory methods were applied so far in water, food, energy policy as a preparation for comprehensive case analysis. Observing the database that we created with these cases arranging some indices of policy process and outcome, government support looked like one of the drivers for promoting participatory method.

Secondly, we conducted interview with the stakeholders of thirty eight organization (forty eight persons) regarding sustainable use of groundwater in Obama city. Based on the analysis of their

perception and attitudes to the issue, we proposed the followings; i) integrating joint fact-finding to the scientific study conducted by city office on the points such as amount of groundwater and suitability of groundwater for snow melting, ii) strengthening a connection with agricultural sector to groundwater issues, and iii) putting a priority on groundwater in community development.

Finally, to analyze individuals' attitude and behavior change on the issue of disputes between geothermal power and hot spring, we conducted interview with five experts of geothermal engineering and hot spring sciences. The results indicated that a variety of stakeholders should verify scientific evidence gained by trans-disciplinary approach (joint fact-finding). Then we carried out an experiment of group deliberation within electronic conference room on the Internet. We set up three groups consisting of inhabitants of hot springs, people in hot springs industry, hot spring lovers and environmentalists for each, and the subjects deliberated several points with provided expert knowledge. The results stressed that the most subjects got interest in being involved in the development process of geothermal power around the time of experiment and some subjects became aware of importance of adaptive management with scientific evidence.

#### Group 5:

The objective of group 5 is to create new tools such as integrated index, map and model which are featured human environmental security, and to build new scenario for future planning, aiming at maximizing human well-being towards a sustainable society since water-energy-food nexus is one of the most important and fundamental global environmental issues facing the world. The sub-topics are firstly, to identify water-energy-food nexus conflicts and tradeoffs and to clear which nexus has an impact on human environmental security with quantifying and visualizing human environmental security, secondly to develop new integrated index including components and indicators, and lastly to propose a policy option using integrated index, map and model. The research activities and findings for the first years are as follows:

(1) Integrated index for water-energy-food; Regarding framework construction, the workshop on risk was held to take interdisciplinary approach. The concepts, theories, methodologies and practices of risk are partially identified. As for indicator selections, profiling activities were conducted both in Indonesia and in the Philippines, and the existing data on local hazards have been collected.

(2) Integrated map; The necessary information on social, natural sciences for creating integrated map of the Obama Bay and Beppu Bay have been collected and the methodologies and practices for creating and using the integrated map have also been developed.

(3) Environment-economy assessment; The Environment-economy assessment through internet questionnaire survey on water-energy-food nexus in the Reinan district, Fukui prefecture was conducted and identified the economic values of ground and spring water, and fisheries production.

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- Naoki Masuhara ( Research Institute for Humanity and Nature , Group 4 )
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- Tomohiro Oh ( Research Institute for Humanity and Nature , Group 1 )
- Shun Teramoto ( Research Institute for Humanity and Nature )
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- Hajime Araki ( Hokkaido University )
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- Yuji Miyashita ( Kanagawa Hot Springs Res. Ins )  
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 Masakatsu Sasada ( Geo-Heat Promotion Association of Japan )  
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### ○ Future Themes

#### Group 1:

The frameworks of science in society at Otsuchi and Obama have been made by continuous co-design and co-monitoring processes. However, co-design for national, regional and global scale, individual national level framework are establishing, inter-national continuous meeting for regional scale with theme group as well as relationship with Future earth program will

#### Group 2:

Mini/micro hydropower, which is supposed to be a core energy target in this project, has not been well discussed nor studied in this fiscal year. In the following year, assessing the potential of mini/micro hydropower and the possible conflicts in implementation will be studied intensively, along with continuing the studies described above.

#### Group3:

At Otsuchi, submarine ground water discharge was observed at the southern coast of Otsuchi Bay. However, confirmation of an area with higher Rn concentration would be needed for future survey in which coupling between physical and biological research should be included. At Obama, confirmation of possible observation stations in the future surveys would be needed since higher Rn concentration was observed at a couple of sites within Obama Bay. At Beppu, appropriate spatial scale for future survey around the Beppu Bay should be identified since high Rn concentration was observed both in the northern and southern areas of the bay. At Yuza, it would be easier to confirm the sampling station compared to the other sites because high submarine groundwater discharge was observed directly by eyes at the coast. Intensive field survey is expected in FY2014. Therefore, it would be essential to plan the sampling schedules as soon as possible after talking with other members of the project. Preparation for field experiments and application for permit for animal sampling in the field should be processed prior to the survey season.

#### Group4:

Firstly, as for comprehensive case analysis, we plan to collect further cases and analyze relationships among indices on process and outcome statistically. One of the challenges is how much cases of nexus issues we can collect.

Secondly, we have a plan to present the results of Obama study at the spring meeting of the Japanese Association of Groundwater Hydrology and submit a peer-review paper to any journals. We are now implementing a questionnaire for the identified stakeholders in Obama to analyze social network among them. We will also present the results of this analysis at any conferences within this fiscal year. In addition to this, we plan to conduct another stakeholder analysis regarding disputes between geothermal power and hot spring in Beppu city. We are now coordinating with local governments to get a credible preliminary lists of stakeholders and potential issues. Also, we are preparing a stakeholder analysis regarding small hydroelectric generation in any sites.

Finally, we will continue the attitude and behavior change analysis on the experimental data collected in the last fiscal year, and plan to present it at the meeting of the Geothermal Research Society of Japan and submit a peer-review paper to any journals. We also continue to conduct interview with experts to formulate an issue mapping of geothermal power engineering, hot spring sciences and the other disciplines. These results will be inputted to the stakeholder analysis in Beppu city.

Group5:

1. Integrated index for water-energy-food: Regarding framework construction, index workshop will be held to identify the concepts, theories, methodologies and practice of index. As for indicator selections, profiling activities will be conducted in the USA and Canada to identify the hazard and existing data for creating index.
2. Integrated map: The integrated map in Beppu bay and Obama bay should be completed using a transdisciplinary approach.
3. Integrated model: The integrated model of the Kitagawa river watershed and Obama Bay should be completed.
4. Environment-economy assessment: The Environment-economy assessment through internet questionnaire survey on water-energy-food nexus in Beppu will be conducted to identify the economic values of hot spring water, geothermal energy and fisheries production.

## ● Achievements

### ○ Books

#### 【Chapters/Sections】

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### ○ Editing

#### 【Editing / Co-editing】

- Balsiger, Jörg and Aysun Uyar (ed.) 2013, 12 Proceedings on Comparing Regional Environmental Governance in East Asia and Europe (EE-REG). , 107pp. ISBN: 978-4-902325-89-8.

### ○ Papers

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- Burnett, K., and C.A. Wada 2014, 02 Optimal groundwater management when recharge is declining: a method for valuing the recharge benefits of watershed conservation. Environmental Economics and Policy Studies . DOI:10.1007/s10018-014-0077-y. (in Japanese) (reviewed).
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- KINOSHITA, H., KAMIMURA, Y., MIZUNO, K. and SHOJI, J. 2013,09 Nighttime predation on post-settlement Japanese black rockfish *Sebastes cheni* in a macroalgal bed: effect of body length on predation rate. *ICES Journal of Marine Science* . DOI:10.1093/icesjms/fst033 (査読付) . (reviewed).
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- Orencio, P. M., and M. Fujii 2013,07 A spatiotemporal approach for determining disaster-risk potential based on damage consequences of multiple hazard events. *Journal of Risk Research* . DOI: 10.1080/13669877.2013.816334. (reviewed).
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## ○Research Presentations

### 【Oral Presentation】

- Uyar, A. Environmental Regionalism” within Regional Economic Cooperation Frameworks of East Asia. 55th ISA-International Studies Association Convention, 2014,03,26-2014,03,29, Canada.
- Endo, A. Human-Environmental Security in the Asia-Pacific Ring of Fire: Water-Energy-Food NEXUS. . International Expert Workshop on Sustainable Development: Addressing nexus issues in urbanization era, 2014,03,11-2014,03,13, Jakarta, Indonesia..
- Baba, K. How do Joint Fact-Finding Approaches work in NEXUS Issues? Perspective and Application to Japanese Cases. *Nexus 2014*, 2014,03,05-2014,03,08, North Carolina, USA.
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- SOFYAN, Y., NISHIJIMA, J., FUJIMITSU, Y., YOSHIKAWA, S., KAGIYAMA, T., OHKURA. Monitoring Geothermal Activity at Aso Volcano, Japan, After Small Eruption in May 2011. 38th Workshop on Geothermal reservoir Engineering, February 2014, Stanford, California.
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- Uyar, A. International Migration Regimes and Human Security Implications in the Sending Countries. 8th International Convention for Asian Scholars, 2013,06,24-2013,06,27, Macao.

- Balsiger, Jörg and Aysun Uyar Comparative Analysis of European and East Asian Regional Environmental Governance. 54th ISA-International Studies Association Convention, 2013, 04, 03–2013, 04, 06, San Francisco.
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- Taniguchi, M Human-Environmental Security in the Ring of Fire: Water-Energy-Food Nexus. Nexus 2014, 2014, 03, 05–2014, 03, 08, North Carolina, USA.
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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/OIGOS initiative**

**URL: <http://en.ilekcrp.org/index.html>**

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

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## **○ 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 as commons by collaboration of various stakeholders with different values and interests 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 diverse 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 2013

#### Research plan:

This project effectively inherits research outcomes of cognitive sciences from previous RIHN projects and integrates them with various cases of solution-oriented design 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 2013, we aimed to elaborate these theoretical frames from meta-analysis of case studies and modeling to produce verifiable hypothesis for designing social experiments. 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 research in FR1 and 2, 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 from FR3, and to avoid analyzing cross-scale governance independently in a separate research group. Social experiments starting from FR3 in selected case study sites will be designed to incorporate cross-scale elements as much as possible. With the approaches integrating empirical studies, social experiments 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. Eleven candidate sites of social experiments 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 11 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 will design a series of social experiments in the case study sites, focusing on ILEK-based adaptive governance mechanisms to clarify drivers of adaptive societal changes. Case Study group will be re-organized into Social Experiment group at the start of social experiments in FR3. We also make a quest of mechanisms to facilitate scale-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. The group worked together with the Case Study group to elucidate dynamic translation and circulation of knowledge across different scale levels. 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, Biosphere 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. General understanding of adaptive governance mechanisms of commons is expected to be achieved with this integrative research design.

#### **Research outcomes of the year 2013:**

##### **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 in FR1 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 adaptive societal change), driven by knowledge producers, knowledge users and translators. In this ILEK Triangle, ILEK productions were hypothesized to lead to dynamic changes of social systems 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 four categories (below).

##### **1. create and visualize values**

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

##### **2. collaboration with diverse actors (local and cross-scale)**

Knowledge is produced and circulated to open new potential of collaboration among stakeholders in and outside the communities, including stakeholders at larger scale levels.

##### **3. provide options and opportunities**

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

##### **4. 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 November 2013 by improving the interview protocol. Interview Specialists Group (ISG) was established in and has accumulated interview records of 37 individuals from 32 case study sites (28 from Japan and 4 from the world outside Japan), including 26 translators, 3 knowledge producers, and 8 knowledge users. Preliminary analyses of 20 interviews in Japan revealed a strong emphasis on drivers classified into “collaboration among diverse actors”. 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. New values were recognized to be created and visualized through the collaborative interactions, and options and opportunities also expanded as a result of collaboration. Translators played significant roles in collaborative networking by bridging gaps in knowledge hierarchy and providing legitimacy for different stakeholders to collaborate. This hypothetical scenario should be verified by further accumulation and detailed analyses of discourses, both in interviews and naturally spoken records, and by theoretical modeling.

### c) Progress in text analysis and theoretical modeling

Methods of computer-assisted text analysis based on the ILEK database launched in FR2 have been developed to conduct quantitative and qualitative analyses of discourses of scientists, translators and stakeholders accumulated in the project research. Trial of simple principal component analysis of frequencies of nouns from time series of discourses of individual bilateral translators revealed its potential to extract major messages that a particular translator had delivered, 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 to participate together in field works at case study sites in FR1 and 2. 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 ( $\approx$ social network), and game theoretic models of exclusion mechanisms of free-riders in adaptive governance processes. A new project researcher specialized in mathematical modeling was assigned to ILEK project in February 2014, and we are expecting a leap in modeling study of adaptive governance mechanisms toward the rest of the project period.

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#### Case Study Group / Europe-North America Team

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**Theory and Modeling Group**

- AKIYAMA, Eizo ( Graduate School of Systems and Information Engineering, Tsukuba University, Professor, Statistical Physics )
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- KANZAKI, Nobutsugu ( Faculty of Education, Shiga University, Associate professor, Environmental Ethics, TF leader )
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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 social experiment will play a key role in accumulation of interview records in case study sites outside Japan as a base of designing coordinated social experiments spreading over the world. Text data of naturally spoken narratives and writings of important actors in case study and social experiment sites will also be accumulated to provide resources for discourse analysis.

In FR3, we will analyse these interview records and narrative data in detail 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 and ontology will be 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 Social Experiment group described below to improve design and hypothesis of the experiments in FR3 and 4. 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 Social experiments

FR3 and 4 will be a critical stage of the project to implement social experiments at selected case study sites to verify focused hypotheses on drivers and processes of ILEK-based adaptive governance. Initial designs of social experiments on the bases of ILEK Triangle model has been completed at 11 candidate sites in FR2, and other experiment sites will be added in FR3 to address remaining questions. Each experiment 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 Social Experiment Group with project members committed to each social experiment sites to improve the design and implementation of the experiments and to integrate results. In parallel with these intensive social experiments, all remaining case studies will be continued by relevant project members for FR3 and 4. They are requested to deliberately incorporate experimental procedures in their case studies,

including design of actions and hypothetical changes of local communities to be verified. 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 FR3.

#### **c) Stakeholder workshop at meta-analysis level**

Stakeholder workshops will be an important component of two-tier transdisciplinary approach in the project. We will complete appropriate design of workshops toward the first workshop scheduled in October 2014 (within Japan), followed by second international workshop in 2015. The WS will mainly invite scientists and stakeholders deeply embedded to each case study sites. The protocol will basically follow those utilized in World Wide Views on Biodiversity project. The output of the WS will be 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 developed in FR2, we will design 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 actions 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**

#### **○ Books**

##### **【Chapters/Sections】**

- Brondizio, E. S. 2014,03 Forest Resources, City Services: Globalization, Household Networks, and Urbanization in the Amazon estuary.. K. Morrison, S. Hetch, C. Padoch (ed.) *The Social Life of Forests*.. University Of Chicago Press , Chicago, IL. USA, pp.348-361.
- Sato T. 2014,03 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.
- Makino, M. 2013,12 Country case studies on policy, governance and institutional issues . *Marine protected areas* . FAO, Rome, pp.5-15.
- Thaman, R.R 2013,04 Islands on the frontline against the winds and waves of global change: Emerging environmental issues and actions to build resilience in Pacific small island developing states (PSIDS). In Tsai, H.-M. (ed,) (ed.) *Proceedings of the IGU Commission on Islands International Conference on Island Development: Local Economy, Culture, Innovation and Sustainability*. National Penghu University, Makong, Penghu Archipelago Taiwan, October 1 - 5, 2013.. , pp.3-H-1-1-10.
- Thaman, R.R 2013,04 Silent alien invasion of our islands and seas: A call for action against invasive alien species (IAS). In Tsai, H.-M. (ed,) (ed.) *Proceedings of the IGU Commission on Islands International Conference on Island Development: Local Economy, Culture, Innovation and Sustainability*. National Penghu University, Makong, Penghu Archipelago,Taiwan, October 1 - 5, 2013. , pp.2-D-3-1-6.

- Thaman, R.R. 2013,04 Ethno-biodiversity, taxonomy and bioinformatics for all ages: Engaging and educating the next generation of taxonomists as a foundation for sustainable living on Planet earth - Challenges and opportunities. In L.A. Brooks and S. Aricò (eds.) (ed.) Tracking key trends in biodiversity science and policy. , UNESCO, Paris, pp.23-25.
- Sakurai, R. 2013,04 Facilitation skills for guiding participatory decision making. Japanese Coordination Committee for Man and the Biosphere. (ed) (ed.) Sustainable Development of Regional Society with Focus on Biodiversity : ProSPER. Net Joint Project. Japanese Coordination Committee for Man and the Biosphere, Yokohama, pp.93-100.

## OPapers

### 【Original Articles】

- Sakurai, R., Jacobson, S. K., & Ueda, G. 2014,03 Public perceptions of significant wildlife in Hyogo, Japan. . *Human Dimensions of Wildlife* (19) :88-95. (reviewed).
- Reed, M.G., and Massie, M. 2014,01 Embracing ecological learning and social learning: Biosphere reserves as exemplars of changing conservation and practices. *Conservation and Society* . (reviewed).
- Sasaoka, M., Laumonier, Y., Sugimura, 2014,01 Influence of Indigenous Sago-based agriculture on Local Forest Landscapes in Maluku, East Indonesia. *Journal of Tropical Forest Science* 26(1) :75-83. (reviewed).
- Medeiros, H., Murrieta, RSS, Adams, C., Brondizio, ES. 2014,01 Local and scientific knowledge for assessing the use of fallows and mature forest by large mammals in SE Brazil: identifying singularities in folk ecology.. *Journal of Ethnobiology and Ethnomedicine* 10 :7. (reviewed).
- Okano, T., Matsuda, H. 2013,12 Biocultural diversity of Yakushima Island: Mountain, beach, and sea. *Journal of Marine and Island Cultures* (2) :69-77. (in Japanese) (reviewed).
- Hetrick, S., Roy Chowdhury, R., E. S. Brondizio, and E. F. Moran 2013,12 Spatiotemporal patterns and socioeconomic determinants of vegetative cover in Altamira City, Brazil.. *Land 2* :774-779. DOI: doi: 10.3390/land20x000x. (reviewed).
- Welch, J., E. S. Brondizio, C. Coimbra, S. Hetrick 2013,12 Neotropical Savanna Recovery amid Agribusiness Deforestation in Central Brazil. . *PLOS ONE* 8 :e81226. (reviewed).
- Sakurai, R., Jacobson, S. K., & Ueda, G 2013,12 Public perceptions of risk and government performance regarding bear management in Japan. *Ursus* (24) :70-82. (reviewed).
- Duraiappah AK, S. T. Asah, E. S. Brondizio, N. Kosoy, P. O' Farrel, A-H Prieur-Richard, K. Takeuchi. 2013,11 The New Commons: Matching the Mis-Matches.. *Current Opinion in Environmental Sustainability* 7 :94-100. DOI:http://dx.doi.org/10.1016/j.cosust.2013.11.031. (reviewed).
- Sakurai, R., Jacobson, S. K., & Carlton, J 2013,10 SMedia coverage of management of the black bear *Ursus thibetanus* in Japan. *Oryx* (47) :519-525. (reviewed).
- Brondizio, E. S. 2013,09 A microcosm of the Anthropocene: Socioecological complexity and social theory in the Amazon. . *Journal de la Reseaux Francaise d' Institut d'études avancées* 10 :10-13. (reviewed).
- Ballesteros, E. and E. S. Brondizio. 2013,08 Building negotiated agreement: The emergence of community based tourism in Floreana (Galapagos Islands).. *Human Organization* 72 :323-335. (reviewed).
- Aricò, S. 2013,04 We should not miss this opportunity. Response to The Future We Want.. *Environmental Development* 7 :171-173. DOI:http://dx.doi.org/10.1016/j.envdev.2013.04.008. (reviewed).
- Makino, M., Sakurai, Y. 2014,03 Towards the integrated research in fisheries science. *Fisheries Science* (74) :printing. (reviewed).
- Kamitsuru, S., Akamatsu, Y., Kamiya, D. and Takemura, S. 2014,03 Factor Analysis for Forestation in First-class Rivers of Chugoku District.. *Journal of Japan Society of Civil Engineers, Ser. B1 (Hydraulic Engineering)* 70(4) : I\_1393- I\_1398. (in Japanese) (reviewed).
- Keita Honjo, Akiko Satake. 2014,02 N-player mosquito net game: Individual and social rationality in the misuse of insecticide-treated nets. *Journal of Theoretical Biology* (342) :39-46. (reviewed).



- Inui, R.; Takemura, S.; Koyama, A.; Onikura, N. & Kamada, M. 2014,01 Potential distribution of *Tridentiger barbatus* (Günther 1861) and *Tridentiger nudicervicus* (Tomiyama 1934) in the Seto Inland Sea, western Japan. *Ichthyological Research* 61 :83-89. (reviewed).
- Hong S-K, Wehi P, Matsuda H 2013,12 Island biocultural diversity and traditional ecological knowledge. *Journal of Marine and Island Cultures* (2) :57-58.
- Matsuda H, Abrams PA 2013,11 Is feedback control effective for ecosystem-based fisheries management. *J Theor Biol* (339) :122-128.
- Oura, T. & Tokita, Kei 2013,09 GPGPU simulations of 2D lattice neutral models in ecology. *Journal of Physcs: Conference Series* (454) :1-7. (reviewed). *Conference Series*. 454:012038.
- Kitamura, K., Clapp, R. A. 2013,09 Common property protected areas: Community control in forest conservation. *Land Use Policy* 34 :204-212. DOI:<http://dx.doi.org/10.1016/j.landusepol.2013.03.008>. (reviewed).
- Tsujino, R., Matsui, K., Yamamoto, K., Koda, R., Yumoto, T., Takada, K-I 2013,09 Degradation of *Abies veitchii* wave-regeneration on Mt. Misen in Ohmine ountains: effects of sika deer population. *Journal of Plant Research* (126) :625-634. DOI:10.1007/s10265-013-0551-9. (reviewed).
- Fujimoto, K., & Sawai. S. 2013,06 A Design Principle of Group-level Decision Making in Cell Populations. *PLoS Computational Biology* 9(6). (reviewed). e1003110.
- Miura G, Munakata A, Schreck CB, Noakes DLG, Matsuda H 2013,06 Effect of short-term decrease in water temperature on body temperature and involvement of testosterone in steelhead and rainbow trout, *Oncorhynchus mykiss*. . *Comparative Biochemistry and Physiology Part A* (166) :112-118. (reviewed).
- Shibata Y, Matsuishi T, Murase H, Matsuoka K, Hakamada T, Kitakado T, Matsuda H 2013,05 Effects of stratification and misspecification of covariates on species distribution models for abundance estimation from virtual line transect survey data. *Fisheries Science* (79) :559-568. (reviewed).

## ○Research Presentations

### 【Oral Presentation】

- Takekawa, Daisuke How Evolution of Theory of Mind modifies perception of nature: Role of anthropomorphism on social learning. International Workshop on “Social Learning and Innovation in Contemporary Hunter-Gatherers: Evolutionary and Ethnographic Perspectives” , 2014, 03, 29-2014, 03, 30, kobe, Hyougo.
- Jokim Kitolelei, Satoru Nishimura, Takashi Torii Understanding Fisheries Rules in Fiji. A Comparison of Three Case Studies, 2014, 03, 14-2014, 03, 16, Kanazawa.
- Eizo Akiyama Emergence of Social Hierarchy in Evolving Population of Interacting Agents. 11th RISS International Conference -Understanding Complex Society from Agent-Based Simulation The Research Institute for Socionetwork Strategies, 2014, 02, 27, Osaka, Japan. .
- Akça, E Effect of Power Plants to Karapınar, Karaman Environment. Public Meeting, 2014, 02, 27, Karaman. (in Turkish)
- Kanzaki, N Research(er) Ethics for Conservation. Applied Philosophy Workshop, 2014, 02, 19, Singapore.
- Akça, E Karapınar Agriculture Trade Chamber of Karapınar. Public Meeting, 2014, 01, 08, Karapınar. (in Turkish)
- Gen Yamakoshi Contexte des ateliers du symposium. Symposium International “Conservation des Population Isolee de Primates, 2013, 11, 16, Conakry, Guinea.
- Sasaoka, M and Laumonier, Y Potential conservation value of less-intensively managed human modified forests in and around National park: Focusing on interrelationships between local people and wild animal species formed through traditional arboricultural practices. The 1st Asia National Park Congress, 2013, 11, 14, Sendai.
- Windra Priawandiputra, Tetsuya Kasagi and Koji Nakamura Comparison of flowering plant-bee linkages between two types of satoyama habitats in Kanazawa, Japan. 61st Annual Meeting of Entomological Society of America, 2013, 11, 10-2013, 11, 13, Austin, Texas, USA.



- Eizo Akiyama, Nobuyuki Hanaki, Ryuichiro Ishikawa Strategic uncertainty and individual bounded rationality in an experimental asset market. Annual meeting of Association of Southern European Economic Theorists, 2013, 11, 07–2013, 11, 09, Bilbao.
- Miyauchi, T., What makes social-ecological systems robust?: A case study of natural resources management in the Kitakami area of northern Japan. International Symposium on Environmental Sociology in East Asia 2013, 2013, 11, 02, Nanjing, China.
- Makino, M., Criddle, K Why do we need Human Dimensions for the FUTURE Program?. PICES 2013 Annual Meeting, 2013, 10, 11–2013, 10, 20, Nanaimo, British Columbia, Canada.
- Sakurai, R., Ueda, G., & Jacobson, S. K Evaluation of the effectiveness of the community bear education seminar at Tajima region, Hyogo Prefecture, Japan– Change of participants’ awareness and behaviors after the seminar-. . The Wildlife Society 20th Annual Conference, 2013, 10, 09, Wisconsin.
- Vaughan, D. “Old Coral, New Tricks for community based active restoration projects”. Florida Keys National Marine Sanctuary, Advisory Council. Coral Restoration Working Group Presentation, 2013, 09, 25, Key West, Florida, USA .
- Reed, M.G. Partnering with Canadian Biosphere Reserves. ENVS 802.3 University of Saskatchewan, 2013, 09, 24, Saskatchewan.
- Kakuma, S MPA as a Tool for Fisheries Management. The 9th ICRI East Asia WS, 2013, 09, 09–2013, 09, 12, Singapore.
- Miyauchi, T. Common property systems and resilience following disasters: case study of tsunami-hit villages in Kitakami area of Miyagi, Japan. ESA (European Sociological Association) 2013 Torino, 2013, 08, 28–2013, 08, 31, Torino, Italy.
- Yasushi Maruyama, Makoto Nichikido External Benefit of Renewable Energy Project: Sociopolitical Changes and Problems after Fukushima in Japan. European Sociology Association 11th Conference, 2013, 08, 28–2013, 08, 31, Torino, Italy.
- Reed, M.G. Can indigenous perspectives and knowledge be included in UNESCO biosphere reserves in Canada? . Canadian Association of Geographers. “Biocultural Conservation Session” , 2013, 08, 13, St. John’s, NL.
- Eizo Akiyama, Nobuyuki Hanaki, Ryuichiro Ishikawa Strategic uncertainty and individual bounded rationality in an experimental asset market. Asian Meeting of the Econometric Society, 2013, 08, 02–2013, 08, 04, Singapore.
- Kakuma, S Satoumi & Marine Protected Areas in Okinawa. Meeting with Vanuatu Government, August 2013, Port Vila Vanuatu.
- Eizo Akiyama, Nobuyuki Hanaki, Ryuichiro Ishikawa Strategic uncertainty and individual bounded rationality in an experimental asset market. Economic Science Association World Meeting 2013, 2013, 07, 11–2013, 07, 14, Zurich.
- Kume, T Rio+20, Future earth, and the ILEK project, RIHN - Co-design,. Ministry meeting (Ministry of environment and forestry, Government of Turkey), 2013, 06, 29, Ankara, Turkey.
- Eizo Akiyama, Nobuyuki Hanaki, Ryuichiro Ishikawa Strategic uncertainty and individual bounded rationality in an experimental asset market. Annual meeting of Society of Experimental Finance, 2013, 06, 27–2013, 06, 29, Tilburg.
- Potvin, D., Mason, A., Godmaire, H., and Reed, M.G Biosphere Reserves as learning sites towards sustainability: Community-research partnerships and the case of Clayoquot Sound. .Canadian Network for Environmental Education and Communication, 2013, 06, 26–2013, 06, 30, Victoria, BC.
- Eizo Akiyama, Nobuyuki Hanaki, Ryuichiro Ishikawa Strategic uncertainty and individual bounded rationality in an experimental asset market. Annual meeting of Association of French Experimental Economists 2013, 2013, 06, 20–2013, 06, 21, Lyon.
- Kume, T Climate change, biodiversity loss, and desertification. Drought,. Toprak ve Su, 2013, 06, 17, Karapinar, Konya, Turkey.
- Reed, M.G Community-engaged research at a national scale: Partnering with Canadian biosphere reserves. Community-Engaged Scholar Seminar Series at Station 20 West, 2013, 06, 17, Saskatoon, SK.

- Sasaoka, M and Laumonier, Y Conservation Value of Less-intensively Managed Human Modified Forests formed through arboricultural activities in Seram, east Indonesia: An Insight on Interrelationships between local people and a protected wild parrot. The 23rd Annual Meeting of the Japan Society of Tropical Ecology, 2013,06,16, Fukuoka.
- Reed, M.G., Godmaire, H., Abernethy, P., and Guertin, M.A Strengthening a community of practice for learning (and evaluation of best practices) in Canadian biosphere reserves. Environmental Studies Association of Canada., 2013,06,04, Victoria, BC.
- Makino, M. Comparison of stakeholders' roles: Case Studies of Marine Protected Areas in Japan. IASC2013, 2013,06,03-2013,06,07, Fujiyoshida, Yamanashi, Japan.
- Miyauchi, T. Common property systems and resilience following disasters: case study of tsunami-hit villages in Kitakami area of Miyagi, Japan. 14th Global Conference of the International Associations fro the Study of the Commons, 2013,06,03-2013,06,07, Kitafuji, Japan.
- Kakuma, S Coral Reef Conservation in Okinawa, Satoumi & Marine Protected Areas. Symposium: Coral Reef Conservation, June 2013, Onna-son, Okinawa.
- Smith, C.J. Conserving Riparian Habitat AND State Dollars with the Conservation Reserve Enhancement Program (CREP).. Salmon Recovery Conference, 2013,05,14-2013,05,15, Vancouver, WA. USA.
- Sato, T. Residential Research and Integrated Local Environmental Knowledge concepts for Adaptive Governance. 10th Annual Meeting of the ITdNet, 2013,04,10-2013,04,11, Munich, Germany.

#### **【Poster Presentation】**

- Arisu Tsuboi, Shizue Ohsawa, Tatsushi Igaki and Koichi Fujimoto Mechanical properties that regulate differential cell division rate during. Workshop on Mechanics and Growth of Tissues: From Development to Cancer, January 2014, Paris, France.
- Vogt, N. D., K. Fernandes; M. Pinedo-Vasquez; F. Rabelo; E.J.P. da Rocha; M. Rollnic; A.S. dos Santos; E. Brondizio; O. Almeida ; S. Rivero; P.J. Deadman; Y. Dou. Linking Ethnographic and Hydro-Climatic Analyses to Identify Flood Regime Changes, Their Drivers and Socio-Cultural Responses Across the Amazon Estuary.. Annual meeting of the American Geophysical Union, 2013,12,10-2013,12,14, San Francisco, USA..
- Sakurai, R., & Jacobson, S. K Assessing the Impact of a Wildlife Education Program in Japan. 42nd North American Association for Environmental Education Conference, 2013,10,11, Maryland.
- Kinjo, T. and A. Terabayashi Role of Commons in the Combination of Subsistence: Focus on the Use of Japanese Sago Palms (*Cycas revoluta* Thumb.) in Tokunoshima Island, Japan. The 14th Global Biennial Conference of the International Association for the Study of the Commons, 2013,06,03-2013,06,07, Fujiyoshida, Yamanashi, Japan.

#### **【Invited Lecture / Honorary Lecture / Panelist】**

- Aricò, S. the Biodiversity Science-Policy Interface: The Case of the CBD. University of Delaware, 2014,02,28, Newark, DE. USA.
- Brondizio, E. S. Institutions and conservation: fit, interplay and mismatches.. Workshop on Biodiversity and the new Sustainable Development Goals., 2013,12,17-2013,12,19, Washington D.C., USA.
- Sakai, A Country report: Activities of MAB Japan in the past two years. East Asian Biosphere Reserves Network 13th Meeting, 2013,10,21-2013,10,25, Ulaanbaatar, Mongolia.
- Reed, M.G., Godmaire, H., et. al. 16 biosphere reserves!, Canadian Commission for UNESCO 1 + 1 = 3: The Benefits of Partnership & Social Learning. EuroMAB , 2013,10,15-2013,10,19, Brockville, Ontario.
- Guertin, M.A. and Reed, M.G Implementing the periodic review in Canada: La mise en oeuvre des examens periodiques au Canada. Strengthening the Biosphere Reserve Network Management Framework. EuroMAB, 2013,10,15-2013,10,19, Brockville, Ontario.
- Sakurai, R. Perceptions and behavioral intentions of university students regarding citizen science activities in Japan. Challenges & Successes of citizen science in international collaboraion. 42nd North American Association for Environmental Education Conference, 2013,10,11, Maryland. .

- Koichi Fujimoto How Noisy Intercellular and Intracellular Signaling Dynamics Produce Group-Level Decision-Making --- a Lesson from Microbial Chemical Communication . 2013 International Symposium on Nonlinear Theory and its Applications (NOLTA2013), 2013, 09, 08–2013, 09, 11, Santa Fe, NM, USA.
- koji Nakamura Experiences and Lessons from the Japan Satoyama Satoumi Assessment (JSSA). Asia-Pacific Regional Workshop on Regional Interpretation of the IPBES Conceptual Framework and Knowledge, 2013, 09, 03, Seoul, Korea.
- Brondizio, E. S. A microcosm of the anthropocene: social theory and fieldwork in the Amazon.. Keynote series of the International Human Dimensions Programme (IHDP), United Nations University, 2013, 06, 21, Bonn, Germany.
- Brondizio, E. S. The land above, within, and below: the evolving complexity of land and common pool resources in the Amazon.. Annual Meeting of the European Society for Ecological Economics., 2013, 06, 19, Lille, France.
- Tokita, K. & Oura, T A neutral fitness model in ecology. Annual Meeting of Society of Mathematical Biology, 2013, 06, 10–2013, 06, 13, Tempe, Arizona, USA.
- Brondizio, E. S. Complexité institutionnel et ressource commune en Amazonie. Séance: La gestion des biens communs.. Academie d'agriculture de France, 2013, 06, 05, Paris, France. (in French)
- Brondizio, E. S. Managing forests of food. The International Conference on Forests for Food Security and Nutrition.. The International Conference on Forests for Food Security and Nutrition., 2013, 05, 13–2013, 05, 14, Rome, Italy.
- Sato, T. New types of scientists/knowledge producers supporting community actions to restore coastal environment. Public Forum on the Concept and Implementation of “Sato-Umi” : Integration of Science and Community in Restoration, Monitoring and Sustainable-use of Marine Resources, 2013, 05, 08, Sarasota, FL, USA.
- Brondizio, E. S. : Dimensions socioculturelles de la valorisation de la biodiversité et des services écosystémiques.. Séminaire International Propriété et Communs Les nouveaux enjeux de l' accès et de l' innovation partagés., 2013, 04, 25–2013, 04, 26, Paris, France. (in French)
- Tokita, K A neutral fitness model in ecology. 2013 NCTS April Workshop on Critical Phenomena and Complex Systems, 2013, 04, 15–2013, 04, 16, Taipei, Taiwan.

## Incubation Studies

### Understanding “Securitization of Nature”: History, Mechanism and Impact to Society and Nature UBUKATA Fumikazu (Graduate School of Environmental Science, Okayama University)

This study tries to explore historical origin, mechanism and the natural and social impacts of what I call “securitization of nature”, the most recent version of commodification of nature as we can see in the establishment of carbon markets. In the fiscal year 2013, our core members concentrated on the following three activities: literature review, interview to resource persons who played a role in making carbon markets, and holding small workshops and meetings. The results we obtained are as follows. First, we could deepen the concept of “securitization of nature” vis-à-vis general commodification of nature. Second, we noticed the importance of the bases that support “securitization”, and found the peculiar aspects which differ from that of general commodification of nature. And third, we could identify focal points of carbon markets in the study. Especially the way that the meaning of carbon is interpreted and valued seems to be of crucial importance. Based on these preliminary findings, we specified some hypotheses for the further study. In addition, Four potential research sites for further research, Laos (Luang Prabang), Cambodia (Oddar Meanchey), Indonesia (Central Kalimantan), and Japan, were also specified.

### Global warming countermeasures by fusion of traditional knowledge and modern science: on regional and global scales

TACHIIRI Kaoru (Research Institute for Global Change)

In this study, we are investigating the countermeasures to Global Warming by fusion of traditional knowledge and modern science on two different spatial scales, regional and global. As IS, we carried out information gathering, concept arrangement and research team organization through literature review and attending/organizing study meetings. In addition to reviewing existing related research results and future issues, by study meetings we strengthened our research team particularly in human science. We also carried out a preliminary field survey in Mongolia to overview Mongolians’ risk reduction strategies for meteorological disasters and its spatial heterogeneity. In addition, we discussed how to integrate human/social/natural sciences and how to model the traditional knowledge (TK), and concluded for former that we should emphasize the two-way communication between modelers and field workers, and for the latter that we can model a regional human-nature system by defining TK as the ways of land use and of livestock management, and that we start modeling, with trial and errors, the global system with a small agent-based model simulating coordination and reliance and then try to scale up the model.

### Breaking the vicious cycle of poverty and environmental degradation

— Income inequality and its environmental impacts between urban and rural areas in South East Asian countries —

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

Policy implications regarding “the vicious cycle of poverty and environmental degradation hypothesis” is that economic development represents the best environmental policy. However, this hypothesis is criticized for simplifying people’s behaviors for coping with poverty, and ignoring outer region’s effects, such as international trade for resource use.

The purpose of this study is to reexamine the relationship between poverty and environmental degradation. In short, this study’s analysis is conducted through the following three perspectives; (1)land use change in river basins,

(2)people's living strategy, (3)macro-economic factors based on the increment of resource pressure and the expansion of income gap.

The main findings are summarized as follows. The induced production and demand of resources, such as land by international trade has been increasing, however, it seems that there is a significant number to absorb rural labor surplus. On the other hand, it is very difficult for residents in rural areas to get job in the formal sector due to their low education level, therefore, their livelihood conditions are vulnerable. Previously described issues seem to affect the expansion of arable land in marginal areas, like in steep land.

### Study on Humanosphere Sustainable Development Through the Rehabilitation of Tropical Peat Wet Land Based on the Creation of People's Forest

MIZUNO Kosuke (Center for Southeast Asian Studies, Kyoto University)

In order to develop an appropriate method which can help regenerate degraded peat swamp forest, we collected native tree seedlings from a natural forest area, grew them in a nursery, and planted them in degraded peat lands with the aid of local people. We also carried out water management practices to raise the water level in drained peat areas and evaluated the effects of this re-wetting process in degraded peat and palm oil plantations. We made an intensive observation plot to clarify water and material cycling, distribution and activities of wood decomposers, as well as the biodiversity of insects, animals, and birds both above and underground ground. The results of our preliminary observations imply that there is much difference between the primary forest and the degraded forest in the water and material cycling and diversity of decomposers. During our Feasibility Study (FS), we will be able to suggest appropriate ways for rehabilitating peat swamp forests with the aid of local people, as a way to consider sustainable forest management and how it can affect local people's livelihoods. For FS, we also composed research units to study sustainable development that takes places across and between the geosphere, biosphere and humanosphere.

### Microorganisms, as Potent Indicators of Human Interactions on the Nature

— Human-borne transition of functional diversity of environmental microorganisms and its effect on human society —

USHIDA Kazunari (Kyoto Prefectural University)

In this study, we focus the interaction between human and the environment from the microbiological point of view. Based on the Next Generation Sequencing (NGS) meta-analyses, the difference in the functional diversity of the microbial community located on the primeval nature, in the surrounding environments of multiple and diverse livelihood, and in the environments where livelihood has been shifted to a system characterized by mass production and globalization will be determined. In this IS period, we have selected a study site and established a research organization. Finally, Nepal was selected as the possible site for the further study due to his geological and geographical properties; along with the valleys, distinct land uses are located from the end of glaciers (primeval nature area), until villages (crop production area) via pastoral area. And even at the same altitude, valley to valley difference in acceptance European agricultural production system is quite clear. Such situation would be adequate for us to conduct the study to reveal the symbiosis and co-evolution between human culture (or humanity) and environmental microorganisms.

### The Social-Ecology of Food Security

NILES, Daniel (RIHN)

The IS period allowed me to opportunity to track developments in the IPBES and GIAHS processes, and to deepen my understanding of the role of narratives in contemporary environmental studies. IPBES has advanced its conceptual framework, though clear methodologies for IPBES-relevant studies are not yet developed. I was able to visit several GIAHS sites, both in Japan and China, as well as to follow proceedings at international meetings and discussions with the Secretariat. I found that the GIAHS sites are highly varied, but share a common feature in that they all must address both conservation of agricultural heritage and related ecosystems in the immediate context of socio-economic development. In this sense, they are affirmed as highly relevant sites for research on the links between environment and human wellbeing. Lastly, the IS period allowed me to conduct several discussions and interviews on the role of narratives in societal discussion of contemporary environmental change. In particular I am interested in developing this discussion further, as I found that narratives are key vehicles able to synthesize (or usefully juxtapose) cultural meanings and phenomena and objective processes, such as economic development, landscape change, or ecological degradation.

### Integrative analysis on the linkage of modernization and environmental degradation in tropical agriculture FUNAKAWA Shinya (Kyoto University Graduate School of Global Environmental Studies)

The objectives of the present study were to investigate the ecological processes involved in the environmental deterioration that has derived from agricultural development in tropical regions of three continents since modern era and then to clarify how we could cope with such problems.

In the IS study in FY 2013, two main activities were carried out; that is, 1) constructing researchers' network in Latin America and 2) identifying effective approaches to understand the essence of agricultural development in different regions.

As a result, I successfully constructed the researchers' network after visiting main institutions such as Sao Paulo university, EMBRAPA and National Institute for Amazonian Studies during 3 weeks trip in Brazil (activity 1). On the other hand, methodology and approaches for investigating the linkage of agricultural development and environmental problems are comprehensively discussed in the IS seminars held in Kyoto for six times, including an international seminar, with different specialists (activity 2).

### Global bioelement management to avoid the food risks

KANEKO Nobuhiro (Graduate School of Environment and Information Sciences, Yokohama National University)

The aim of this study was to discuss conservation agriculture based on ecosystem nutrient cycling, and to propose sustainable bioelement management to sustain human population. Global application of chemical fertilizers and agrochemicals are decreasing especially in developed countries. However, amount of fertilizers is not based on the budgets of nutrients in croplands, thus it is far from sustainable. In contrasts, fertilization is not enough in some developing countries. Tillage always damages soil biodiversity and deteriorate soil functioning. We have started no-tillage experiments in some tropical countries. In a sugarcane plantation, about righty percent of growth in no-tillage management compared to conventional management after 3-years. It is common in natural system that nutrient cycling is tight and effectively used by plants, and few disturbance in soil. However, it not exists in croplands. We could confirm that ecological analysis of agrosystem is useful to establish sustainable agriculture.

## Environmental Problems in the Linkage between Local and Broad Areas

— Cooperative Research on the Basis of Actual Life and Philosophical Dialogue

KAJITANI Shinji (The University of Tokyo Center for Philosophy)

The aim of this project is to take advantage of “philosophical dialogue” in order to cultivate the initiative of those who are involved in the problems of living circumstances, and in order to connect it to concrete activities. Philosophical dialogue is characteristic in that it enables participants to be free from expert knowledge, to start from their own experience, to widen and deepen their own thinking by asking its reason and background, and to build a community where participants share the problems and tasks. In 2013 I held dialogical workshops on various topics on various occasions, and realized that philosophical dialogue could create a place where people of different ages, generations, occupations, types of education and social statuses can talk equally and freely. Through these events, I began to have collaborators for the project in the academic, industrial and governmental fields, and began to understand that each local community has its own needs and difficulties pertaining to communication and discussion. This has allowed me to consider environmental problems from different perspectives in the context of the city-country relationship, and rethink the content of the project.

## Understanding regional environmental resources and its application to agriculture and fishery in Minamisanriku town.

KIMURA Kazuhiko (Miyagi University School of Food, Agricultural and Environmental Sciences)

Regional environmental resources such as water in rivers and the sea, soil around arable land and forests are important for agriculture and fishery. To understand deeply these aspects by local residents will be a key to motivate people to know our environments and use our natural resources in a sustainable manner. We studied what we can do to promote understanding.

## Global environment and health: method development of Human Dimension Big Data for trend analysis on health

KANEKO Satoshi (Nagasaki University Institute of Tropical Medicine)

The environmental data from a satellite is used for simulation and data analysis to evaluate the global environmental changes. However, source of information on human health is limited due to the difficulties to collect data, especially in developing countries, which are vulnerable to global environmental change. In this study, we explored to couple the vein authentication system, one of the biometric data acquisition systems, to a health and demographic surveillance system (HDSS) for improvement of the identification accuracy and integration of different data sources of an individual. In addition, we discussed the research direction towards the feasibility and the main studies. Furthermore, we sought for the possibilities of data linkage the HDSS data to DIAS (Data Integration & Analysis System), and a way to contribute for the Universal Health Coverage in the Sustainable Development Goals.



## 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.

### Building resilience network in Southern Africa and organization of Lusaka Workshop

UMETSU Chieko (Graduate School of Fisheries Science and Environmental Studies, Nagasaki University)

Southern Africa is a region that has increasingly close relationships with Asia in both economic and political terms. This region also has been experiencing population transfer from Asia and changing dynamically. There is a concern that development by foreign direct investment is causing environmental problems through exploitation of natural resources. The importance of resilience of social-ecological systems in this region is suggested. In the past, Resilience Project organized the Lusaka Workshop three times (2007, 2009, 2011) and discussed pressing issues together with researchers, government officials, and the staffs from NGO and international organizations. The purpose of this CR project is to expand the participants of Lusaka Workshop to Southern Africa region and organize Southern Africa Resilience Network to discuss resilience of social-ecological systems to environmental change such as climate change, natural disasters. During the FY2013, we are planning to organize Lusaka Workshop 2013 in August and form resilience network among stakeholders.

### The wisdom of the aged: Learning from the high-altitude elderly

OKUMIYA Kiyohito (Center for Southeast Studies, Kyoto University)

We focused on aging problems and lifestyle-related diseases because we regard these as manifestations of global environmental issues in the human body. Project research also aimed to clarify the meaning of “highland civilization”, defined by human ecological, physiological, and cultural adaptations to high-altitude environments, and to describe how recent changes in lifestyle have affected quality of life (QOL) among the elderly. Based on these observations, we also proposed a model of human-nature interactions appropriate for highland civilizations.

Community-based healthcare design has progressed in Bhutan with the collaboration of the Ministry of Health and local health staff involved in the Kyoto University Bhutan friendship program.

The project has published extensively, including: “Aging, diseases and health in the Himalayas and Tibet from medical, ecological and cultural viewpoints: studies on Arunachal Pradesh, Ladakh, and Qinghai”; “Pastoral nomadism, pastoral transhumance, and sedentary pastoralism-from the fields of Mongolia, Tibet, the Himalayas and the Andes” (in Japanese); “Himalayan Study Monographs (No. 15)” (in Japanese); “Ladakh: Ecology, Disaster, and Health”; several chapters in a forthcoming volume on Ecohealth in the RIHN Book Series, and two additional books are currently in preparation.

### 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 Soviet Union and the independence of present central Asian countries, conflicts and lack of coordination on resources and environmental issues have been rising among countries in the region. The aim of this research is to develop the research network originally founded in the RIHN’s Ili Project, and to extend its



activities among various stakeholders in central Asia.

In order to extend our network, we conducted field trips to China and Kazakhstan to investigate the present status in the area. Additionally, we held a workshop on the future plan for social implementation of our outcomes at RIHN with two researchers of Kazakh National University. Also, we discussed with the Japanese Association of Arid Lands Studies and related researchers the plan for “2nd International Conference on Arid Lands Studies”, which will be held in Uzbekistan in September 2014.

#### Startup of consortium for in-situ conservation of wild rice

SATO Yo-Ichiro (Kyoto Sangyo University)

As an ancestor of rice (*Oryza sativa*), wild rice (*O. rufigogon*) is an important genetic resource for future breeding programs. However, natural populations of wild rice have been threatened by economic development in Southeastern countries, because the conservation of natural stands of wild rice is often contradictory policy to the expansion of major roads or the construction of buildings. RIHN research project H-02 (2006-2010) has been evaluating the level of genetic diversity (GD) of various crop species and their wild relatives, and has attempted to emphasize the importance of wild relatives and natural stands to society through joint research with local policy-makers and scientists. In FY2013, the project's contribution to the significance of conservation of genetic resources was summarized in a brief text book, and it was translated into Thai and Lao at the end of 2013. The localized text books were then distributed to elementary schools, junior high schools, and local stakeholders.

#### Operation of the Amur Okhotsk Consortium as a multilateral academic network

SHIRAIWA Takayuki (Institute of Low Temperature Science, Hokkaido University / Research Institute for Humanity and Nature)

The purpose was to operate the Amur-Okhotsk Consortium as a multilateral academic network to discuss the sustainable use and conservation of the Amur-Okhotsk ecosystem. We held the 3<sup>rd</sup> International Meeting of Amur-Okhotsk Consortium from October 7 to 8, 2013 in Vladivostok, Russia, and published the English report for the findings as the project of 2013. A policy proposal for sustainable use and environmental conservation of the Amur River and the Sea of Okhotsk will be also published by the end of March, 2014.

#### Co-hosting of the 7th National Health Research Forum of Lao P.D.R., and its related field activities

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

Co-hosting the 7th Laos National Health Research Forum (NHRF), and supporting the related activities after the forum. Outcome: The 7th Laos National Health Research Forum was successfully held in Vientiane on October 16 and 17. More than 150 participants, including 39 Japanese joined to the forum. There were 30 oral presentations and 29 poster presentations, some of which were related to the RIHN ecohealth project. The forum offered a very productive opportunity for collecting and exchanging information related to health research and promotion in Lao P.D.R. After the forum, many participants travelled to Xepon district of Savannakhet province, to attend the opening ceremony of the Xepon Village Health Volunteer Training Center. The center was built with the grass-root fund of the Japanese Embassy of Lao P.D.R. Capacity building of village health volunteers as well as health staff of the district and health centers will be made for improving the health status of the area especially through controlling endemic malaria and improving maternal and child health in this region.

### Classification and global distribution of ecosystem networks

YAMAMURA Norio (Culture and information science, Doshisha University)

When the biomass of vegetation is small and highly fluctuating as in the grasslands of Mongolia, enterprises buy products from livestock that local people accumulate as their assets. When the biomass is large and stable as in forests of Sarawak, Malaysia, enterprises directly develop the forests. The properties of natural resources thus influences effective strategies of enterprises. The historical right of local people to their livelihoods also is an important factor for the enterprise strategy. We examine by reference search whether or not characterization of social-ecological networks given in Mongolia and Sarawak is useful in general systems including fishery and agriculture. In the fiscal year of 2013, we examined several sites for grassland and forests, and those for coastal and pelagic fishery. In the fiscal year of 2014, we extend them to a world scale.

### Application of the environmental scenario which the revival of the stricken area

YOSHIOKA Takahito (Kyoto University)

MATSUSHIMA Kenta (Kyoto University)

The purpose of the original RIHN research project entitled “Interactions between the environmental quality of a watershed and the environmental consciousness,” was to verify the applicability of environmental scenarios to reconstruct areas in Tohoku that have suffered severely from the East Japan great earthquake disaster. This year, we surveyed important issues to make the local society safer and more secure, while effectively using local resources. Kamaishi City is considering the target goal of the reconstruction of the city be based on the “Smart Community Plan” proposal.

We also conducted a workshop for high school students in Kamaishi City. We estimated their recognition of the smart community, and surmised important issues for introducing the system of the smart community into the reconstruction program of the Kamaishi City. Scenario workshops were suggested as an effective means to introduce the new system and concepts such as the smart community. Local issue recognition and expected city goals were suggested to be very important for exchanging the people’s intentions and for the reconstruction of the local society.

## 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 crossproject, 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).

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 Humanities 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 8th International Symposium

In order to diffuse the findings of the three FR projects concluding in March 2013, the RIHN 8th International Symposium “Risk Societies, Edge Environments: Ecosystems and Livelihoods in the Balance” was held on 23-25 October 2013 at the RIHN Lecture Hall. The details of the symposium are as follows.

<Wednesday 23 October>

#### Opening Session

Chair: MALLEE, Hein (RIHN) & MCGREEVY, Steven R. (RIHN)

- Opening Remarks: YASUNARI Tetsuzo (Director-General, RIHN)
- Objectives of the Symposium: NILES, Daniel (RIHN) & ABE Ken-ichi (RIHN)
- Keynote Address 1: Responding to Risk: Perception and Decision Making  
GUTSCHER, Heinz (University of Zurich, Switzerland)
- Keynote Address 2: The Research Challenge from Global Risks  
JAEGER, Calro. C (Global Climate Forum, Germany)

#### Session 1: Human Subsistence in Relation to Invasive and Endangered Species

Chairs: MOHAMED, Moamer Eltayeb Ali (Red Sea University, Sudan) & PANDA Sudhindra Nath (Tottori University, Japan)

- Resource Use of Coastal Fisheries in Sudan  
SALEH, Adel Mohamed (Red Sea University, Sudan)
- Current Status and Distribution of Dugongs (*Dugong dugon*) in Sudan  
ADAM, Badar eldinn Kahalaf alla (Red Sea University, Sudan)
- Evaluating the Invasion Strategic of Mesquite (*Prosopis juliflora*) and Risk Management in Eastern Sudan Using Remotely Sensed Technique  
HOSHINO Buho (Rakuno Gakuen University, Japan)
- Root System Development of Prosopis Seedling under Different Soil Moisture Conditions  
YODA Kiyotsugu (Ishinomaki Senshu University, Japan)
- Mesquite (*Prosopis spp.*) Water Uptake under Different Simulated Drought Conditions  
YASUDA Hiroshi (Tottori University, Japan)

Comment: MOHAMEDAIN, Mahgoub Suliman (RIHN/ Sudan University of Science and Technology, Sudan)  
NAWATA Hiroshi (RIHN/ Akita University, Japan)

<Thursday 24 October>

#### Session 2: Global Warming Risk in the Far North

Chair: HIYAMA Tetsuya (RIHN)

- Political Economy of Extreme Events: Storms and Floods in Northern Finland  
TENNERG, Monica (University of Lapland, Finland)
- Flood Risk and Migration in the Republic of Sakha (Yakutia)  
FUJIWARA Junko (RIHN)
- Climate Change in the Eyes and Actions of the Northern Native Peoples of Sakha  
DMITRIEVA, Valentina I. (North-Eastern Federal University, Russia)
- Adaptation Strategies for Risk and Uncertainty: The Role of an Interdisciplinary Approach including Natural and Human Sciences  
OKUMURA Makoto (Tohoku University, Japan)

Comment: TAKAKURA Hiroki (Tohoku University, Japan)

- Discussion

### Session 3: Transdisciplinary Approach to Food/Health Risk in Southeast Asian Watersheds

Chairs: MASUDA Tadayoshi (RIHN)

- Food and Health Risk and Watershed Management in South Asia  
RAÑOL, Roberto Jr. (RIHN/University of the Philippines Los Baños, the Philippines) & KADA Ryohei (RIHN/Yokohama National University, Japan)
- Economic Development, Environmental Degradation, and Public Health: The Case of Langat River Basin, Malaysia  
POON, Wai-Ching (Monash University Sunway Campus, Malaysia)
- The Effects on Household Food Security and Health of Transient Displacement due to Flooding Events in Communities in the Silang-Santa Rosa Sub-Watershed Area: A Venue for Trans-Disciplinary Management  
JUBAN, Noel R. (University of the Philippines Manila, the Philippines)
- Yaman ng Lawa Social Action Agenda: The “Yankaw Fish Garden Sanctuary”  
CONCEPCION, Rogelio Navea (University of the Philippines Los Baños, the Philippines)
- Discussion

<Friday 25 October >

### Session 4: Synthesis and Summary Discussion

Chair: NILES, Daniel (RIHN) & MCGREEVY, Steven R. (RIHN)

- Synthesis of Session 1  
NAWATA Hiroshi (RIHN/Akita University, Japan)
- Synthesis of Session 2  
HIYAMA Tetsuya (RIHN)
- Synthesis of Session 3  
KADA Ryohei (RIHN/Yokohama National University, Japan)
- Comments: GUTSCHER, Heinz (University of Zurich, Switzerland)  
MORI Soichi (Ministry of Education, Culture, Sports, Science and Technology (MEXT), Japan)  
VAN DER LEEUW, Sander Ernst (RIHN/Arizona State University, USA)
- Closing Remarks  
SATO Tetsu (Deputy Director-General, RIHN)

## 2. RIHN Forum

“What are global environmental problems?” “What are integrated global environmental studies?” “What will be the outcomes of such studies?” “What is the future of global environmental problems?” “Will it be possible to solve such problems?”

The RIHN Forum is intended to help us to address such fundamental questions and to animate discussion of up-to-date environmental topics. The twelfth forum was held in fiscal 2013 as below.

### The 12th RIHN Forum

Date: 29 June, 2013

Theme: Our Global Environmental Research for Humanity

Venue: Kyoto International Conference Center

### 3. RIHN Public Seminars

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In order to present RIHN research activity in a manner that accessible to the general public, since November 2004, RIHN has offered public lectures. Four seminars were held in 2013 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.

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The 50 <sup>th</sup> Public Seminar	24 May, 2013 Transdisciplinary Science Supporting Sustainable Community Development : Goals of ILEK Project SATO Tetsu (RIHN)
The 51 <sup>st</sup> Public Seminar	21 June, 2013 The Daily Life in Rural Area — The Reality of Wild Beast Damages and Protection Mesures YAOTA Kiyoyuki (RIHN)
The 52 <sup>nd</sup> Public Seminar	10 September, 2013 <i>Minamata</i> Disease in Canada: Why again? Judy da Sylva (Grassy Narrows First Nations community, Canada) HANADA Masanori (Kumamoto Gakuen University)
The 53 <sup>rd</sup> Public Seminar	20 September, 2013 “Arab Spring” from Environmental Point of View TAKAKI Keiko (J. F. Oberlin University) NAWATA Hiroshi (RIHN)
The 54 <sup>th</sup> Public Seminar	18 October, 2013 Coastal Environment and Marine Resource ISHIKAWA Satoshi
The 55 <sup>th</sup> Public Seminar	11 December, 2013 Global Warming: Which Way to Go EMORI Seita (National Institute for Environmental Studies)
The 56 <sup>th</sup> Public Seminar	21 February, 2014 “A Conversation with a Hunter – The Mountains and Animal Life in Kyoto” SENMATSU Shinya (Hunter)
The 57 <sup>th</sup> Public Seminar	23 February, 2014 “A Conversation with Wanjira Maathai about Peace and Environment” MATHAI, Wanjira (The Wangari Maathai Institute for Peace & Environmental Studies)

### 4. RIHN Kids Seminar

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In order to enhance community relations, RIHN has held public lectures for children in neighboring elementary schools since 2010. The fiscal year 2013 seminar was held as below.

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The 4<sup>th</sup> Kids Seminar “The Secret of the Soils of the Rice Fields”

Date: 2 August, 2013

Venue: RIHN

HASHIMOTO Satoko (RIHN)

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## 5. RIHN Open House

In order to introduce RIHN's research projects and facilities to the surrounding community, RIHN has opened our buildings to the public once a year since 2011. Several interesting events such as joint experiments, public talks, exhibitions, and games were conducted in order to deepen our interaction with local citizens in fiscal 2013.

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Date: 2 August, 2013

Venue: RIHN

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## 6. RIHN Area Seminars

The RIHN Area Seminars offer an opportunity for RIHN research staff to gather with regional intellectuals and local citizens to consider problems related to the environment and culture of each area of Japan. The first seminar was held in 2005. The fiscal year 2013 seminar was held as below.

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### The 13th RIHN Area Seminar

“Future of the Earth and Regional Knowledge – Towards a Solution for the Environmental Problem”

Date: 11 February, 2014

Venue: Tottori University of Environmental Studies (Tottori City, Tottori)

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## 7. RIHN Tokyo Seminar

In order to gain the attention of researchers and the general public and to promote research cooperation and development, RIHN periodically holds seminars in Tokyo. We invite renowned Japanese researchers as well as public officials to discuss RIHN research project objectives and findings. The seminar was held in fiscal 2013 as below.

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### 5<sup>th</sup> Tokyo Seminar

“Are cities Earth-Friendly? – The Past, Present, and Future of Earth Environment and Megacities”

Date: 24 January, 2014

Venue: Yurakucho Asahi Hall

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## 8. 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 forum was held in fiscal 2013 as below.

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### The Earth Forum Kyoto

“Thinking about the Future of the Forest (green) and the Earth (blue) – Towards Global Commons”

Special Session: 22 February, 2014

International Symposium: 23 February, 2014

Venue: Kyoto International Conference Center



## 9. The Earth Hall of Fame KYOTO

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

The 2013 recipients of the Earth Hall of Fame Kyoto Award :

Dr. MIYAWAKI Akira (Director of Japanese Center for International Studies in Ecology)

## 10. RIHN Seminars

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

- |                      |   |
|----------------------|---|
| The 88 <sup>th</sup> | 5 July, 2013<br>Breakthroughs in Eco Health and Trans Disciplinary Research through Participatory Public Policies in Laguna Lake Watersheds in the Philippines<br>GLVEZ TAN, Jamie (Visiting Research Fellow, RIHN / Professor, University of the Philippines College of Medicine / President of Health Futures Foundation, Inc.) |
| The 89 <sup>th</sup> | 25 July, 2013<br>Water Productivity and Emission Factor as the Essential Indicators to Improve Water Management in Paddy Field<br>SETIAWAN, Budi Indra (Visiting Research Fellow, RIHN / Professor, Department of Civil and Environmental Engineering, Bogor Agricultural University)   |
| The 90 <sup>th</sup> | 26 July, 2013<br>Reflection on Cultural & Morphological Sustainability<br>WIDODO, Johannes (Visiting Research Fellow, RIHN / Associate Professor, Department of Architecture School of Design and Environment, National University of Singapore)  |
| The 91 <sup>st</sup> | 27 August, 2013<br>Urban Lakes in Megacity Jakarta: Threats and Management Strategy for Future Sustainability<br>HENNY, Cynthia (Visiting Research Fellow, RIHN / Senior Researcher, Research Center for Limnology Indonesian Institute of Sciences (LIPI))   |
| The 92 <sup>nd</sup> | 25 September, 2013<br>Molecular Identification and genetic diversity of date palm ( <i>Phoenix dactylifera</i> / L.) cultivars at InBelbel and Matriouen In Algerian Sahara<br>BENKHALIFA, Abderrahmane (Visiting Research Fellow, RIHN / Assistant Professor, Ecole Normale Supérieure, Kouba)                                   |
| The 93 <sup>rd</sup> | 3 October, 2013<br>Water Ethics: A Values Approach to Solving the Water Crisis<br>GROENFELDT, David (Visiting Research Fellow, RIHN / Director, Water-Culture Institute)  |
| The 94 <sup>th</sup> | 30 October, 2013<br>Adaptive Co-Management of Community Wastes for Selected Communities in Silang-Sta. Rosa Subwatershed<br>RANOLA, Roberto Jr. Dela Fuente (Visiting Research Fellow, RIHN / Professor, Department of Agricultural Economics, College of Economics and Management, University of the Philippines Los Banos)      |



- The 95<sup>th</sup> 11 November, 2013  
Towards a Cultural Understanding of Water Management  
GROENFELDT, David John (Visiting Research Fellow, RIHN / Director, Water–Culture Institute)
- The 96<sup>th</sup> 12 November, 2013  
Understanding Mesquite Risk Dilemma and Sophism in Sudan  
MOHAMEDAIN SULIMAN, Mahgoub (Visiting Research Fellows, RIHN, Assistant Prof. at College of Forestry and Range Science, Sudan University of Science and Technology (SUST), Khartoum-Sudan)
- The 97<sup>th</sup> 21 November, 2013  
Toward Solution Oriented Water Management Research in Sulawesi, Indonesia  
RAMPISELA, Dorotea Agnes (Visiting Research Fellow, RIHN / Senior Lecturer at Faculty of Agriculture Hasanuddin University Makassar, Indonesia)
- The 98<sup>th</sup> 3 December, 2013  
Environmental Humanities and a Transdisciplinary Response to Global Environmental Change. The experience of the Rachel Carson Center for Environment and Society.  
EMMETT, Robert (Director of Academic Programs, Rachel Carson Center for Environment and Society, Germany)
- The 99<sup>th</sup> 19 December, 2013  
Occurrence and levels of major ions in Laguna Lake: Impacts on drinking water production  
ESPINO, Maria Pythias Baradero (Visiting Research Fellow, RIHN / Associate Professor, Institute of Chemistry, University of the Philippines)
- The 100<sup>th</sup> 19 December 2013  
On the background and foreground of Future Earth Initiative  
MORI Soichi (Visiting Professor, RIHN / Senior Fellow, National Institute of Science and Technology Policy)
- The 101<sup>st</sup> 20 March 2014  
The relationship between gas emissions, energy and development in the context of China  
WANG, Yuan (Visiting Researcher, RIHN / Associate Professor, School of the Environment, Nanjing University, China)

### 11. Lunch Seminars (Danwakai)

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

- No.211 2 April, 2013  
Market Driven Natural Resource Management - the Case of Forest Certification in Malaysia  
NAITO Daisuke (Specially Appointed Assistant Professor)
- No.212 30 April, 2013  
Reintroducing Storks: from the perspective of transdisciplinarity and residential research  
KIKUCHI Naoki (Associate Professor)
- No.213 7 May, 2013  
Sustainability and Transition: Envisioning and enacting change from the bottom-up  
MCGREEVY, Steven Robert (Specially Appointed Assistant Professor)
- No.214 18 June, 2013  
City Spatial Data Infrastructures for Historical GIS  
MIMURA Yutaka (Project Researcher)

- No.215 16 July, 2013  
Coral communities of Sekisei Lagoon- the past, present, and rehabilitation  
YAP, Minlee (Project Researcher)
- No.216 30 July, 2013  
Alternative Forms of International Environmental Governance  
– The Use of Rights In Environmental Protection  
WEST, Thomas (Visiting Researcher)
- No.217 6 August, 2013  
Focusing on various stakeholders around local resources: The case studies on coastal areas in Japan and West Africa  
NAKAGAWA Chigusa (Project Researcher)
- No.218 20 August, 2013  
Water use and material cycle in Agriculture in Japan  
HASHIMOTO Satoko (Project Researcher)
- No.219 3 September, 2013  
Towards a Data Hub with Linked Open Data  
MINAMI Yoshitaka (Specially Appointed Assistant Professor)
- No.220 17 September, 2013  
Analytical Science for “Food Safety”  
TADA Yohei (Technical Assistant)
- No.221 15 October, 2013  
Assessment of Coastal Environments in Fisheries Area: Batan Bay, Aklan, Philippines  
NILLOS, Mae Grace (Visiting Research fellow)
- No.222 19 November, 2013  
Livelihood and social networks in rural areas of southwest Niger  
SASAKI Yuko (Project Researcher)
- No.223 3 December, 2013  
The Two Types of Commons, Generalized and Specific, in Coastal Fisheries in Yaeyama, Southwestern Japan  
AKIMICHI, Tomoya (Emeritus Professor)
- No.224 17 December, 2013  
How to use RIHN Archives  
YASUTOMI Natsuko (Assistant Professor)
- No.225 7 January, 2014  
Study on groundwater recharge and flow system using multi-tracer method in semi-arid region, Northwest China  
ABE Yutaka (Technical Assistant)
- No.226 14 January, 2014  
Definition of cities: Analysis of relations between population size and characteristics of cities  
UCHIYAMA Yuta (Project Researcher)
- No.227 21 January, 2014  
Ecohealth and Pandemic Threat: Coexisting with Avian Influenza Viruses  
MALLEE, Hein (Specially Appointed Professor)
- No.228 18 February, 2014  
The developing path of subsistence based rice production in the rain-fed paddy village, Northeast Thailand

No.229 WATANABE Kazuo (Project Researcher)  
18 March 2014  
Ocean and coastal policy issues in Japan  
ENDO Aiko (Associate Professor)

## 12. RIHN Annual Open Meeting

Each December, 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 over 335 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: 4-6 December, 2013

Venue: Co-op inn Kyoto

## 13. 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. Three press conferences were held in fiscal 2013.

## 14. Publications

### 14-1. RIHN Series

The RIHN Series was developed to publish books introducing RIHN's research results to the general public. The following title was published in fiscal year 2013.

Syoku to Nou no Survival Senryaku (Survival Strategies for Food and Agriculture)

Edited by KADA Ryohei, Showado, March 2014 (in Japanese).

### 14-2. RIHN Science Series

"Mongolia, The Collapse and Regeneration of Grassland Ecosystem Network"

Edited by FUJITA Noboru, KATO Satoshi, KUSANO Eiichi, Kyoto University Press, October 2013

"Indus, Investigating the Worlds found in Southern Asia Strata"

Edited by OSADA Toshiki, Kyoto University Press, October 2013

### 14-3. Others

"Earth Environmental Studies Manual 1 – A Suggestion for Joint Research" Edited by RIHN, Asakura Publishing, January 2014

"Earth Environmental Studies Manual 2 – Measure, Examine, Understand" Edited by RIHN, Asakura Publishing, January 2014

### 14-4. RIHN News: Humanity & Nature Newsletter

This periodical communicates RIHN identity and latest news to specific research communities. The newsletter is published in an A4 format with easy-to read content. Issues 42-47 were published in fiscal 2013.

## Individual Achievements

A	ABE Ken-ichi	Professor
	AKIMICHI Tomoya	Emeritus Professor
	ARIMA Makoto	Visiting Professor
B	BENKHALIFA, Abderrahmane	Visiting Research Fellow
C	CHEN, Xin	Visiting Researcher
E	ENDO Aiko	Associate Professor
	ENDO Hitoshi	Project Researcher
	ESPINO, Maria Pythias Baradero	Visiting Research Fellow
F	FUJIWARA Junko	Senior Project Researcher
	FUKUMOTO Sou	Visiting Researcher
	FUKUSHI Yuki	Research Fellow, NIHU Center for Area Studies
	FUKUSHIMA Atsuko	Project Research Associate
G	GALVEZ TAN, Jaime	Visiting Research Fellow
	GROENFELDT, David John	Visiting Research Fellow
H	HABU Junko	Visiting Professor
	HAFIZ KOURA, Hafiz Mohamed Fathy	Project Research Associate
	HAMASAKI Hironori	Project Researcher
	HANDOH Itsuki C.	Specially Appointed Associate Professor
	HASHIMOTO Watanabe Satoko	Project Researcher
	HAYASHI Kengo	Project Researcher
	HENNY, Cynthia	Visiting Research Fellow
	HIMIYAMA Yukio	Visiting Professor
	HIYAMA Tetsuya	Associate Professor
I	ICHIKAWA Kotaro	Project Researcher
	IMAGAWA Chie	Project Researcher
	ISHIHARA Hiroe	Project Researcher
	ISHIKAWA Mamoru	Visiting Associate Professor
	ISHIKAWA Satoshi	Associate Professor
	ISHIMOTO Yudai	Project Researcher
	ISHIYAMA Shun	Project Researcher
J	JIANG, Hong-wei	Visiting Researcher
K	KADA Ryohei	Professor
	KANIE Norichika	Visiting Associate Professor
	KATO Hisaaki	Project Research Associate
	KATO Tsuyoshi	Visiting Professor
	KIHIRA Tomoe	Project Research Associate
	KIKUCHI Naoki	Associate Professor
	KISHITA Yusuke	Visiting Associate Professor
	KITAGAWA Hideki	Visiting Professor
	KOYAMA Masami	Project Research Associate
	KUBOTA Jumpei	Professor
	KUMAZAWA Terukazu	Assistant Professor
	KURATA Takashi	Specially Appointed Associate Professor
	KUSAKA Soichiro	Visiting Researcher
L	LIN Hebin	Visiting Researcher
M	MACHI Yoshihiko	Visiting Researcher
	MALLEE, Hein	Specially Appointed Professor
	MASUDA Tadayoshi	Senior Project Researcher
	MASUHARA Naoki	Project Researcher
	MATSUDA Hiroko	Project Researcher

	MCGREEVY, Steven Robert	Specially Appointed Assistant Professor
	MCLELLAN, Benjamin-Craig	Visiting Associate Professor
	MEUTIA, Ami Aminah	Project Researcher
	MIKI Hiroshi	Project Researcher
	MIKRIGUL, Adil	Visiting Researcher
	MIMURA Yutaka	Project Researcher
	MINAMI Yoshitaka	Specially Appointed Assistant Professor
	MIYAKAWA Chie	Project Research Associate
	MIYAZAKI Hidetoshi	Project Researcher
	MIZUMA Sakiko	Project Research Associate
	MOJI Kazuhiko	Emeritus Professor
	MORI Soichi	Visiting Professor
	MURAMATSU Shin	Professor
	MUTO Nozomu	Project Research Associate
N	NAITO Daisuke	Specially Appointed Assistant Professor
	NAKAGAMI Ken'ichi	Visiting Professor
	NAKAGAWA Chigusa	Project Researcher
	NAKAMURA Ryo	Project Researcher
	NAKANO Takanori	Professor
	NAKATSUKA Takeshi	Professor
	NATSUME Muneyuki	Visiting Researcher
	NAWATA Hiroshi	Visiting Professor
	NILES, Daniel Ely	Assistant Professor
	NILLOS, Mae Grace Gareza	Visiting Research Fellow
	NISHIMOTO Futoshi	Visiting Researcher
	NOSE Mitsuhiro	Visiting Researcher
O	OGATA Yuka	Project Researcher
	OH Tomohiro	Project Researcher
	OKAMOTO Takako	Project Research Associate
	OKAMOTO Yoko	Project Research Associate
	OKAMOTO Yuki	Project Researcher
	OKUDA Noboru	Visiting Associate Professor
	OKUMIYA Kiyohito	Visiting Associate Professor
	OMOTO Reiko	Project Researcher
	ONISHI Masayuki	Visiting Professor
	OSADA Toshiki	Emeritus Professor
R	RAMPISELA, Dorotea Agnes	Associate Professor
	RANOLA, Roberto Jr. Dela Fuente	Visiting Research Fellow
S	SAKAI Toru	Senior Project Researcher
	SANO Masaki	Visiting Researcher
	SASAKI Yuko	Project Researcher
	SATO Tetsu	Professor
	SATO Yo-Ichiro	Emeritus Professor
	SEKINO Nobuyuki	Project Researcher
	SEKINO Tatsuki	Associate Professor
	SETIAWAN, Budi Indra	Visiting Research Fellow
	SHIMIZU Hiromi	Project Research Associate
	SHIMIZU Takao	Project Researcher
	SHIN Kicheol	Assistant Professor
	SHIRAIWA Takayuki	Visiting Associate Professor

	SULIMAN MOHAMEDAIN SULIMAN, Mahgoub	Visiting Research Fellow
	SURYANINGTYAS, Puspita	Visiting Researcher
T	TAKAGI Akira	Specially Appointed Associate Professor
	TAKEMURA Shion	Project Researcher
	TANAKA Masakazu	Visiting Professor
	TANAKA Ueru	Associate Professor
	TANIGUCHI Makoto	Professor
	TERADA Masahiro	Specially Appointed Associate Professor
	TERAMOTO Syun	Project Research Associate
	TESHIROGI Kouki	Project Researcher
	TSUWA Saeka	Project Research Associate
U	UCHIBORI Motomitsu	Visiting Professor
	UCHIYAMA Junzo	Visiting Associate Professor
	UCHIYAMA Yuta	Project Researcher
V	VAN DER LEEUW, Sander Ernst	Visiting Research Fellow
W	WANG Na	Project Research Associate
	WANG Yuan	Visiting Researcher
	WATANABE Kazuo	Project Researcher
	WEST, Thomas Ernest Riversdale	Visiting Researcher
	WIDODO, Johannes	Visiting Research Fellow
X	XU Chenxi	Project Research Associate
Y	YAMADA Makoto	Project Researcher
	YAOTA Kiyoyuki	Project Researcher
	YAP, Minlee	Project Researcher
	YASUNARI Tetsuzo	Director-General
	YASUTOMI Natsuko	Assistant Professor
	YONEMOTO Shohei	Visiting Professor

※Job titles listed above are as of 31 March, 2014.

(For those who retired in the middle of fiscal 2013, the job titles of that time are listed.)

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**HAMASAKI Hironori**


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Project Researcher

**Born in 1979 年.****[Academic Career]**

Graduate School of Policy Science, Ritsumeikan University, Doctoral Course (2008-2010)

The Okuma School of Public Management, Waseda University, Master Course (2003-2005)

College of Political Science and Economics, Waseda University (1998-2003)

**[Professional Career]**

Project Researcher, Asian Program for Incubation of Environmental Leaders (APIEL), Graduate School of Engineering, University of Tokyo (2010)

**[Higher Degrees]**

Ph.D. (Ritsumeikan University, 2011)

MSc (Waseda University, 2005)

**[Fields of Specialization]**

Policy Science

International Public Policy

Water Resources Management/Water Governance/Water Security

**[Academic Society Memberships]**

Public Policy Studies Association JAPAN

Japan Society of Research and Information on Public and Co-operative Economy

Japan Association of Global Governance

**—Achievements—****[Research Presentations]***[Oral Presentation]*

- Hamasaki, H. and K. Nakagami New paradigm of Integrated Water Resources Management. The 12th Annual Convention of the Society of Environmental Conservation Engineering, 2013, 09, 03, Ritsumeikan Biwako Kusatsu Campus, Kusatsu City, Shiga. (in Japanese)
- Hamasaki, H. Governance in water resources management - a case of the Mekong River Basin. The 2nd Convention of Japan Association of Global Governance, 2013, 04, 06, Ritsumeikan University, Kyoto. (in Japanese)

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**HANDO H Itsuki C.**


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Specially Appointed Associate Professor

**Born in 1974.****[Academic Career]**

School of Environmental Sciences, University of East Anglia, D. Course (2000)

Department of Marine Science and Technology, Tokyo University of Fisheries (1996)

**[Professional Career]**

Associate Professor, Research Institute for Humanity and Nature (2011)

Assistant Professor, Center for Marine Environmental Studies, Ehime University (2007)

Visiting Researcher, Research Institute for Humanity and Nature (2007)

Senior Project Researcher, Research Institute for Humanity and Nature (2006)

Consultant, Department of Applied Mathematics, University of Sheffield, Sheffield, United Kingdom (2005)

Research Associate, Department of Applied Mathematics & Sheffield Centre for Earth Observation Science, University of Sheffield, Sheffield, United Kingdom (2004)

Senior Research Associate, School of Environmental Sciences, University of East Anglia, Norwich, United Kingdom (2001)

Teaching Assistant, School of Environmental Sciences, University of East Anglia, Norwich, United Kingdom (1998)

Research Assistant in Physics and Environmental Modelling, Department of Ocean Sciences, Tokyo University of Fisheries (1996)

#### **[Higher Degrees]**

Ph.D. (University of East Anglia, 2002)

#### **[Fields of Specialization]**

Earth Systems Science

Transdisciplinary Mathematical Modelling

#### **[Academic Society Memberships]**

American Geophysical Union

Society for Risk Analysis

#### **[Awards]**

NIHU Humanities Research Encouragement Award (2013)

### **—Achievements—**

#### **[Papers]**

##### *[Original Articles]*

- Kawai, T., Jagiello, K., Sosnowska, A., Odziomek, K., Gajewicz, A., Handoh, I.C., Puzyn, T., Suzuki, N. 2014,02 A New Metric for Long-Range Transport Potential of Chemicals. *Environmental Science & Technology* 48(6) :3245-3252. (reviewed).

#### **[Research Presentations]**

##### *[Oral Presentation]*

- Itsuki C. Handoh Consilience Cyberspace: A world connected through your environmental values . RIHN Futurability Initiatives International Symposium 2014: Humanity in Nature: What ought to be?, 2014, 03, 24-2014, 03, 24, Tokyo International Forum. (in Japanese)

## **HASHIMOTO WATANABE Satoko**

Project Researcher

#### **Born in 1983.**

#### **[Academic Career]**

Department of Agricultural Engineering, Faculty of Agriculture, Kyoto University, D. Course(2012)

Department of Agricultural Engineering, Faculty of Agriculture, Kyoto University, M. Course(2008)

Department of Agricultural Engineering, Faculty of Agriculture, Kyoto University, M. Course(2006)



**[Professional Career]**

Research Fellow of the Japan Society for the Promotion  
of Science(2010)

**[Higher Degrees]**

D. Agr. (Kyoto University, 2012)

M. Agr. (Kyoto University, 2008)

**[Fields of Specialization]**

Soil science

Hydrology

**[Academic Society Memberships]**

The Japanese Society of Irrigation, Drainage and Rural Engineering

Japanese Society of Soil Science and Plant Nutrition

Japanese Society of Soil Physics

**—Achievements—****[Research Presentations]***[Poster Presentation]*

- Satoko Hashimoto Watanabe, Kimihito Nakamura, Hironori Hamasaki, Chie Imagawa, Hisaaki Kato, Tsugihiko Watanabe The Characteristics of Water quality in Agricultural Area Reusing Drainage Water. 1st World Irrigation Forum, 2013,09,30–2013,10,03, Mardin, Turkey. 3.3 Irrigation and drainage for environmental sustainability: Full Papers 7p.

**Hein MALLEE**

Specially Appointed Professor

**[Professional Career]**

International Development Research Centre, Singapore

Senior Program Officer

Rural Poverty & Environment Program

Ecosystems Approaches to Human Health Program

2004 - 2013

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Ford Foundation, Beijing

Program Officer

Environment and Development Program

1999 - 2004

+++++

China-Netherlands Poverty Alleviation Project | Huoshan, Anhui Province, China

Co-director

1997 - 1999

**[Higher Degrees]**

Ph.D. Leyden University 1997

**[Fields of Specialization]**

Social science

China Studies  
 Natural Resources Management  
 Forest Governance  
 Ecohealth

—Achievements—

**[Books]**

*[Chapters/Sections]*

- Hein Mallee 2014 Ecohealth, Transdisciplinarity and Participation. Managing Environmental Risks to Food and Health Security in Asian Watersheds Project Final Report. .

**[Papers]**

*[Original Articles]*

- Johanne Saint-Charles, Jena Webb, Hein Mallee, Nguyen Viet Hung, Andres Sanchez, Berna van Wendel 2014 Ecohealth as a Field: Looking Forward. EcoHealth . DOI:10.1007/s10393-014-0930-2. (reviewed). (Accepted).
- Hein Mallee 2014 「エコヘルスをめぐる世界の動向」 (International Trends in Ecohealth). 医学の歩み 240. (Accepted).

**[Research Presentations]**

*[Oral Presentation]*

- Hein Mallee Ecohealth and Pandemic Threat: Coexisting with Avian Influenza Viruses. RIHN Lunch Seminar, 2014, 01, 21-2014, 01, 21, Research Institute for Humanity and Nature.
- Hein Mallee Ecohealth Research in Southeast and East Asia. JSPS-AASPP/GRENE Joint International Symposium on Water and Health in Urban Areas, 2013, 12, 16-2013, 12, 16, Hue, Vietnam.
- Hein Mallee Ecohealth, Watersheds and Transdisciplinarity. LakeHEAD Community Forum, 2013, 11, 08-2013, 11, 08, Los Banos.
- Hein Mallee Ecohealth Research. 5th RIHN-Sangyo University Study Meeting, 2013, 10, 30-2013, 10, 30, Sangyo University, Kyoto. (in Japanese)
- Hein Mallee Research Integration at the Research Institute for Humanity and Nature. First Global Conference on Research Integration and Implementation, 2013, 09, 08-2013, 09, 11, ANU, Canberra. "Lightning Talk".

**HIYAMA Tetsuya**

Associate Professor

**Born in 1967.**

**[Academic Career]**

1986-1990: College of Natural Sciences, University of Tsukuba

1990-1995: Graduate School of Geoscience, University of Tsukuba

**[Professional Career]**

1995-1995: JSPS Research Fellow, Institute of Geoscience, University of Tsukuba

1995-2001: Assist. Prof., Institute for Hydrospheric-Atmospheric Sciences, Nagoya Univ.

2001-2001: Assist. Prof., Hydrospheric Atmospheric Research Center, Nagoya Univ.

2002–2010: Assoc. Prof., Hydrospheric Atmospheric Research Center, Nagoya Univ.

2010– : Assoc. Prof., Research Institute for Humanity and Nature

### [Higher Degrees]

Ph.D. (Science), University of Tsukuba, 1995

### [Fields of Specialization]

Ecohydrology, Hydrometeorology

## —Achievements—

### [Papers]

#### [Original Articles]

- Lu, P., Liu, Y. and Hiyama, T. 2014,01 Linking surface temperature based approaches for estimating soil heat flux with error propagation. *Atmospheric and Climate Sciences* 4(1) :29–41. DOI:10.4236/acs.2014.41004. (reviewed).
- Kurita, N., Fujiyoshi, Y., Wada, R., Nakayama, T., Matsumi, Y., Hiyama, T. and Muramoto, K. 2013,12 Isotopic variations associated with north-south displacement of the Baiu front. *SOLA (Scientific Online Letters on the Atmosphere)* 9 :187–190. DOI:10.2151/sola.2013-042. (reviewed).
- Hiyama, T., Asai, K., Kolesnikov, A.B., Gagarin, L.A. and Shepelev, V.V. 2013,09 Estimation of residence time of permafrost groundwater in the middle of the Lena River basin, eastern Siberia. *Environmental Research Letters* 8 :035040. DOI:10.1088/1748-9326/8/3/035040. (reviewed).
- Suzuki, T., Ohta, T., Hiyama, T., Izumi, Y., Mwandemele, O. and Iijima, M. 2013,08 Effects of the introduction of rice on evapotranspiration in seasonal wetlands. *Hydrological Processes* (accepted). DOI:10.1002/hyp.9970. (reviewed).
- Hiyama, T., Ohta, T., Sugimoto, A., Yamazaki, T., Oshima, K., Yonenobu, H., Yamamoto, K., Kotani, A., Park, H., Kodama, Y., Hatta, S., Fedorov, A.N. and Maximov, T.C. 2013,07 Changes in eco-hydrological systems under recent climate change in eastern Siberia. *IAHS Publication* 360 :155–160. (reviewed).
- Fedorov, A.N., Gavrilliev, P.P., Konstantinov, P.Y., Hiyama, T., Iijima, Y. and Iwahana, G. 2013,04 Estimating the water balance of a thermokarst lake in the middle of the Lena River basin, eastern Siberia. *Ecohydrology* . DOI:10.1002/eco.1378. (reviewed).

### [Research Presentations]

#### [Oral Presentation]

- Tetsuya Hiyama, Toru Sakai, Shamil Maksyutov, Heonsook Kim, Takahiro Sasai, Yasushi Yamaguchi, Atsuko Sugimoto, Shunsuke Tei, Takeshi Ohta, Ayumi Kotani, Kazukiyo Yamamoto, Takeshi Yamazaki, Kazuhiro Oshima, Hotaek Park, Trofim C. Maximov, Alexander N. Fedorov Global warming and changes in Siberian terrestrial environments. 2nd International Conference on "Global Warming and the Human-Nature Dimension in Siberia: Social Adaptation to the Changes of the Terrestrial Ecosystem, with an Emphasis on Water Environments", 2013,10,08–2013,10,11, Lecture Hall, National Academy of Republic of Sakha (Yakutia), Yakutsk, Russia.
- Yoshihiro Tachibana, Kazuhiro Oshima, Tetsuya Hiyama Climatological features of atmospheric and terrestrial water cycles in the three great Siberian rivers and their interannual variations. 2nd International Conference on "Global Warming and the Human-Nature Dimension in Siberia: Social Adaptation to the Changes of the Terrestrial Ecosystem, with an Emphasis on Water Environments", 2013,10,08–2013,10,11, Conference Hall of Institute for Biological Problems of Cryolithozone, Yakutsk, Russia.

- Ryuhei Yoshida, Masahiro Sawada, Takeshi Yamazaki, Takeshi Ohta, Tetsuya Hiyama Estimation of regional water cycle changes by various land-cover-change scenarios in eastern Siberia. 2nd International Conference on "Global Warming and the Human-Nature Dimension in Siberia: Social Adaptation to the Changes of the Terrestrial Ecosystem, with an Emphasis on Water Environments", 2013, 10, 08-2013, 10, 11, Conference Hall of Institute for Biological Problems of Cryolithozone, Yakutsk, Russia.
- Hiyama, T., T. Ohta, A. Sugimoto, T. Yamazaki, K. Oshima, H. Yonenobu, K. Yamamoto, A. Kotani, H. Park, Y. Kodama, S. Hatta, A.N. Fedorov, T.C. Maximov Changes in eco-hydrological systems under recent climate change in eastern Siberia. IAHS-IAPSO-IASPEI Joint Assembly "Knowledge for the Future", Session H02 "Cold and mountain region hydrological systems under climate change: towards improved projections", 2013, 07, 22-2013, 07, 26, Gothenburg, Sweden.
- Jack Ratjindua Kambatuku, Tetsuya Hiyama, Miho Hanamura, Tetsuji Suzuki, Yuichiro Fujioka, Takeshi Ohta, Morio Iijima Regional Precipitation Patterns and their Implication for Drought-Adapted Mixed Cropping Systems in the Cuvelai Drainage Basin, North-Central Namibia. International Symposium of SATREPS Rice-Mahangu Project "Agricultural Use of Seasonal Wetland Formed in Semiarid Region of Africa", 2013, 07, 13, Noyori Conference Hall, Nagoya University, Nagoya.
- Tetsuya Hiyama, Shamil Maksyutov, Heonsook Kim, Takahiro Sasai, Yasushi Yamaguchi, Atsuko Sugimoto, Hitoshi Yonenobu, Takeshi Ohta, Ayumi Kotani, Kazukiyo Yamamoto, Takeshi Yamazaki, Kazuhiro Oshima, Hotaek Park Global warming and changes in Siberian terrestrial environments. 日本地球惑星科学連合 2013 年大会, 2013, 05, 19-2013, 05, 24, 千葉市 (幕張メッセ) .
- Kazuhiro Oshima, Yoshihiro Tachibana, Tetsuya Hiyama Climatological features of atmospheric and terrestrial water cycles in the three great Siberian rivers. 日本地球惑星科学連合 2013 年大会, 2013, 05, 19-2013, 05, 24, 千葉市 (幕張メッセ) .

## ICHIKAWA Kotaro

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Project Researcher

### **Born in 1978.**

#### **[Academic Career]**

Faculty of Agriculture, Kyoto University (B.S. 1999-2003)

Biosphere Informatics, Graduate School of Informatics, Kyoto University (M.S. 2003-2005)

Biosphere Informatics, Graduate School of Informatics, Kyoto University (Ph. D. 2005-2007)

#### **[Professional Career]**

2005.4-2007.9. Research fellow of the Japan Society for the Promotion of Science (DC1)

2007.10.-2008.3 Research fellow of the Japan Society for the Promotion of Science (PD)

2008.4-2010.9 Research fellow of the Japan Society for the Promotion of Science (PD)

2010.10- Project researcher at Research Institute for Humanity and Nature

#### **[Higher Degrees]**

Bachelor of Agriculture (Kyoto University, 2003)

Master of Informatics (Kyoto University, 2005)

Doctor of Philosophy of Informatics (Kyoto University, 2007)

#### **[Fields of Specialization]**

Bioacoustics

#### **[Academic Society Memberships]**

Japanese Society of Fisheries Science

Acoustical Society of America

Advanced Marined Science and Technology

Japanese Society of Biologging Science

**[Awards]**

1. TOP 10 ARTICLES PUBLISHED IN THE SAME DOMAIN SINCE YOUR PUBLICATION (2010), BioMedLib, Ichikawa K, Akamatsu T, Shinke T, Sasamori K, Miyauchi Y, Abe Y, Adulyanukosol K, Arai N: Detection probability of vocalizing dugongs during playback of conspecific calls. J Acoust Soc Am; 2009 Oct;126(4):1954-9, September 10, 2010.
2. 海洋理工学会平成 19 年度業績賞 (2008), 海洋理工学会, 5 月 16 日 (京都大学情報学研究科バイオテレメトリチームの一員として受賞)
3. Poster award (2004): Kotaro Ichikawa, Tomonari Akamatsu, Tomio Shinke, Nobuaki Arai, Chika Tsutsumi & Kanjana Adulyanukosol, Acoustical monitoring of dugong, OCEANS' 04/TECHNO-OCEAN, November 10-12, 2004

**—Achievements—****[Books]***[Chapters/Sections]*

- ICHIKAWA, Kotaro 2013 Notes on the aerial surveys. Hiroshi NAWATA (ed.) Dryland Mangroves. Arab Subsistence Monograph Series, 2. Shoukadoh Book Sellers, Kamigyo-ku, Kyoto, pp.31.

**ISHIMOTO Yudai**

Project Researcher

**Born in 1979.****[Academic Career]**

Department of Agriculture, Tottori University(2001)

Graduate School of Asian and African Area Studies, Kyoto University (2008)

**[Professional Career]**

Teaching assistant at Kyoto University (2003)

**[Higher Degrees]**

Doctor degree of area studies(Kyoto University,2011)

Master degree of area studies(Kyoto University,2008)

**[Fields of Specialization]**

Ecological anthropology

Area Studies

**[Academic Society Memberships]**

Japan Association for African Studies

The Japanese Association for Arid Land Studies

The Society for Ecological Anthropology

**—Achievements—****[Papers]***[Original Articles]*

- Ishimoto, Y., Miyazaki, H., Seto, S., Tanaka, U. 2013,12 Safety Net of Agro-pastoralists in the Sahel: Survival Devices Embedded in Food Consumption System.. Sand Dune Research 60(2) :73-78. (in Japanese)
- Ishimoto, Y., Miyazaki, H., Seto, S., Umetsu, C., Tanaka, U. 2013,09 Resilience of Agro-pastoralists Livelihood System in the Sahel : A Case of Introduction of Migration in I-village, Northeastern Burkina Faso.. Journal of Arid Land Studies 23(2) :73-77. (in Japanese) (reviewed).
- Ishimoto, Y., Miyazaki, H, Umetsu, C. 2013,07 Social Safety Net Using Mobile Phones : A Case Study of Southern Province, Zambia.. Journal of agricultural development studies 24(1) :26-35. (in Japanese) (reviewed).

**[Research Presentations]***[Oral Presentation]*

- Yudai Ishimoto Water Management for the Livelihood in Semi-Arid Area, West Africa. History, Culture, and Society of Water Management in the Middle East and North Africa, 2014,03,07, Akita. (in Japanese)

*[Invited Lecture / Honororary Lecture / Panelist]*

- Ishimoto, Y. Safety Net of Agro-pastoralists in the Sahel. . Symposium in the 59th Academic meeting for Japanese Society of Sand Dune Research, 2013,07,04-2013,07,05, Tokyo Institute of Technology (Tokyo). (in Japanese)

**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. Course(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]**

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]***[Chapters/Sections]*

- Shun ISHIYAMA 2013,12 Dates as foods. Date Palms. Arab Subsistence Ecosystem Series, 2. Rinsen-Shoten, Sakyo-ku, Kyoto, Japan, pp.262-266. (in Japanese)
- Shun ISHIYAMA 2013,12 Chainges of Subsistence and life; Water Source, Farm Expansion and Residence Area.. Shun ISHIYAMA, Hiroshi NAWATA (ed.) Date Palms. Arab Subsistence Ecosystem Series , 2. Rinsen Shoten, Sakyo-ku, Kyoto, Japan, pp.235-261. (in Japanese)
- Shun ISHIYAMA 2013,12 Date palms and Subsistence of the Desert. Shun ISHIYAMA, Hiroshi NAWATA (ed.) Date Palms. Arab Subsistence Ecosystem Series , 2. Rinsen Shiten, Sakyo-ku, Kyoto, Japan, pp.5-12. (in Japanese)
- Shun ISHIYAMA 2013,12 Future of Oases. Shun ISHIYAMA/Hiroshi NAWATA (ed.) Date Palms. Arab Subsistence Ecosystem Series, 2. , Sakyo-ku, Kyoto, Japan, pp.295-302. (in Japanese)
- ISHIYAMA, S. 2013,04 Environmental Change and Dynamism of Livelihood -Goumanché, an agricultural People of African semi-arid land.. Sato, Y. and Taniguchi, M. (ed.) Environmental history in yellow belt -From Sahel to Silkroad. Civilization and Environmental history series of the RIHN. Kobundo, Chiyoda-ku, Tokyo, Japan, pp.98-111. (in Japanese)

**[Editing]***[Editing / Co-editing]*

- Shun ISHIYAMA, Hiroshi NAWATA (ed.) 2013,12 Date Palm. Human Subsistence Ecosystems in Arab Societies, 2. Rinsen Shoten, Sakyo-ku, Kyoto, Japan, 315pp. (in Japanese)

**[Papers]***[Original Articles]*

- Hyungjun LEE, Hiroshi YASUDA, Mohamed Ahmed Mohamed ABD ELBASIT, Shun ISHIYAMA, Hiroshi NAWATA 2014,01 Rainfall Time Series of Gadaref in the Midstream of the Nile Basin.. Jounal of Japan Society of hydrology and Water resouces. 27(1) :29-33. (in Japanese) (reviewed).
- Shun ISHIYAMA 2013,09 Multiple Livelihoods of Farmer under Variable Rainfall Condition in African Semi Arid Zone -A Case Study on Gourmantche People, North East of Burkinafaso.. Journal of Arid land Studies 23(2) :67-71. (in Japanese) (reviewed).

**[Research Presentations]***[Oral Presentation]*

- Shun ISHIYAMA, Hiroshi NAWATA, Mutasim Mekki M. E., Mussab Hassan A., Rotation Cropping and Rainfall Variation -Indigenous Method in Gadaref State, Sudan. 50th Anual Meeting of Japan Association for African Studies, 2013,05,25-2013,05,26, Univercity of Tokyo, Shibuya-ku Tokyo, Japan. (in Japanese)
- 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, 2011,04,09-2100,04,11, Algeria, Adrar.



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**KUMAZAWA Terukazu**


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Assistant Professor

**Born in 1974 年.****[Higher Degrees]**

Dr of Engineering

**[Fields of Specialization]**

Environmental planning

Regional informatics

**—Achievements—****[Research Presentations]***[Oral Presentation]*

- Keishiro Hara • Michinori Kimura • Terukazu Kumazawa • Masashi Kuroda • Michinori Uwasu Historical Trends of Research on “Sound Material-Cycle Society” in Japan - Evidences from a Database. Jeju, Korea, 2013, 12, 04-2013, 12, 06, Jeju, Korea.
- Terukazu Kumazawa, Hidehiko Kanagae Towards describing the transition process ontology for making a compact city more resilient. the 50th annual meeting of the Japan Section of the Regional Science Association International, 2013, 10, 12-2013, 10, 14, Tokushima. (in Japanese) The resume is written by English..
- Terukazu Kumazawa • Takanori Matsui Description of Social-Ecological Systems Framework Using Ontology Language. The 14th Global Conference of the International Association for the Study of the Commons (IASC2013), 2013, 06, 03-2013, 06, 07, Fujiyoshida, Yamanashi. Only abstract and ppt file.
- Kouji Kozaki, Terukazu Kumazawa, Osamu Saito, Riichiro Mizoguchi Ontology Exploration Tool for Social, Economic and Environmental Development. SEED (Social, Economic and Environmental Development) Workshop, 7th IEEE International Conference on Digital Ecosystems and Technologies Special Theme (IEEE DEST 2013), 2013, 07, 24-2013, 07, 26, Menlo Park, California, USA. 国際会議論文 (査読付) .

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**LIN Hebin**


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Visiting Researcher

**Born in 1981.****[Academic Career]**

Graduate School of Environment and Natural Resources, Renmin University of China, China (2004)

Graduate School of International Development and Cooperation, Hiroshima University, Japan (2006)

Graduate School of Global Environmental Studies, Kyoto University, Japan (2013)

**[Professional Career]**

Teaching Assistant, Hiroshima University, Japan (2005)

Research Assistant, Hiroshima University and Japan International Cooperation Agency, Japan (2006)

Research Assistant, Kyoto University, Japan (2008-2011)

Lecturer, Training Course, International Lake Environment Committee Foundation-Japan International Cooperation Agency, Japan (2011-2013)

Research Assistant, Kobe University, Japan (2012)

Visiting Researcher, Research Institute for Humanity and Nature, Japan (2013)

Project Researcher, Research Institute for Humanity and Nature, Japan (2013)

**[Higher Degrees]**

Ph.D. in Global Environmental Studies (Kyoto University, 2013)

M.A. in Master of Arts (Hiroshima University, 2006)

B.A. in Public Administration (Renmin University of China, 2004)

**[Fields of Specialization]**

Ecological economics

Environmental economics

Watershed management

Ecosystem management

**—Achievements—**

**[Books]**

*[Chapters/Sections]*

- Lin H, Thornton JA 2013, 10 Integrated payments for ecosystem services: a governance path from lakes and rivers to coastal areas in China. Mohammed EY (ed.) Economic Incentives for Marine and Coastal Conservation. Earthscan, London, pp.69–92.

**[Research Presentations]**

*[Oral Presentation]*

- Lin H Rewarding conservation services for water and biodiversity: science, stakeholders, organizations and rules. 2nd World Congress of Biodiversity, Ecology and Environment, 2013, 04, 23–2012, 04, 27, Nanjing, Jiangsu, China.

**MASUHARA Naoki**

Project Researcher

**Born in 1974.**

**[Higher Degrees]**

Master of Politics (Waseda University, 2000)

**[Fields of Specialization]**

Public Administration

Local Government Studies

Environment and Energy Policy

Citizen Participation Studies

**—Achievements—****[Research Presentations]***[Poster Presentation]*

- Naoki Masuhara, Michinori Kimura, and Kenshi Baba Comprehensive Case Analysis on Participatory Approaches Applied to Resolve Environmental Disputes in Local Community from Nexus Perspectives. Nexus 2014: Water, Food, Climate and Energy Conference, 2014, 03, 05–2014, 03, 08, Chapel Hill, North Carolina USA.

**MCGREEVY, Steven**

Specially Appointed Assistant Professor

**Born in 1978.****[Academic Career]**

Division of Natural Resource Economics, Graduate School of Agriculture, Kyoto University (2008)

College of Continuing Education, University of Minnesota (2002)

St. John's University- Collegeville, MN (1997)

**[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

Sustainable Agriculture

Socio-ecological Systems

**[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—****[Books]***[Chapters/Sections]*

- McGreevy, Steven R. , Akira Shibata 2013,10 Mobilizing biochar: A multi-stakeholder scheme for climate-friendly foods and rural sustainable development. Tomas Goreau, Ronal Larson, and Joanna Campe (ed.) Geotherapy: Innovative Methods of Soil Fertility Restoration, Carbon Sequestration, & Reversing CO2 Increase. CRC Press. In Press

**[Research Presentations]***[Oral Presentation]*

- McGreevy, Steven R. 'Carbon negativity'—responding to the 'green grab,' framing biochar battlelines, and mobilizing stakeholder support. 2013 North American Biochar Symposium, , 2013, 10, 13–2013, 10, 16, University of Massachusetts– Amherst.
- McGreevy, Steven R. New possibilities for common-pool resource use in rural Japan: Agroforestry, carbon sequestration, and renewable energy. 14th Global Conference of the International Association for the Study of the Commons, 2013, 06, 03–2013, 06, 07, Kitafuji, Fuji Calm.

*[Poster Presentation]*

- Bates, Albert K., Jonathon Dawson, J.T. Ross Jackson, Erich J. Knight, Steven R. McGreevy, Frank Michael, and David Yarrow eCOOLvillages. 11th International Conference of the International Communal Studies Association, 2013, 06, 26–2013, 06, 28, Findhorn Community, Scotland.

*[Invited Lecture / Honororary Lecture / Panelist]*

- McGreevy, Steven R. Sustainable rural revitalization efforts in Japan: Bridging actors and knowledge. Global Carbon Project Seminar, 2014, 03, 10, Tsukuba City, National Institute for Environmental Studies.

**Minlee YAP**

Project Researcher

**[Academic Career]**

Department of Marine Biosciences, Tokyo University of Fisheries (2006)

Graduate school of Marine System Engineering, Tokyo University of Marine Science and Technology (2008)

Graduate school of Applied Marine Environmental Studies, Tokyo University of Marine Science and Technology (2012)

**[Professional Career]**

Project Researcher, Research Institute for Humanity and Nature (2012.04–)

**[Higher Degrees]**

M. Sc (Tokyo Univeristy of Marine Science and Technology, 2008)

PhD (Tokyo University of Marine Science and Technology, 2012)

**[Fields of Specialization]**

Coral Reef Ecology

**[Academic Society Memberships]**

The Japanese Society of Fisheries Science

The Japanese Coral reef Society

**—Achievements—****[Papers]***[Original Articles]*

- Kakaskasen Andreas Roeroe, Minlee Yap, Mineo Okamoto 2013, 07 Development of new assessment methods for Acropora coral recruitment using coral settlement devices and holes of marine block. Fisheries Science Volume 79 (Issue 4) :617–627. (reviewed).

- Minlee Yap, Kakaskasen Andreas Roeroe, Laurentius Theodorus Xaverius Lalamentik, Mineo Okamoto 2013,05 Recruitment patterns and early growth of acroporid corals in Manado, Indonesia. Fisheries Science Volume 79(Issue 3) :385-395. (reviewed).

## NAKAMURA Ryo

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Project Researcher

### **Born in 1976.**

#### **[Academic Career]**

Comparative Studies of Humanities and Social Sciences (Cultural Anthropology), Nagoya University, D. Course (2008)

Comparative Studies of Humanities and Social Sciences (Cultural Anthropology), Nagoya University, M.A. Course (2003)

Shizuoka University, B.A. Course (2000)

#### **[Professional Career]**

Project researcher, Research Institute for Humanity and Nature (2008-)

Part-time staff, Graduate School of Letters, Nagoya University(2008)

Tutor, Graduate School of Letters, Nagoya University(2006)

Teaching Assistant, Graduate School of Letters, Nagoya University(2003-2007)

#### **[Higher Degrees]**

Ph.D. (Nagoya University, 2008)

M.A. (Nagoya University, 2003)

B.A. (Shizuoka University, 2000)

#### **[Fields of Specialization]**

Cultural Anthropology

Environmental Anthropology

Comparative Study on Swahili Maritime Societies

#### **[Academic Society Memberships]**

Japan Association for African Studies (2003-)

Japanese Society of Cultural Anthropology (2008-)

Japan Association for Religious Studies (2008-)

Japan Association for Middle East Studies (2009-)

Japan Association for Nilo-Ethiopian Studies (2011-)

### **—Achievements—**

#### **[Research Presentations]**

##### *[Oral Presentation]*

- NAKAMURA, Ryo "Coastal resource use and management of Kilwa Island in the southern Swahili Coast, Tanzania". Global Conference on Environmental Studies (CENVISU-2013), 2013, 04, 24-2013, 04, 27, Antalya, Turkey.

## 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]**

Environmental Resource Geology

Isotope Geochemistry

**[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—****[Books]***[Chapters/Sections]*

- Takanori Nakano 2014,01 . Research Institute for Humanity and Nature (ed.) Global Environmental Studies Manual 2 . measure the earth, 2. Asakura Publishing Co, Ltd., Shinjyuku-ku, Tokyo, pp.39-61. (in Japanese)
- Takanori Nakano 2013,12 Production area information . SEEDer editorial committee (ed.) SEEDer -Future of our planet thinking from local environmental information-. SEEDer, 9. Showado, Sakyo-ku, Kyoto, pp.10-16. (in Japanese)
- Takanori Nakano 2013,12 Diversity of alcohol and water. National Institutes for the Humanities (ed.) HUMAN -Invitation to the forest of knowledge-. . HUMAN, 5. Heibonsha Ltd., Bunkyo-ku, Tokyo city, pp.99-104. (in Japanese)
- Takanori Nakano 2013,10 The book to enjoy the Geopark, the Japanese archipelago Geo site geology hundred election. Japan Geotechnical Consultants Association,NPO Geological Information Utilization and Promotion Initiative,Study of geo -diversity of Japanese archipelago (ed.) Water quality diversity connecting geo-diversity and biodiversity. the Japanese archipelago Geo site geology hundred election, 5. Ohmsya, Chiyoda-ku, Tokyo , pp.146-151. (in Japanese)

**[Papers]***[Original Articles]*

- Kusaka, S., Nakano, T 2014,03 Carbon and oxygen isotope ratios and their temperature dependence in carbonate and tooth enamel using GasBench II preparation device.. Rapid Communications in Mass Spectrometry. 28(5) :563-567. DOI:10.1002/rcm. 6799.

**[Research Presentations]***[Oral Presentation]*

- Takanori Nakano Exploring the connections of groundwater from isotope Environmental Studies. Otsuchi's treasure Urban development that leverages the power of water, 2014,02,08, Otsuchi central community center. (in Japanese)
- Nakano Takanori Past, present and future of isotope environmental studies. The 3rd isotope environmental studies symposium, 2013,12,17-2013,12,18, Research Institute for Humanity and Nature. (in Japanese)
- Takanori Nakano Knowing from the water quality map of spring . Spring Council, 2013,08,29, Echizen Ono City . (in Japanese)
- Takanori Nakano Overview of Dozenheiya groundwater resources survey results:1 The report from the water quality. , 2013,07,19, Saijyo City Hall Main Building 5F large conference room. (in Japanese)
- Takanori Nakano Network of water and people starting from water quality map making . Government Buildings office multipurpose meeting room , 2013,05,19, Otsuchi-cyo Mini Symposium. (in Japanese)
- Takanori Nakano Environmental map project for Future Asia study. Japan Geoscience union meeting 2013, 2013,05,19-2013,05,24, Makuhari Messe International Convention Complex. (in Japanese)

*[Poster Presentation]*

- Takanori Nakano Elements of groundwater in Otsuchi-cyo, Iwate Prefecture - Stable isotope map. The 3rd isotope environmental studies symposium, 2013,12,17-2013,12,18, Research Institute for Humanity and Nature. (in Japanese)
- Takanori Nakano Geochemical and isotopic map of spring water and surface water in Yuza town of Yamagata prefecture. Japan Geoscience union meeting 2013, 2013,05,19-2013,05,24, Makuhari Messe International Convention Complex. (in Japanese)

*[Invited Lecture / Honorary Lecture / Panelist]*

- Takanori Nakano Water quality map making for environmental realization city . Graduate school for creative cities, Osaka city university, Knowledge information infrastructure study field workshop , 2013,04,30, GSCC Umeda-satellite . (in Japanese)
- Takanori Nakano Global environmental chemistry map and isotope sedimentology. The sedimentological society of Japan 2013 Chiba meeting, 2013,04,10-2013,04,15, Chiba campus, Chiba University. (in Japanese)

**RAMPISELA, Dorotea Agnes**

Associate Professor

**Born in 1957.****[Academic Career]**

Department of Forestry, Faculty of Agriculture, Kyoto University, D. Course (1992)

Department of Forestry, Faculty of Agriculture, Kyoto University, M. Course (1989)

Department of Soil Science, Faculty of Agriculture, Hasanuddin University Indonesia (1981)



**[Professional Career]**

Visiting Research Fellow Research Institute for Humanity and Nature (2013)

Visiting Research Fellow CSEAS Kyoto University (2007)

Associate Professor, Graduate School of Hasanuddin University (1993)

Assistant Professor, Faculty of Agriculture Hasanuddin University (1981)

**[Higher Degrees]**

D. Agr. (Kyoto University, 1987)

M. Agr. (Kyoto University, 1983)

**[Fields of Specialization]**

Soil and Water Conservation

Hydrology

Action Research

Sustainable Development

**[Academic Society Memberships]**

The Japanese Forestry Society

Himpunan Ilmu Tanah Indonesia (HITI), Indonesia Soil Science Society

**—Achievements—****[Books]***[Chapters/Sections]*

- Hidemi Yoshida, Rampisela Dorotea Agnes, Mochtar Solle and Muh. Jayadi 2013, 11 A long-term evaluation of families affected by the Bili-Bili Dam development resettlement project in South Sulawesi, Indonesia.. Mikiyasu Nakayama , Ryo Fujikura (ed.) Restoring Communities Resettled After Dam Construction in Asia . Routledge.

**NAWATA Hiroshi**

Visiting Professor

**Born in 1968.****[Academic Career]**

Human and Environmental Studies (Cultural Anthropology), Kyoto University, D. Course (2003)

Human and Environmental Studies (Cultural Anthropology), Kyoto University, M. A. Course (1997)

African and Asian Studies (Folklore), University of Khartoum, Sudan, Diploma Course (1994)

Letters, Arts and Sciences (Asian History), Waseda University, B. A. Course (1992)

**[Professional Career]**

Visiting Professor, Reserach Department, Research Institute for Humanity and Nature (2013–present)

Professor, Faculty of International Resource Sciences, Akita University (2013–present)

Associate Professor, Research Department, Research Institute for Humanity and Nature (2008–2013)

Associate Professor, Socioeconomics Division, Arid Land Research Center, Tottori University (2007)

Assistant Professor, Division of Comprehensive Measures to Combat Desertification, Arid Land Research Center, Tottori University (2004–2007)

Part-time Lecturer, Faculty of Foreign Studies, Osaka University of Foreign Studies (2004–2005)

Part-time Lecturer, College of Economics, College of Business Administration, and College of Letters, Ritsumeikan University (2004–2005)

Part-time Lecturer, School of Humanities and Social Sciences, Osaka Prefecture University(2004–2005)

Part-time Lecturer, School of Policy Studies, Kwansei Gakuin University(2003–2004)

Teaching Assistant, Graduate School of Human and Environmental Studies, Kyoto University(1998–1999)

Research Fellow, Japan Society for the Promotion of Science(1997–2000)

#### **[Higher Degrees]**

Ph.D. (Kyoto University, 2003)

M.A. (Kyoto University, 1997)

Diploma (University of Khartoum, Sudan, 1994)

B.A. (Waseda University, 1992)

#### **[Fields of Specialization]**

Cultural Anthropology

Social Ecology

Middle Eastern and African Area Studies

Arid Land Studies

Human-livestock Relationship Studies

#### **[Academic Society Memberships]**

The Japanese Association for Arid Land Studies

Japanese Coral Reef Society

Japanese Society of Cultural Anthropology

Japan Association for African Studies

Japan Association for Middle East Studies

Japan Association for Nilo-Ethiopian Studies

#### **[Awards]**

Encouragement Award of the Japanese Association for Arid Land Studies(2003)

### **—Achievements—**

#### **[Books]**

##### *[Chapters/Sections]*

- Hiroshi NAWATA 2014,01 "Going beyond a negative heritage of combating desertification: Based on sharing results of inter-disciplinary researches". Research Institute for Humanity and Nature (ed.) Manuals of Global Environmental Studies, Vol. 1. Asakura Syoten, Tokyo, pp.82–85. (in Japanese)
- Hiroshi NAWATA 2013,11 "Rain-beg ritual ceremony adjusting livestock numbers and herding zones: Adaptive strategy to climatic variation in the eastern end of Sahel zone". Satoshi YOKOYAMA (ed.) Geography on Resource and Subsistence. Kaiseisya, Otsu, pp.187–216. (in Japanese)

#### **[Editing]**

##### *[Editing / Co-editing]*

- Ishiyama, S. and H. Nawata (ed.) 2013,12 Date Palms, Arab Subsistence Ecosystem Series Vol. 2. . Rinsen Shoten, Kyoto, 315pp. (in Japanese)
- Nakamura, R. and H. Nawata (ed.) 2013,12 Mangroves, Arab Subsistence Ecosystem Series Vol. 3. . Rinsen Shoten, Kyoto, 323pp. (in Japanese)
- Hosniho, B. and H. Nawata (ed.) 2013,12 The Alien Species Mesquite, Arab Subsistence Ecosystem Series Vol. 4. . Rinsen Shoten, Kyoto, 270pp. (in Japanese)

**[Papers]***[Original Articles]*

- Hiroshi YASUDA, Mohamed A.M. Abd Elbasit, Kiyotsugu YODA, Ronny BERNDTSSON, Takayuki KAWAI, Hiroshi NAWATA, Asaddig M. Ibrahim, Tomoe INOUE, Wataru TSUJI, Tarig El Gamri and Tadaomi SAITO 2014, 01 Diurnal fluctuation of groundwater levels caused by the invasive alien mesquite plant. *Arid Land Research and Management* 28(2) :242-246. (reviewed).
- Hyungjun LEE, Hiroshi YASUDA, Shun ISIYAMA, Hiroshi NAWATA, Mohamed Abd Elbasit Mohamed Ahmed 2014, 01 Rainfall time series of Gadaref in the midstream of the Nile basin. *Journal of Japan Society of Hydrology and Water Resources* 27(1) :29-33. (in Japanese) (reviewed).
- Hiroshi NAWATA 2013, 11 Relationship between Humans and Camels in Arid Tropical Mangrove Ecosystems on the Red Sea Coast. *Global Environmental Research* 17(2) :233-246. (reviewed).
- Hiroshi NAWATA 2013, 09 Ecological, social, cultural and religious responses of local people to drought: A case analysis of rain-beg ritual ceremony among the Beja in the eastern end of Sahel zone. *Journal of Arid Land Studies* 23(2) :61-66. (in Japanese) (reviewed).

**[Research Presentations]***[Oral Presentation]*

- Nawata, H. "Oases landscape in risk". RIHN 8th International Symposium "Risk Societies, Edge Environments: Ecosystems and Livelihoods in the Balance", 2013, 10, 23-2013, 10, 25, RIHN, Kyoto.
- Nawata, H. "Synthesis of session 1: Human subsistence in relation to invasive and endangered species". RIHN 8th International Symposium "Risk Societies, Edge Environments: Ecosystems and Livelihoods in the Balance", 2013, 10, 23-2013, 10, 25, RIHN, Kyoto.

**ONISHI Masayuki**

Visiting Professor

**[Academic Career]**

- Completed PhD Course, Department of Linguistics, Faculty of Arts, The Australian National University (1994)
- Completed Graduate Diploma Course (TESOL), Faculty of Education, The University of Canberra (1989)
- Completed Diploma Course (Bengali Language and Literature), Department of Bengali, Jadavpur University (1979)
- Completed BA Course (English Language and Literature), Faculty of Arts, Tokyo University (1975)

**[Professional Career]**

- Senior Research Fellow, Indus Project, RIHN (2007)
- Visiting Fellow, Department of Linguistics, Max-Planck Institute (Evolutionary Anthropology) (2005)
- Visiting Fellow, Department of Linguistics, RSPAS, The Australian National University (2003)
- Professor, Faculty of International Studies, Meio University (1998)
- Associate Professor, Faculty of International Studies, Meio University (1997)
- Research Assistant, RCLT, The Australian National University (1995)

**[Higher Degrees]**

- PhD (The Australian National University, 1995)
- Graduate Diploma (The University of Canberra, 1989)

**[Fields of Specialization]**

- Linguistic Typology
- Descriptive Linguistics

**[Academic Society Memberships]**

Australian Linguistic Society  
 The Linguistic Society of Papua New Guinea  
 Okinawa Center of Language Study

**—Achievements—****[Research Presentations]***[Oral Presentation]*

- Masayuki Onishi Linguistic and cultural diversity in south Bougainville. International Symposium on Biocultural Diversity in the Asia-Pacific, 2013,08,12, RIHN, Kyoto, Japan.

*[Invited Lecture / Honororary Lecture / Panelist]*

- Masayuki Onishi Biocultural diversity in Bougainville. MAPS seminar, 2013,07,18, Melanesian and Pacific Studies Center, University of Papua New Guinea, Port Moresby, Papua New Guinea.

**SASAKI Yuko**

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Project Researcher

**Born in 1974.****[Academic Career]**

Department of International and Cultural Studies, Faculty of Liberal Arts, Ttsuda College (1998)  
 Course in Environmental Management, Graduate School of Global Environmental Studies, Kyoto University, M. Course (2009)  
 Course in Environmental Management, Graduate School of Global Environmental Studies, Kyoto University, D. Course (2012)

**[Professional Career]**

Trainee, International NGO in Denmark/DAPP (1998)  
 Tutor, prep school of Johnan (1999)  
 Instructor, Tutoring School of Rinkai Seminar (2000–2002)  
 Volunteer, Japan Overseas Cooperation Volunteers (2003–2005)  
 Coordinator, Japan Overseas Cooperation Volunteers (2005–2007)  
 Researcher, Japan International Research Center for Agricultural Sciences (2009–2010)

**[Higher Degrees]**

D. Global environment studies (Kyoto University, 2012)  
 M. Global environment studies (Kyoto University, 2012)

**[Fields of Specialization]**

African Studies (Southern Africa, Sahel)  
 Rural Development Studies  
 Global Environmental Studies

**[Academic Society Memberships]**

Japanese Agricultural System Society  
 The Japan Society for International Development  
 Japan Association for African Studies

**—Achievements—****[Papers]***[Original Articles]*

- Yohei KOMURA, Ueru TANAKA, Yuko SASAKI, Hitoshi SHINJO 2013,04 The perception and coping behaviors in a “crisis year” among villagers in the Sahel region - A case study based on the Haousa and Foulani people of Southern Niger-. Journal of the Japanese Agricultural Systems Society 29(2) :41-50. (in Japanese) (reviewed).

**[Research Presentations]***[Poster Presentation]*

- Yuko Sasaki 2013, 2013.12.01-2013.12.03, Uji Campus, Kyoto University The Extension Method of Practical Technique to Control Wind Erosion at Rural Areas in Niger, West Africa.. GCOE-ARS Final Symposium , 2013,12,01-2013,12,03, Kyoto Univ. Uji Campus.
- Yuko SASAKI, Ueru TANAKA, Kenta IKAZAKI, Hitoshi SHINJO, Satoshi TOBITA Lessons learnt from the extension of practical technique to control wind erosion with improvement of crop performance in Niger, West Africa.. Conference on Desertification and Land Degradation , 2013,07,17-2013,07,18, University of Ghent, Belgium .
- Yuko SASAKI, Ueru TANAKA, 2013. The Social network structure and the survival strategies of female households in the rural sahelian villages in West Africa. . 14th Spring Conference of the Society for International Development Studies , 2013,06,08, Utsunomiya Univ. . (in Japanese) Best Poster Presentation Award.

*[Invited Lecture / Honorary Lecture / Panelist]*

- Yuko SASAKI The livelihood and Environmental Awareness of the Cultivators and Pastoralists in Shaelian Rural Area of West Africa.. 2013 Fall Conference of the Japanese Agricultural Systems Society , 2013,11,02-2013,11,03, Iwate Univ. at Morioka. (in Japanese) 2013 Award for Young.

**SATO Tetsu**

Professor

**Born in 1955.****[Professional Career]**

Associate professor, Department of Biology, University of Malawi, Republic of Malawi (1997)

Conservation director, WWF Japan (2001)

Professor, Nagano University (2006)

Professor, RIHN (2012)

Deputy Director-General, RIHN (2013)

**[Higher Degrees]**

D.Sc(Sophia University,1985)

M.Sc(Sophia University,1980)

**[Fields of Specialization]**

Ecology

Sustainability Science

**—Achievements—****[Books]***[Chapters/Sections]*

- Sato, T. 2014,03 Integrated Local Environmental Knowledge Supporting Adaptive Governance of Local Communities. Alvares, C. (ed.) (ed.) Multicultural Knowledge and the University. Multiversity India, pp. 268-273.

**[Research Presentations]***[Oral Presentation]*

- Sato, T. Residential Research and Integrated Local Environmental Knowledge concepts for Adaptive Governance. 10th Annual Meeting of the ITdNet, 2013,04,10-2013,04,11, Munich, Germany.

*[Invited Lecture / Honorary Lecture / Panelist]*

- Sato, T. Behavioral interactions and niche construction: Implications for rapid evolution of complex communities among cichlid fishes in Africa. Brown Bag Seminar, Mote Marine Laboratory, 2014,03,19, Sarasota, FL, USA.
- Sato, T. Integrated Local Environmental Knowledge supporting decision making and actions toward sustainability. Seminar at University of Saskatchewan, School of Environment and Sustainability, 2013,10,13, Saskatoon, Canada.
- Sato, T. New types of scientists/knowledge producers supporting community actions to restore coastal environment. Public Forum on the Concept and Implementation of “Sato-Umi” : Integration of Science and Community in Restoration Monitoring and Sustainable-use of Marine Resources, 2013,05,08, Sarasota, FL, USA.

**SATO Yo-Ichiro**

Emeritus Professor

**Born in 1952.****[Academic Career]**

Faculty of Agriculture, Kyoto University (1977)

Department of Agronomy, Kyoto University, M. Course (1979)

**[Professional Career]**

Assistant at Faculty of Agriculture, Kochi University (1981)

Research Associate at National Institute of Genetics (1983)

Associate Professor at Shizuoka University (1994)

Professor, Research Institute for Humanity and Nature (2004)

Deputy Director-General, Research Institute for Humanity and Nature (2008)

Program Director - Ecohistory Program (2013)

Program Director - Ecosophy Program (2013)

Emeritus Professors (2013)

**[Higher Degrees]**

D.Agr. (Kyoto University, 1986)

**[Fields of Specialization]**

Plant genetics

**[Academic Society Memberships]**

Japan Society of Breeding

Society of Evolutionary Studies, Japan  
 Japan Society for Scientific Studies on Cultural Properties  
 Society of Tropical Ecology  
 The Society of Biosophia Studies  
 Japanese Society for DNA Polymorphism Research  
 The Society for the Study of Phytogeography and Taxonomy  
 The Japanese Forest Society

**[Awards]**

Ninth Matsushita Konosuke “Hana to midori no hakuran-kai kinen shorei-sho” (2001)  
 Seventh NHK Shizuoka broadcasting station “Akebono-sho” (2001)  
 Seventeenth Hamada Seiryō-sho (2004)

—Achievements—

**[Books]**

*[Authored/Co-authored]*

- Sato Yo-ichiro 2013, 07 Know about and eat various rice in the world/Shirou Tabeyou Sekai no Kome. Iwanami Junior Series. Iwanami Shoten, Tokyo, 214pp. (in Japanese)

**SEKINO Tatsuki**

Associate Professor

**Born in 1969.**

**[Academic Career]**

Department of Zoology, Faculty of Science, Kyoto University, D. Course (1998)  
 Department of Biology, Faculty of Science, Shinshu University, M. Sc. (1993)  
 Department of Biology, Faculty of Science, Shinshu University (1991)

**[Professional Career]**

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

## —Achievements—

**[Books]***[Chapters/Sections]*

- Sekino, T. 2014,01 Application of database. Research Institute for Humanity and Nature (ed.) Manual for Global Environmental Science Vol. 2. A, Shinjyuku-ku Tokyo, pp.126-127. (in Japanese)
- Sekino, T. 2014,01 Why integration and visualization are required?. Research Institute for Humanity and Nature (ed.) Manual for Global Environmental Science Vol. 2. Asakura Pub., Shinjyuku-ku Tokyo, pp.115. (in Japanese)
- Sekino, T. 2014,01 Time Information System. Research Institute for Humanity and Nature (ed.) Manual for Global Environmental Science Vol. 2. Asakura Pub., Shinjyuku-ku Tokyo, pp.116-117. (in Japanese)

**[Papers]***[Original Articles]*

- Sekino T. and Yasutomi N. 2014,01 How can we leave research resources originated in various scientific fields? -An example of "RIHN Archives". IPSJ SIG Technical Reports 2014-CH-101(6) :1-6. (in Japanese)
- Sekino T. and Yamada T. 2013,12 Interpretation of character strings expressing date and conversion of calendar - Toward construction of integrated base of calendars . IPSJ Symposium Series 2013(4) : 161-166. (in Japanese) (reviewed).
- Sekino T. 2013,10 Can SIG-CH become a Hub between Humanities and Informatics? . IPSJ SIG Technical Reports 2013-CH-100(10) :1-3. (in Japanese)

*[Review Articles]*

- Sekino T., Yamada T., Ohmukai I. and Hara S. 2013,12 Information Technology for "Knowledge of Area". IPSJ Symposium Series 2013(4) :87-88. (in Japanese)

**[Research Presentations]***[Oral Presentation]*

- Sekino T. and Yasutomi N. How can we leave research resources originated in various scientific fields? -An example of "RIHN Archives".. IPSJ SIG-CH 101, 2014,01,25, Doshisha University. (in Japanese)
- Sekino T. and Yamada T. Interpretation of character strings expressing date and conversion of calendar - Toward construction of integrated base of calendars. Computers and Humanities Symposium 2013, 2013,12,12-2013,12,14, Kyoto University. (in Japanese)
- Sekino, Tatsuki Time Information System HuTime and Realization of "Temporal Information Science". PNC 2013 Annual Conference and Joint Meetings, 2013,12,10-2013,12,12, Kyoto University.
- Sekino, T. GT-Tools: Role of spatiotemporel information in resource sharing for the humanities. PNC 2013 Annual Conference and Joint Meetings, 2013,12,10-2013,12,12, Kyoto University. (in Japanese)
- Sekino T. Can SIG-CH become a Hub between Humanities and Informatics?. IPSJ SIG-CH 100, 2013,10,05, National Museum of Ethnology. (in Japanese)

*[Invited Lecture / Honorary Lecture / Panelist]*

- Sekino T., Yamada T., Ohmukai I. and Hara S. Information Technology for "Knowledge of Area". Computers and Humanities Symposium 2013, 2013,12,12-2013,12,14, Kyoto University. (in Japanese)
- Sekino T. Application of temporal information for humanities. Special Session "Application of spatio-temporal information for humanities", Forum on Information Technology 2013, 2013,09,04, Tottori University. (in Japanese)



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**TAKEMURA Shion**


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Project Researcher

**—Achievements—****[Papers]***[Original Articles]*

- Kamitsuru, S., Akamatsu, Y., Kamiya, D. and Takemura, S. 2014,03 Factor Analysis for Forestation in First-class Rivers of Chugoku District.. Journal of Japan Society of Civil Engineers, Ser. B1 (Hydraulic Engineering) 70(4) : I\_1393-I\_1398. (in Japanese) (reviewed).
- Inui, R.; Takemura, S.; Koyama, A.; Onikura, N. & Kamada, M. 2014,01 Potential distribution of Tridentiger barbatus (Günther 1861) and Tridentiger nudicervicus (Tomiyama 1934) in the Seto Inland Sea, western Japan. Ichthyological Research 61 :83-89. (reviewed).

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**TANIGUCHI Makoto**


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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]*

- Uyar, A., Taniguchi, M. 2013 Regional Science–Society Interface within Global Environmental and Social Change towards Sustainability. Japan Social Innovation Journal 3(1). DOI:1. (reviewed).

*[Review Articles]*

- Taniguchi, M. 2013 Groundwater and climate change: Problems and ideas for the better management as the water resources. Proceedings of The 3rd Gelk International Symposium (20) :21.

Ueru TANAKA

---

Associate professor

**Born in 1960.**

**[Higher Degrees]**

Dr. Agric(Kyoto Univeristy, 1997)

—Achievements—

**[Editing]**

*[Editing / Co-editing]*

- Le Van An, Ueru Tanaka and Hirohide Kobayashi (ed.) 2013,09 Project report on local livelihood diversification for vulnerable people in natural disaseter prone areas. Agricultural Publishing House, Hanoi, Vietnam, 331pp.

**[Papers]**

*[Original Articles]*

- Ho Trung Thong, Vu Chi Cuong, Ho Le Quynh Chau, Tanaka Ueru, Nguyen Van Hoang 2013,11 Nitrogen-corrected metabolizable energy values and nutrient apparent digestibilities of fish meal for broiler. Science and Technology Journal of Agriculture and Rural Development 19/2013 :78-84. (Other) (reviewed). (in Vietnamese with English summary) .
- Hidetoshi MIYAZAKI, Yudai ISHIMOTO, Ueru TANAKA, Chieko UMETSU 2013,08 The role of the sweet potato in the crop diversification of small-scale farmers in SouthernProvince, Zambia. African Study Monographs 34(2) :119-137. (reviewed).

**[Research Presentations]***[Oral Presentation]*

- Hidetoshi MIYAZAKI, KP Singh, H. ENDO, U. TANAKA Soil Fertility Management for Smallholder Farmer in Semi Arid Tropics: In case of South Rajasthan. National Seminar on Traditional Storage Technology and Agricultural System, 2013,10,27-2013,10,28, Udaipur, India.
- K.P. Singh, H. Miyazaki, H. Endo, J.S. Kharakwal, Ueru Tanaka Save the indigenous agricultural techniques (Special Reference to Rajasthan). National Seminar on Traditional Storage Technology and Agricultural System, 2013,10,27-2013,10,28, Udaipur, India.
- Yudai Ishimoto, Hidetoshi Miyazaki, Ueru Tanaka, Chieko Umetsu Discussion on the Informal Safety Net by Mobile Phone in Southern Zambia. 4th Lusaka Resilience Workshop, "Towards Comprehensive Food Security: Bridging Climate Resilience and Disaster Resilience" , 2013,08,29, Lusaka, Zambia.

*[Poster Presentation]*

- Ueru TANAKA, K. IKAZAKI, Y. SASAKI, H. SHINJO and S. TOBITA A technique practical for local people to improve crop performance with erosion control in the Sahel, West Africa. GCOE-ARS Final Symposium 2013, 2013,12,01-2013,12,03, Uji Campus, Kyoto University.
- Yuko SASAKI, Ueru TANAKA, Kenta IKAZAKI, Hitoshi SHINJO, Satoshi TOBITA Lessons learnt from the extension of practical technique to control wind erosion with improvement of crop performance in Niger, West Africa. Conference on Desertification and Land Degradation, 2013,07,17-2013,07,18, University of Ghent, Belgium .
- T. Shimizu, U. Tanaka, Y. Sasaki, K. Ikazaki, H. Shinjo and H. Nakamura Co-design of practical technique using local materials and knowledge to control water erosion with improvement of household income in Niger, West Africa. Conference on Desertification and Land Degradation, 2013,07,17-2013,07,18, University of Ghent, Belgium .
- Ueru TANAKA, K. IKAZAKI, Y. SASAKI, H. SHINJO and S. TOBITA A technique practical and affordable for local people to improve crop performance with erosion control in the Sahel, West Africa. Conference on Desertification and Land Degradation, 2013,07,17-2013,07,18, University of Ghent, Belgium.
- Hidetoshi MIYAZAKI, Y. ISHIMOTO, U. TANAKA, C. UMETSU Transformation of the ownership of indigenous trees as common resources - a case study in the semiarid tropics of Zambia - . IASC2013 (International Association for the Study of the Commons 2013), 2013,06,03-2013,06,07, kitafuji, Japan. .
- Ueru Tanaka, K. Ikazaki, Y. Sasaki, H. Shinjo, S. Tobita Practical technique and extension method for improvement of crop performance with wind erosion control. UNCCD 2nd Scientific Conference, 2013,04,09-2013,04,12, Bonn (Germany).

*[Invited Lecture / Honorary Lecture / Panelist]*

- Ueru Tanaka Practical technique to improve crop performance and wind erosion control in the Sahel, West Africa. Special Seminar in Ankara , 2013,07,29, Ministry of Water and Forest, Ankara, Turkey.
- Ueru Tanaka, Yuko Sasaki, Takao Shimizu and Kenta Ikazaki Design and verification of practical techniques concurrently enhancing farmland productivity and desertification control in the Sahel, West Africa. TICAD V Official Side Event, 2013,06,02, Yokohama, Japan.
- Ueru Tanaka Local knowledge and soil-friendly tool in Sahelian traditional agriculture. International Forum on GIAHS, 2013,05,29, Nanao, Japan.

## 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

**—Achievements—****[Papers]***[Original Articles]*

- Kanamori, H., T. Yasunari, and K. Kuraji 2013 Modulation of the diurnal cycle of rainfall associated with the MJO observed by a dense hourly rain gauge network at Sarawak, Borneo. *J. Climate* . (reviewed). in press .

- Abe, M. M. Hori, T. Yasunari, A. Kitoh 2013 Effects of the Tibetan Plateau on the onset of the summer monsoon in South Asia: The role of the air-sea interaction. *J. Geophys. Res.* . DOI:10.1002/jgrd.50210. (reviewed). in press.
- AP Dimri, T Yasunari, A Wiltshire, P Kumar, C Mathison, J Ridley, D Jacob 2013 Application of regional climate models to the Indian winter monsoon over the western Himalayas. *Science of the total environment*, Elsevier . DOI:10.1016/j.scitotenv.2013.01.040. (reviewed).
- Yasunari, T., Niles D.N., Taniguchi, M. and Chen, D 2013 Asia: Proving Ground for Global Sustainability. *Current Opinion in Environmental Sustainability*, Elsevier . DOI:10.1016/j.cosust.2013.08.002. (reviewed). in press.

## 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

American Geophysical Union

American Meteorological Society

### —Achievements—

#### [Research Presentations]

##### [Oral Presentation]

- N. Yasutomi Effects of increase of observation data input on terrestrial climatological mean temperature over Asia. Japan Geoscience Union Meeting, 2013, 2013, 05, 19–2013, 05, 23, Chiba, Japan.



## 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-07 (FR5)	Global Warming and the Human-Nature Dimension in Siberia: Social Adaptation to the Changes of the Terrestrial Ecosystem, with an Emphasis on Water Environments	60	3	30	1	0	2	7	0	0	17
C-08 (FR4)	Megacities and the Global Environment	67	8	32	2	14	0	1	2	2	6
C-09-Init (FR3)	Designing Local Frameworks for Integrated Water Resources Management	90	7	20	5	6	0	3	1	0	48
D-05 (FR2)	Coastal Area Capability Enhancement in Southeast Asia	112	11	53	0	18	0	8	0	0	22
R-05 (FR5)	A Study of Human Subsistence Ecosystems in Arab Societies: To Combat Livelihood Degradation for the Post-oil Era	93	6	19	1	12	0	5	9	1	40
R-06 (FR3)	Managing Environmental Risks to Food and Health Security in Asian Watersheds	26	7	8	1	0	0	1	0	1	8
R-07 (FR2)	Desertification and Livelihood in Semi-Arid Afro-Eurasia	30	7	14	1	3	0	1	3	0	1
R-08-Init (FR1)	Human-Environmental Security in Asia-Pacific Ring of Fire: Water-Energy-Food Nexus	69	10	22	4	5	0	5	1	0	22
E-05-Init (FR2)	Creation and Sustainable Governance of New Commons through Formation of Integrated Local Environmental Knowledge	128	8	49	6	17	0	9	10	1	28
PR (NAKATSUKA)	Societal Adaptation to Climate Change: Integrating Palaeoclimatological Data with Historical and Archaeological Evidences	53	3	27	2	9	3	8	1	0	0
FS ※ (MCGREEVY)	Lifeworlds of Sustainable Food Consumption: Agrifood Systems in Transition	25	2	10	1	4	0	2	2	0	4
FS ※ (MCLELLAN)	Co-designing Futurable Anthropospheric Energy Systems	9	1	5	0	0	0	0	0	0	3
FS (ISHIKAWA)	Improving Environmental Literacy to Promote Self-Sustaining Communities	33	1	18	1	6	0	2	0	0	5
FS (ONISHI)	Biocultural Diversity in the Asia-Pacific : Linking Community-based Participatory Research and the Transmission of Ecological Knowledge to Future Generations	37	2	9	1	3	2	2	0	0	18

FS (OKUDA)	Biodiversity-driven Nutrient Cycling in Social-ecological Systems: New Measures of Ecosystem Health	68	1	28	4	12	0	16	1	1	5
FS (TANAKA)	A Transdisciplinary Study of the Environmental Impact of Military Activities	17	1	8	1	4	1	1	0	0	1
FS (HABU)	Long-term Sustainability through Place-based, Small-scale Economies: Approaches from Historical Ecology	37	2	5	2	4	1	3	1	1	18
	Total	954	80	357	33	117	9	74	31	7	246

FS※= Initiative Feasibility Study

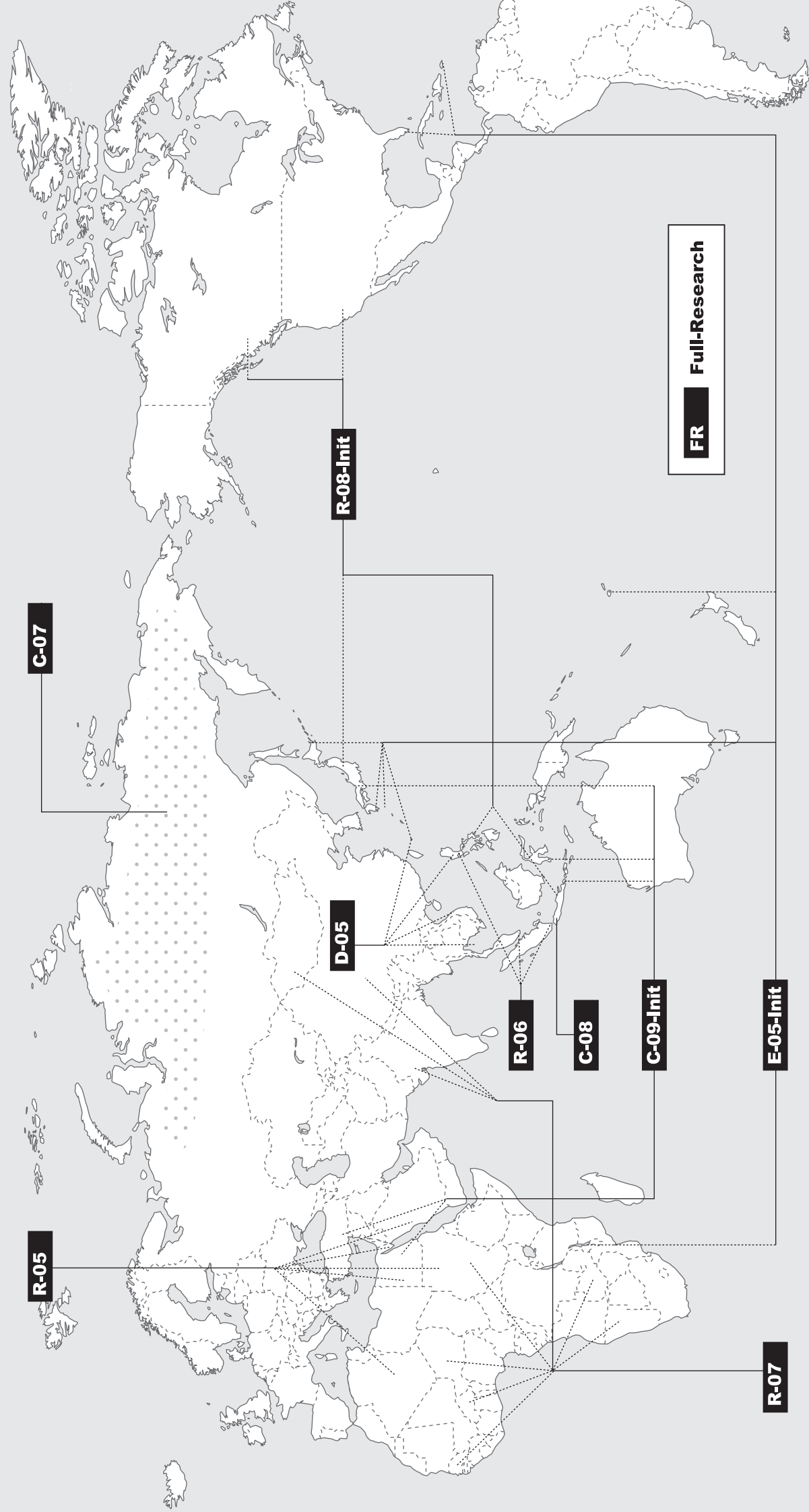
As of 31 March, 2014



**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-07 (FR5)	Global Warming and the Human-Nature Dimension in Siberia: Social Adaptation to the Changes of the Terrestrial Ecosystem, with an Emphasis on Water Environments	46	10	4	60	(Natural Sciences) Ecohydrology, Earth science, Ethology, River engineering, Hydrology, Atmospheric model, Atmospheric physics, Water and energy cycle, Isotope hydrology, Conservation ecology, Ecology, Marine physics, Limnology, Biological ice-core analysis, Ice core study, Atmospheric chemistry, Forestry, Meteorology, Biology, Environmental conservation, Remote sensing and modeling, Climatology, Forest science, Forest meteorology, Resource economics, Dendrochronology, Ecological hydrology, Animal physiological ecology, Plant physiological ecology, Groundwater analysis, Frozen ground science, Cryosphere landscape, Ecosystem impact (Humanities) Descriptive linguistics, Social anthropology, Religious ethnology, Mythology, Linguistics (Sakha), Cultural anthropology, Sociology, Politics (Social Sciences) Russian economics, River engineering, River ice engineering, Civil engineering, International relations, History
C-08 (FR4)	Megacities and the Global Environment	14	21	32	67	(Natural Sciences) Infrastructure planning and management, Hydrology, Urban planning, City sustainability, Remote sensing, Landscape ecology, Irrigation and drainage, Water resource planning, Architectural environmental engineering, Environmental studies (Humanities) Japanese economic history, Economic history of Dutch East Indies, Religion, Linguistic anthropology, Food culture, Asian economic history, Chinese history in the early modern ages, Chinese socio-economic history, Study of overseas Chinese, Indonesian modern history, Cultural science, History and culture, Oriental history, Urban history, Architectural history, Literacy education for urban environment, Geography of developing countries, (Social Sciences) Architectural history, Cultural Anthropology of Urban history, Anthropology, Urban study in South East Asia, Historical demography, Regional resources management, Geographic information system, Urban policy planning, Food engineering, Information agriculture, Urban redevelopment, Chinese urban history, Western urban history, Urban history in southeast Asia, Environmental economics, Studies of colonial architecture, City planning and spatial information science, Urban history (Colonial city), Workplace design, Architectural design, Commercial science, Marketing and distribution, Islamic architecture, Soundscape, Modern architectural history, Architectonics, Architectural planning, Architect, Design, Studies of China-towns, Business administration, Soundscape studies, Axiology, Sociology, Agro informatics, Food (marine products), Fisheries resource management, Consumer behavior, Commerce, Innovation research, Social science
C-09-Init (FR3)	Designing Local Frameworks for Integrated Water Resources Management	63	10	17	90	(Natural Sciences) Farming system research, Agriculture, 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, Agricultural engineering (Humanities) Archaeology, Cultural anthropology, Anthropology, Economic geography, Development anthropology, Geography, History of Islamic art and culture, Water resource management (Social Sciences) Environmental policy, Environmental sociology, Policy science, Management, Sociology, Agricultural engineering, Environmental science, Environmental planning, Social development study, Agricultural economics, Socioeconomics, Regional development planning
D-05 (FR2)	Coastal Area Capability Enhancement in Southeast Asia	86	9	17	112	(Natural Sciences) Tropical forest research, Fish ecology, Fish taxonomy, Population genetics, Genetics, Fisheries science, Ichthyology, Coastal 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, Coastal 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-05 (FR5)	A Study of Human Subsistence Ecosystems in Arab Societies: To Combat Livelihood Degradation for the Post-oil Era	52	28	13	93	(Natural Sciences) Forest hydrology, Bioacoustics, Physical anthropology (Molecular anthropology), Agricultural chemistry, Plant ecophysiology, Aquatic biological informatics, Plant ecology, Forest ecology, Hydrology, Soil hydrology, Animal physiology, Nutrient physiology, Tree environmental physiology, Environmental geomorphology, Botanical phylogenetic systematics, Paleobotany, Biogeography, Natural geography, Revegetation technology, Afforestation, Biological oceanography, Oceanography, Bio-chemistry, Forestry, Tree physiology, Entomology, Agricultural economics, Agricultural education, Food science, Nutritional physiology, Remote sensing - GIS, Agriculture, Genetics, Seed, Plant physiology, Water resource management, Weed science, Fungology, Biology (Humanities) Archaeology, Islamic culture, Cultural Anthropology, Area studies, History, Religious anthropology, Architectural history, Architectonics, Botany, Agricultural economics, Social anthropology, Education (Social Sciences) Irrigation and drainage, Landscape ecology, Development study, Rural development, Marine biology, Folklore, Afforestation, Plant ecology, City planning, Geology, Remote sensing, Fisheries, Marine mineral resources
R-06 (FR3)	Managing Environmental Risks to Food and Health Security in Asian Watersheds	19	0	7	26	(Natural Sciences) Isotope environmental studies, Public health, Earth and space science, Organic chemistry, Earth science, Environmental chemistry, Environmental risk, Plant ecology, Isotopic-geochemical study, Disaster management, Preventive medicine, Ecology, Field epidemiology, Biology, Environmental medicine, Lake environmental studies, Biological chemistry (Social Sciences) Environmental economics, Environmental resource economics, Spatial econometrics, Resource economics, Environmental studies, Civil and environmental engineering, Resource management, Database administration
R-07 (FR2)	Desertification and Livelihood in Semi-Arid Afro-Eurasia	15	5	10	30	(Natural Sciences) Agronomy, Boundary agriculture, Remote sensing, Soil ecology, Soil science, Weed science, Meteorology, Natural geography, Architecture (Humanities) Ethnoarchaeology, Cultural anthropology, Ethnic geography (Social Sciences) Rural development studies, Social development studies, Rural economics, Area studies (Africa, South Asia), Social anthropology
R-08-Init (FR1)	Human-Environmental Security in Asia-Pacific Ring of Fire: Water-Energy-Food Nexus	39	6	24	69	(Natural Sciences) Hydrology, Underground heat, Hot spring science, Energy science, Thermal energy, Agricultural water utilization, Bioresource ecology, Model of connectivity of hills, Humans and oceans, Geothermal science, Estuary ecology, Fisheries and environmental oceanography, Coastal fisheries ecology, Geothermal energy, Coastal fisheries, Bioresource science, Marine / coastal geology, Geology, Water - energy nexus, Coastal oceanography (Humanities) History, Linguistic (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, Energy policy, Economics, Environmental social science, Behavioral social science, Integrated water resources management, Cultural anthropology
E-05-Init (FR2)	Creation and Sustainable Governance of New Commons through Formation of Integrated Local Environmental Knowledge	44	17	67	128	(Natural Sciences) Local environmental science, Landscape ecology, Statistical physics, Governance theory, Science and technology studies, Fishery resource 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, Ecosystem management, Agroecosystem, Knowledge theory, Watershed management, Fisheries management (Humanities) Science ethics, Folklore, Governance theory, Ecological anthropology, Social anthropology, History, Japanese history (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 psychology, Environmental governance, Ocean policy, Environmental NGO theory, Coastal management
PR (NAKATSUKA)	Societal Adaptation to Climate Change: Integrating Palaeoclimatological Data with Historical and Archaeological Evidences	32	20	1	53	(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 (Humanities) Japanese Early Modern Age History, Archaeology, Japanese Early Modern Age Urban History, Comparative Studies of Historical Documents, Prehistorical Archaeology, Conservation of Historical Materials, Japanese Middle Age History, Japanese Archaeology, Theoretical Archaeology, Japanese History, Vegetational History, Disaster Archaeology, Historical Geography (Social Sciences) Japanese Economic History, Historical Demography
FS ※ (MCGREEVY)	Lifeworlds of Sustainable Food Consumption: Agrifood Systems in Transition	10	3	12	25	(Natural Sciences) Soil Science, Agrifood Social Science, Agricultural Economics, Rural Sociology, Food System Science, Farm Management, Regional Studies, Renewable Energy Sciences, Water Quality, Resource Cycling, Weed Management Science (Humanities) Environmental Sociology, Social Statistics, Regional Policy and Planning (Social Sciences) Environmental Sociology, Environmental Planning, Food Policy, Rural Planning, Innovation Studies, Management Theory, Global Agricultural Economics, Agrifood Social Science, Economic Sociology
FS ※ (MCLELLAN)	Co-designing Futurable Anthropospheric Energy Systems	7	0	2	9	(Natural Sciences) Energy engineering, Earth system science, Life cycle engineering, Process engineering (Social Sciences) Politics, Public policy
FS (ISHIKAWA)	Improving Environmental Literacy to Promote Self-Sustaining Communities	18	8	7	33	(Natural Sciences) Geography, Hydrology, Climatology, Land atmosphere interaction, Ecology, Practical environmental studies, Environmental remediation, Environmental geography, Biochemical cycles, Consortium, Stable isotope ecology, Agricultural meteorology, Environmental science, Air pollution, Environmental economics and policy, Meteorology, Glaciology (Humanities) Rural economics, Cultural anthropology, Area studies, Cognitive psychology, Science and technology studies, Ecological anthropology, Social psychology (Social Sciences) Sustainability studies, Social psychology, Agricultural economics, Economics, Science management
FS (ONISHI)	Biocultural Diversity in the Asia-Pacific : Linking Community-based Participatory Research and the Transmission of Ecological Knowledge to Future Generations	13	18	6	37	(Natural Sciences) Agriculture, Plant breeding, Ecology, Forestry, Climatology, Wood anatomy, Botany, Biology, Pharmacy, Human ecology (Humanities) Linguistics, Culture and information science, Sociolinguistics, Geography, Human geography, Spatiotemporal Informatics, Anthropology, Archaeology, Education (Social Sciences) Forestry, Environmental governance, Environmental economics, Economics, Peace studies
FS (OKUDA)	Biodiversity-driven Nutrient Cycling in Social-ecological Systems: New Measures of Ecosystem Health	56	1	11	68	(Natural Sciences) Ecological science, Plant ecology, Satellite ecology, Stable isotope ecology, Community ecology, Water weed resource circulation, Fish genetics and breeding science, Freshwater biology, Environmental engineering, Freshwater ecology, Fish ecology, Phycology, Ecological stoichiometry, Marine ecosystem engineering, Ecosystem ecology, Aquatic biology, Fisheries 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 (Humanities) Historical geography (Social Sciences) Environmental policy, Sewage line governance, Rural sociology, Environmental sociology, Industrial ecology, Ecological economics, Applied economics, Quantitative sociology, Social psychology
FS (TANAKA)	A Transdisciplinary Study of the Environmental Impact of Military Activities	3	0	14	17	(Natural Sciences) Earth and environmental studies, Environmental engineering (Humanities) Humanities (Social Sciences) Cultural anthropology, Social anthropology, Ryukyuan and Okinawan studies, Medical anthropology, Environmental economics
FS (HABU)	Long-term Sustainability through Place-based, Small-scale Economies: Approaches from Historical Ecology	9	0	28	37	(Natural Sciences) Oceanography, Aquatic marine environmental education research, Global environmental oceanography, Paleoenvironment, Stable isotope ecology, Botanical archaeology, Anthropology, Agroecology, Physical anthropology, Environmental archaeology (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, Bioarchaeology, Archaeology, Cultural ecology, Evolutionary ecology, Dissemination and enlightenment of environmental issues, Area studies, Lifelong learning
	Total	526	156	272	954	

FS ※ = Initiative Feasibility Study



## Full-Research

**C-07** Global Warming and the Human-Nature Dimension in Siberia: Social Adaptation to the Changes of the Terrestrial Ecosystem, with an Emphasis on Water Environments

- o Lena River Basin, East Siberia

**C-08** Megacities and the Global Environment

- o Jakarta Mega-Urban Region

**C-09-Init** Designing Local Frameworks for Integrated Water Resources Management

- o Turkey; Egypt; Indonesia; Shiga, Japan

**D-05** Coastal Area Capability Enhancement in Southeast Asia

- o Coastal states of Southeast Asia; Ishigakijima, Mikawa Bay, Japan; Hue, Vietnam

**R-05** A Study of Human Subsistence Ecosystems in Arab Societies: To Combat Livelihood Degradation for the Post-oil Era

- o Semi-arid lands in Sudan, the Sinai Peninsula in Egypt, the Red Sea coast in Sudan, Saudi Arabia and Egypt, and Saharan oasis in Algeria

**R-06** Managing Environmental Risks to Food and Health Security in Asian Watersheds

- o Laguna Lake area in the Philippines; Kuala Lumpur, Malaysia; Lampung, Indonesia

**R-07** Desertification and Livelihood in Semi-Arid Afro-Eurasia

- o Niger, Burkina Faso, Namibia, Zambia, India, Senegal, Sudan, China, Mongolia

**R-08-Init** Human-Environmental Security in Asia-Pacific Ring of Fire: Water-Energy-Food Nexus

- o Obama, Beppu, Otsuchi, Japan; Indonesia; Philippines; British Columbia, Canada; California, USA

**E-05-Init** Creation and Sustainable Governance of New Commons through Formation of Integrated Local Environmental Knowledge (ILEK project)

- o Yakushima, Shiretoko, Shiraho, Ishigaki-city, Ayacho, Miyazaki, Japan; Fiji; Virgin Islands of the United States; Sarasota Bay, Florida; Lake Malawi, Malawi