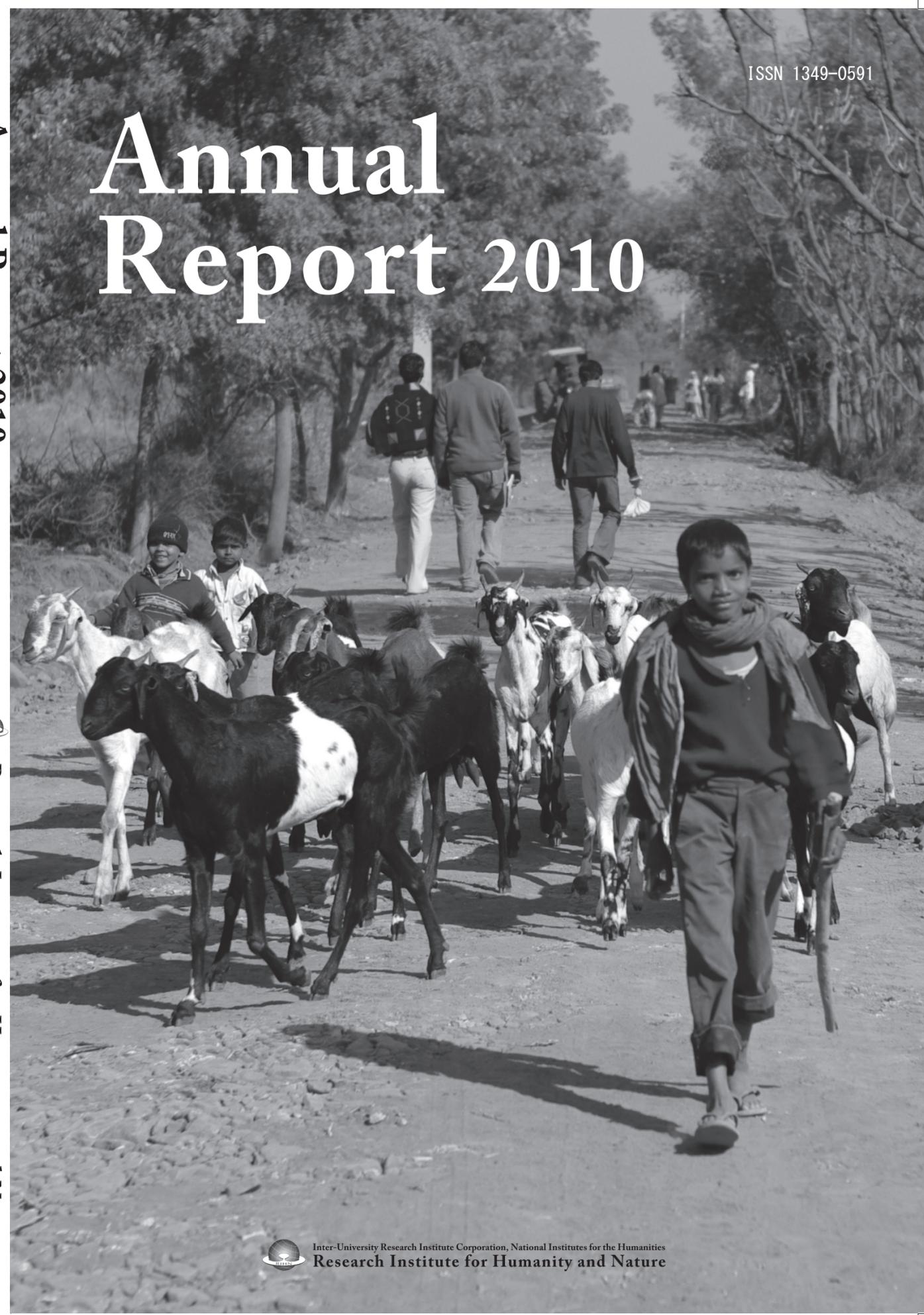


# Annual Report 2010

Annual Report 2010

Research Institute for Humanity and Nature



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Issued on May 2010

photo ENDO Jin

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

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## Research Activities

### ● Full-Research

- |                     |   |              |
|---------------------|---|--------------|
| <b>Project No.</b>  | <b>C-05 (Project leader: TANIGUCHI Makoto)</b>  | <b>p. 4</b>  |
| <b>Project Name</b> | Human Impacts on Urban Subsurface Environments  |              |
| <b>Project No.</b>  | <b>C-06 (Project leader: KAWABATA Zen'ichiro)</b>   | <b>p. 10</b> |
| <b>Project Name</b> | Effects of Environmental Change on the Interactions between Pathogens and Humans  |              |
| <b>Project No.</b>  | <b>C-07 (Project leader: INOUE Gen)</b>   | <b>p. 17</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. 23</b> |
| <b>Project Name</b> | Megacities and the Global Environment   |              |
| <b>Project No.</b>  | <b>D-02 (Project leader: YUMOTO Takakazu)</b>   | <b>p. 31</b> |
| <b>Project Name</b> | A New Cultural and Historical Exploration into Human-Nature Relationships in the Japanese Archipelago   |              |
| <b>Project No.</b>  | <b>D-03 (Project leader: OKUMIYA Kiyohito)</b>  | <b>p. 40</b> |
| <b>Project Name</b> | Human Life, Aging and Disease in High-Altitude Environments: Physio-Medical, Ecological and Cultural Adaptation in "Highland Civilizations"                     |              |
| <b>Project No.</b>  | <b>D-04 (Project leader: YAMAMURA Norio)</b>  | <b>p. 44</b> |
| <b>Project Name</b> | Collapse and Restoration of Ecosystem Networks with Human Activity  |              |
| <b>Project No.</b>  | <b>E-04 (Project leader: UMETSU Chieko)</b>   | <b>p. 52</b> |
| <b>Project Name</b> | Vulnerability and Resilience of Social-Ecological Systems   |              |
| <b>Project No.</b>  | <b>H-02 (Project leader: SATO Yo-Ichiro)</b>  | <b>p. 57</b> |
| <b>Project Name</b> | Agriculture and Environment Interactions in Eurasia: Past, Present and Future —A ten-thousand-year history  |              |
| <b>Project No.</b>  | <b>H-03 (Project leader: OSADA Toshiki)</b>   | <b>p. 62</b> |
| <b>Project Name</b> | Environmental Change and the Indus Civilization   |              |
| <b>Project No.</b>  | <b>H-04 (Project leader: UCHIYAMA Junzo)</b>  | <b>p. 70</b> |
| <b>Project Name</b> | Neolithisation and Modernisation: Landscape History on East Asian Inland Seas   |              |
| <b>Project No.</b>  | <b>R-03 (Project leader: KUBOTA Jumpei)</b>   | <b>p. 77</b> |
| <b>Project Name</b> | Historical Interactions between Multi-Cultural Societies and the Natural Environment in a Semi-Arid Region in Central Eurasia                                   |              |
| <b>Project No.</b>  | <b>R-04 (Project leader: MOJI Kazuhiko)</b>   | <b>p. 86</b> |
| <b>Project Name</b> | Environmental Change and Infectious Diseases in Tropical Asia   |              |

- Project No.** R-05 (**Project leader: NAWATA Hiroshi**) **p. 93**  
**Project Name** A Study of Human Subsistence Ecosystems in Arab Societies :  
 To Combat Livelihood Degradation for the Post-Oil Era
- **Pre-Research** **p. 103**  
**Project No.** PR (**Project leader: KADA Ryohei**)  
**Project Name** Managing Environmental Risks to Food and Health Security in Asian Watersheds
- **Feasibility Studies**
- Project No.** FS (**FS Proposer: ISHIKAWA Satoshi**)  
**Project Name** Coastal Area Capability in Southeast Asia
- Project No.** FS (**FS Proposer: OKUDA Toshinori**)  
**Project Name** The Effect of Local Governance on Incentive Programs for Forest Ecosystem Service  
 Conservation
- Project No.** FS (**FS Proposer: TANAKA Ueru**)  
**Project Name** Desertification, Local Husbandry and Livelihoods in Sub-Sahara Africa
- Project No.** FS (**FS Proposer: TANAKA Hiroki**)  
**Project Name** The Hydrological Cycle and Water Problems in the Changjiang River Basin:  
 Human-Nature Interaction in a Transforming China
- Project No.** FS (**FS Proposer: NAGAO Seiya**)  
**Project Name** Environmental Peninsula Science for Establishment of a Sustainable Society  
 on Noto Peninsula
- Project No.** FS (**FS Proposer: HAYASHIDA Sachiko**)  
**Project Name** Atmospheric Methane and Agriculture in Monsoon Asia
- Project No.** FS (**FS Proposer: FUKUI Kiichi**)  
**Project Name** Green Earth: Plant, Human and Earth Interactions
- Project No.** FS (**FS Proposer: MATOH Toru**)  
**Project Name** Designing Agriculture in the Era of Petroleum Scarcity
- Project No.** FS (**FS Proposer: WATANABE Tsugihiko**)  
**Project Name** Historical Evaluation and the Future of Irrigation

**●Incubation Studies****p. 106**

NAKATSUKA Takeshi (Graduate School of Environmental Studies, Nagoya University)

Exploring of Social Systems Tolerant of Climate Variations by Collaboration of High-resolution Paleoclimatology with History and Archeology

NODA Shin-ichi (Research Center for the Pacific Islands, Kagoshima University)

Social Changes in Micronesian Area-natural-social Environment and Life

FUKUSHIMA Takehiko (Graduate School of Life and Environmental Sciences, University of Tsukuba)

Water Environment Problems and Futurability in the Lakes of Downstream/pollution-accumulating Type

MURAMATSU Koichi (Research Institute for Oriental Cultures, Gakushuin University)

The History and Environment on Water and Human in Livelihood Mixed Area of the East Asia

WATANABE Hisami (Tropical Biosphere Research Center, University of the Ryukyus)

Changes of Food-nutritional Status and Diseases in People Living in Dependence on the Mekong River

**Stage: FR**

**Project No.: C-05**

**Project Name: Human Impacts on Urban Subsurface Environments**

**Abbreviated Title: Urban Subsurface Environment**

**Project Leader: TANIGUCHI, Makoto**

**Research Axis: Circulation**

**URL: <http://www.chikyu.ac.jp/USE/>**

**Key Words: subsurface environment, groundwater, urbanization, heat island, contamination, subsurface thermal anomaly, development stage of the city**

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## ■ Research Subject and Objectives

### 1. Research Objectives

Securing water resources and preventing contamination of water caused by human activities in urban areas are global environmental issues in the 21st century. Heat island phenomena caused by human activities is also a big environmental problem in addition to global warming. These global environmental issues which are caused by urbanization, should be addressed strongly and prevented as population and density increases occur rapidly in urban areas.

Most global environmental studies have long been focused on the environmental issues above ground, such as air pollution, global warming, seawater pollution, and decrease in biodiversity. Subsurface environmental issues are also important for human life in the present and future, but have been largely ignored because of the invisibility of the phenomena and difficulty of evaluations.

Subsurface environmental problems such as subsidence due to excessive pumping and groundwater contamination, have occurred repeatedly in Asian major cities with a time lag depending on the development stage of urbanization. Therefore, we may be able to assess future scenarios if we can evaluate the relationships between subsurface environmental problems and the development stage of the city.

### 2. Research Content

This project deals with: (1) Relationships between the development stages of the cities and subsurface environmental problems which will be assessed by socio-economic analyses and reconstructions of urban areas using historical records; (2) Serious problems in subsurface environments and changes in reliable water resources which will be studied after evaluations of groundwater flow systems and changes in groundwater storage using hydrogeochemical data and in-situ/satellite-GRACE gravity data; (3) Evaluation of accumulation of materials (contaminants) in subsurface and their transport from land to ocean including groundwater pathways using chemical analyses of subsurface water, sediments and tracers; and (4) Subsurface thermal contamination due to the "heat island" effect in urban areas by reconstruction of surface temperature history and urban meteorological analyses.

Tokyo, Osaka, Bangkok, and Jakarta are targeted as main study cities, and Taipei, Manila and Seoul are selected as secondary study cities, depending on the four sub-themes. The project will focus on the urban subsurface environments however, we will treat the problems on a basin scale, because subsurface water, heat, and material transports are interconnected on this scale. We will assess the relationships between subsurface environmental changes and human activities during the past 100 years.

## ■ Progress and Results in 2010

### Outline of results

(1) Field surveys on subsurface environment in targeted cities have been made, and monitoring of

subsurface environments at 7 cities (Bangkok, Jakarta, Manila, Seoul, Taipei, Tokyo and Osaka) has been going on.

(2) Assessments of natural and social data in each city, and a database based on GIS have been made. Land cover/use maps based on GIS with 0.5 km mesh have been made at three development stages (1930' s, 1970' s, and 2000' s) of seven cities.

(3) International Symposium, HydroChange2008, has been organized by RIHN, with IAHS and GWSP, and the book "From Headwater to the Ocean" has been published by CRC press (679 pp).

(4) Studies on cross cutting theme such as religion-groundwater relationships have been made in Bangkok and Jakarta. The relationships between groundwater discharge and elevation of the religious facilities and soil have been investigated.

(5) Interim results of the project have been published by special issue of STOTEN (Science of the Total Environment, Elsevier) including one overview and 15 original papers.

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## ■ Future Themes

- (1) New approaches on the relationship between law/institution and groundwater (private water) /surface water (public water) have been started. Integration of the chronology of the document and database will be made.
- (2) New working groups on integrated model and indicators will integrate the status of social economics, water resources, environmental loads, and policy on subsurface environment.
- (3) Land cover/use data based on GIS at three ages (1930' s, 1970' s and 2000' s) in 7 cities will be used for evaluating groundwater recharge rate, thermal storage in aquifer, and subsurface contamination.

## Books

### 【Chapters/Sections】

- Taniguchi, M. 2010 Water and Life. Akimichi, T., Kamatus, K., Nakamura, Y. (ed.) Spring water-when the people meet groundwater. Benseysha, pp.79-103. (in Japanese)
- Umetsu, C., Taniguchi, M., Watanabe, T., Yachi, S. 2010 Transdisciplinary Research in Watershed Conservation: Experience, Lessons, and Future Directions. J. A., Burnett, K. and Balisacan, A. M. (ed.) Sustainability Science for Watershed Landscapes. Southeast Asian Regional Center for Graduate Study and Research in Agriculture. Institute of Southeast Asian Studies, Los Banos, Philippines, pp.77-102.
- Taniguchi, M. 2010 Culture reflected in groundwater and canal in Thailand. Water and Culuter. Showa-do,, pp.220-224. (in Japanese)

## Editing

### 【Editing / Co-editing】

- Taniguchi, M., Kaneko, S., Yoshikoshi, A. (ed.) Mar,2011 Urban and Water Environment in Asia. Kokon-shoin, (in Japanese)
- Taniguchi, M., Taniguchi, T., Toyota, T. (ed.) Mar,2011 Megacities -landscape of cities and water-. Shinsensha, (in Japanese)

## Papers

### 【Original Articles】

- Glesson, T., VanderSteen, J., Sophocleous, A. M., Taniguchi, M., Alley, Diana, W. M., Allen, M., Zhou, Y. Jun,2010 Groundwater sustainability strategies. *Nature Gescience* VOL 3 :378-379. (reviewed).
- Hosono, T., Chih-Chieh, Su., Okamura, K., Taniguchi, M. 2010 Historical record of heavy metal pollution deduced by lead isotope ratios in core sediments from the Osaka Bay, Japan. *Journal of Geochemical Exploration* 107 :1-8. (reviewed).
- Hosono, T., Siringan,F., Yamanaka,T., Umezawa, Y., Onodera, S., Nakano T. and Taniguchi, M. 2010 Application of multi-isotope ratios to study the source and quality of urban groundwater in Metro Manila, Philippines. *Applied Geochemistry* 25 :900-909. (reviewed).

## Research Presentations

### 【Oral Presentation】

- Taniguchi, M. . Consortium formation meeting, Mar 01,2011, Bangkok, Thailand.
- Taniguchi, M. . 3rd Feedback seminar from RIHN project C05, Feb 28,2011, Bangkok, Thailand.
- Taniguchi, M. . 2nd Feedback seminar from RIHN project C05, Jan 06,2011, Jakarta, Indonesia.
- Taniguchi, M. . American Geophysical Union, Dec 16,2010, San Francisco, USA.
- Taniguchi, M. . UNESCO-IHP Training Course " Discussion" , Nov 19,2010, Nagoya University, Nagoya.
- Taniguchi, M. . UNESCO-GRAPHIC Expert Meeting, Nov 15,2010, RIHN, Kyoto.

- Taniguchi, M. . UNESCO - IHP Training Course "Global groundwater problems and adaptation to the changing climate and society", Nov 08,2010, Nagoya University, Nagoya.
- Taniguchi, M. . 1st Feedback seminar from RIHN project C05, Nov 03,2010, University of Philippines, Manila, Philippines.
- Taniguchi, M. . World Water Week, Sep 07,2010, Stockholm, Sweden.
- Taniguchi, M. . American Society of Limnology and Oceanography, Jun 07,2010, Santa Fe, USA.
- Taniguchi, M. Human impacts on urban subsurface environment. JpGU, May 23,2010, Makuhari, Chiba.
- Taniguchi, M. . European Geoscience Union, May 05,2010, Vienna, Austria.

**【Invited Lecture / Honororary Lecture / Panelist】**

- Taniguchi, M. Is submarine groundwater important pathway for water and material transports?. Symposium on Coastal Water Resources , Oct 22,2010, Pusan University, Tokyo.

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**Stage: FR**

**Project No.: C-06**

**Project Name: Effects of Environmental Change on the Interactions between Pathogens and Humans**

**Abbreviated Title: Environmental Diseases**

**Project Leader: KAWABATA, Zen' ichiro**

**Research Axis: Circulation**

**URL: <http://www.chikyu.ac.jp/z/>**

**Key Words: Freshwater ecosystem, Environmental alterations, Koi herpes virus (KHV) disease, Human life, Interactions, Model**

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## ■ Research Subject and Objectives Research Objectives and Topics

### Objectives

Infectious disease has become a significant global environmental problem. This study investigates the emergence and spread of Koi HerpesVirus (KHV) in Lake Biwa, Japan. KHV is a pathogen responsible for episodic mass mortality of common carp (*Cyprinus carpio carpio*) since the late 1990s. The common carp is the original domesticated aquaculture species, and an important source of protein today.

This study has three main objectives: (1) To describe Koi Herpes Virus disease ecology, including: the specific links between anthropogenic changes to freshwater ecosystems and the emergence and spread of KHV disease; the impacts of KHV disease on local ecosystem services; the social and cultural attempts to address KHV disease; and the environmental changes associated with human adaptation; (2) To describe a general model of linkage between environments, pathogens and humans; (3) To suggest how interactions between pathogen and humans may be modified in order to mitigate the human and environmental damages associated with infectious diseases.

### Research Methods and Organization

Field surveys are conducted at Lake Biwa, Japan, and Lake Erhai, China. Laboratory work is undertaken at RIHN. Our project is organized into five research groups, plus executive and advisory groups, as follows: The Human Alterations Group investigates the effects of anthropogenic environmental alteration on the emergence and spread of KHV and the behavior of its host *Cyprinus carpio carpio*. The Pathogen and Host Ecology Group defines the biology and ecology of KHV and carp, and so describes the environmental factors involved in KHV infection and transmission. The Ecosystem Impacts Group examines the process of infection and the effects of KHV disease on ecosystem functions such as material cycling. The Economics and Culture Group investigates the losses associated with KHV disease, including of ecosystem services or other economic and cultural phenomena, and describes the social attempts to redress those losses. The Feedback Group examines the human response to losses caused by KHV disease, and the environmental change associated with this response. The Executive Group coordinates the activities of each group and develops the model of pathogen-human interactions. Finally, an Advisory Group composed of recognized experts in relevant fields makes suggestions in order to improve the research.

### Perception and contribution to global environmental problems

Field surveys are being conducted primarily at Lake Biwa, Japan, where researchers from various disciplines and fishermen have accumulated much data, and at Lake Erhai, China. China is responsible for almost the entire global carp production. Lake Erhai is an inland lake in China that has never experienced an outbreak of KHV. We will create a model to predict the outbreak and spread of KHV in Lake Biwa by accumulating and synthesizing both new and existing data from Lake Biwa. The model will be applied to Lake Erhai to provide suggestions for how to manage the lake to lessen the probability of an outbreak of KHV disease. The practical application of this model to such an important region is critical to attenuating the global problem of KHV disease. The Lake Biwa model will be modified to apply to other infectious diseases in other areas, to suggest environments that might prevent the outbreak and spread

of infectious disease, and to demonstrate how to facilitate the safe coexistence of humans and pathogens.

### ■ Progress and Results in 2010 Main results to date

- 1) We found that water temperature on gentle gradient lake shores is more spatially and temporally variable than on steep banks constructed by humans. This result suggests that gentle shores can provide a wider range of thermal conditions that allows fish to fine tune their (everyday) thermoregulatory behavior, acclimate efficiently to (longer-term) changes in water temperature, and generally alleviate stresses associated with unfavorable water temperatures and so reduce susceptibility to KHV (Yamanaka et al. 2010).
- 2) We established a method to measure KHV presence in natural water (Minamoto et al., 2009a; Honjo et al., 2010) and found that in the five years since its presence was first documented, KHV has spread throughout Lake Biwa (Fig. 4) (Minamoto et al., 2009b).
- 3) Telemetry tracking of carp behavior revealed that carp favor warmer water temperatures. This finding was incorporated into our mathematical model predicting KHV disease outbreaks.
- 4) We found no evidence of KHV antibodies in carp smaller than 30cm, while 54% of carp larger than 30cm were KHV positive. Of antibody-positive individuals, 44% contracted KHV by polymerase chain reaction (PCR), strongly suggesting that those surviving carp become KHV carriers. A few individuals were positive by PCR but negative for antibodies, indicating recent infection. These results suggest that transmission of KHV is still occurring within the native common carp population in Lake Biwa (Uchii, et al., 2009).
- 5) We developed a non-invasive method (i.e. a method that does not require handling fish) to quantify how water conditions stress carp. This method indicates that changes in water temperature do stress carp.
- 6) In Lake Erhai we found a pattern of gradient and water temperature conditions similar to those of Lake Biwa. The similarity indicates Lake Biwa can serve as a model for other lakes.
- 7) At national and international conferences, we have presented our findings on the linkages between environment, pathogen and humans, and emphasized their importance to the prevention and control of infectious disease.

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## ■ Future Themes

### Research objectives in 2011

- 1) Refine a method to quantify carp spatially and temporally and innovative method to describe our conceptual model of environment-pathogen-human linkages including a development of micro-device capable of *in-situ* measurement of KHV incidence and infectivity.
- 2) Determine the environmental factors involved in KHV abundance and its infectivity, and in carp population density and its susceptibility.
- 3) Conduct controlled experiments to reveal the relationship between water temperature, carp stress and susceptibility to KHV.
- 4) Assess the economic and cultural impacts of carp die-offs.
- 5) Apply the conceptual model of environment-pathogen-human linkage to other infectious diseases; KHV disease in Lake Erhai, China, Schistosomiasis in Kenya, fish diseases in the Ping River at Chaing Mai, Thailand, and *Legionella* disease, MRSA, Norovirus disease, and nontuberculous mycobacteria disease in Japan, and then describe the common parameters of KHV disease and other infectious diseases.
- 6) Continue to explore evidence that anthropogenic environmental changes can mediate disease outbreaks.
- 7) Synthesis of results of the work groups in order to develop a set of recommendations designed to minimize the emergence and facilitate the safe coexistence of humans with pathogens.
- 8) Publish our results in international journals and books in order to disseminate the concepts and practical measures that can aid the control of "fertile" disease environments.
- 9) Organize a national and international symposium on environment-pathogen-human linkage to develop a network for this field of study.

### Scheduled Research Activities in 2010

- 1) Develop a method to quantitatively detect KHV in sediment, organisms and other elements in aquatic ecosystems.
- 2) Clarify the distribution of infectious KHV in Lake Biwa.
- 3) Develop a micro-device to measure the quantity and infectivity of KHV *in situ*.
- 4) Determine the environmental factors involved in KHV dynamics and infectivity.
- 5) Use outdoor experimental tanks to define optimum water temperature for carp.
- 6) Describe the environmental characteristics of the places where KHV and carp interact, and clarify the behavior of the KHV-infected carp in order to reveal the locations where infection likely occurs .
- 7) Conduct controlled experiments to reveal the relationship water temperature and carp stress and susceptibility to KHV.
- 8) Demonstrate the ecological effects of carp on species composition in experimental ponds.
- 9) Evaluate the cultural and nutritional value of carp as a human food.
- 10) Assess the economic and cultural impacts of carp die-offs.
- 11) Create a preliminary model of the interactions between environmental change, KHV and humans.
- 12) Survey the spatial and temporal distribution of water temperature in Lake Erhai in order to establish the applicability of Lake Biwa findings to Lake Erhai.
- 13) Describe the common parameters of KHV and other infectious diseases.
- 14) Promote collaboration with the DIVERSITAS program of international biodiversity science.
- 15) Develop a set of recommendations to prevent or minimize the emergence and spread of infectious diseases.

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- Kawabata, Z Oct,2010 Freshwater bio-diversity. Narifumi Tachimoto and Toshitaka Hidaka(supervised), Research Institute for Humanity and Nature(RIHN) (ed.) The RIHN Encyclopedia of Global Environmental Studies. Kobun-do, Tokyo, pp.168-169. (in Japanese)
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### **Research Presentations**

#### **【Oral Presentation】**

- Minamoto, T., Yamanaka, H., Honjo, M. N., Kawabata, Z. New method for fish biota survey using environmental DNA. The 58th annual Meeting of the Japanese Society of Ecology, Mar 08, 2011-Mar 12, 2011, Sapporo, Japan. (in Japanese)
- Minamoto, T., Honjo, M. N., Yamanaka, H., Uchii, K., Kawabata, Z. A Nation-wide survey for cyprinid herpesvirus-3 in Japan. The 75th Annual Meeting of the Japanese Society of Limnology, Sep 17, 2010-Sep 20, 2010, Hirosaki City, Japan. (in Japanese)
- Minamoto, T., Honjo, M. N., Kawabata, Z. Seasonal dynamics of CyHV-3 in natural freshwater environments. Workshop on the Linkage between CyHV-3 (KHV) and Humans, May 13, 2010-May 18, 2010, Jerusalem, Israel.
- Zen'ichiro Kawabata Linkage of environment, KHV and humans. Workshop on the Linkage between CyHV-3 (KHV) and Humans, May 13, 2010-May 18, 2010, The Hebrew University, Jerusalem, Israel.
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- Yamaguchi, N., Uebayashi, Y., Torii, M., Nasu, M. Rapid Enumeration of *Legionella pneumophila* in Aquatic Environment by Using a Microfluidic Device. 110th General Meeting of American Society for Microbiology, May 23, 2010–May 27, 2010, San Diego, CA, USA.
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- Kawabata, Z. KHV and human linkage. Faculty of Fisheries Technology and Aquatic Resource, Maejyo University, Jun 07, 2010, Cheng Mai, Thailand.

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**Stage: FR**

**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**

**Project Leader: INOUE, Gen**

**Research Axis: Circulation**

**URL: <http://www.chikyu.ac.jp/siberia/>**

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### ■ Research Subject and Objectives

Global warming will likely transform Siberian environments. Early evidence indicates that the hydrological, carbon, and methane cycles are undergoing rapid change, 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, will be forced to adapt again, but to a cascading series of environmental changes whose dimensions are understood only in outline. This project uses multiple satellite and surface systems to track changes in the carbon and hydrologic cycles and the cryosphere, and assesses their likely interactions and significance for human inhabitants of the region. This project is jointly conducted by Japanese and Russian universities and research institutes.

The Lena River Basin in Eastern Siberia is covered in larch forest but receives little precipitation. Permafrost provides moisture to the forest. The area is thus an ideal setting in which to study the effects of climate warming, as the forest-permafrost symbiosis is extremely susceptible to abnormal variations in temperature. Abnormally high temperatures have been recorded in the region in recent years, and changes in the ecosystem and cryosphere environment, such as forest degradation and frequent flooding, are evident.

This research project takes natural and social science perspectives on three aspects of climate-associated environmental change. The project 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 in order to realize these goals. The Siberia bird's-eye group uses climatic and satellite remote sensing data to describe change in climate and in principal patterns of human adaptation. The water cycle and ecosystem interaction group uses dendrochronology, isotope-analysis, flux monitoring, and hydrological analysis in order to examine interaction between climate and vegetation. The human ecology group elucidates the impact of climate and ecological change described above on the residential life in urban and agricultural districts in Eastern Siberia and the cultural practices and social systems of local minority peoples related to their capacities for adaptation.

### ■ Progress and Results in 2010

The activities of each group are as follows:

The Siberia bird's eye group:

Analytical emphasis is on flood, as flood impacts are significant and climate change increases flood frequency and intensity. Flood frequency and extent are described through remotely sensed and field based data. Data show a recent gradual increase in upstream air temperature (in the southern part of the Lena River Basin) yet little change in air temperature downstream (northern part of the basin near the Arctic Ocean). River ice-jam floods along the Lena River were detected by satellite each thaw season. In

addition, a spatio-temporal survey of flood around the Alazeya River Basin was conducted. Field surveys and remote sensing determined that insect damage and forest fires were major causes of forest degradation. A dynamic vegetation model of Eastern Siberia, including forest fire and soil freezing and thawing, predicted that an annual mean air temperature rise of more than 2o C will thaw permafrost to a depth prohibiting larch forest growth.

The water cycle and ecosystem interaction group:

Cellulose carbon isotope samples taken from larch forest in the Siberian tundra-taiga transition zone described inter-annual variations of precipitation and soil moisture. Changes in the seasonal larch growth pattern are clearly associated with water stress. Based on this analysis, the group made point-scale measurements of inter-annual variations in soil moisture from 1950s to 2000s.

A new monitoring site was established in the middle reaches of the Aldan River (Ust' Maya), where precipitation is high in relation to that at Yakutsk, in order to clarify the precipitation-forest reponse relationships. The new flux-tower (in addition to the one operating at Yakutsk) allowed continuous measurement of hydro-meteorological elements, sensible heat, latent heat (evapotranspiration), and carbon dioxide fluxes. Numerical simulation based on a regional (non-hydrostatic) climate model revealed that increases in surface wetness due to global warming would not significantly increase precipitation through evapotranspiration. Extensive land cover change from taiga forest- to grass-cover or water surface would have a much greater positive impact on precipitation in Eastern Siberia. A newly established research contract between RIHN and the Melnikov Permafrost Institute, Siberian Branch of the Russian Academy of Sciences, has allowed joint study of permafrost groundwater and ground ice in central Eastern Siberia. As a first step, the age of groundwater found in several natural springs was established as a few tens of years. Researchers from both institutes also made improvements to the conventional water circulation model allowing better prediction of the Lena River Basin water cycle.

The human ecology group:

This group documented the folk knowledge of middle Lena River Basin peoples related to river ice-jam floods. Group researchers combined field data and newspaper reports with remotely sensed data in order to develop a graphic display of recent flooding patterns, and so the influence of global warming on the frozen water environment. The group analyzed the traffic density, vehicle type, and quantity of freight travelling over the frozen Lena River in winter. Such frozen-river "roads" are the most important public transport in the region, but access to them will be dramatically decreased with global warming. Transmitters attached to wild reindeers will reveal their pattern of movement in relation to environmental variables such as vegetation status and snow depth. Direct observation of reindeer herders and investigation of hunting and traffic in furs and of salmon harvests will clarify dynamics affecting these three important areas of human-animal interaction. Disaster-driven emigration is a new indicator of adaptation and maladjustment to climate change, and field research is now underway in villages experiencing significant out-migration.

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## ■ Future Themes

Climate change and social change intersect in complex ways and are often difficult to predict. We believe that the human dimension of climate change in Siberia is an important factor, because human reaction to changing environments has the potential to exacerbate, or perhaps mitigate, negative impacts. It is necessary to examine local media for environment- and climate-related reports, development plans and policies in Siberia. The apparent path of industrial development, especially in relation to energy and road infrastructure, will likely have a significant effect on Eastern Siberian social life and water environments.

## Books

### 【Authored/Co-authored】

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**Stage: FR**

**Project No.: C-08**

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

**Project Leader: MURAMATSU, Shin**

**Research Axis: Circulation**

**URL: <http://www.chikyu.ac.jp/xxx/>**

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

## ■ Research Subject and Objectives

### *a) Research objectives and background,*

#### (1) Objective:

Cities today support half of the earth's population. In this context, this project establishes cities as the most important spaces where human beings are destined to live in the future and, as its main objective, seeks to find methods for creating harmonious relationships between cities and the earth's environment. The project therefore will investigate megacities as the focus of urban problems in order to: 1) establish methods for recognizing megacities in an integrated manner according to various disciplines, history and culture, etc., 2) indicate integrated solutions for mitigating problems, and 3) indicate models of how cities that successfully integrate environmental, economic and social affluence should be.

#### (2) Project goals and vision of the final outcomes

To achieve the objectives stated above, as the main subject of the project research we have chosen Jabodebek, the metropolitan area of the capital of Indonesia, where rice cultivation in tropical monsoon conditions is the main occupation. For purposes of comparison, we will also consider 26 other megacities. We have set four project goals, two in each of the areas of cognitive science and design science.

**A. Cognitive Science:** Goal 1: To shed light on the mechanism of megaurbanization and historical restrictive conditions.

Goal 2: To identify problems caused by megaurbanization, to shed light on their mechanisms and establish analytical methods for these. **B. Design science:** Goal 3: To create indicators for assessing the impact of cities on the earth's environment and to integrate and visualize geographical information on urban spaces. Goal 4: To approach megacity issues from urban micro to macro and from regions by various stakeholders to the international arena.

Figure 1 shows how megaurbanization plays a role in the earth's environmental problems and the pattern of the flow of procedures in resolving these in light of the four goals of the project.

As specific outcomes, we also aim to achieve the following six results as final results of the project: 1) development of a city sustainability index (CSI), 2) indication of a Megacity Scenario 2050 as a model describing how the next generation will live in megacities by the year 2050, 3) development of a Megacity GIS network concept to facilitate an understanding of megacities, 4) development of education and familiarization programs to intervene in megacity micro, meso, and macro conditions, 5) publication of Megacity Studies, (in Japanese and English) for introducing the outcomes of our megacity research and the most advanced megacity conditions, and 6) demonstration of an international role in the area of megacities in cooperation with other international organizations.

#### (3) Background:

Many huge, heavily populated cities are emerging in non-Western temperate regions and tropical monsoon regions. The problems that these so-called megacities cause for human beings were highlighted in the Brundtland Report of 1987 (WCED: 1987), and since then there have been a considerable number of reports and studies on the subject.

The 20th century in particular saw the emergence of megacities in excess of 10 million people for the first time and the activities of people in these cities cause environmental problems on a global scale

(global warming) as well as local environmental problems (urban vulnerability). These megacities themselves are also expected to feel of serious impact of these problems. Although to date there have been strong indications of the connection between megacities and the environment and although institutes such as the Urbanization and Global Environmental Change (UGEC) are continuing their research on the connection between the two, there has been little progress in serious interdisciplinary research aimed at considering the future potential of megacities (Seto: 2010).

Some possible reasons for this are: 1) the facets and conditions of megacities are complex, 2) methods and controls for gaining insights into these megacities, which have grown to enormous proportions, deviate from conventional methods to date, and 3) it is not easy to find integrated solutions for problems of megacities due to their highly unique characteristics. In individual academic areas, projects to improve cities and initiatives in climate change that apply the knowledge of fields such as engineering, agriculture and social science, etc. are currently underway in cities in various areas. This project aims to integrate outcomes of these projects and to complement conventional approaches to the study of megacities by including assessments of beneficial aspects of urban environments and correlating them with other urban environments.

#### ***b) Research methods and organization,***

##### **(1) Research Method**

**1) Scope:** For this project we believe the definition of “city” as an area which currently has a population density of at least 2,000 persons/km<sup>2</sup> is appropriate. The “city” is also characterized by the inflow and outflow of people, goods, capital and information, and the relevant area includes not only the area within the city but extends to other domestic cities and even outside the country (Figure 2). However, the main focus of interest in this project are those areas where there is a strong likelihood that actual solutions to problems can be handled through policies, etc., and are geographically connected and form a cohesive geographical area (such as hydrographic basin zones, adjacent waters, basins, etc.), and in this project will be referred to as the “urban sphere.” Furthermore, in megacities with a population of 10 million or over, the “urban sphere” is generally an area extending 100 to 200 km in radius outwards from the city center, and within that area both “urban” and “non-urban” human activities take place. In addition, the interaction of the natural environment, built environment and social environment, which surround these human activities, comprise the “urban sphere.”

**2) Characteristics:** Characteristics of this project are: i) a common understanding of a city, ii) the importance placed on historical, cultural and ecological perspectives in cognitive science and design science and iii) integrated design.

i) Common understanding of a city: One characteristic of this project is in not limiting the scope of urban environmental problems (local, global). The study of a problem commences with the identification of the problem, and this facilitates the integration of the research. In addition to focusing on several problems such as the frequent occurrence of floods, the incidence of heat islands, the decline in biodiversity, ecological changes, global warming, urban vulnerability and the widening social disparities, the project to date has also attempted to shed light on the mechanisms involved through research in a wide range of fields of study including ecology, hydraulic engineering, architectural planning, urban history, distributive sociology, fisheries science and sociology. When we undertake such studies, in addition to using existing, unified analytical methods, we also develop new analytical methods in response to the problem. We also conduct integrated city assessments based on CSI.

ii) Placing importance on historical and cultural perspectives in cognitive science and design science: Existing international research on cities and environmental problems either completely ignores historical, cultural and ecological factors or uses them as specific restricting conditions without correlating them in anyway. In this project, global environmental problems are deemed to be restrained by historical, cultural and ecological factors and, with that understanding, research of these areas is currently being pursued by both researchers of history and sociology.

iii) Integrated design science: Complex environmental problems such as environmental problems that occur

in cities cannot be remedied by one single solution. The use of various methods in combination and the indication of the importance of using a combination of methods to resolve a problem are also characteristic of this project. In other words, in addition to direct methods of modern science (natural science, engineering, agriculture, sociology, etc.), fundamental methods such as education and awareness raising are also used. At the same time, we search for local ecological knowledge appropriate for a city and apply it. In dealing with problems from the micro level relating to the lives of individuals to solutions for the city as a whole, and even international issues on a macro level, we develop various methods to respond to problems of various sizes.

## (2) Research framework:

As shown in Figure 3, we organized the following groups according to the flow of procedures for problem solving: Whole Earth Urban Historical Research Group, Long-term Socioeconomic History Group, Value System Study Group, Mechanism Investigation Group, Database Group, City Sustainable Index Group, Scenario Group and, finally, the Coordination Group to supervise all of the groups. The Natural Environment Team to study the natural environment, the Built environment Team to handle the built environment, and the Food Resource Consumption Team to handle food resources were also established within the Mechanism Investigation Group.

## ■ Progress and Results in 2010

### ◆ Achievements in Full Research to Date

Following on from the feasibility study (FS) and the pre-research (PR), we launched the first year of the study in fiscal 2010. Based on advice from the Project Evaluation Committee (PEC) and the Program Reviewer, we indicated an overall picture of the FRI research issues for this year in the context of the four project goals already stated, and later will describe three of these in detail.

#### (1) Overview

**1) Goal 1:** To shed light on the mechanism of mega-urbanization and historical restrictive conditions

- i) Whole Earth Urban Historical Research Group: Held The Whole Earth Urban Historical Research Seminar (three meetings altogether on the following topics: food and cities, South Asian megacities, communities). Conducted a survey on megacities in China (Peking University, Tianjin University, Tongji University)
- ii) Long-term Socioeconomic History Group: Read 18-19 century Batavian Chinese documents. Collected and analyzed maps and historical data including demography at Leiden University in Leiden, Holland.
- iii) Value System Study Group: Conducted interviews and awareness surveys of approximately 20 subjects on two occasions in Jakarta

**2) Goal 2:** To identify problems caused by mega-urbanization, to shed light on their mechanisms and establish analytical methods for these.

- i) Natural Environment Team: Collected and analyzed data relating to heat islands, flood risk and biodiversity.
- ii) Built environment Team: Specified residential concentration units, residential units. Calculated construction stock volume and volume of CO<sub>2</sub> generated, measured residence vulnerability in each residential concentration.
- iii) Food Resource Consumption Team: Organized Indonesian food consumption data. Identified fish species at the retail stage in Jakarta and conducted interview surveys on the distribution structure.

**3) Goal 3:** To create indicators for assessing the impact of cities on the earth's environment and to integrate and visualize geographical information on urban spaces.

- i) City Sustainable Index Group: Undertook literature review and analysis for establishing CSI. Currently in the process of submitting *Review of sustainability indices and indicators: Towards a new city sustainability index (CSI)* by Koichiro Mori and Aris Christodoulou to the Environmental Impact Assessment Review.
- ii) Database Group: Collected and organized geographical information on Jabodetabek (Jakarta, Bogor, Depok, Tangerang, Bekasi). Integrated current geographical information from Geographic Information System (GIS) and old maps.

**4) Goal 4:** To approach megacity issues from urban micro to macro and from regions by various

stakeholders to the international arena.

- i) Scenario Group: Held international workshops in cooperation with the University of Indonesia regarding Scenario 2050 (August: Tokyo, November: Jakarta).
- ii) Coordination Group: Concluded an MOU with University of Indonesia. Paid an official visit to Indonesia Institute of Science (LIPI) (November 3, 2010). Invited Ellisa Evawani, lecturer of Department of Architecture, University of Indonesia (October-December 2010). Visited Cikini at the center of Jakarta as the planned area for holding a joint field workshop. Held Jakarta seminars (3 times).
- iii) Natural Environment Team: Presented paper at "Opportunities and Challenges for Sustainability in an Urbanizing World" of the International Conference on Urbanization and Global Environmental Change (UGECC), an international conference at the University of Arizona from October 17 to 19, 2010.

## **(2) Three outcomes related in particular detail:**

### **1) Development of methods for analyzing variations in environmental load due to changes in the built environment**

A significant amount of building activity is required to expand city areas accompanying urbanization. The Built environment Team of the project has been conducting investigative research to estimate the total volume of building material stock in Jakarta as well as the volume of CO<sub>2</sub> generated accompanying the use of construction materials and to calculate the vulnerability of buildings of the city as a whole in regard to various disasters including earthquakes.

One of the significant research outcomes achieved this year has been the classification of dwellings built in Jakarta according to characteristics such as size, room layout and building age as well as the clarification of resident attributes, family composition, building material characteristics, and strength and volume of construction material used per capita by dwelling type. We also categorized these dwellings by residential district according to population concentration, land use, dwelling types used and other forms of concentration. By doing this, we were able to calculate the number of dwellings and volume of construction stock for each residential district. At present we are calculating estimates of CO<sub>2</sub> generated that is attributable to construction materials. We also prepared building height data within the city of Jakarta based on analyses of ALOS images. This data makes it possible to estimate building material volumes used in large-scale buildings such as skyscrapers, which are difficult to measure in the field. We intend to continue with this work from hereon.

### **2) Impact assessment of environmental warming due to urbanization**

Among other issues, the Natural Environment Group in the project has been analyzing the impact advancing urbanization is having on the heat island problem, the increase in flood risk, and the decline in biodiversity. The group earmarked the suburbs of Jakarta as the subject area of this year's research and evaluated the progress of urbanization and the occurrence of heat island phenomena.

Among the factors that cause heat islands to occur is the increase in land surface temperature as a result of covering the earth with artificial materials (increase in sensible heat flux). To undertake our research, we first conducted surveys of current land use and ground coverage conditions and a survey of buildings, and we prepared a 3-dimensional CAD model of the subject area. We also calculated sensibility heat flux during the hottest period using a heat balance simulator. We then reconstructed conditions of the subject area 30 years ago based on past aerial photos and results of interviews with residents and proceeded with calculations of heat sensibility flux using similar methods. Comparison of the pair of results indicated that the abandonment of rice paddies and conversion to residential areas, increase in buildings and decrease in trees that had occurred over the past 30 years resulted in a significant increase in diurnal sensibility heat flux and this was causing heat island phenomena.

### **3) Literature review and analysis for establishing a sustainability index (CSI)**

Research conducted by the City Sustainable Index Group resulted in two major outcomes. The first was a review of existing major sustainability indicators as preliminary research for establishing a city sustainability index (CSI). The review covered just under 20 indicators including an environmental sustainability index (ESI) and an environmental performance index (EPI). The assessment and classification of these from the perspective of their adaptability as "city" assessment indicators

elucidated five characteristics necessary as city assessment indicators. The CSI requirements derived were five. One more outcome was the selection of assessment indicators (which are the minimum units that comprise the CSI) based on results of the review as well as the commencement of the collection of data on specific major European and Japanese cities as subjects for comparison. Indicators appropriate for a city assessment that cover the triple bottom line of environment, economy and society were then selected provisionally. Using data of major Japanese and European cities up until the end of fiscal 2010, we intend to test the index system as a whole and determine directional properties for adjustment and development.

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## ■ Future Themes

### ◆ Research Plan

The following describes the research plan according to the four project goals stated above up until the mid-term review (February 2012).

(1) Goal1: To shed light on the mechanism of megaurbanization and historical restrictive conditions.

1) Whole Earth Urban Historical Research Group: Undertake comparative research of megacities all over the world excluding Jakarta. In fiscal 2011 we will focus our research on megacities in India and China but at the same time we also intend to deepen our knowledge of megacities in Africa and Latin America by holding The Whole Earth Urban Historical Research Seminar.

2) Long-term Socioeconomic History Group: Continue reading of 18-19th century Batavia Chinese documents. Review historical data at Jakarta public record offices and Leiden University. Hold joint study meetings in Jakarta with University of Indonesia, etc.

3) Value System Study Group: Conduct an awareness survey with a sample group of about 1,000 persons.

(2) Goal 2: To identify problems caused by megaurbanization and their mechanisms and to establish analytical methods for these.

1) Natural Environment Team: Continue data collection and analysis concerning heat islands, flood risk and biodiversity.

2) Built environment Team: Continue identification of dwelling concentration units and dwelling units. Undertake an inventory survey of dwellings in high concentration residential areas (Cikini). Develop and conduct trial experiments on inexpensive, highly earthquake proof construction materials.

3) Food Resource Consumption Team: Conduct food consumption surveys in Jakarta and non-urban areas. Gather statistics on food consumption in megacities of China and India. Verify the environmental load (soil, etc.) of fish aquaculture.

(3) Goal 3: To create indicators for assessing the impact of cities on the earth's environment and geographical information on urban spaces

1) City Sustainable Index Group: Construct and conduct trial experiments on CSI.

2) Database Group: Continue to collect and organize geographical information on Jabodetabek (Jakarta, Bogor, Depok, Tangerang and Bekasi). Continue integration of current geographical information from GIS and old maps.

(4) Goal 4: To approach megacity issues from urban micro to macro and from regions by various stakeholders to the international arena.

1) Scenario Group: Conduct a survey of a high-concentration residential area (Cikini) in Jakarta in cooperation with the University of Indonesia. Hold international seminar on urban visualization.

2) Coordination Group: Hold a Jakarta city scenario workshop in Tokyo in April 2011. Invite about three persons from Indonesia. Hold a children's urban environment education workshop in Tokyo in July 2011. Invite participants from Jakarta and Istanbul, etc. Hold an overall project gathering in November 2011. Invite participants from Jakarta (local knowledge experts), Canada (Southeast Asian city researcher) and United States (Jomon archaeologist) for three months. Sign MOUs with Indonesian Institute of Sciences (LIPI) and Bogor Agricultural University. Hold Jakarta seminars (4 times). Hold study meetings and invite representatives from the international organization UGEC. Consider contents of working paper Megacity Studies (English/Japanese) to introduce outcomes of megacity research and the latest conditions.

## Books

### 【 Authored/Co-authored 】

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## Research Presentations

### 【Oral Presentation】

- KIMURA, T. Voices from Religions: Religions for Sustainability. The 4th International Conference for the Society of the Study of Religion, Nature and Culture, Dec 16, 2010–Dec 19, 2010, The University of Western Australia.
- HAYASHI, K. Field work on the comprehensive survey on Urban Cultural Resources in Asia. Practice and Succession of Architectural Fieldwork Process of its Acquirement and Communication– (Symposium held by the sub-committee of Comparative Dwelling Culture in Architectural Planning and Design, Nov 27, 2010, Architectural Institute of Japan. (in Japanese)
- MURAKAMI, A. The Influences of Urbanization on the Thermal Environment and Residents, Life Styles in Jakarta, Indonesia. The International Conference on Urbanization and Global Environmental Change (UGEC): Opportunities and Challenges for Sustainability in an Urbanizing World, Oct 17, 2010–Oct 19, 2010, University of Arizona, .
- KATO, H. Transportation and environment. Seminar on Development of “National Implementation Plan” under the “ASEAN–Japan Action Plan on Environment Improvement in the Transport Sector”, October 2010, Japan International Cooperation Agency (JICA), Tokyo (Japan).
- AMI, M. Japanese Education System. Kyoto University Seminar for Indonesian Islamic school and university teachers, October 2010, CSEAS.
- SHIROYAMA, T. The Institutions and Dynamics of the Long Distance Trade in the 18th to 19th Centuries: The Case of Batavia Gong’ an Archives. The Second International Conference on Taiwan Business History, The Institute of Taiwan History, Sep 23, 2010–Sep 25, 2010, Academia Sinica, Taipei. (in Chinese)
- KURIHARA, S. The change of the meaning of courtyard space in Chinese traditional courtyard-style house “Si-he-yuan” from the viewpoint of material, living behavior and cinematography –Through the Chinese movie “Sunflower” –. ANNUAL MEETING of ARCHITECTURAL INSTITUTE OF JAPAN, September 2010, Hokuriku. (in Japanese)
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- TANGAWA, R. Study of constructions of lighthouses along the coast of Korean Peninsula in the beginning of the 20th century. , April 2010, Kanagawa–University. (in Japanese)

**Stage: FR**

**Project No.: D-02**

**Project Name: A New Cultural and Historical Exploration into Human-Nature Relationships in the Japanese Archipelago**

**Project Leader: YUMOTO, Takakazu**

**Research Axis: Diversity**

**URL: <http://www.chikyu.ac.jp/retto/index.htm>**

## ■ Research Subject and Objectives

Research objectives and background

The Japanese Archipelago extends over 3000 km from North to South, and includes subarctic, cool temperate, warm temperate and subtropical climatic zones. It is evident that, even during the global environmental changes that have taken place over the past 100,000 years, these various climatic zones were present. As a result, the characteristics of the natural environment and the human subsistence activities within the Japanese Archipelago varied greatly, as did the relationships between nature and human activity. Under the influence of climatic change and human activities, the distributions of individual species of plants and animals in the Japanese Archipelago and its surrounding land masses have been constantly changing. Populations of plants and animals have repeatedly divided, expanded and diminished in response to changes in the availability of suitable habitat. Where suitable habitat was not available, the species became extinct.

The knowledge and skills that humans have developed concerning individual species can be considered to contain both the idea that biological resources should be used in a sustainable way, and the desire to harvest without fear of exhausting the resources. Although ethnological research has highlighted phenomena such as public management of lands and resources, and environmental preservation through limited harvest, it is still unclear when, in which region and among whom the philosophy of preservation was put into practice, or under which social conditions it became an influential way of thinking. Throughout the period of human habitation, the Japanese Archipelago has been blessed with a warm climate and abundant rainfall, and consequently abundant biological resources. But what is the history of overuse and exhaustion of those resources? And how did individual species fare in this historical process? These are the central issues of the present project.

The three main problems to be investigated here are as follows.

- 1) How did new subsistence/economic systems (human-nature relationships concerning food, shelter, clothing, tools, fuel, fodder, fertilisers, medicine, rituals) emerge and spread?
- 2) How were these subsistence/economic systems maintained, and how and why did they end? What kind of social system (social structure, economic foundation, system of spatial organisation, technical system, perception of nature) supported the subsistence/economic system, and, after it ends, how does the social system change?

What becomes of the biological resources that were connected to the system after it ends? Do they become entirely extinct or remain as relics?

Significance as a RIHN project

(1) Reconstructing Japanese history from an unprecedented point of view in the following three respects.

1) Taking the climatic changes over the last tens of thousands of years as an axis, the project will examine both the history of the living organisms and human history, interpreting history as the sum total of all human-nature relationship vectors in all the periods (for example, the Satoyama, a traditional rural agro-ecosystem which has established in early modern Japan).

2) By comparative analysis of the social and economic factors that shaped and supported the human-nature relationships in each of six climatically and historically different regions of the Japanese Archipelago, the project will explicate the connections between those regions. At that we understand the

present-day biota in each of the regions as a result of the history of the division, relocation and local overall extinction of species. 3) From the point of view of human ecology and using materials such as archaeological remains, historical records, and oral tradition, we will attempt to reconstruct the network of natural resource usage in each of the regions in each period. Based on the results of this analysis, we aim to identify the main cause of change in human-nature relationships, and to verify the extent to which the concept of using biological resources in unsustainable ways existed in each period.

(2) Building a theoretical method for reconstructing the history of human beings based on the interaction with the environment using a trans-disciplinary approach. The project attempts to establish a new research method, which can be applied in other regions, by explicating the mechanisms underlying human culture and environmental issues through an approach which is wide, both in its time and space scale, and which takes into account both the impact that the natural environment has on the formation and change of human cultures, and the influence that human activities exert on the natural environment.

(3) Proposing some guidelines for avoiding future threats to the environment. By understanding the long-term impact that human activities have on the natural environment through the change in subsistence/economic systems, it is possible to predict the future environmental dangers, e.g. the loss of biological diversity, and to propose a realistic policy for handling them.

### ■ Progress and Results in 2010

Outcomes of the project as a whole

- 1) A series of chronological charts of environmental history for each district is being compiled from epoch-making events on environmental issues and policy changes on resource managements. It will be completed by adding data of estimated vegetation changes (based on pollen analysis) and population change (based on historical demography). More than 6000 chronological data were compiled as a database in Hu-Time (time-sequence data base).
- 2) The word "wise use" has been examined from various aspects in several workshops. Consequently, it is defined as knowledge and skills which have been able to use the regenerable natural resources without exhausting, and to obtain ecosystem services (provisioning, regulating, cultural, and supporting, in *sensu* Millennium Ecosystem Assessment (2005)) in sustainable ways. Examples of "wise use" and "unwise use" from each district are being sorted out and categorized by identifying which multi-layered governance (e.g. community, local government, national government, international organization) took an initiative role, and according to what kind of incentive it concerned to. Each chronological datum was notified as a character of a particular layer of environmental governance.
- 3) Paleo-ecosystem WG and Plant geography WG held a cooperative workshop to combine each achievement. One of their outcomes is to identify the refuges for warm temperate plants and cold temperate plants in Last Glacial Maximum. The results were presented in a symposium of Japanese Society of Botany. Based on the discussion then, an estimated vegetation map in Last Glacial Maximum in Japan Archipelago (including Sakhalin) is now preparing for publication.
- 4) Analyses on old bones have been conducted, focusing to the comparison among Jomon period (high self-sufficiency, by hunting and gathering), Edo period (high self-sufficiency, by developed agriculture with national-wide trade) and Present (low self-sufficiency, food supported by international trade). In Jomon period, three human populations; Hokkaido, Honshu-Kyushu, and Okinawa were recognized as different groups based on dietary: Hokkaido population depended on sea mammals or fish in high trophic level; Honshu-Kyushu population depended on C3 plant materials; and Okinawa population depended on fish and mollusks in lagoon. Even in Edo period, three different groups still existed. But those differences have disappeared in the Present population.

Outcomes of each working group

- 1) Paleo-ecosystem WG: Data of pollen analysis in Japan from various authors are being compiled to register in Global Pollen Database. Comparative pollen analysis is undergoing dated back to Last Interglacial Period in Lake Biwa, Kamiyoshi Basin, and the Osaka Group in Kinki region, and revealing the human

activities and vegetation changes. Symposia were held in the annual meetings of Ecological Society of Japan and of The Japanese Association of Historical Botany.

- 2) Plant geography WG: Plants from various climate zones were selected and analyzed by DNA makers. Especially, nuclear DNA markers have successively developed on *Persea thunbergii* as a climax species and *Zanthoxylum armatum* as a pioneer species in warm temperate zone where less information is available.
- 3) Old human bone WG: Stable isotope analysis on present human based on hair was conducted to reveal the more-dependency on meats than on fish, and the extreme vegetarian lifestyle for some subjects. Also, stable isotope analysis of the collagen from old human bone of Edo Period revealed the considerable regional variations of food intake: from coastal fish to millets which produced in slash-and-burn cultivation.
- 4) Sakhalin WG: The locality known as Cyurui where molartooth of Naumann's elephants (*Palaeoloxodon naumanni*) were excavated 30 years ago was re-excavated to obtain environmental proxy as pollen and tephra.
- 5) Hokkaido WG: Documents, either official and private, in Shiribeshi region were examined to study the history of herring catch and destruction of forests owing to firewood and boiling fish. Governmental policy on resource managements in historical context is being analyzed.
- 6) Tohoku WG: The local extinction of large mammals, wolves, boars, monkeys and deer was studied based on old documents to reveal the year of extinction and its presumed reason. The present-absent map of monkeys in Edo Period, Meiji-Taisho Era, Showa 30s, the beginning of Heisei, and present in whole Tohoku region has completed.
- 7) Chubu WG: Documents in Edo Period were analyzed on the managements of Osutaka-yama (a area of the protected forest for rearing young hawks which provide to lords used for hunting birds). A lot of letters, which shows the conflicts between people who obtained the benefits from young hawks and people who wanted to log trees, was discovered.
- 8) Kinki WG: History of forests which have been providing timbers to old capitals (Nara, Kyoto, Osaka and others) were studied, and the exhausting of large trees, conflicts between lords and villagers, and the developments of transportation were related to each other. Domestic use of timber as housing in a village was studied by breaking down an old house, and the size and species of each timber were analyzed intensively to reveal the forest use surrounding the village.
- 9) Kyushu WG: Fire which maintains grassland in Aso and Kuju was analyzed by documents which recorded the ceremony of lord's hunting by firing. Also, a boring core analysis on pollen, tephra, plant opal revealed that the fire and grassland was observed before Akahoya tephra (ca. BP 6300).
- 10) Okinawa WG: Excavation of bone accumulation and documental works revealed that the extinction of dugong (*Dugong dugong*) in Yaeyama Islands was occurred by over-killed in Meiji Era, after the end of sustainable managements by Shuri Dynasty which monopolized the resource use.

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#### ■ Future Themes

- 1) We completed the chronological data base used by Hu-Time.
- 2) We completed a scheme of socio-ecological conditions which discriminate whether they lead sustainable use of regenerable resource or not.
- 3) We published 5 volumes of Japanese books on Japanese Environmental History "Japanese Nature modified

by Human Activities” . Over 90 papers were already written by project members. The last volume will be published in April, 2011.

4) We presented our results and conclusion in RIHN international symposium which will be held in October, 2010 (five or six related papers will be published as one volume in RIHN series in English by Springer) as well as a satellite program of CBD (Convention of Biodiversity) COP10 in Nagoya.

5) We organized several workshops and symposium for local people.

## Books

### 【Authored/Co-authored】

- Merz, M. Mar, 2011 Wood and Traditional Woodworking in Japan. Kaiseisha Press, Kyoto, 227pp. (in Japanese)

## Editing

### 【Editing / Co-editing】

- Miwa, D. & Moriguchi, M. (ed.) Mar, 2011 Leant from Trees. Life History of Islands, 7. Border Ink, Naha, Okinawa, 110pp. (in Japanese)
- Yumoto, T. (ed.) Mar, 2011 Environmental History of Villages and Woods. 35,000 Years of the Japanese Archipelago; An Environmental History between Humanity and Nature, 3. Bun-ichi Sogo Shuppan, Shinjuku-ku, Tokyo, 381pp. (in Japanese)
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**Stage: FR**

**Project No.: D-03**

**Project Name: Human Life, Aging and Disease in High-Altitude Environments: Physio-Medical, Ecological and Cultural Adaptation in "Highland Civilizations"**

**Project Leader: OKUMIYA, Kiyohito**

**Research Axis: Diversity**

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### ■ Research Subject and Objectives

#### Research Objectives:

We intend to explore new perspectives regarding how people live in high-altitude environments where oxygen levels are low and natural resources are limited. We focus on aging problems and lifestyle-related diseases because we regard these as manifestations of global environmental issues in the human body. We aim to clarify "highland civilization", as defined by ecological and cultural adaptations to high-altitude environments, physiological adaptations, and how recent changes in lifestyle have affected quality of life (QOL) amongst the elderly. We also propose a model of human-nature interactions in "highland civilization."

#### Background:

In humans, acute lack of oxygen causes irreversible brain damage within five minutes. In highland areas, humans have adapted to the physiological, ecological and cultural challenges of high altitude environments, which include low oxygen levels and scarce food sources, over many generations (Aldenderfer 2003) (Baker 1978) (Beall 2006) (Rivera 2007). "Highland civilization" embodies both ecological and cultural adaptations and it has been reported that elderly highlanders have a high subjective QOL (Yamamoto 2008) (Matsubayashi 2009). In recent decades, modern lifestyle changes have impacted highland life. Whilst highland life has become more convenient with increased food supplies, it is estimated that lifestyle-related diseases such as myocardial infarction or diabetes will increase as a result. Any increase in cardio-respiratory disease may have greater impact in a low oxygen environment. In this project, we will study the influence of these lifestyle changes over several decades on QOL among elderly highlanders.

#### Significance for "Global Environmental Issues" :

Environmental changes associated with human activities are actualized on a global scale. Improvements in diet and medicine have increased the average life span, and with this, an increase in age-related diseases including lifestyle-related diseases. Lifestyle-related diseases are age-related diseases influenced by lifestyle, such as eating habits, activity level, sleep patterns, smoking and alcohol consumption. Reconsidering lifestyles that encourage lifestyle-related diseases may be incidentally coupled with rethinking lifestyles that impact the environment, such as activities that may contribute to pollution and global warming.

This research explores a fundamental message regarding global environmental problems based on aspects of lifestyle-related diseases and QOL in the elderly. Our project is compatible with RIHN's mission to integrate the humanities and science by investigating QOL, lifestyle and environments within various disciplines, including geography, agriculture, anthropology, meteorology, ecology, economics and medicine. The Himalaya-Tibet area is the strategic investigation site. In 2007, the IPCC reported that this area exceeds the global average for temperature increase and the severe glacial retreat is globally important. Additionally, the decreasing water supply to the lower stream is an additional concern. We have set an automated weather station (AWS) in Ladakh and started providing information to the public.

### ■ Progress and Results in 2010

Research findings indicate the following.

- 1) Ecological and cultural adaptation in highlands is characterized as maximal and sustainable utilization of limited but diversified natural resources, flexible management for disasters and simple life with modest virtues.
- 2) The “Himalaya model of lifestyle-related diseases” hypothesis of diabetes acceleration was developed by the interaction among physiological adaptation in high-altitude and the effect of recent change of lifestyles with socio-economic globalization.

#### **Ecological and cultural adaptation to the high-altitude environment and recent lifestyle change due to the globalization**

Subsistence lifestyle and economic conditions supporting the base of “highland civilizations” were studied in the three ecologically distinct zones in Himalaya-Tibet region: Arunachal Pradesh and Bhutan in the forest zone, Ladakh in the oasis zone, and Qinghai in the grassland zone. Vertical distribution of vegetation, ethnic groups, subsistence lifestyle and alien plant invasion were described from 200 to 4000 m in Arunachal Pradesh (Kosaka 2010). The detailed household interview and analysis of satellite image revealed the recent decrease in the number of livestock, the increasing use of chemical fertilizer, and the distribution pattern of spreading abandoned land at Domkhar village in Ladakh. Shortage of fodder, heavy snowfall, and less accessibility to social services were identified as the reasons for migration of pastoral people from Changthang highland to Leh city in Ladakh. Risk assessment of glacial lake collapsing, recording the restoration process from flooding damage (Yamaguchi 2011), and analysis of the climatic aspect of disaster occurrence have also been conducted in Ladakh.

#### **“Himalaya model of lifestyle-related diseases” : The interaction between long-term physiological high-altitude adaptation and recent lifestyle change.**

There was the association between physiological hypoxic adaptation and lifestyle-related diseases. Han people had higher hemoglobin concentration compared with Tibetans in Qinghai. Increasing prevalence of diabetes mellitus was strongly associated with increases in hemoglobin levels related to adaptation to hypoxia in Ladakh, Yushu, and Arunachal (Okumiya 2010) .

There was the association between high-altitude and lifestyle-related diseases. High blood sugar, pulmonary disorder by dust, sleep disorder (Ladakh), hypertension and hyperlipidemia (Arunachal) were more prevalent in higher-altitude dwelling people (Ishimoto 2011).

There was the association among ecological environment, globalization and food diversity. The food diversity score was highest in Arunachal (humid), moderate in Qinghai (semi rid) and lowest in Ladakh (arid). In Ladakh there was lower food diversity in people in rural area than urban one.

There was the association between settlement, livelihood change and lifestyle-related diseases. Lifestyle-related diseases were more prevalent in urban area of Yushu than rural area of Haiyan in Qinghai (Okumiya 2010) . Official workers and monks had more prevalence of obesity, hypertension and diabetes than agro-pastoral local people in urban areas of Yushu and Leh.

The prevalence of diabetes was low in the traditional lifestyle in pastoral people in Arunachal and Haiyan (3000 m) but the prevalence of prediabetes in Ladakh was high in Ladakh (2900-3800 m) where natural resource is lowest and they may be fragile to lifestyle change. There was more prevalence of high hemoglobin level and high blood sugar with obesity and hypertension in Yushu (3600 m) than in Ladakh. Change of lifestyle in hypoxia-adapted people may accelerate lifestyle-related diseases: ” Diabetes acceleration hypothesis” .

#### **Health care design for elderly people in highlands for successful aging with high QOL**

We started follow-up monitoring of blood pressure, body weight and amount of exercise with the collaboration of local health staffs in Ladakh. Comprehensive geriatric functional analysis in all elderly people in Khaling in Bhutan were assessed and we are developing geriatric care system by the collaboration with local health staffs including traditional medical staffs and monks to promote health, high spirituality and QOL (Sakamoto 2011).

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### ■ Future Themes

Manifestations of global environmental issues in the human body has been clarified in the changing highland civilizations under the twin influences of socioeconomic globalization and global warming. Verifying the difference of adaptation and maladaptation in “Himalaya model of lifestyle-related diseases” -diabetes acceleration hypothesis, the integration of medical and cultural/ecological team will be promoted. Pursuing culturally and ecologically fitted health care design with high QOL and presenting wisdom of the aged and wisdom of coexistence to deal with aging and disease, we will reconsider present lifestyles and the future of modern civilization.

**Stage: FR**

**Project No.: D-04**

**Project Name: Collapse and Restoration of Ecosystem Networks with Human Activity**

**Abbreviated Title: Ecosystem Networks**

**Project Leader: YAMAMURA, Norio**

**Research Axis: Diversity**

**URL: <http://www.chikyu.ac.jp/yamamura-pro/>**

**Key Words: Biodiversity, Complex adaptive system, Ecosystem networks, Minimization of uncertainty, Simulation, Social networks**

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## ■ Research Subject and Objectives

### Research Objectives

This project proposes a new concept of “ecosystem networks” that links sociological, economic, and ecological issues to solve environmental problems, especially the problem of ecosystem deterioration.

The project aims to (1) clarify the mechanisms resulting in the collapse and deterioration of ecosystems and then (2) facilitate restoration and maintenance of healthier ecosystems with rich biodiversity and ecological functions while minimizing instability and uncertainty in the long term over a wide area. In addition, it will (3) provide new approaches in environmental science by extracting the characteristics of interactions between human societies and the environment, and changes in these interactions.

<Background>

Most ecosystems on the planet have been seriously degraded by human activities and are now in critical condition. This problem, which has led to the loss of biodiversity and ecosystem function, is widely accepted as one of the most serious global environmental problems. Nevertheless, most research on the issue has focused only on the direct consequences of human impacts. The collapse and deterioration (destabilization and decrease in sustainability) of ecosystems by human activities via interactions within the ecosystem network, including indirect and cascade effects, have rarely been considered. In addition, few studies have taken a social science perspective, although environmental problems are one of the consequences of the interactions between nature and human societies. The effects of social structures (e.g., changes in and globalization of economic, political, cultural, and social networks mediated by direct interactions and distribution and information systems) on ecosystems, and the effects of the resultant collapse and deterioration of ecosystems on human societies, have rarely been investigated in depth.

Unless we take complex interactions between human societies and ecosystems into consideration, we may underestimate or misunderstand the impacts of human activities on ecosystems, and thus may not implement effective measures. Therefore, in this project we propose a new concept of “ecosystem networks” to facilitate understanding and management of environmental problems.

<Need to conduct the project at Research Institute for Humanity and Nature (RIHN)>

This project combines network aspects in ecology and social sciences, which have been studied independently until now. The project framework enables us to investigate the effects of the structure of society (economic, political, and cultural networks) on the ecosystem changes caused by human activities and the effects of ecosystem changes on social structures. Such projects which explore global environmental problems from the perspective of human-ecosystem interactions are impossible within the conventional framework of distinct research fields. The approach of this project is unique, even at the Research Institute for Humanity and Nature (RIHN), but its direction is in line with a central tenet of RIHN, which holds that the root of so-called global environmental problems lies in human culture in the broadest sense, that is, the fact that humans wish to control nature. The project would be difficult to conduct anywhere other than at RIHN.

<Research methods>

The most important concept of this project is the “ecosystem network,” which has a nested structure

involving interactions among and within subsystems, including human societies. Most terrestrial ecosystems affected by human activities are a mosaic of different land covers. In the ecosystem network, the subsystems (e.g., primary forests, secondary forests, lands for shifting cultivation) form an interacting network. In addition, each subsystem consists of networks of biological interactions. Moreover, we place human society as a subsystem within the ecosystem network and regard human activities as part of the interactions within the ecosystem network.

The research areas for this project are a tropical rainforest in Southeast Asia (Sarawak, Malaysia) and a grassland in Central Asia (Mongolia). For a comparative investigation, it is essential to establish more than one research area to obtain generalizable results and discussion. In both study areas, terrestrial ecosystems are being devastated by the surge in Asian economies associated with the recent dramatic economic growth of China. Nevertheless, the lives of many people depend on natural ecosystems, and the destruction of these ecosystems results directly in dramatic changes in their lives. While the economies of both regions have similar frameworks, their ecological characteristics, such as the regeneration time of vegetation and the distribution of biomass in the ecosystems, differ.

For thousands of years, livestock have extensively grazed the grasslands of Mongolia. In recent decades, however, overgrazing by livestock, especially by the increased number of goats raised for the production of cashmere for export, has caused a serious problem in the region. Overgrazing results in excessive vegetation removal from the soil surface, alkalinizes the soil, and facilitates the growth of inedible plant species.

In Sarawak, ecosystems have changed dramatically in the last 100 years; land use has shifted from extensive agriculture in forests by indigenous people to logging in natural forests as a source of timber for export, and then to oil-palm plantations. The expansion of these plantations is thought to have brought about a sharp decrease in biodiversity and caused a reduction in or loss of ecosystem components essential to the indigenous people.

In both Sarawak and the grasslands of Mongolia, we are conducting research in three core steps: (1) Identification of area-specific problems and hypothetical ecosystem network structures closely related to the problems; (2) confirmation and evaluation of the hypothetical links through field surveys, remote sensing, literature surveys, and modeling; and (3) scenario analyses by building a few scenarios with different network structures, and evaluation of predicted ecosystem and social status using various indices. By integrating these results, we will (4) establish a general conservation theory based on the concept of ecosystem networks. The core of the theory will indicate which network structures are likely to lead to environmental problems and how we can restore the network to mitigate the problems.

<Organization>

The project is composed of three groups: one for the theoretical and modeling study and one group each for the field studies in Mongolia and Sarawak. To facilitate cooperation and discussion irrespective of research field, we do not divide the members of the field teams into subgroups; instead we have supervisors with a background in the social sciences and ecology for each study site. See the attached list for core and other members and their roles in the project.

## ■ Progress and Results in 2010

(1) Identification of environmental problems and hypothetical ecosystem network structure closely related to the problems

<Mongolia>

We found the most serious environmental problem in Mongolia to be increased degradation of pastures in areas where sustainable nomadism is difficult. Pasture degradation has been caused by overgrazing by livestock as a result of increased numbers of livestock, concentrations of livestock around cities and roadsides, and reduced migration distances of herders since the introduction of a free-market economy following democratization in the early 1990s (Fig. 1A).

In the forest-steppe zone, the overgrazing leads to dominance by grazing-tolerant plants and soil alkalization, which prevent the recovery of good pasture unless livestock grazing pressure is dramatically reduced. In the steppe and dry steppe zones, overgrazing results in the decline or local

extinction of shrubs in areas surrounding herders' places of residence and villages. Climatic drying also accelerates pasture degradation.

<Sarawak>

In Sarawak, we found the most serious environmental issues to be the declining availability of forest resources for use by indigenous people and the related reduction in biodiversity caused by the expansion of plantations. Our field research revealed that oil palm plantations cause degradation of ecosystem services received by local indigenous people, such as reduced availability of and changes in hunted animals, and loss of lands for shifting cultivation. Such problems may be associated with depopulation (Fig. 1B).

We used a geographical information system (GIS) to map the expansion of oil palm plantations and established datasets to analyze conditions associated with the development of plantations. We also gathered basic information about other government policies that may have large impacts on the lives of local people, such as the Sarawak Corridor of Renewable Energy (SCORE), which involves the construction of many dams and hydroelectric power stations in various regions of Sarawak.

## (2) Confirmation and evaluation of hypothetical links

<Mongolia>

We studied the mechanisms leading to concentrations of livestock and reductions in nomadic distances based on results of a questionnaire and field surveys. High concentrations of goats around cities and roadsides were due to the high prices obtained for cashmere in these locations. The economic state of herders also affected the degradation level: herders with a small number of livestock tended to increase their number of goats and decrease nomadic distance, both of which contribute to pasture degradation.

One important hypothesis about water cycling in the study area is that the surrounding forests and shrubs help maintain soil moisture in the pastures (Fig. 2). To test this idea, we continuously measured precipitation and soil moisture. Our data do indicate that forests of the forest-steppe zone help maintain soil moisture for a long period of time after precipitation while pastures do not. Therefore, in addition to overgrazing, deforestation by foresters and herders and destruction of tree seedlings by livestock may be serious problems that should be regulated for pasture conservation. On the other hand, in steppe and dry steppe zones, we found that shrubs, which are not the preferred food of livestock, have an important function: they constantly absorb water from deep soil, and have positive effects on the growth of herbs by controlling moisture. In areas with serious pasture degradation, high livestock density leads to grazing of shrubs, which accelerates pasture degradation (positive feedback).

<Sarawak>

Several factors were found to be responsible for the rapid expansion of plantations in Sarawak. The strongest drivers were the increasing price of palm oil due to the expected exhaustion of fossil fuels and growing demands for edible oils in the United States, India, and China. In addition, the increasing demand for bio-fuels was another important factor.

Our survey revealed that one condition of the rapid development of plantations was alliances of government and big business formed by unofficial money flow and family relationships. This may also lead to tolerance of excessive and illegal deforestation and pollution by developers and conflicts with local communities.

Another factor we have focused on is that changes in indigenous societies facilitate development of lands customarily used by indigenous people. Increases in cash incomes as well as degradation of forests drive more people from the forests to the cities, thus creating a positive feedback cycle of forest degradation. To analyze this hypothesis, we conducted questionnaire surveys in 50 villages along the Rajan and Baram rivers, two major rivers in Sarawak. Preliminary analyses support our hypothesis but additionally revealed that other factors, such as the social capital of each village, also affect the outcome of the feedback (Fig. 3).

## (3) Institutions, indices, and simulation models investigated for scenario analyses

<Mongolia>

We have considered the effects of different systems and institutions, such as the protection and planting of tree seedlings and shrubs, organization of herders' groups for common use of pasture, improvement of road transport services, and the state of development (disordered or controlled) of mining and agriculture, on the conservation and recovery of pastures with forests and shrubs.

To evaluate different scenarios, we will use various social, economic, and ecological indices, such as productivity of pastures and livestock, the price of livestock products, the household income of a herder, land value, the chance of education, income distribution produced by mine and agriculture developments, and changes in the gross domestic product and state budget.

We have begun developing numerical models to simulate the interactions between the migration behavior of herders and vegetation properties. Such a model, together with the process model for plant-soil water interactions, will be integrated into the land cover model (see Section 2) to analyze various scenarios.

<Sarawak>

We have investigated different systems and institutions, such as forest certification, bio-prospecting, and the Reducing Emissions from Deforestation and Degradation in Developing Countries (REDD) program for scenario analyses. We have analyzed the effectiveness of and problems with these systems. For example, bio-prospecting, namely the utilization of bio-resources in tropical forests to develop new medicines, has already started in Sarawak, but the high costs for pharmaceutical companies and the low rewards for traditional knowledge make the system inefficient and unsustainable.

To evaluate different scenarios, we will use variable social, economic, and ecological indices. In the case of tropical forests, biodiversity is one of the most important ecological indices. In addition to examining the effects of local vegetation on species diversity, we also conducted surveys at plots of identical vegetation with different surrounding vegetation to elucidate larger-scale effects. The results of these surveys suggest that the biodiversity of surrounding vegetation has a considerable effect, especially in species-rich primary forests.

We have begun developing land cover transition models to simulate land cover changes for the entire state of Sarawak using existing land cover GIS data and satellite remote-sensing data from the past two decades. From this, the human impacts on land cover changes will be quantified and incorporated into a mesoscale land cover model (see Section 2) with which we will analyze various scenarios.

#### (4) Establishment of conservation theory

We have just started establishing a general conservation theory for ecosystem networks on the basis of concrete case studies from Mongolia and Sarawak. Although the structure of the theory has not been clearly determined, two important points in the general theory have been isolated, i.e., two network effects in the dynamics of socio-ecological systems. The first involves ripple effects that spread through the spatial structure: for example, the migration distances of herders strongly affect vegetation and sustainability, and local biodiversity is strongly influenced by surrounding land cover. The second is positive feedbacks of interactions between ecosystems and human behaviors, leading to rapid changes called regime shifts. For example, a reduction in forest use by inhabitants decreases profits from the forest, leading to further reductions in forest use, and the likely acceptance by inhabitants of commercial logging or oil palm plantations.

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### ■ Future Themes

(1) Topics for the field researches and data analyses in FY2010-11.

<Mongolia>

- 1) Continuous measurements of climate conditions
- 2) Seasonal production and livestock-grazed biomass of herbs and shrubs
- 3) Relationships among moving distances and other characteristics of farming and the economic and social status of herders
- 4) Economic analyses of different types of livestock farming and other industries

<Sarawak>

- 1) Interactions between indigenous societies and ecosystems by a questionnaire survey
- 2) Characteristics (food web, biodiversity, ecological functions, etc.) of ecosystems under different forest covers, especially in plantations
- 3) Actual and potential economic values of land with different land cover

(2) Scenario analyses

The scenario approach has become popular in recent years. Well-known examples include those proposed by the Intergovernmental Panel on Climate Change (IPCC) for different levels of CO<sub>2</sub> emission, and those proposed by Millennium Ecosystem Assessment. In both cases, each scenario (family) assumes a set of conditions along a particular story line. We will use a similar approach. In the next two years, we will identify scenarios for analysis and evaluate them using different indices. Three provisional scenarios are as follows.

SCENARIOS

1. Business as usual

Mongolia: Land privatization progresses and further declines of trees and shrubs cause degradation of pastures. This causes a serious shortage of grasslands for stock farming and social instability.

Sarawak: A bipolarization of lands into protected areas and monocultures (plantations) causes a shortage of lands for indigenous people and abandonment of traditional cultures. It also causes serious global problems because of CO<sub>2</sub> emissions and loss of biodiversity unique to the region.

2. Infrastructure investment and development

Mongolia: This scenario includes road construction, the introduction of a cold transport system, and building of wells in pastures. These strategies may improve livestock distribution and thus reduce the overgrazing and degradation of pastures currently occurring around roads, cities, and wells because of the high livestock densities in these areas.

Sarawak: This scenario includes road construction and establishment of an efficient system of bio-prospecting. One problem in remote areas is a lack of access to facilities outside of the village where residents can sell their products and send their children to school. Our questionnaire survey

revealed that such infrastructure is essential to maintaining a community in a good state. Economic valuation of traditional knowledge may be another way to promote inheritance of this knowledge.

### 3. Changes in institutions

Mongolia: This scenario includes reinforcement of community units and establishment of protected areas. One problem in Mongolia is the lack of management bodies for pastures. One possible solution is to strengthen local communities and to allow them to manage their pastureland for sustainable use.

Sarawak: This scenario includes a forest certification system and REDD. The effects of deforestation are not included in current evaluations of the use of oil palms to decrease CO<sub>2</sub> emissions. Such oversights often lead to incorrect or inefficient strategies. REDD, a system to calculate emissions from deforestation in developing countries, may partly resolve the problem.

### INDICES FOR SCENARIO EVALUATION

The following variables may provide useful indices for evaluating the scenarios.

1. Land cover

2. Variables calculated using land cover data

Biomass, carbon sequestration, biodiversity, economic values

3. Variables partly independent of land cover

Traditional knowledge, water availability and quality, population distribution

### (3) Establishment of conservation theory

The key concept of our project is the “ecosystem network,” which has a nested structure involving interactions among and within subsystems, including human societies. The aim of establishing a conservation theory based on the ecosystem network is to determine the causes of environmental problems and to realize what links in the ecosystem network should be adjusted to effectively resolve the problems.

Our studies to date suggest a significant difference in the structures of the ecosystem networks of Mongolia and Sarawak. This difference is based on differences in economic properties for humans in the two ecosystems. In Mongolia, the vegetation itself (grasses) has no direct value for humans; the value is stored in livestock that feeds on the grasses. Therefore, global economics affect the inhabitants’ behavior, leading to overuse of the vegetation and degradation of the grassland. In this case, the effective response to the problem should involve changing the inhabitants’ behavior. On the other hand, in Sarawak, economic value is stored in the vegetation (trees). Therefore, enterprises and governments tend to severely develop the forests, causing both reductions in the amount of forest available to inhabitants and biodiversity loss. The effective response to this problem should involve regulation of enterprises and governments.

The ecosystem network concept may provide useful guidelines for conserving ecosystem networks in other areas where inhabitants depend strongly on natural ecosystems and where the ecosystems are being affected by economic globalization. In other words, one can investigate whether the ecosystem network of a target area is of the Mongolian type or the Sarawak type, or determine the proportional distribution of the two types within a network.

## Papers

### 【Original Articles】

- Ohkouchi N, Tayasu I, Koba K, 2010 Use of carbon-14 natural abundances in soil ecology: implications for food-web research. . *Earth, Life, and Isotopes* .
- Saizen, I., Maekawa, A. and Yamamura, N. 2010 Spatial analysis of time-series changes in livestock distribution by detection of local spatial associations in Mongolia. . *Applied Geography* .
- Takada, T., Miyamoto, A. and Hasegawa, S. 2010 Derivation of a yearly transition probability matrix for land-use dynamics and its applications, . *Landscape Ecology* .

**Stage:** FR

**Project No.:** E-04

**Project Name:** Vulnerability and Resilience of Social-Ecological Systems

**Abbreviated Title:** Resilience Project

**Project Leader:** UMETSU, Chieko

**Research Axis:** Ecosophy

**URL:** <http://www.chikyu.ac.jp/resilience/>

**Key Words:** resilience, poverty, social-ecological system, resource management, environmental variability, vulnerability, human security, semi-arid tropics

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## ■ Research Subject and Objectives

<Research Objectives>

The objective of this research is 1) to consider impacts of environmental variability on vulnerability and resilience of human activities in the semi-arid tropics; 2) to study factors affecting social-ecological systems and their recovery from shocks; 3) to analyze factors determining ability of households and communities to recover from environmental shocks and the roles of institutions in improving household resilience; and 4) to identify the factors affecting resilience of social-ecological systems and ways in which the resilience of subsistence farmers in the semi-arid tropics to environmental variability can be strengthened.

<Background>

A vicious cycle of poverty and environmental degradation, such as forest degradation and desertification, is a major cause of global environmental problems. This is especially the case in the semi-arid tropics (SAT) including Sub-Saharan Africa and South Asia, where a majority of the world's poor are concentrated. Within the SAT, communities' livelihoods depend critically on fragile and poorly endowed natural resources, and poverty and environmental degradation are widespread. People in these regions depend largely on rain-fed agriculture, and their livelihoods are vulnerable to environmental variability. Environmental resources such as vegetation and soil are also vulnerable to human activities. To surmount these environmental challenges, human society and ecosystems must be resilient to (recover quickly from) environmental shocks. Thus in this project we consider society and ecology as one social-ecological system and empirically analyze its resilience.

<How do you utilize the results of the project to help solving "global environmental issues" ?>

Through data collection, observation and analysis, our research will identify key resilience indicators able to provide ecosystem and resource management options for communities in the SAT. These results will be disseminated through workshops, conferences, working papers and peer-reviewed publications to share information with concerned governmental and non-governmental agencies and groups.

## ■ Progress and Results in 2010

In FY2006 (PR) we focussed on establishing research collaborations with various institutions in Zambia. In FY2007 (FR1) we prepared experimental field sites and installed monitoring equipment such as weather stations, on-farm rain gauges and soil moisture measurement devices. Comprehensive household surveys and monitoring of rainfall and crop growth commenced in November 2007. Intensive field data collections for the 2007/2008 and 2008/2009 agricultural seasons and data compilations were completed in subsequent fiscal years of FY2008 (FR2) and FY 2009 (FR3). For the current fiscal year of FY 2010 (FR4), filed surveys, other field monitors and data compilations for the 2009/2010 seasons have just been completed.

• We approach resilience of farming households to climatic variability by focusing on mechanisms and speed of consumption, food production and livelihood recovery after experiencing shocks such as drought and floods (see conceptual diagram in Figure 2). Theme 1 measures the level of decline of agricultural

production through maize yields. Theme 2 observes the speed of recovery in food consumption and health and nutritional status such as body weight, growth and skinfold thickness. Theme 3 qualitatively considers conditions under which livelihoods decline or do not decline; how they recover; and how differential coping strategies and the household access to resources in response to shocks. Theme 4 visualizes the spatial pattern of agricultural households' resource use and cross-scale interactions.

- Analysis of household food consumption after climatic shocks using data from high frequency household surveys is in progress.

- In the field experiment in Eastern Province, impacts of tree burning on soil nutrient status and maize yield varied according to the amount of tree biomass burnt. The field experiment in Southern Province suggested that maize yield was strongly influenced by topography and temperature.

- Dataset covering two cropping seasons of 2007/08 and 2008/09 was established for the analyses. Using the dataset, resilience at household level was quantitatively measured and factors affecting the resilience were identified. The decline of food consumption through calorie intake before harvest (February) was observed during both 2007/08 and 2008/09 cropping seasons. After March 2008, food consumption gradually recovered, however the speed of recovery was slow. The effect of heavy rainfall in December 2007 appeared after one year as the hike of maize price. It took more than one year for most households to recover food consumption (calorie intake) to the level before December 2007 heavy rainfall.

- After floods, farmers responded by replanting maize, shifting from maize to potato and beans. In addition, some new activities for getting cash income, such as livestock sales, fishery and wage labor, emerged to offset a shortfall of income, which indicated varieties of coping mechanisms exist for affected households.

- We could explain that the increased process of vulnerability differs by each actors, such as farmers, households and rural societies. And also we revealed that vulnerability increased by various reasons, and it could be transmittable among economic, socio-political and even cultural sphere.

- Cellular phones are playing an important role in helping farmers to cope with shocks. Farmers under financial and non-financial stresses started utilizing cellular phones to garner support from their social network.

- We disseminated our project outcomes at the international conferences. We presented at ISPRS 2010 (Kyoto), GLP Open Meeting 2010 (USA), AIWEST-DR2010 (Indonesia), and plan to participate at Resilience2011 (USA), EnvironmentAsia (Thailand). We organized a session at the JASID 2010 (Japan Society for International Development). We also organized Resilience Workshops (12th, 13th) and Resilience Seminars (30th, 31st, 32nd).

- Project annual reports (FS, PR, FR1, FR2, FR3, FR4), working papers (#001-#012) and a Japanese translation of a resilience workbook by Resilience Alliance, are all available at the project web site. [http://www.chikyu.ac.jp/resilience/publication-W\\_e.html](http://www.chikyu.ac.jp/resilience/publication-W_e.html)

- Three project members are now participating IHDP committee and sub-committee of the Science Council of Japan and actively contributing to international community.

## ○Co-Researchers

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## ■ Future Themes

For the final year of research (FR5), we plan to conduct the following:

1. While refining the theoretical aspects of resilience, we need to consider the practical applicability of the resilience approach based on the field research.
2. Integration of the research and data should be accelerated for the common goal for analyzing resilience of the farm households qualitatively and quantitatively.
3. For FY2010 and early FY2011 weather monitoring, plot experiments, household surveys, and the accumulation, compilation and analysis of data sets will be continued.
4. The first monitored 2007/2008 cropping season was an abnormal flood year, against which the 2008/2009 and 2009/2010 cropping season should be compared.
5. Coping strategies of farm households to environmental changes will be analyzed and assessed qualitatively and quantitatively.
6. To give feedback to the local community we provided rainfall information for the first cropping season 2007/2008 to local farmers. We will continue to do so.
7. We prepare for the RIHN International Symposium and RIHN Forum for FY2011. We also prepare for working workshop for book publication.
8. Collaboration with other international research organizations should be enhanced.
9. The concept of resilience can be applied to other RIHN project as well. We continue promoting inter-project initiatives within RIHN projects and other research groups.

## Papers

### 【Original Articles】

- Ito, Chihiro 2010 The Role of Labor Migration to Neighboring Small Towns in Rural Livelihoods: A Case Study in Southern Province, Zambia. *African Studies Quarterly*, 12(1): 45-73. (on-line) .

## Research Presentations

### 【Oral Presentation】

- Umetsu, Chieko, Thamana Lekprichakul, K.Palanisami, M. Shanthasheela, Takashi Kume “Resilience of Tsunami Affected Farm Households in Coastal Region of Tamil Nadu, India” . Resilience2011 Meeting, Mar 12, 2011-Mar 16, 2011, Arizona State University, Tempe, U.S.A..
- Thamana Lekprichakul, Chieko Umetsu, Tom Evans “Spatial Heterogeneity and Temporal Dynamics of Social-Ecological Resilience to Food Insecurity: A Case of Zambia” . Resilience2011 Meeting, Mar 12, 2011-Mar 16, 2011, Arizona State University, Tempe, U.S.A..
- Evans, Tom, Thamana Lekprichakul, Chieko Umetsu, Kelly Caylor “An agent-based model of land use and smallholder resilience to climate variability in rural Zambia” . Resilience2011 Meeting, Mar 12, 2011-Mar 16, 2011, Arizona State University, Tempe, U.S.A..
- Kume, Takashi, Chieko Umetsu, K. Palanisami “How can resilience be understood and quantified? -A case study of the 2004 tsunami disaster in Nagapattinam district, Tamil Nadu, India” . Resilience2011 Meeting, Mar 12, 2011-Mar 16, 2011, Arizona State University, Tempe, U.S.A..
- Sakurai, Takeshi, Hiromitsu Kanno, Taro Yamauchi “How vulnerable and resilient are farmers against unexpectedly extreme weather?: Evidence from the case of heavy rain in drought-prone semi-arid area of Zambia”. Resilience2011 Meeting, Mar 12, 2011-Mar 16, 2011, Arizona State University, Tempe, U.S.A..
- Kume, Takashi, Chieko Umetsu, K.Palanisami “Recovery of agricultural fields from the 2004 tsunami in Nagapattinam district, Tamil Nadu, India”. the GLP Open Meeting 2010, Oct 17, 2010-Oct 19, 2010, Arizona State University, Arizona, U.S.A..
- Miyazaki, Hidetoshi, Y. Ishimoto, M. Yamashita, H. Shinjo, U. Tanaka “Land Use Management and Coping Behaviors with Climate Change: A Case Study of Southern Zambia”. the GLP Open Meeting 2010, Oct 17, 2010-Oct 19, 2010, Arizona State University, Arizona, U.S.A..

- Lekprichakul, Thamana “Shock sensitivity, land use recovery and resilience: Lessons learned from the Indian Ocean’s tsunami affected farmers in Tamil Nadu”. the GLP Open Meeting 2010, Oct 17,2010–Oct 19,2010, Arizona State University, Arizona, U.S.A. .
- Evans, Tom “An agent-based model of land use and smallholder resilience to climate variability in rural Zambia” . the GLP Open Meeting 2010, Oct 17,2010–Oct 19,2010, Arizona State University, Arizona, U.S.A. .
- Umetsu, Chieko, Thamana Lekprichakul, K.Palanisami, M. Shanthasheela, Takashi Kume, “Resilience of Tsunami Affected Households in Coastal Region of Tamil Nadu, India” . The 2010 Meeting of the Society of Environmental Economics and Policy Studies, Sep 11,2010–Sep 12,2010, Nagoya University, Nagoya. (in Japanese) Proceedings, pp.224-225. .
- Lekprichakul, Thamana. “Shock sensitivity and resilience: Lessons learned from the Indian Ocean tsunami survivors in Tamil Nadu, India” . the 16th Annual Asian Development Studies Program National Conference, East-West Center,, Jun 29,2010–Jul 01,2010, Honolulu, Hawaii.

**【Poster Presentation】**

- H. Miyazaki, M. Yamashita, Y. Ishimoto, H. Shinjo, U. Tanaka “Small-Scale Farmers’ Adaptive and Coping Behaviors to Climatic Variability: A Case Study of Southern Zambia”. Resilience 2011 Meeting, Mar 12,2011–Mar 16,2011, Arizona State University, Tempe, U.S.A. .

**【Invited Lecture / Honororary Lecture / Panelist】**

- Organized Session: “Resilience of Social-Ecological Systems and Poverty Reduction” . Japan Society for International Development (JASID) 21st Annual Meeting, Dec 04,2010–Dec 05,1020, Waseda University, Tokyo.. (in Japanese)

**Stage:** FR

**Project No.:** H-02

**Project Name:** Agriculture and Environment Interactions in Eurasia: Past, Present and Future -A ten-thousand-year history

**Project Leader:** SATO, Yo-Ichiro

**Research Axis:** Ecohistory

**URL:** <http://www.chikyu.ac.jp/sato-project/>

## ■ Research Subject and Objectives

### Aim of research

The main goal of our project is to study the history of the relationship between agriculture and environment over a period of ten thousand years. In four different climatic zones that existed in and around Eurasia in the last ten thousand years, we try to assess how the origins and development of agriculture influenced the surrounding environment. We also seek to evaluate how the environment in turn impacted on agriculture, focusing on periods of social crisis caused by the collapse of agricultural production and consequent recovery. The four climatic zones are ‘monsoon’, ‘pasture (in Europe)’, ‘desert’ and ‘vegiculture’ (Figure 1). Based on historical evidence, we focus on swidden agriculture, often criticized as having destructive effects on the environment. We evaluate the sustainability of agriculture by analyzing its history and its influence on the global environment.

### Background

Although agriculture is one of the central issues of global environmental problems, there are still many misunderstandings and lack of knowledge concerning its history, especially about its interactions with the ecosystems in which it operates. Great danger may lie ahead if we ignore this problem and continue with blind faith in the sustainability of agriculture in the future. The goal of our project is to clarify the history of relationships between agriculture and environment, focusing on periods of social collapse caused by food production failure, and to explore the means by which people survived those critical situations. We will demonstrate the mechanism of recovery of the society along chronological order. Based on these results, we hope to establish a ‘general principle of collapse and recovery’ through case studies in on the four different climatic zones.

## ■ Progress and Results in 2010

Our aim has been to verify the hypothesis that agriculture in different parts of Eurasia did not develop continuously without setbacks. We believe that this has been achieved. In the current fiscal year, we tried to reinterpret the historical evolution of agriculture, focusing on the ‘maintenance of (especially genetic) diversity’, which is the basic concept in our project. It has been traditionally believed that since the beginning of agriculture, the genetic diversity of crop decreased, thus causing various environmental problems and natural disasters. However, not only concrete data to verify that has hardly been academically presented, but also the genetic diversity has not just decreased but shown more dynamic transformation through the history. Therefore, we aimed to collect concrete data concerning changes of genetic diversity in different fields of research.

### Research achievements

#### (1) Monsoon Zone Group

(a) We conducted morphological and molecular genetic analyses of indigenous wild and cultivated rice crops from Australia and from the region between Southeast Asia and Japan (space-axis analysis). The results showed a decrease in the variety of cultivated crops, which indicates that in Monsoon cultivation, people utilized genetic diversity effectively to extend their fields. Also, the diversity of rice crops in Japan (seed size corresponds to genetic variance) increased until the Meiji Period but decreased afterwards (time-axis analysis), demonstrating that social elements and people’s taste were

reflected in the choice.

(b) Research was conducted on the soil strata in Ikeshima Fukumanji site (Yao City, Osaka Prefecture) and in Maekawa site (Inakadate Village, Aomori Prefecture) (time-axis analysis). Based on the results of phytolith analysis, it was known that in both sites people had attempted to adapt to environmental changes such as flooding by introducing various crops.

(c) By examining old maps and pictures, it became clear that flooding occurred frequently in the Ikeshima Fukumanji site from the Yayoi Period to the modern era. Especially between the Middle Ages and the modern era, the cutting down of pine trees around Ikoma Mountains, where the source of the Yamato River is located, seems to have caused frequent flooding.

**As the result, it was found out that monsoon zone agriculture was not constantly developed through the history as previously discussed, but has gone through a number of collapse and recoveries using various *shinogi* (=adaptation) techniques.**

### **(2) Mugi Zone Group**

(a) We conducted pollen analyses on samples collected at two different locations of Xinjiang Uygur Autonomous Region. From the analysis of the mud-like substance coating the coffins of Xiaohe Tombs, we found the following: in the BM Period (3500–3400 years ago), there were no forests in the region but water was abundant and some types of grain were being cultivated. In the following M Period (3400–3200 years ago) the region became drier and more saline. The length and weight of wheat grains excavated from coffins show constant increase from the BM to M periods, but in the end of the M period both length and weight become varied, indicating unstable wheat production. This also shows degradation of environment from the BM to M periods. Results of pollen analysis of a soil boring sample near Rouqiang (80–100cm depth, age unknown) showed that there were no major environmental changes and that semi-shrub deserts, as can be seen today, have existed over a long period. From these results, it was assumed that human activities, especially agriculture, caused environmental changes such as desertification in this region. The need for more detailed and larger-scale analyses was also acknowledged.

(b) A cultivation experiment was conducted over 3 years in the dry region of West Asia in several regions, in order to assess the water consumption rate of different types of wheat. Rain-fed cultivation of bread wheat, Durum wheat, Emmer wheat and Einkorn wheat showed that the later the flowering season was, the lower the crop yield became. Einkorn wheat, whose flowering season was the last, hardly yielded at all. Thus we learned that the productivity difference depended largely on environmental issues such as water and temperature during the reproductive stage.

**Through the archaeological research of the Xiaohe Tomb site and experimental studies, it was verified that the Xiaohe Tomb area used to have rather rich vegetation and fauna, which enabled pasturage and cultivation of particularly water-requiring bread wheat. With the research result, our original assumption of the project: desertification (=environmental degradation) was caused by human activities rather than natural causes, was verified on concrete data. Further studies on destructive factors created by human activities, such as salinization, will be done in the final year of the project to complete the research.**

### **(3) Vegeculture Zone Group**

(a) In the Philippines, we conducted research on the origins of taro cultivation. It is believed that agriculture was introduced to the Philippines from south China and Taiwan. However, when we examined the diffusion of modern taro crops and their usage, we discovered wild and cultivated varieties that have not been reported previously. Also, a semi-wild variety seems to be widely diffused and is utilized in daily life. This suggests that the cultivation of taro began in the Philippines.

(b) Ethnographic research on tuber crop cultivation was conducted in the Eastern Highlands of Papua New Guinea, focusing on the diversity of cultivation. We learned that various types of yam and taro are being utilized and that they are used on different occasions, depending on their function and importance. People are encouraged to cultivate different types of sweet potato and no agricultural methods exist to cultivate high-value varieties intensively.

### **(4) Slash-and-burn Agriculture Group**

(a) We began to analyze historical records concerning land usage from the former Hakumine Village

(current Hakumine, Hakusan City), Ishikawa Prefecture, which date from the entire Edo Period (*Echizen kaga hakusan juhachikamura toritsugi-moto Yamagishi Juroemon-ke monjo*, etc.). In this document, there are many sale agreement papers of land where slash-and-burn agriculture was practised. They are therefore important materials to learn about the reality of this technique, whose yield was usually not included in the official annual rice yield (add: accounts or figures?). The document is currently being examined, while at the same time study is being conducted on the changes of crops cultivated.

(b) The Third Slash-and-burn Agriculture Summit took place in Oita City. We demonstrated the importance of our research in connection to contemporary agricultural issues in Japan, especially in relation to the problems of intermediate and mountainous areas.

### Connection with final results

As the above-mentioned research report on taro cultivation demonstrates, there is still a strong possibility that our understanding of the historical evolution of agriculture may change further in the future. The ultimate goal of our project is to fundamentally rewrite the history of relationships between agriculture and environment and to make suggestions concerning the future of agriculture. We are confident of having made a large step towards achieving our goal, through the different achievements of this year and the establishment of contacts with researchers in a range of regions and fields at different symposia. We were also able to publish four volumes of the 'Agricultural History in Eurasian Continent' (5 vol.), the last volume of which will appear during the current fiscal year.

### Unexpected results

Some parts of our achievements were broadcast in the NHK program 'Science ZERO'. The research report from the Tian-luo-shan site in Zhejiang Province was published as the project member's achievement in Science journal. Also, an article written by one of the project members appeared in the last year's Nature Genetics journal. He currently leads international discussion about early agriculture in Monsoon Asia.

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#### ■Future Themes

##### Problems we faced during the current fiscal year and suggested solutions:

Since the next fiscal year will be the last year of our project, we do not plan to perform any large-scale research abroad. However, since we could not conduct research in Xinjiang Uygur Autonomous Region this year, we hope to undertake it next year, if the local situation permits, even if only to a limited extent.

##### Issues for next fiscal year:

- 1) We will try to determine the factors that, after natural disasters, either allowed the continuation of agricultural activity or caused its collapse, while focusing on people' s occupation, type of disaster and power structure of each period. From this, we will establish a general principle that could inspire future agricultural activity.
- 2) In the process of (1), we will make use of photographs taken by Sven Hedin, in order to learn about paleoenvironmental change in the Xinjiang Uygur Autonomous Region. We will digitize these photographs and create a database to preserve them as cultural heritage.
- 3) Weeds, harmful insects and disease-causing organisms appeared when agricultural activity first began. These are more or less uniform beings, selected to survive in a homogeneous agricultural field. They have been eliminated by the use of chemical substances (pesticides), which also have the effect of harming or destroying the environment. The Slash-and-burn Agriculture Group, on the other hand, demonstrated that fire not only prevented the increase of weeds, harmful insects and disease-causing organisms, but also caused chemical substances, which plants could use, to increase in the soil. We plan to organize a symposium entitled 'Weeds, harmful insects and disease-causing germs' .
- 4) We will publish our achievements, which have been made public this year in the form of publications and symposia, also in English (we will also prepare a book in English). Our short-term goal is to successfully organize an exhibition at the National Museum of Nature and Science (September to November 2010), which is planned as part of our final project report. We also plan to produce a scientific publication on the domestication of plants and animals. Since agriculture is a theme closely related to our everyday life, we have organized the 'Seminar on environmental thoughts' more than twenty five times now. These results will also be published in book form.
- 5) Different knowledge related to life culture, such as agriculture and food, will largely contribute to making concrete suggestions in RIHN' s basic fields of research, whose ultimate goal is to identify advantageous ways of future human life. Therefore we hope to transfer our knowledge, based on the achievements of our project, to other projects. In this way, the research quality of the whole institute will benefit.

**Stage: FR**

**Project No.: H-03**

**Project Name: Environmental Change and the Indus Civilization**

**Abbreviated Title: Indus Project**

**Project Leader: OSADA, Toshiki**

**Research Axis: Ecohistory**

**URL: [http://www.chikyu.ac.jp/indus/Indus\\_project/index.html](http://www.chikyu.ac.jp/indus/Indus_project/index.html)**

**Key Words: Indus civilization, human-environment interaction, Ghaggar-Hakra (Sarasvati) river, climate change, disintegration of Indus civilization networks**

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### ■ Research Subject and Objectives

1) Research objectives and background

[Research objectives]

The Indus civilization (2600BC-1900BC) is known for its cultural and technological achievements including its characteristic seals and scripts, fortified settlements and drain systems. Indus cities and cultures spread over 680,000 km<sup>2</sup> along the Indus and Ghaggar-Hakra River and into Gujarat in Western India, yet its urban phase lasted for only 700 years, much shorter than any of its contemporaries. This project aims to investigate the causes of this rapid decline of the civilization from the perspective of human-environment interaction. Drawing on various disciplines of both natural and human sciences, we compose social and environmental histories of key Indus civilization cities and their vicinities in order to determine whether and which environmental factors were the causes of their short life and rapid decline.

In order to fully grasp the causes of the decline, we find it important to look at the civilization in a wider context, both in space and time. For this reason we investigate diverse natural environment surrounding the civilization on one hand, and the history of the long-term climate change in South Asia on the other. The relationship of the societies and cultures of the Indus civilization with those of other ancient civilizations is also being investigated, side by side with their relationship with the post-Indus societies and cultures of South Asia.

[Significance of our project with regard to global environmental problems]

The investigation of the relationship between global climate change and the rise and fall of ancient civilizations attracted many scholars around the world. As mentioned below some scholars hypothesize that the impact of abrupt climate change caused the decline of the Indus civilization, but actually there has been no reliable data to test this hypothesis. In this regard our research is a pioneering work; we provide detailed data on long-term climate change in the whole of South Asia for the first time. In addition, we investigate some regional environmental changes which might have made a significant impact on the civilization. By putting together the outcomes of these researches we will enhance our understandings on the relationship between both long- and short-term environmental changes and human civilizations, and thus make a contribution towards solving some key issues of current global environmental problems.

[Background]

The supposed impact of environmental change on the decline of the Indus civilization has been studied from two different perspectives. The first group of researchers proposed that the main causes for the decline were local. There have been several different theories based on this local hypothesis e.g. Wheeler's Aryan invasion theory and Raikes' flood theory. The second group of scholars, on the other hand, examined the issue from the global level. They focused their study on the global climate change observed during mid- and late Holocene. They claim that the Old World, especially Asia, witnessed a collapse of agriculture-based societies including the Indus societies during mid- and late Holocene

which was coincidental with the abrupt climate change mentioned above. The past decades have seen a revival of ‘environmental determinism’ in palaeo-environmental research, with palaeo-climate shifts implicated in the collapse of many past civilizations. We do not accept the environmental determinism proposed by many scholars engaged in global-level analysis, but we also consider that it is important to integrate the outcomes of palaeo-environmental researches in South Asia into our project. Our standpoint is that we need to look at both local and global levels.

Furthermore, we consider that past theories, in general, are too simplistic and too narrow in scope. They failed to see the diversity of both natural and social environments of the Indus societies, and, as a result, failed to grasp the complexity of the process of the so-called decline in each region. This is why we emphasize the importance of looking at the process in a much more wider context on one hand, and much more in detail in the target regions on the other.

## 2) Research methods and organization

[Research methods]

As mentioned in 1), we combine the research methods of various disciplines of both natural and human sciences. For each key issue we collaborate the research outcomes of different research groups.

As for the reconstruction of the natural environment of the Indus civilization, various geoscience methods are employed to investigate both long-term climate change and regional environmental changes. The subsistence systems, which may have been subject to the influence of global climate change as well as regional environment changes, are being studied through ethno-botanical and archaeo-botanical analysis.

As for the reconstruction of socio-economic and cultural aspects of the civilization, we employ various methods of humanities: archaeological methods to recover cultural artefacts from the archaeological sites, and linguistic and anthropological methods to discover characteristics of the Indus societies at different levels. These methods are also useful to understand the relationship between Indus societies and other ancient civilizations.

[Research organization]

We have five working groups; (1) palaeo-environment research group (PERG); (2) material culture research group (MCRG); (3) subsistence system research group (SSRG); (4) inherited culture research group (ICRG); and (5) DNA research group (DNAG).

(1) PERG aims to investigate: (a) long-term climate change in South Asia, using core samplings from Rara Lake in the Lesser-Himalayan region and reconstructing the Asian monsoon by chemical index of alteration and other proxies; (b) the palaeo-channel of the Ghaggar-Hakra River through the analysis of satellite imagery and field research including the dating of sand dunes; (c) sea-level change along the coastline of Gujarat during the Indus period through the analysis of satellite imagery, hydro-isostatic modeling and geological/topographical analysis; (d) local climate changes through the oxygen isotope analysis of otolith recovering from Indus sites in Gujarat; and (e) palaeo-seismological analysis for understanding the impact of earthquakes.

(2) MCRG excavated two sites in India, i.e., Kanmer (Kachchh, Gujarat) and Farmana (Rohtak, Haryana). The members uncovered a number of structures including a citadel with stone walls, a large burial ground, plant and animal remains, and diverse artefacts such as pottery, ornaments, and Indus seals/sealings with and without Indus scripts. They analyze these data to reconstruct the society and culture of each region, as well as trade and other networks which united these regions with other regions within and outside the civilization. They also gather supplementary data on other Indus sites both in India and Pakistan.

(3) SSRG reconstructs the subsistence systems of the Indus civilization by analyzing archaeo-botanical data obtained from Indus sites and ethno-botanical data found mainly in present-day Maharashtra and Karnataka. Their fieldwork focuses on the study of distribution and characteristics of emmer and Indian dwarf wheat, both of which were found in many Indus sites and must have been main winter crops during the Indus period.

(4) ICRG reconstructs the history of the Indus societies using linguistic methods. The members of the

Indologist subgroup analyze Vedic and Mesopotamian cuneiform texts, while those of the linguistic subgroup use comparative methods to reconstruct the substratum cultures and languages of South Asia. They have produced Language Atlas of South Asia which shows the distribution of modern South Asian languages, and on the basis of this atlas they have started to make maps showing the distribution of key cultural vocabulary of the Indus civilization.

(5) DNAG was formed in 2009 when a huge amount of human bones were found in Farmana. The members have been working on cow and human bones in order to reconstruct the genetic histories.

### ■ Progress and Results in 2010

#### 1) ACHIEVEMENTS IN FULL RESEARCH TO DATE

For the first two years the central activities of our project were to excavate Kanmer and Farmana in India to collect archaeological data. Through this process we obtained a huge amount of data which help us present a detailed picture of the societies and cultures of the two contrasting regions – one along the coast of Gujarat and the other along the Ghaggar-Hakra River in Haryana – of the Indus civilization.

What have been uncovered from these sites include: a number of structures including a citadel with stone walls, plant and animal remains, and diverse artefacts such as pottery, ornaments and others. At Kanmer we have found three sealings like pendants with Indus scripts (reported in *Science* in May 2010) and other Indus seals with and without Indus scripts –which provide important data for continued efforts to decipher the Indus writing system. At Farmana, we discovered a large-scale burial ground which has rarely been found in Indus sites except at Harappa. Each of these findings makes a significant contribution to our understandings of the societies, cultures and subsistence systems of the Indus civilization. They show that there existed strong regional differences within the civilization, as well as trade and other networks which united different regions within and outside the civilization. Detailed analysis of these data has been conducted by the members of MCRG; the outcome of their analysis will be published in two volumes of final report by the end of March 2011.

In the third and fourth years, we worked intensively to reconstruct: (1) long-term climate change in South Asia; and (2) the history of the regional environments surrounding Kanmer and Farmana where excavations were conducted. The objectives of these researches are to assess the impact of global climate change in South Asia, and of local environmental changes, on the societies and subsistence systems of these regions during the Indus period.

(1) As regard the reconstruction of long-term climate change, PERG conducted coring from Rara Lake in the Lesser-Himalayan region in 2009. They have been analyzing the monsoon pattern of the last five thousand years by using chemical index of alteration and other proxies. The preliminary analysis has shown that: (a) there seems to have been a big phase shift around 3 ka; and (b) there might also have been some change around 4.1-4.2 ka, but whether it was related to the 4.2 ka event is not yet clear. They continue their analysis on these points.

(2) Our research on regional environmental changes centers around two issues: (a) the avulsion of the Ghaggar-Hakra or the old Sarasvati River, and (b) the palaeo-coastline of Gujarat. Researches on these issues have mainly been led by the members of PERG, but linguistic analysis of Vedic texts and Mesopotamian cuneiform texts conducted by ICRG have greatly assisted to put the outcomes of their researches in the proper context.

(a) The first issue concerns the long-standing debate about the Ghaggar-Hakra River, identified as the mighty Sarasvati River in the Rig-Veda text. Many Indian scholars have thought that it was a big river as described in the Vedic text, and together with the Indus River it supported the agricultural systems of the civilization. Our PERG team, however, established through the dating of sand dunes that during the Indus period no part of the Ghaggar was much bigger than today's Ghaggar which is rather a small river highly affected by monsoon. This has confirmed our hypothesis that the Indus civilization was unique among ancient civilizations in that it did not, at least in part, depend on large rivers.

(b) The second issue concerns the history of trade networks within and outside the Indus societies. Sea trade between the Indus regions and the west can be reconstructed to some extent by the study of

Mesopotamian cuneiform texts. Furthermore, the artefacts discovered at sites in Gujarat such as Lothal show us that they functioned as centers of trade with Mesopotamia and Africa during the Indus period. PERG examined the sea level change of Lothal by means of hydro-isostatic modeling and geological/topographical analysis. They have found that due to the gradual fall of sea level, this important seaport gradually became out of use in the first millennium BC. This suggests that regional environmental change was responsible, at least to some extent, for the decline of trade along the coast of Gujarat.

As regards networks between different Indus regions, our MCRG team has discovered ample examples for giving us a detailed picture of how such networks functioned at different levels. To supplement their findings, recent study by Dr. Randall Law of University of Wisconsin-Madison depicts complex trade routes of different types of mineral resources such as limestone, steatite, carnelian, lapis lazuli, etc. from the places of origin to big cities like Mohenjodaro, Harappa, Dholavira and others. This clearly shows that inter-regional trade networks were highly active during the Indus period. (Law's voluminous work will be published as part of our occasional paper series within this fiscal year.)

The regional variation of the Indus societies and cultures is in part the reflection of the enormous diversity of natural environment across different regions of the civilization. The Indus civilization regions comprise the so-called Yellow Belt in the west where agriculture is largely dependent on irrigation systems, and the Green Belt on the northeast where agriculture depends on monsoon, dissected by the dry Thar Desert where the current annual rainfall is less than 100 mm. It seems that the climate during the Indus period was much the same as it stands now. Based on the analysis of archaeo-botanical data obtained from Indus sites SSRG has found that the Indus civilization could be divided into three regions in terms of crops - the winter crop region in the west, the summer crop region along the coast of Gujarat and the mixed crop region in the northeast. Furthermore, Dr. Mallah, a core member of our MCRG team in Pakistan, discovered new Indus sites on the western rim of the Thar Desert where it is rather dry. This suggests that some pastoralists lived even in the desert area during the Indus period. In general, the decline of the Indus civilization seems to coincide with the shift of human habitation from the winter crop region to the mixed crop region.

Agricultural systems are highly dependent on main crops. Wheat and rice coexist in South Asia. The domestication of rice in India is still a matter for debate. We have found some rice remains both at Farmana and Kanmer but whether they belong to the Indus period or not has not yet been confirmed, and we are waiting for the result of AMS dating due in this February. Wheat, on the other hand, was clearly predominant at Harappa and other sites along the Indus River, i.e. in the winter crop region. Among different subspecies of wheat, "Indian dwarf wheat", the remains of which were found in several Indus sites, appears to be indigenous to the region and have been the main winter crop alongside of emmer wheat (which was probably brought from Africa) during the Indus period. The former subspecies was considered to have disappeared from India due to the green revolution in the late 1960's. The members of SSRG, however, have found it being cultivated in Maharashtra and Karnataka. It is fascinating to see that India has still retained this subspecies which provides us a key to understand the Indus subsistence systems. In this regard India could be called a "residual area", as it tends to retain her tradition for a long time even in the face of globalization. Residual areas are naturally areas of diversity, as opposed to spread areas which tend to be homogeneous (Nichols 1992:193).

To sum up, the achievements of our research teams have so far shown that there was an enormous diversity both in the natural environment and the societies/cultures of the Indus civilization, and as such, the causes of its decline are multi-dimensional. It is wrong to assume that all the Indus societies were dependent on the irrigation-based agriculture. It is natural to consider that the societies consist not only of agriculturalists but also traders, pastoralists, and even hunter-gatherers. The Indus societies must also have been multi-lingual, multi-ethnic and multi-cultural, as they had such complex and diverse trade and other networks within and outside themselves. The previous understandings of the Indus civilization were largely based on the assumption that it was analogous to the other ancient

civilizations; they were also mainly based on the reports of excavations at Mohenjodaro and Harappa. Our project will hopefully present an alternative picture of the civilization which is much more rich and diverse.

## 2) AMENDMENTS TO RESEARCH OBJECTIVES AND METHODS AS NECESSARY

DNA research group (DNAG) was formed in 2009 when a huge amount of human bones were found at Farmana where we excavated for three seasons (2006-2009). There has been no other change in our research organization since the beginning of our FR in 2007.

We have one minor change in our methods of investigating the palaeo-environment during the Indus period. PERG team which had collected coral samples from Maldives to determine the fluctuation of sea surface temperature failed to obtain data covering the Indus period. So we decided to use otolith samples at Indus sites in Gujarat collected by Dr. Ajithprasad, in addition to sediment core samples from Rara Lake, for the purpose of reconstructing the environment during the period. The most hazardous incidents which affected our research seriously were the political turmoil in Pakistan. Due to the lack of security, we couldn't conduct excavations there. Initially we planned

to excavate three Indus sites in diverse natural environments: (1) Kanmer along the coast of Gujarat (India); (2) Farmana along the Ghaggar River (India); and (3) Ganweriwala in the Cholistan Desert (Pakistan). We visited the archaeological site at Ganweriwala in April 2007 and asked the archaeological department of the Government of Pakistan for an official permission to conduct excavations there. However, due to a series of incidents culminating in the assassination of Mrs. Bhutto in December 2007, the social situation of Pakistan, especially in rural areas, became too dangerous for foreigners to stay for a long period. The archaeological department never gave a permission to work in Pakistan to any foreign archaeological mission after these incidents. We, therefore, were forced to abandon our plan of excavating at Ganweriwala.

In addition to the excavations at Ganweriwala, we also planned to conduct field research to obtain data for seismological analysis both in India and Pakistan. This was to understand the impact of earthquakes on the Indus civilization across the two countries. But we couldn't conduct the planned research on the Pakistan side either, for the reasons mentioned above.

We, however, succeeded in exchanging MOU's with two universities in Pakistan and including two eminent scholars from Pakistan, Dr Mallah (Shah Abdul Latif University) and Dr. Masih (Punjab University), as core members of our project. Professor Uno, our Japanese core member, visited SAL University, provided training to students there, and collected the most recent data obtained from the archaeological work conducted by Dr Mallah's team in the Thar Desert. We have also kept a close partnership with Professor Kenoyer (University of Wisconsin), a leading authority on Indus archaeology. This way we keep updating information on the progress of the Indus study on the Pakistan side.

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## ■ Future Themes

In the final year we will integrate all the achievements made so far to present a comprehensive picture of the Indus civilization and its decline. More specifically, we will attempt to detail the extent of impact of regional environmental changes and global climate change on the societies, subsistence systems and trade networks in each region, and clarify how much of such impact was responsible to the shift of human habitation from the winter crop region along the Indus to the mixed crop region along the Ghaggar-Hakra and the loss of urban centers across Indus regions.

As mentioned above, the two volumes of final report on the excavations at Kanmer and Farmana will be published by the end of March 2011. Other works supplementing them - such as Law's work on trade networks - will also be published in our OP series.

PERG will finalize their analysis of climate change in South Asia. They will present the outcomes of their researches in three international conferences in 2011 - Chapman Meeting of AGU (March), EGU (April) and INQUA (July) - and publish a paper in an international journal. Two remaining researches concerning the palaeo-environment of the Indus period - oxygen isotope analysis of otolith and palaeo-seismological analysis in India - will also be concluded in 2011.

SSRG will finalize their analysis of the distribution and characteristics of emmer and Indian dwarf wheat, as well as their work on the archaeological remains of other crops from Indus sites.

DNAG will conclude their DNA analysis of cow and human bones.

The data obtained from SSRG and DNAG will be collaborated with those from ICRG. The linguistic subgroup of ICRG is now drawing maps of cultural vocabulary including plant and animal names, while the members of the Indology subgroup have been analyzing the description of cows and oxen in the Vedic texts in detail. The results of these researches will be integrated into and visualized on GIS of different levels.

We have so far published many English books and monographs including nine volumes of Occasional Papers and three volumes of Manohar Indus series. By the end of our project, we plan to publish at least two more volumes of OP (Law and Parpola's monographs), five volumes of Manohar Indus series, the final version of the Language Atlas of South Asia (from Harvard UP), and a collection of English papers (Springer), in addition to the two volumes of final report of excavations. We also plan to publish a Japanese book presenting our new view on the Indus civilization for general audience.

Apart from publishing books and papers focusing on different topics of the Indus civilization, we have also been holding several international conferences focusing on important topics. We plan to hold an international conference with all the core members of our project to share the results of our researches.

## Books

### 【Authored/Co-authored】

- Law, Randall William Jan, 2011 Inter-regional interaction and urbanism in the ancient Indus Valley (Linguistics, Archaeology and the Human Past). Occasional Paper, 11. RIHN, Kyoto, Japan, 800pp

## Editing

### 【Editing / Co-editing】

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- Indus Project (ed.) Nov, 2010 Annual Report of the Indus Project 2009. RIHN, Kyoto, Japan, 230pp (in Japanese)
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- Osada, T., M. Onishi (ed.) Jul, 2010 Language Atlas of South Asia. RIHN, Kyoto, Japan, Kyoto, Japan, 160pp.

## Research Presentations

### 【Oral Presentation】

- Osada, T. Environmental change and the Indus Civilization: a report on the major outcome of our RIHN project (2007–2011) . *Climates, Past Landscapes and Civilizations*. American Geophysical Union Chapman Conference, Mar 21, 2011–Mar 25, 2011, Santa Fe, New Mexico, USA.
- Maemoku, H., Y. Shitaoka, T. Nagatomo, H. Yagi Was the Ghaggar River Mighty Saraswati during Mature Harappan Period? . *Climates, Past Landscapes and Civilizations*. American Geophysical Union Chapman Conference, Mar 21, 2011–Mar 25, 2011, Santa Fe, New Mexico, USA.
- Nakamura, A., Y. Yokoyama, H. Yagi, M. Okamura, H. Matsuoka, N. Miyake, T. Osada, H. Teramura, T. Yamada, D.P. Adhikari, V. Dangol, H. Matsuzaki Mid-Late Holocene Asian monsoon reconstruction using a sediment core obtained from Lake Rara, western Nepal. *Climates, Past Landscapes and Civilizations*. American Geophysical Union Chapman Conference, Mar 21, 2011–Mar 25, 2011, Santa Fe, New Mexico, USA.
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- Okuno, J. The role of hydro-isostasy for Holocene sea-level changes and coastal evolution in the southern Indus region, Gujarat, India. *Climates, Past Landscapes and Civilizations*. American Geophysical Union Chapman Conference, Mar 21, 2011–Mar 25, 2011, Santa Fe, New Mexico, USA.
- Miyauchi, T., H. Maemoku, H. Matsuoka, T. Osada, J.S. Kharakwal Late Holocene geomorphic coastal change affecting the mutation of bay-facing Harappan sites in the Indus civilization, Gujarat, India. *Climates, Past Landscapes and Civilizations*. American Geophysical Union Chapman Conference, Mar 21, 2011–Mar 25, 2011, Santa Fe, New Mexico, USA.
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- Maemoku, H., T. Nagatomo, S. Shitaoka Was the sacred Saraswati a great river during mature periods of Indus civilization?. JpGU 2010, May 23, 2010–May 28, 2010, Makuhari, Chiba, Japan. (in Japanese)

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**Stage: FR**

**Project No.: H-04**

**Project Name: Neolithisation and Modernisation: Landscape History on East Asian Inland Seas**

**Abbreviated Title: NEOMAP**

**Project Leader: UCHIYAMA, Junzo**

**Research Axis: Ecohistory**

**URL: <http://www.chikyu.ac.jp/neo-map/>**

**Key Words: landscape change, inland seas, Neolithisation, Modernisation, cultural landscape, landscape preservation**

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## ■ Research Subject and Objectives

### 1. Research Objectives

This project aims at reconsidering the notion of “cultural landscape protection” by way of reconstructing the historical landscape (hereinafter LS) change on East-Asian inland seas during the two most notable revolutionary periods in the history of human-nature relations, i.e. Neolithisation (hereinafter NLS) and Modernisation (hereinafter MDS), through the analyses of sustenance activities, trade and mental or cultural structures (political system, art, literature, festivals etc), climatic and topographical analysis in eight regions on the shores of East-Asian Inland Sea (Japan and East China Sea). The primary goals of the project are to:

- (1) Reconstruct the changes in the naturally and culturally conditioned spheres of LS.
- (2) Explicate the functioning of inland seas as a network creating cultural unity and diversity.
- (3) Reconsider the idea of “cultural LS” in order to put the cultural LS protection policies into a new perspective. Comparing NLS and MDS processes can give us a better understanding of possible future developments and solutions to present environmental issues.

### 2. Background

Earlier, there has been an obvious tendency to see the environmental problems as caused by a complex set of natural processes, whereas the influence of human culture has often been reduced to a simplified “human factor”. Unlike other animals, humans take action towards environment also for non-functional, philosophical, aesthetic or religious motives. Therefore, as has been understood by the academic community in recent years, any successful analysis of environmental problems has to deal with human cultures in all their richness and detail. The present project aims at investigating the environmental issues from the human culture’s point of view through a holistic concept of “LS”. LS as the stage of humans’ everyday life, is a concept that includes both the visible/ physical side of the natural environment and cultural/ intellectual side, making possible a holistic analysis of the environmental problems at the stage where they arise. On the other hand, LS is made up of elements that date back to different historical layers, thus allowing us to reconstruct the historical process of emergence of the environmental issues. Belonging to the Ecohistory program of RIHN, the NEOMAP project aims at deeper understanding of the historical formation of the global environmental issues from a very long-term perspective (including prehistory) and through a multidisciplinary and international research agenda provided by the concept of LS. The research is carried out on eight key regions on the shores of East Asian Inland Seas (East China Sea and the Japan Sea), since historically, the inland sea coastal areas were densely populated and played a major role as worldwide trading spots and collision spots for various cultures and civilizations. Therefore, it can be said that these are the most suitable fields for the observation of the interactions between culture and nature.

In addition, considering that the concept of “cultural LS” has become an important issue in government and international protection programs (e.g. the nomination of national LS treasures, UNESCO World Heritage sites), it is crucial to understand the cultural formation mechanisms of protected LS and the processes that sustain them.

### 3. Topics and Methodology

#### 1) Research Areas

The project focuses mainly on the East Asian inland sea, i.e. the Japan Sea Rim and the East China Sea Rim. Historically, inland sea coastal areas were densely populated and played a major role as worldwide trading spots and collision spots for various cultures and civilizations. Throughout the duration of this research project, results will be compared to those of the LS research in the North European inland seas.

Eight research areas were chosen around the East Asian inland seas to represent the full variety of cultural and natural settings. The selected research areas are: 1. Hokuriku, 2. Biwako and 3. Northern Kyushu for mainland Japan, 4. Hokkaido and 5. Ryukyu for marginal Japan, 6. Southern Coast of Korea, 7. Northern Zhejiang for China, and 8. Primorye for Far-East Russia.

In order to foster interdisciplinarity, the work groups (hereinafter WG) are organised according to regions rather than by research subjects.

#### 2) Research Methods

As a basis for studies on both NLS and MDS, a geographical database will be created for each region for both of the periods with available cartographical data in the form of both historic and modern maps, information on the distribution and spatial structure of archaeological sites, and other related archaeological data. Land use, settlement patterns and population dynamics will be mapped on the basis of cartographic data, historical documents, pollen analyses, and other environmental and ecological datasets.

Since LS is a holistic phenomenon that entails both a cultural and a natural side, and develops through the influence of human practices and interactions of the natural environment, a large part of LS research has to be based on qualitative rather than quantitative research methods. Specific research methods would depend on each discipline and on one of the highlighted periods of study (NLS or MDS).

#### 3) Project Organisation

Eight research areas were chosen around the East Asian inland seas to represent the full variety of cultural and natural settings: Hokuriku, Biwako, Northern Kyushu, Hokkaido, Ryukyu Islands, Northern Zhejiang, Southern Coast of Korea, Primorye. In order to foster interdisciplinarity, the work-groups (hereinafter: WG) are organised according to regions rather than by research subjects. Each regional WG includes NLS and MDS researchers carrying out research in the area. It is highly recommendable that each member belongs to at least two of the WGs, in order to facilitate the comparative discussion between the area groups. Information exchange inside the project is facilitated by frequent WG meetings, two general meetings per year and other seminars and work groups. In some cases, the researchers carry out joint field work.

In addition, there are three database WGs that are responsible for the creation of the GIS database and the basic data collection (Neolithisation WG, Modernisation WG and technical GIS WG).

This project has signed memoranda and research cooperation agreements with research institutes in Korea, Russia and UK in order to promote international integrative research.

### 4. Significance as an RIHN Project

Belonging to the Ecohistory program of RIHN, the NEOMAP project aims at a deeper understanding of the historical formation of the global environmental issues from a very long term-perspective (including prehistory) and through a multidisciplinary and international research agenda provided by the concept of LS.

Using the multidisciplinary flexibility that RIHN can offer, the NEOMAP project will emphasise the role of socio-cultural systems in the functional cycle of human-nature relationships, considering that the understanding of the socio-cultural sphere is indispensable for building preservation strategies in the future. Because humans can act based on irrational motives (i.e. aesthetic, symbolic, or religious principles) in terms of their integration within a given environment, it is extremely important to

analyse the role of culture regarding modern environmental issues without simplifying human behaviour. Focusing on two major periods in history (NLS and MDS) that can be considered direct roots of modern environmental problems, the NEOMAP project will offer new insights into the mutuality of nature-culture relationships that would enable us to make predictions for future developments and clarify the historical background of LS elements that have become an object of protection. Since LS is a holistic phenomenon, its analysis requires specialised knowledge of an extremely wide panorama of academic fields. Therefore only an interdisciplinary project of considerable scale can cover the development of human-nature relationships within a larger region, and throughout several historical periods. As a fully funded and operational RIHN project, NEOMAP would have both the interdisciplinarity and the scale to offer a comprehensive analysis, uniting scholars from archaeology, modern history, geology, geography, LS engineering, anthropology, linguistics and biology.

Of the two areas targeted by the Ecohistory program of RIHN - The Asian Green Belt and Yellow Belt -, the NEOMAP project research area is included in the former. Co-operating with the project H-02 "Agriculture and Environment Interactions in Eurasia: Past, Present and Future - A Ten-Thousand-Year History - ", the project hopes to contribute to a clearer understanding of the historical roots of the environmental problems in the area.

### ■ Progress and Results in 2010

In the FR3, the project members have been engaged in full scale research activities and carried out thorough field work in their designated areas. The topics that are addressed by the individual researchers in all the research groups can be divided into four major common themes. (1) The birth and expansion of agriculture; (2) LS change at waterfronts; (3) Migration and colonisation as a major force of LS change; (4) Travelling and creation of mental LS images.

As the first volume of landscape series, *Higashi Ajia Naikai bunka-ken no keikanshi to kankyō: Mizube no tayousei* (Landscape History and Environment on the East Asian Inland Seas: Versatile Waterfronts) was published. Monthly landscape seminar provided good opportunities for wide-ranging discussion. The project organized sessions at Society for American Archaeology (SAA), International Conference of Historical Geographers (ICHG), and some members had presentations at Centre of Excellence in Cultural Theory (CECT) in Estonia. For social activity, we collaborated with Suita city museum in Osaka for the special exhibition of natural history. Series of open class at Muromachi elementary school is an interesting educational outreach.

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## ■ Future Themes

### 1. Outcomes in Fiscal Year 2009

The project has eight regional work groups, each carrying out research in a key area of the East Asian Inland Seas. Research focuses on four umbrella topics:

- (1) The birth and expansion of agriculture.
- (2) Waterfronts, including water bodies, waterways and rice paddies.
- (3) Migration and colonisation as forces of landscape change.
- (4) Travel and creation of mental landscape images. Special attention has been paid to three following major aspects of landscape formation in the region.

#### (1) Modernisation as seen from Neolithisation

What do the landscape changes associated with Modernisation have to do with Neolithisation? It was previously thought that the “Neolithic revolution,” when agricultural societies and large-scale settlements emerged and the basic elements of modern landscapes were established, was an event that occurred in a relatively short period of time. If, however, we refer to humankind’s increasing capacity to exploit their environments compared to earlier hunter-gatherer societies, “Neolithisation” should be defined as a process of human adaptation to the natural environment since the end of the last Ice Age. As aggressive resource use and increasing regional interdependency are characteristic of the present day as well, the period of Modernisation can be seen as a climax or intensification of Neolithisation.

#### (2) The cultural functions of inland seas

Seas have an immeasurable impact on their surrounding landscapes. Our Hokkaido workgroup describes how inland seas enable migrations and new colonisations, transforming indigenous spiritual and sustenance landscapes and imposing new settler landscapes. Okinawa, in contrast, was positioned as an outpost of trade between

Japan and China. Its extensive coastlines and marine environments have shaped the regional landscapes from within, bringing about specific regional sustenance patterns and religious world views. At times, the maritime and continental influences interact, as in the Primorye Region, where the continental influence of Korean settlers blended with that of the new European settlers who arrived across the sea.

#### (3) The creation of mental landscape images

What is the impact of culture’s mental structures on landscapes? What do great cultural systems like religion have to do with landscape and environmental issues? We explore one instance in Japan. With the rise of Buddhism in the Nara period (AD 710–794), the killing of living beings, including animals and fish, was prohibited. Since the Middle Ages, hunting and fishing were strictly prohibited within 2 li (roughly 1.3 km) of the temples, but this area was gradually redefined according to the area directly visible from the temple. Both the ban and its gradual redefinition, have had a large impact on resource use and the natural environment of the Japanese archipelago.

### 2. Future Topics

NEOMAP scholars participate in many public events designed to increase public awareness about landscape and environmental issues. As visualization is a useful tool for making specific historical data accessible to nonacademic audiences, in the next years our publications will emphasize the creation of landscape database and atlas. Superimposing the landscapes of Neolithisation and Modernisation on one

single map can lead us to new discoveries about historical human-nature interrelationships and enhance consciousness about environmental issues. We also hold regular seminars in and outside RIHN and present our results at international workshops and symposia. NEOMAP is active in international collaboration, and has organised joint activities with scholars from Estonia, Belgium, Holland, UK and Germany.

## **Books**

### **【Authored/Co-authored】**

- TKACHEVA, N and TKACHEV, Sergey 2010 Oil and natural gas in the modern politics. Press of Maritime State University, Vladivostok, Russia, 192pp. (in Russian)

## **Editing**

### **【Editing / Co-editing】**

- UCHIYAMA, Junzo • NAKAI, Seiichi • NAKAMURA, Oki (ed.) 2010 Higashi Ajia Naikai no Kankyo to Bunka (Environments and Cultures in East Asian Inland Seas). Katsura-shobou, Toyama, 373pp. (in Japanese)

## **Papers**

### **【Original Articles】**

- KIM, Jangsuk 2010 Opportunistic vs. Target mode: Prey choice changes in Korean prehistory.. *Journal of Anthropological Archaeology* (29) :80-93.

## **Research Presentations**

### **【Oral Presentation】**

- UCHIYAMA, Junzo Jomon Style and Yayoi Style: Worldview transition with Neolithisation in central Japan. . Second CECT (Centre of Excellence in Cultural Theory) Autumn Conference: Spatiality, memory and visualisation of culture/nature relationships: theoretical aspects, Oct 22, 2010–Oct 24, 2010, Tallinn, Estonia.
- NAKAMURA, Oki Interpretation in Ritual Archaeology: Context and Scale. Ritual and Landscape of Stone Circles, Jun 29, 2010–Jun 30, 2010, Shibuya-ku, Tokyo. (in Japanese)

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**Stage:** FR

**Project No.:** R-03

**Project Name:** Historical Interactions between Multi-Cultural Societies and the Natural Environment in a Semi-Arid Region in Central Eurasia

**Abbreviated Title:** Ili Project

**Project Leader:** KUBOTA, Jumpei

**Research Axis:** Resources

**URL:** <http://www.ilipro.com/index.html>

**Key Words:** arid and semi-arid region Central Eurasia ethnic groups border agriculture nomadic pastoralism historical interactions

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## ■ Research Subject and Objectives

### (1) Research objectives and background

Historically, with the exception of those people who lived in oasis areas, people of the semi-arid region that extend across Central Eurasia once lived a predominately nomadic lifestyle. After a long transition marked by the rise and fall of various ethnic groups and countries, a tight and well-defined border divided the region between Russia and Qing China in the 18th century. At the same time, the people of this area experienced a great change in their lifestyle, caused by the migration of farmers, the settlement of nomads and development of agriculture. Settlement policies and borders prevented these people from following their way of adaptation. Finally, with the weakening of the Soviet Union, the Russian side of the political frontier was divided into many republics. Man-made trans-boundary issues, between countries or ethnic groups, religions, agriculture and nomadic pastoralism, commonly lie behind the various environment problems in the world. This is one of the keys to understanding the present environmental problems.

This project aims to study and clarify the historical interaction between human activities and natural systems in the semi-arid region of Central Eurasia, with particular emphasis on trans-boundary issues. The project attempts to clarify historical changes, the rise and fall of nomadic groups and countries, their movements, changes in subsistence patterns, the use of natural resources, and climate change. At the same time, we will investigate the present status of the area and the effects of human activities on the natural environment, with particular emphasis on their historical, social and cultural background.

### (2) Research methods

The study area is the Ili River basin, which flows from China to Kazakhstan, terminating at Lake Balkhash as well as the surrounding areas, including Kyrgyz and Uzbekistan. Geographically, the Ili-Balkhash Basin is recognized as a fertile area with relatively high precipitation, lying to the north of the Tian Shan Mountains. Central Eurasia is an excellent location for tracing human reactions both to past climate changes and to anthropogenic activities. In this climatically sensitive area, which alternates between semi-arid and arid conditions, human influence can be traced historically. In the last two decades, many paleoclimatic records in this area were derived from ice cores, tree rings, lake sediments and glacier fluctuations (Thompson et. al., 1995; Marchenko and Gorbunov, 1997; Yao, 1997; Esper et. al., 2002, 2003; Narama, 2002a, b; Solomina and Alverson, 2004; Treydte et. al., 2006). These climate reconstructions provide a chance to describe and understand the full range of the natural climate system behaviour of this region. Also, there was an excellent research project, called "CLIMAN project", including the collaboration of archaeology, geomorphology and geology on the human adaptation to lake level change in the Aral Sea (Boomer et al., 2009). However, Interactions between environmental changes and human reactions have rarely been studied in multi-disciplinary manner in Central Eurasia.

So, we would like to investigate the area as follows;

- a) Clarify historical changes, the rise and fall of nomadic groups and countries, their movements, changes in subsistence, the use of natural resources and climate change through the analysis of historical documents and archaeological investigations as well as various natural proxies such as ice cores, lake sediment samples, tree rings and wind-blown deposit.
- b) Investigate the present status of the area and the effects of human activities on the natural environment, including their social, religious and cultural background.
- c) Compare upstream and downstream areas in terms of historical changes and their present status, looking at both sides of the political border, which used to be the same but have developed differently, in order to understand the meaning of boundaries on environmental issues.

### **(3) Research organizations**

The project consists of two research groups: one has clarified historical changes in both human activities and natural systems and the other group has investigated the current processes of human activities and natural systems. In addition, we have been cooperating with various research institutions in overseas countries;

Kazakhstan: Institute of Geography; Institute of Archaeology; Kazakhstan Scientific Research Institute on Problems of the Cultural Heritage on Nomads; Tethys Scientific Society.

China: Cold and Arid Region Environment and Engineering Institute;

Others: Central Asia Deep Ice-Coring Project (CADIP); NESPI; CLAIMAN

### **(4) Significance as a RIHN Project**

Historically, human beings have strived to adapt to changes in the environment. This projects aims not to search for a so-called historical understanding of the rise and fall of the ethnic groups, but to find the history of adaptations by human beings in semi-arid regions of Central Eurasia, focusing natural resources use. On the basis of historical analysis, we have tried to investigate the present environmental problems caused by modern developments in both the former Soviet Union and China with special emphasis on man-made boundaries, which is one of the fundamental factors behind present environmental problems.

### **■ Progress and Results in 2010**

We reconstructed the change of the climate in the area by using various proxies during the past 1,000 years as the basis for understanding the historical interaction between human activities and the environment. At first, we reconstructed a series of air temperature variations from tree ring width records in Kyrgyz (Esper et. al, 2002) and precipitation from the accumulation date at the Guliya ice-cap in China (Thompson et. al., 1995). Reconstructed temperature and precipitation, and estimated river discharge, indicated that the period from AD1000 to AD1500 was warm and dry, while the Little Ice Age (LIA), from 1500 to 1850 was cold and wet. After the LIA, the climate became wet and warm. This long-term trend well corresponds to the reconstructed lake level of Lake Balkhash represented by the ratio of saline and planktonic diatoms, indicating that there was a trend of decreasing lake level from the 10th to 13th century, as well as those of the Lake Issyk-Kul (Giralt et. al., 2002) and the Aral Sea (Boroffkka, et. al., 2006). After this significant regression, the lake level showed rapid recovery, and remained relatively high. Results from other proxies, such as dust and retrieval of glaciers supported this long-term trend.

We developed a chronological database, showing the rise and falls of settlements. In the northern piedmont of the Tian Shan Mountains, oasis cities, which were the agricultural centres and trading bases in the Syr Darya basin of western Turkestan, flourished from the 7th century, while settlements in the Ili River basin were the next to be blessed with prosperity. Most of the settlements were not agricultural bases, but nomadic and trading bases with military use. In medieval times, agricultural and nomadic peoples lived separately, making full use of eco-environment variations. Their interactions were a complementary relationship in terms of natural resources use. The climate change caused not only negative, but also positive effects for agricultural/nomadic production. The warm and dry climate in the early medieval times might have accelerated the development of agricultural and trading activities, consequently contribute to the flourishing of the area, especially oasis cities in the Syr Darya basin of western Turkestan. Also, the cold and wet climate in the early LIA, might have affected the declines of oasis cities and the increase of nomadic activities in the Ili river basin and Dzungaria. Relocations and changes of subsistence complex patterns were major ways of adaptation.

After the division of the area between Russia and Qing China, the balance between human capability and the impacts of environmental change, such as climate change, drastically altered. The establishment of a clear political border between Russia and Qing China shifted patterns of human-environmental interaction in the region.

In Kazakhstan, this process could be divided into several stages. After the expansion of Russia, the first attempt at changing subsistence from nomadic pastoralism to agriculture, in association with the settlement of nomadic people started from the late 19th century. The collectivization of the agricultural sector from 1929 triggered serious social confusion in Kazakhstan, resulting in the loss of a large number of nomadic populations. In the Virgin Lands Programme of Khrushchev's Agricultural Policy, Kazakhstan was forced to become one of the major crop production areas in the Soviet Union, causing excessive development which ignored environmental capacity and exerted significant impact on the area. In addition, these development policies were applied while ignoring and destroying traditional social systems. Especially, newly applied production system including the division of labour, together with the migration of skilled peoples from other countries as leaders for collective farms, prevented the accumulation of agricultural knowledge, and also caused the loss of traditional knowledge of nomadic pastoralism. The collapse of the Soviet Union caused the deterioration of terms of trade in the agricultural sector. The amount of state purchase and subsidies was reduced. Consequently, many farmlands developed during the planned economy were abandoned. This reduced the pressure on natural resources, ironically resulting in the recovery of the ecosystem. At the same time, peoples labouring in divided systems were provided rather small farmlands as a result of privatization. But they could not manage their own privatized land because of their limited knowledge of subsistence. This caused a serious economic crisis, and made recovery to difficult.

In China, the commencement of modern development had been delayed, not starting until the 1950' s. Agricultural development led by the Chinese Qing Dynasty was limited. After the first development period in the 1960' s in which grassland in plain areas was converted into farmland for growing cereals, the traditional nomadic pastoral system was well preserved by using natural grassland in the mountains. The second development was made by converting cereals to other cash crops, causing no serious damage to natural resources, such as land and water. Recent development after 2000 including industrial development, however, has been very active. The increasing demand for natural resources and consequent pollutions is projected.

### ○Co-Researchers

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- Funakawa, Shinya ( Kyoto University, Professor, Soil analysis )
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- Jashenko, Roman ( Institute of Zoology, Kazakhstan, Senior researcher, Evaluation of impacts of agricultural development in Kazakhstan )

## ■ Future Themes

- Reconstruction of the climate changes and human activities concerning the use of natural resources such as land and water will be finalized. This work will be accomplished through quantitative validation using the hydrological model which includes anthropological processes such as irrigation. We plan to apply our model not only on the Ili-Balkhash basin, but also the Aral Sea basin.
- We plan to investigate decision making processes of the development plans in the Ili River basin and the Aral Sea under the planned economy in the USSR era using historical documents. Detailed analysis about these processes would contribute how we establish proper environmental governance.
- We will publish the outcomes of our researches as a book series in three or four volumes. Each volume will be collectively written by several authors. This work should contribute to knowledge not only by dispatching the results to academic societies, but also for integrating outcomes.
- We plan to hold a workshop/symposium in Almaty, Kazakhstan, inviting cooperative researchers from overseas countries. The main purpose of this workshop/symposium is to feed back our findings and outcomes to the public, and especially to local researchers, engineers and planners.

## Books

### 【Authored/Co-authored】

- Noda Jin and Onuma Takahiro 2010 A Collection of Documents from the Kazakh Sultans to the Qing Dynasty. Joint Usage / Research Center for Islamic Area Studies, TIAS Central Eurasian Research Series Special Issue, No.1.. The University of Tokyo, Tokyo, Bunkyo-ku, 182pp.

### 【Chapters/Sections】

- SUGIYAMA Kiyohiko May, 2010 The Qing Empire in the Central Eurasian Context: Its Structure of Rule as

Seen from the Eight Banner System. Matsuzato Kimitaka (ed.) Comparative Imperiology. Slavic Eurasian Studies. Journal of Central Eurasian Studies 2., 22. Slavic Research Center, Hokkaido University, Sapporo, Japan, pp.87-108.

## Editing

### 【Editing / Co-editing】

- Mitsuko Watanabe and Jumpei Kubota (ed.) Aug, 2010 Reconceptualizing Cultural and Environmental Change in Central Asia: An Historical Perspective on the Future. Ili Project, Research Institute for Humanity and Nature, Kita-ku, Kyoto., 215pp.

## Papers

### 【Original Articles】

- Uetake J, Kohshima S, Nakazawa F, Takeuchi N, Fujita K, Miyake T, Narita H, Aizen VB, Nakawo M Feb, 2011 Evidence for propagation of cold-adapted yeast in an ice core from a Siberian Altai glacier. *Journal of Geophysical Research - Biogeosciences* 116(G01019). DOI:10.1029/2010JG001337 . (reviewed).
- Okamoto, S., K. Fujita, H. Narita, J. Uetake, N. Takeuchi, T. Miyake, F. Nakazawa, V. B. Aizen, S. A. Nikitin, M. Nakawo Jan, 2011 Re-evaluation of the reconstruction of summer temperatures from melt features in Belukha ice cores, Siberian Altai. *Journal of Geophysical Research* 116(D02110). DOI:10.1029/2010JD013977 . (reviewed).
- Onuma Takahiro Dec, 2010 The Development of the Junghars and the Role of Bukharan Merchants. *Journal of Central Eurasian Studies* 2.
- Fujita K, Hiyama K, Iida H, Ageta Y Nov, 2010 Self-regulated fluctuations in the ablation of a snow patch over four decades. 46(W11541). DOI:10.1029/2009WR008383 . (reviewed).
- Akiko Sakai, Koji Fujita, Chiyuki Narama, Jumpei Kubota, Masayoshi Nakawo, and Tandong Yao May, 2010 Reconstructions of annual discharge and equilibrium line altitude of glaciers at Qilian Shan, northwest China, from 1978 to 2002. *Hydrological Processes* . DOI:10.1002/hyp.7700. (reviewed).
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- Akiko Sakai, Koji Fujita, Chiyuki Narama, Jumpei Kubota, Masayoshi Nakawo, and Tandong Yao May, 2010 Reconstructions of annual discharge and equilibrium line altitude of glaciers at Qilian Shan, northwest China, from 1978 to 2002. *Hydrological Processes* 24(19) :2798-2806. DOI:10.1002/hyp.7700. (reviewed).
- Zhang Y, Fujita K, Liu SY, Liu Q, Wang X Apr, 2010 Multi-decadal ice-velocity and elevation changes of a monsoonal maritime glacier: Hailuoguo glacier, China. *Journal of Glaciology* 56(195) :65-74. (reviewed).
- Narama, C., Kaab, A., Duishonakunov, M., Abdrakhmatov, K. Apr, 2010 The 24 July 2008 outburst flood at the western Zyndan glacier lake and recent regional changes in glacier lakes of the Teskey Ala-Too range, Tien Shan, Kyrgyzstan. *Natural Hazards and Earth System Sciences* 10(4) :647-659. DOI:10.5194/nhess-10-647-2010. (reviewed).
- Schlosser E, Manning KW, Powers JG, Duda MG, Birnbaum G, Fujita K 2010 Characteristics of high-precipitation events in Dronning Maud Land, Antarctica. *Journal of Geophysical Research - Atmospheres* 115(D14107). DOI:10.1029/2009JD013410. (reviewed).
- SHIMIZU Katsuyuki, KITAMURA Yoshinobu, KUBOTA Jumpei 2010 Agricultural Water Use and Its Impact on the Environs in the Lower Ili River Basin, Kazakhstan. *Applied Hydrology* 22 :74-80. (reviewed).

## Research Presentations

### 【Oral Presentation】

- Narama, C., Kaab, A., Duishonakunov, M., Abdrakhmatov, K., Tadono, T Current state of glacier hazards in the Tien Shan mountains. . The 4th Joint PI Symposium of ALOS Data Nodes for ALOS Science Program 2010 Tokyo, Nov 15, 2010–Nov 17, 2010, Tokyo.
- Toshihiko Anzai, Katsuyuki Shimizu, and Yoshinobu Kitamura Effect of spatial distribution of paddy and upland fields on groundwater level fluctuation - A case study of an irrigated district in the lower Ili river basin, Kazakhstan -. 7th International AFAS Joint Symposium between Korea and Japan on Current Status and Perspectives of Agriculture, Forestry, and Animal Sciences in 2010, November 2010, Chuncheon, Korea.
- NODA Jin Kazak Nomadism in the Ili Region under the Russian Administration, 1871–1881. Central Eurasian Studies Society 11th Annual Conference, Oct 29, 2010, Michigan State University, East Lansing, MI, U.S.A.
- Narama, C., Kicengge, Kubota, J., Shatravin, V., Duishonakunov, M., Moholdt, G., Abdrakhmatov, K. The lake-level changes in Central Asia during the last 1000 years based on historical map. PAGES 2K International Workshop, Aug 26, 2010–Aug 27, 2010, Nagoya Univ. Aichi pref. Japan.
- Okamoto, S., Fujita, K., Narita, H., Uetake, J., Takeuchi, N., Miyake, T., Nakazawa, F., Aizen, V. B., Nikitin, S. A. and Nakawo, M. Stratigraphy analysis focused on air bubbles in the Belukha ice core, Siberian Altai. International Symposium on Snow, Ice and Humanity in a Changing Climate, Jun 21, 2010–Jun 26, 2010, Hokkaido Univ. Sapporo, Japan.
- Fujita K, Takeuchi N, Nikitin SA, Surazakov AB, Okamoto S, Aizen VB, Kubota J Mass balance of Gregoriev Glacier, Kyrgyz Tianshan Mts. derived from GPS surveys and energy-balance model. International Symposium on Snow, Ice and Humanity in a Changing Climate, Jun 21, 2010–Jun 25, 2010, Hokkaido Univ. Sapporo, Japan.
- Sakai A, Tadono T, Fujita K, Kubota J Formation conditions of supraglacial lakes on debris-covered glaciers in the Himalayas. International Symposium on Snow, Ice and Humanity in a Changing Climate, Jun 21, 2010–Jun 25, 2010, Hokkaido Univ. Sapporo, Japan.
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- Fujita K, Sakai A, Surazakov AB Re-evaluation of potential risk of glacial lake outburst flood in the Himalayas. International Symposium on Snow, Ice and Humanity in a Changing Climate, Jun 21, 2010–Jun 25, 2010, Hokkaido Univ., Sapporo, Japan.

#### **【Poster Presentation】**

- Nakazawa F, Uetake J, Suyama Y, Kaneko R, Takeuchi N, Fujita K, Kanda H DNA analysis of a single Pinus pollen grain in a glacier for identification of the species. International Symposium on Snow, Ice and Humanity in a Changing Climate, Jun 21, 2010–Jun 25, 2010, Hokkaido Univ., Sapporo, Japan.
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- Okamoto S, Fujita K, Narita H, Uetake J, Takeuchi N, Miyake T, Nakazawa F, Aizen V, Nikitin S, Nakawo M Re-evaluation of the reconstruction of summer temperatures from melt features in Belukha ice cores, Siberian Altai. 2010 PAGES (PAst Global changES) Regional Workshop in Japan, Jun 05, 2010–Jun 06, 2010, Nagoya Univ., Nagoya, Japan.
- Sakai A, Fujita K, Narama C, Kubota J, Nakawo M, Yao TD Fluctuations of discharge from Qilian Mountains in northwest China during the last two millennia. 2010 PAGES (PAst Global changES) Regional Workshop in Japan, Jun 05, 2010–Jun 06, 2010, Nagoya Univ., Nagoya, Japan.

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

- Fujita K Recent changes in Himalayan glaciers and glacial lakes. Workshop on Integrated Studies of

Environmental Changes and Climate Adaptation Responses in the Tibet-Himalayan Region, Sep 13, 2010–Sep 15, 2010, Kathmandu, Nepal.. .

- Fujita K Glacier Monitoring Activities in Japan, Nepal and Bhutan. WGMS General Assembly of the National Correspondents, Sep 01, 2010–Sep 04, 2010, Zermatt, Switzerland.
- Fujita K Changes in cryosphere in the Asian highland. PAGES 1st Asia 2k Workshop, Aug 26, 2010–Aug 27, 2010, Nagoya Univ., Nagoya, Japan..
- Fujita K Recent changes in Himalayan glaciers and ice core studies in the Asian highland. 2010 PAGES (PAst Global changES) Regional Workshop in Japan, Jun 05, 2010–Jun 06, 2010, Nagoya Univ., Nagoya, Japan.

**Stage:** FR

**Project No.:** R-04

**Project Name:** Environmental Change and Infectious Disease in Tropical Asia

**Abbreviated Title:** The RIHN Ecohealth Project

**Project Leader:** MOJI, Kazuhiko

**Research Axis:** Resources

**URL:** <http://www.chikyu.ac.jp/ecohealth/>

**Key Words:** ecohealth, environmental change, infectious disease, malaria, liver fluke, filariasis, water-borne diseases, tropical monsoon Asia

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### ■ Research Subject and Objectives

**Objectives:** The RIHN ecohealth project studies the effects of human societal and environmental changes on the ecology of diseases such as malaria, dengue fever, *opisthorchiasis* (liver fluke infection), diarrhea disease in tropical monsoon Asia. Population increase and migration, urbanization, deforestation, spread of wet rice cultivation, economic development, changes in livelihood and lifestyle, modernization and globalization are the factors transforming the ecological relationships. The project also investigates the relation between climate changes (temperature, rainfall, flood, etc.) and infectious diseases (water-borne diseases etc.).

**Basic concept:** Health, wellbeing and survival of human being in the long-run are the ultimate goal of mitigation of and adaptation to global environmental changes (at least from human points of view). Health is one of the key indicators of sound environment. Without sound environment for human life and survival, human health cannot be improved and sustained. Human health must be understood ecologically as well as medically as a part of the earth system. This view of health, ecohealth, is the basic concept of this project. Human health is global common asset sustained by many environmental and social factors.

**Background:** Human infectious disease is an outcome of biological interaction between pathogens and human beings. It is directly related to both the ecology of pathogens and the ecology of human beings. The ecology of pathogens is a part of the environment of human beings, while the ecology of human beings is a part of the environment of pathogens. Therefore, all the infectious disease necessarily has links with environments. Moreover, incidence of many human infectious diseases is related with non-human reservoirs and/or vectors of the pathogens. Incidence of vector-borne diseases such as malaria is related to the ecology of pathogens, vectors, and humans (and of non-human reservoirs in some species). Climate change, deforestation, expansion of wet rice fields, and other natural and social environmental changes must have a large impacts on epidemiology and endemiology of infectious diseases through their impacts on their ecology. The ecological settings of human being, vectors, and pathogens have been changing very rapidly in tropical monsoon Asia because of man-made environmental changes in this area. How the environmental changes in tropical monsoon Asia have effects on the endemiology and epidemiology of the diseases is of interest of the RIHN ecohealth project.

**Contributions to global environmental issues:** Unlike medical control programs/projects which usually aim at short-term problem-solving approaches of infectious diseases, this project tries to understand the fundamental relations of human life/livelihood and ecology of pathogens and vectors by making trans-disciplinary and integrated approaches. The project would provide a long-term view of human survival and health toward the future.

**Research methods and area:** 1) Long-term observation of a local population in Lahanam area, Songkhone district, Savannakhet province, Lao PDR by establishing Health and Demographic Surveillance System (HDSS). Since 2005 we are following about 4,500 residents there. We introduced paperless IT-HDSS in 2010

and expand the area covering 7500 residnets. In Bangladesh, we use data from the Matlab HDSS and others. 2) Collection and analyses of community-based information on environmental changes and health including infectious diseases. 3) Collection and analyses of national-based information on environmental changes and health including infectious diseases (analyses should be the district level and/or provincial level). 4) Discussion on global ecohealth concept.

**Project Organization:** Several research groups comprise our project. The Lao Study Group is collaborating with the National Institute of Public Health (NIOPH), Savannakhet Provincial Health Department and other institutions. The main study sites are the Lahanam health zone of Songkhone district and Xepon district of Savannakhet province. The Lahanam Study Group's research examines patterns of liver fluke infection of *Opisthorchis viverrini* (Ov), a parasitic infection associated with consumption of raw freshwater fish. In 2010-2012, the principal objectives of this group are to: 1) Expansion and maintenance of the Lahanam Health and Demographic Surveillance System (HDSS) and analyse life expectancy and causes of death; 2) Study on parasitology and epidemiology of Ov; 3) Study the relation between modern irrigation/wet-rice cultivation and liver fluke infection; 4) Study fish and snail ecology, fishery ecology, and consumption of fish, and; 5) Determine feasible educational, behavioural, and/or environmental control of liver fluke infection. Studies on young child and school health and nutrition are also under way in this area. The Xepon Study Group is developing an integrated ecological and medical approach to malaria control in this malaria hot zone. This group established a mobile phone-based health information network system covering all 158 villages in Xepon. Land-cover studies and satellite image analysis (ALOS) were conducted in Lahanam and Xepon. In 2010 this group found the very high mortality of young children among farmers in mountain. The principal objectives of this group in 2011-2012 are to: 1) Maintain the Xepon Health Information Network in order to monitor monthly incidence and mortality of malaria and other diseases; 2) Analyze the relation of forest cover change, settlement, subsistence, mosquito population/ecology with malaria endemicity/epidemiology; 3) Analyze the environmental and societal changes within the Banhiang River catchment area (a tributary of the Mekong River), including rainfall, flood, land-cover/use, and water quantity and quality; 4) Analyze the effects of the Vietnam War on the occurrence of malaria. The Xepon HDSS shall be introduced in 2011.

The Vietnam Study Group in collaboration with Nagasaki University Institute of Tropical Medicine, the Khanh Phu Malaria Center of Khanh Hoa Province, and others is focusing on transmission of new human malaria, *Plasmodium knowlesi* (Pk) in humans as well as in monkeys. The Group found a very high mix-infection of Pk with *P. vivax* in humans. The Group started the multi-disciplinary study of malariology, entomology, primatology, forestry, epidemiology and social science. The team also check the prevalence of Pk near the border to Lao and Sepone.

The Bangladesh Study Group in collaboration with the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B) is studying the relationship between the effect of the Indian Ocean Dipole and the incidence of cholera in Dhaka. This group is also studying the long-term effects of flood on morbidity and mortality in Matlab. Another Bangladesh Study Group in collaboration with the Ministry of Health and Family Welfare is studying epidemiology of rabies nation-widely, and epidemiology of filariasis in the north-western part of the country.

The China Study Group investigates how social and environmental change affects vulnerability of health in the Greater Mekong Subregion. There are many vulnerable populations, including male and female commercial sex workers, IV drug users, migrant urban labourers, poor rural farmers, ethnic minorities, and international migrants. The Yunnan Health and Development Research Association (YHDRA) is conducting researches to improve ecohealth of the vulnerable population. Prevalence of HIV/AIDS among vulnerable peoples is studied. The China History Study Group is making database of control of malaria and *schistosomiasis* in the 20th Century. Disease profile of the colonial Indochina is also studied.

The Integration Group collaborates with other international project on ecohealth. The project tries to contribute to the establishment of concept of ecological health. At the same time, this concept must be reflected into the change of human behaviour, disease control and health promotion. Under this new concept, the project seeks to provide people with new measurements and/or tools to improve the population health.

### ■ Progress and Results in 2010

(1) Establishing Health and Demographic Surveillance System (HDSS) and the integrated study on infection with liver fluke (*Opisthorchis viverrini*) in Lahanam area, Savannakhet Province, Lao PDR. The study team focuses on which effects the changes in lifestyle accompanied by the modernization of paddy cultivation and the economic development have brought on infection with liver fluke in this area. The study team established HDSS for the first time in Laos in order to monitor the changes in the health profile of the local people for the long term. The target population reached 7,000 in 2008. The study team introduced a new data collecting method with the use of PDA in February 2010. The study team also conducted groundtruthing with reference to the satellite image of the area in 2009. The study team began to trace the daily activities of the local population with the use of the GPS and acceleration sensor along with interview. The study team also has conducted stool examination for several times to find out parasite eggs. Based on these researches, the study team proposed a hypothesis that the changes in water environment accompanied with modernization have affected the spacial distribution of both liver fluke and the vectors such as Bithynia snails and Cyprinidae fish. The study team started an ecological survey on the intermediate hosts in 2010 in order to validate the hypothesis. The project co-sponsored the fourth National Health Research Forum of Laos in October 2010.

(2) Study on the dynamics between malaria infection and the deforestation in Sepone district, Savannakhet Province, Lao PDR. The project aims to understand dynamic relation of malaria and deforestation in this area on the Vietnamese border. Malaria is endemic in this area. The project set up the mobile phone network which links the villages in remote mountainous area to the district hospital in order to effectively monitor the malaria infection cases in remote villages. The project is also analyzing the land coverage with the use of satellite imagery and groundtruthing. This land analysis put forward a hypothesis that a recent deforestation might affect the malaria infection dynamics among the local people. The project focused on the relationship between the ecology of vector mosquitoes and the forest vegetation in 2010, finding that the forest is much damaged by the bombing during the Vietnam War. Detail demographic anthropological study was also done finding very high young child mortality.

(3) The project conducted the study on the relation between climate and infectious disease in Matlab in collaboration with ICDDR, B, Nagasaki University, and the London School of Hygiene and Tropical Medicine. The project also collaborated with the Ministry of Health of Bangladesh. The Second International Symposium on Climate Change and Neglected Tropical Diseases was conducted in September 2010 in Dhaka, where the RIHN Ecohealth Project proposed the Bangladesh National Preparedness for Climate Change by campaigning public environmental hygiene to reduce the abundance of mosquitos and flies.

(4) The project studied the historical dynamics of infectious diseases in Yunnan Province. The historical study traces the demise of malaria and schistosomiasis with official records of the disease control. Field survey collecting oral history was made. The project also focuses in a current perspective on the effects of the mobile population increase accompanied with the market reform on the infectious diseases such as STD, HIV/AIDS and TB. The project collaborates with Yunnan University Center for Environmental Hsitory, Yunnan Health and Development Research Association (YHDRA), and Kunming Medical University in various field survey. The project conducted community ecohealth survey in 10 villages. The 5th Symposium on Chinese Environmental Issues "International Symposium on Development and Environment, Livelihood, and Health in Shouthwestern China" was held in Kunming on November 2010 .The symposium was organized by the RIHN Initiative for Chinese Environmental Issues in cooperation with Yunnan University.

### ○ Co-Researchers

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 MORITA, Eitaro ( Asia Health and Education Fund (AHEF), Secretary general, international cooperation )  
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 ZHANG Kaining ( Yunnan Health and Development Research Association, China, Professor, public health )  
 ZHOU Qiong ( Yunnan University, Professor, environmental history )  
 LI Yushang ( Shanghai JiaoTong University, Professor, environmental history )  
 MORINAKA, Koichi ( Non Profit Organization Asia Health and Education Fund, Member, International medical cooperation, Project management )

## ■ Future Themes

Activities scheduled in FY2011-12:

April

Lao Ecohealth Research Meeting (RIHN), 8: Bangladesh Ecohealth Research Meeting (Kyoto Univ.),

May

HIV field survey in Lao. and seminars in Yunnan, China and Laos

June-July

Ecohealth Education/Promotion Research Meeting (RIHN), Research in July-August:

HDSS meeting at Nagasaki

The Third International Conference on Lao Studies@Khon Kaen, Thailand;

Field survey in Xepon and Lahanam;

HIV/ AIDS survey in Savannakhet

August:

Field survey in Xepon and Lahanam

September-November

24 Bangkok Lao Ecohealth Research Meeting (Mahidol Univ.)  
 25-28 Parasitological Research in Lahanam, 29-30 The  
 29-30 The 5th Lao National Health Research Forum@Vientiane, Laos

December:

Project Annual Meeting@RIHN; RIHN Projects Workshop

Jan-Mar 2012:

Field survey in Laos, Bangladesh and China  
 Malaria meeting in Vietnam

## Books

### 【Authored/Co-authored】

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### 【Chapters/Sections】

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- Wataru IJIMA Dec, 2010 China Maritime Customs and the context of "International" (in Japanese). Haruki WADA, Kanichi GOTO, Yoichi KIBATA (ed.) Modern East Asian History, IWANAMI Koza vol.1. Iwanami-shoten, Tokyo, Japan.
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- Yuki FUKUSHI Jun, 2010 Cholera prevention Movement in War-time Shanghai . Ezra F. Vogel, Kenichiro HIRANO (ed.) Society and Culture during Sino-Japanese War China . Keio Gijyuku daigaku Syuppankai (in Japanese), Tokyo, Japan.
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### 【Original Articles】

- Zhang KL, Zhou JS. Mar, 2011 Recapturing public health sciences for HIV/AIDS in China.. *Public Health*. (reviewed).
- Moazzem Hassain, Eisei Noiri and Kazuhiko Moji Feb, 2011 Climate Change and Kala-Azar. T.K. Jha, E. Noiri (ed.) Kala-Azar in South Asia. Springer,
- Hashizume M, Faruque AS, Moji K. et. al Feb, 2011 The Indian ocean dipole and cholera incidence in Bangladesh: a time-series analysis.. *Environ Health Perspect* :239-244.
- Li XM, Cai GX, et al Feb, 2011 Investigation of community healthcare services and programmed immunization of floating children: A study in Kunming City, China. *Information, An International Interdisciplinary Journal*. 14(2) :651-656. (reviewed).

- Minematsu K, Takamura N, Goto K, Honda S, Aoyagi K, Moji K, Tsunawake N. Feb, 2011 A proposed method for the evaluation of body fat in Japanese adults that predicts obesity. *Nutr Res.* 31(2) :113-121. (reviewed).
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- SUN Jia-yu, CAI Guo-xi, et al Aug, 2010 Prevalence of Chronic Diseases and their Influencing Factors among Peasants Participating in NCMS: A Study in 4 Districts of Kunming. *China Preventive Medicine,* 11(8) :781-783. (reviewed).
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- Hashizume M, Nishiwaki Y, Michikawa T, Ueda K, Onozuka D, Yokota K, Mine M, Mori A, Shimizu A, Sugimoto N, Yamamoto T. 2010 Effects of Asian Dust Events on Daily Mortality in Nagasaki, Japan. *Epidemiology* 22 :S130. (reviewed).
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**Stage:** FR

**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://www.chikyu.ac.jp/arab-subsistence/>

**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 will examine 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 will propose 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 oil-rich countries of the Middle East have put excessive pressures on the Earth's energy, water, and food resources. In prioritizing economic prosperity for their own benefit, 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. These practices have widened social differences among the people of the Middle East at a time when we are facing a turning point in modern oil-based civilization. Current inter dependencies based on the trading of fossil fuel must change drastically to a new form of interdependency through which we build viable future societies.

Our project will focus on human subsistence ecosystems, namely life-support mechanisms and self-sufficient modes of production (hunting, gathering, fishing, herding, farming, and forestry) with low energy resource consumption. We will also re-examine advanced technology, economic development, and comprehensive measures to combat desertification. Based on our research results, we will propose a scientific framework for strengthening subsistence productivity and rehabilitating daily life in Arab societies in the post-oil era.

### **Research Methods**

Our research method consists of two main approaches: (1) analysis of subsistence ecosystems, focusing on keystone species (camels, date palm, dugong, mangrove, and coral [reef]); and (2) examination of the sustainability and fragility of Arab societies, focusing on ecotones (wadi beds, riverbanks, mountainsides, and seashores).

We will develop and implement our study of human subsistence ecosystems in Arab societies 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; and 3) sharing the research results to support local decision making.

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

### **Project Organization**

**(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 will develop comprehensive measures to control this invasive species. These teams will be 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 should consider 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 will examine this issue and compile 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 plan 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 will examine Arab communities and Islamic civilization from the viewpoint of energy flow.

**■ Progress and Results in 2010****1. Alien invasive species control**

The Japanese-Sudanese interdisciplinary research teams are developing comprehensive measures to control this invasive species. Hydrologists, plant physiologists, weed scientists, remote-sensing specialists, range managers, agricultural economists, nutrient physiologists, and cultural anthropologists worked together in the field surveys at riverbanks, wadi beds, seashores and mountainsides in arid to semi-arid areas of Sudan. We are comparing mesquite seedlings in natural fields and in experimental fields at Sudan University with those at Arid Dome, Tottori University in Japan, to analyze root system development.

## **2. Environmental assessment in coastal zone**

Forest structure, morphology, and water use of *Avicennia marina* were studied in the southern Egyptian Red Sea coast with the Nature Conservation Sector, Egyptian Environmental Affairs Agency. Ten microsatellite markers on DNA analysis were found on collected samples. Parent-child relationship of *A. marina* may be revealed in further study at RIHN laboratory. Local environmental researchers and administrators had started our technical instruction for plantation in the Red Sea coast in Egypt and Saudi Arabia with Saudi Wildlife Commission. Anthropological study on maritime society shows that the fishermen possess rich Traditional Ecological Knowledge, particularly on the coral reef environment. Volume of each material of the coral buildings was estimated from architectural surveys and restoration works, by digitalizing each building by plans and sections with photographic records.

## **3. Support for local decision making & 4) Comparative studies of local ecosystems**

On December 2009, the RIHN and CNDRB (Centre National de Développement des Ressources Biologiques) agreed to the joint Memorandum of Understanding (MOU). Expected roles of CNDRB in the survey are establishing an inventory of fauna and flora of the sites and drafting projects on natural conservation involving the inhabitants.

Objective of the survey is to explain the human subsistence eco-system of the oasis in the Sahara Desert, considering history and changes. The members of the survey are composed of anthropologists, biologists, geographers and historians. Practitioners, consultants and motivated farmers, are also included in the field survey for sharing the research processes and data collection.

The project has selected three sites for field surveys. They are In Belbel, Matriouen and Aoulef. Main research site is In Belbel where Professor KOBORI has executed his field research since 1979. The project profits to accumulate field data based on KOBORI's study. Matriouen (10 km east from In Belbel) and Aoulef are the sites to complete field information.

We analyze present situations of human subsistence eco-systems in the main sites collecting historical change of the oasis.

In pre-oil era (more than 50 years before), the human subsistence had been based on self-sufficient systems. The life of oasis had practiced with resources around. Especially, date palm culture and irrigation systems by underground water course, called foggara, were indispensable. On the other hand, toward the outside, people had had networks by camels on which transportation had depended. Pasturing of camels had also made human network in the desert.

Mode of the desert life started to change since 1970s. For example, they started to consume cous-cous bringing from outside. In the time, oasis agriculture has also started to change. People have tried to develop new water source by deep well and to expand the irrigated farms by water exploitation. Use of deep well water was very insecure because of capacity of installed pumps. They are using now one foggara and only one deep well, however 4 deep wells have been reclaimed.

Importance of date palm for oasis life has not changed against the changes. In pre-oil era, dates were consumed as self-sufficient food. It is becoming one of cash crops by trying to bring new varieties associated with vegetable farming.

We started to collect ecological footprint data at an irrigated farm associated with date palm in Aoulef for analyzing quantitatively local resources use since October 2010.

## **OCo-Researchers**

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## ■ Future Themes

We could completely start our field surveys and continue with full-scale field surveys in each research area. For the next step we will proceed to consider out reaches of the researches and to collect comparative data among research areas.

Use of uprooted alien invasive species is important theme in next stage. Sudanese researchers are examining it for feeding and for carbon production. A development of the technique on environmental coastal zone management as mangrove afforestation skill understanding the biological characteristics and the traditional use will be also stressing theme.

Acquaintances from ecological foot print survey are some of useful method of the quantitative comparison for each research area.

Exchange of research process and interim results are indispensable to integrate and refine the study. Inter survey sites meeting and sharing of research with Arab people will significant topics of the project outreach for accomplishing our final objectives.

## Books

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- Ken YOSHIKAWA, Masaki INOUE, Ichidou YOSHIMORI, Atsushi NAKASHIMA, Tomohiro TERAMINAMI, Naoko MATSUO, Ryo BANJO, and Chiharu MIYAMOTO Mar, 2011 Forest structure of gray mangrove (*Avicennia marina*) along Egyptian Red Sea coast. *The Scientific Reports of the Faculty of Agriculture Okayama University* 100 :39–51. (reviewed).
- Hiroshi NAWATA Dec, 2010 Oil and Livelihood in Arid Land: A Case Study of the Beja in Eastern Sudan. *Biostory* 14 :18–27. (in Japanese)
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- Ken YOSHIKAWA, Ichido YOSHIMORI, and Akihiro SEO Aug, 2010 Report on DNA Analysis. Hiroshi Nawata (ed.) *Investigative Report 2010.*
- NAKAMURA, Ryo Aug, 2010 Anthropological Study on the Ababda Maritime Society in the Southern Parts of the Red Sea coast in Egypt. Hiroshi Nawata (ed.) *Investigative Report August 2010.*
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marina along the Red Sea Coast in Egypt. Hiroshi Nawata (ed.) *Investigative Report 2010*.

- Atsushi NAKASHIMA, Tomohiro TERAMINAMI, and Mao OMINAMI Aug, 2010 Growth and Morphological Characteristics of *Avicennia marina* under High Grazing Pressure by Camels in the Red Sea Coast, Egypt. Hiroshi Nawata (ed.) *Investigative Report August 2010*.
- Ken YOSHIKAWA, Masaki INOUE, and Ichido YOSHIMORI Aug, 2010 The Implementation Report of Egyptian Mangrove Survey. Hiroshi Nawata (ed.) *Investigative Report 2010*.
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- Ken YOSHIKAWA, Masaki INOUE, and Ichido YOSHIMORI Aug, 2010 Monitoring Plan of Seedlings in Sharm El-Bahary Mangrove Forest. Hiroshi Nawata (ed.) *Investigative Report 2010*.
- Naoko MATSUO, and Ryo BANJO Aug, 2010 Sampling for Stable Isotope Analysis to Estimate the Long-term Trends in Intrinsic Water-use Efficiency and the Long-term Trends in Stomatal Conductance. Hiroshi Nawata (ed.) *Investigative Report August 2010*.
- Atsushi NAKASHIMA and Tomohiro TERAMINAMI Aug, 2010 Morphological Characteristics of the Mangrove Sites along the Egyptian Red Sea Coast. Hiroshi Nawata (ed.) *Investigative Report 2010*.
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- NAWATA, Hiroshi, Muhammad Ahmad, Asiri, and Rabi abd al-Rahman Hasanin Jul, 2010 Traditional Natural Resource Use and Conservation of Juniper Woodlands in the Arabian Peninsula. *Annals of Japan Association for Middle East Studies* 26(1) :151-184. (reviewed).
- Hiroshi NAWATA Jul, 2010 Exploitation and Conservation of Middle East Tree Resources in the Oil Era: A Study of Human Subsistence Ecosystems in Arab Societies. *Annals of Japan Association for Middle East Studies* 26(1) :137-150. (reviewed).
- NAKAMURA, Ryo 2010 Socio-Cultural Structure in Swahili Maritime Society: From the Case of Kilwa Island, Southern Swahili Coast, Tanzania. . pp.25. \*Progress report on previous research for Tanzania Commission for Science and Technology.

## Research Presentations

### 【Oral Presentation】

- NAKAMURA Ryo *Boat Culture in the Western Indian Ocean*. 2nd International Symposium: Saharan Civilization, Dec 22, 2010–Dec 24, 2010, Nagoya University, Aichi, Japan.
- Hiroshi NAWATA *Keystone Species of Human Subsistence Ecosystems in Arab Societies*. RIHN Satellite Symposium for IAS International Conference 2010 at Kyoto "Keystone Species of Human Subsistence Ecosystems in Arab Societies", Dec 20, 2010–Dec 21, 2010, RIHN, Kyoto.
- NAKAMURA Ryo *The Dryland Fishing Culture of the Ababda Maritime Society along the Red Sea Coast of Southern Egypt*. RIHN Satellite Symposium for IAS International Conference 2010 at Kyoto, Keystone Species of Human Subsistence Ecosystems in Arab Societies, Dec 20, 2010–Dec 21, 2010, Research Institute for Humanity and Nature, Kyoto, Japan.
- Kotaro Ichikawa *Conservation of Keystone Species in Human Subsistence Ecosystems: Studies on vocal behavior of the dugongs in Thailand*. Keystone Species of Human Subsistence Ecosystems in Arab

- Societies, Dec 20, 2010–Dec 21, 2010, RIHN, Kyoto.
- Hiroshi NAWATA *Historical and Ethnographical Studies on Operculum of Gastropods as Incense and Perfume in the Coastal Zones of Arid Tropics*. RIHN Satellite Symposium for IAS International Conference 2010 at Kyoto "Keystone Species of Human Subsistence Ecosystems in Arab Societies", Dec 20, 2010–Dec 21, 2010, RIHN, Kyoto.
  - Hiroshi NAWATA *Livestock Playing a Key Role in Mesquite Expansion in Local Ecosystems*. RIHN Satellite Symposium for IAS International Conference 2010 at Kyoto "Keystone Species of Human Subsistence Ecosystems in Arab Societies", Dec 20, 2010–Dec 21, 2010, RIHN, Kyoto.
  - Yoshiharu FUJII, Abdel Gabar BABIKER, Yukhiro SUGIMOTO, and Hiroshi NAWATA *Allelopathic Activity of Mesquite (Prosopis juliflora) and Screening of Allelopathic Plants in Sudan*. RIHN Satellite Symposium for IAS International Conference 2010 at Kyoto "Keystone Species of Human Subsistence Ecosystems in Arab Societies", Dec 20, 2010–Dec 21, 2010, RIHN, Kyoto.
  - Hiroshi NAWATA *Traditional Resource Use and Conservation of Juniper Woodlands in the Arabian Peninsula: A Case Analysis of Raydah Nature Reserve, Southwestern Saudi Arabia*. Islamic Area Studies Third International Conference 2010 "New Horizons in Islamic Area Studies: Continuity, Contestations and the Future", Dec 17, 2010–Dec 19, 2010, Kyoto International Conference Center, Kyoto.
  - NAKAMURA Ryo *The Bantu and Arab Cultures on Kilwa Island as seen through Jini*. The 2nd International Symposium: 50th Anniversary of Africa Nation States as Renaissance, Dec 13, 2010–Dec 15, 2010, Nagoya University, Aichi, Japan.
  - Fumiko Hakoyama *Trends of Safe Drinking Water Supply in the Sahel Region: Global Principles, Foreign Assurances and National Policy*. 1st Ameli-Eaur International Workshop Sustainable Water and Sanitation System & 7th International Symposium on Sustainable Water and Sanitation System, Sep 21, 2010–Sep 22, 2010, Paris. JST–JICA Research Project(2009–2014) Improving Sustainable Water and Sanitation systems in Sahel Region in Africa: Case of Burkina Faso.
  - Hiroshi NAWATA *Creating a New Form of Social Networks through a Camel Race in the Sahara Desert*. Annual Meeting of RIHN Arab–Subsistence Project, Sep 18, 2010–Sep 20, 2010, RIHN, Kyoto. (in Japanese)
  - Sin'ichi NISHIMOTO, Yoshihumi Yasuoka, Aya Yasuoka, Hiroshi Nawata *Studies on architectural construction method and conservation-restoration method of coral architectures in Sinai Peninsula, Egypt*. Annual Meeting of RIHN Arab–Subsistence Project, Sep 18, 2010–Sep 20, 2010, RIHN, Kyoto.
  - Atsushi Nakashima, Tomohiro Teraminami, Mao Ominami *Effects of environmental condition on the growth of current year branches of Grey mangrove in Red Sea coast*. Annual Meeting of RIHN Arab Subsistence Project, Sep 18, 2010–Sep 20, 2010, RIHN, Kyoto.
  - Ryo Nakamura *A report of cultural anthropological surveys on Bedouin/Ababda community in southern Egyptian Red Sea coast*. Annual Meeting of RIHN Arab–Subsistence Project, Sep 18, 2010–Sep 20, 2010, RIHN, Kyoto.
  - Kiyotugu Yoda, Jia Ruichen, Mohamed Elbasit, Buho Hoshino, Hiroshi Nawata, Yutaka Yasuda *A revisional study on growth regime of Mesquite (Prosopis)*. Annual Meeting of RIHN Arab–Subsistence Project, Sep 18, 2010–Sep 20, 2010, RIHN, Kyoto.
  - Takasi Sakata *Distribution of Camels*. Annual Meeting of RIHN Arab Subsistence Project, Sep 18, 2010–Sep 20, 2010, RIHN, Kyoto.
  - Yoshiharu Fujii *A proposal for integrated management of alien invasive species, papilionaceous Prosopis spp: particularly from the view point of allelopathy*. Annual Meeting of RIHN Arab Subsistence Project, Sep 18, 2010–Sep 20, 2010, RIHN, Kyoto.
  - Iwao Kobori *Algerian Sahara: Field Surveys in Tidikelt*. Annual Meeting of RIHN Arab Subsistence Project, Sep 18, 2010–Sep 20, 2010, RIHN, Kyoto.
  - Kyoko Horie *Women in InBelbel*. Annual Meeting of RIHN Arab Subsistence Project, Sep 18, 2010–Sep 20, 2010, RIHN, Kyoto.

- Motohiko Kogo *Why seaside?* Mangrove paleontological research organization, Sep 18, 2010–2012, RIHN, Kyoto.
- Yoko Shindo, Sin'ichi Nishimoto, Hiroshi Nawata *Change of material culture in Raya/al-Turarea*. Annual Meeting of RIHN Arab-Subsistence Project, Sep 18, 2010–Sep 20, 2010, RIHN, Kyoto.
- Keiko Takaki *Traditional life in oasis in Tunisia and its future– Date palm, brick and solar energy*. Annual Meeting of RIHN Arab Subsistence Project, Sep 18, 2010–Sep 20, 2010, RIHN, Kyoto.
- Buho Hoshino, Jia Ruichen, Hiroshi Nawata, Abdelaziz Karamalla, Kiyotsugu Yoda *Extracting vegetation distribution in eastern Sudan by using satellite and ground measurements*. Annual Meeting of RIHN Arab-Subsistence Project, Sep 18, 2010–Sep 20, 2010, RIHN, Kyoto.
- Mohamed Abd Elbasit and Hiroshi Yasuda *Impact of invasive plant species (Mesquite) on water resources in arid region*. Annual Meeting of RIHN Arab-Subsistence Project, Sep 18, 2010–Sep 20, 2010, RIHN, Kyoto.
- Ryo Banjo, Naoko Matsuo *Effects of water absorption stress by Grey mangrove in Egyptian Red Sea coast on water use efficiency by the leaves*. Annual Meeting of RIHN Arab Subsistence Project, Sep 18, 2010–Sep 20, 2010, RIHN, Kyoto.
- Ken Yoshikawa, Masaki Inoue, Ichido Yoshimori *Progress report of analysis on forest structure of Grey mangrove in Red Sea coast and surveys on genetic variation*. Annual Meeting of RIHN Arab-Subsistence Project, Sep 18, 2010–Sep 20, 2010, RIHN, Kyoto.
- Shun Ishiyama *Human subsistence in Sahara oasis*. Annual Meeting of RIHN Arab Subsistence Project, Sep 18, 2010–Sep 20, 2010, RIHN, Kyoto.
- Hiroshi NAWATA *To Combat a Negative Heritage of Combating Desertification: Learning from Problems caused by Planting the Alien Invasive Species Mesquite*. Annual Meeting of RIHN Arab-Subsistence Project, Sep 18, 2010–Sep 20, 2010, RIHN, Kyoto. (in Japanese)
- Sin'ichi NISHIMOTO, Yoshihumi YASUOKA, Aya YASUOKA and Hiroshi NAWATA *Architectural Survey and Restoration Work of Coral Buildings in Sinai Peninsula, Egypt*. Annual Meeting of RIHN Arab Subsistence Project, Sep 18, 2010–Sep 20, 2010, RIHN, Kyoto. (in Japanese)
- Hiroshi NAWATA *Introduction: How Will You Live without Oil? Part 2*. The 40th RIHN Public Seminar, Sep 17, 2010, RIHN, Kyoto. (in Japanese)
- Shun Ishiyama *Is rural life good for the environment? Creating life and natural energy*. The 40th RIHN Public Seminar part 2, Sep 17, 2010, .
- Hiroshi NAWATA, Shun ISHIYAMA, and Ryo NAKAMURA *Sudanese people may have a longest history of sorghum production in the world: Anthropological understanding of its domestication and co-evolution with Striga*. SATREPS–JSPS AA Science Platform Program Joint Seminar on Striga spp., the food security scourge in Africa, Sep 15, 2010, Awaji Yumebutai International Conference Center, Awaji, Hyogo.
- Hiroshi NAWATA *Extinct Species and Humans*. The First RIHN Kids Seminar, Aug 23, 2010, RIHN, Kyoto. (in Japanese)
- Hiroshi NAWATA *A Future Proposal: Our Livelihoods during the Oil Boom*. The Second Public Symposium of RIHN Ecohistory Program, Aug 22, 2010, The Museum of Kyoto. (in Japanese)
- Hoshino, Buho, Hiroshi Nawata, and Jia Ruichen *Land surface characteristics retrieval using ALOS PALSAR polarization in along the Red Sea coastal*. 38th COSPAR Scientific Assembly of the Committee on Space Research, Jul 18, 2010–Jul 25, 2010, Bremen, Germany.
- Hiroshi NAWATA *Nature Conservation through Cooperative Work with Foreign Workers: About Herding Issue in and around the Nature Reserve of the Juniper Woodlands*. the 47th Annual Meeting, Japan Association for African Studies, May 30, 2010, Nara City Hall, Nara. (in Japanese)
- Buho Hoshino *Extracting ground surface characteristics in Red Sea coast using PARSAR (HH/HV) back scattering coefficient*. Meeting of the Remote Sensing Society of Japan, May 27, 2010–May 28, 2010, Tsukuba, Ibaraki, Japan.

- Hiroshi NAWATA *Traditional Natural Resource Use and Conservation of Juniper Woodlands in the Arabian Peninsula: A Case Analysis of Raydah Nature Reserve, Southwestern Saudi Arabia*. The 26th Annual Meeting, Japan Association for Middle East Studies, May 19, 2010, Chuo University, Hino-city, Tokyo. (in Japanese)
- Hiroshi NAWATA *Exploitation and Conservation of Middle East Tree Resources in the Oil Era*. the 26th Annual Meeting, Japan Association for Middle East Studies, May 09, 2010, Chuo University, Hino-city, Tokyo. (in Japanese)
- Shun Ishiyama *Forest destruction and improved kitchen range in southern edge of Sahara - Efficiency in practical use*. The 26th Meeting of Annual Meeting of JAMES, May 08, 2010-May 09, 2010, Chuo University, Tokyo.
- Ryo Nakamura *Direct and Environmental Uses of Mangrove Resources on Kilwa Island, Southern Swahili Coast, Tanzania*. The 26th Meeting of Annual Meeting of JAMES, May 08, 2010-May 09, 2010, Chuo University, Tokyo.
- Hiroshi NAWATA *Islam and Nature Reserve Management: Rehabilitation of the Traditional Resource Management System Hima in the Arabian Peninsula*. The 19th Annual Meeting, Japan Association for Nilo-Ethiopian Studies, Apr 17, 2010, Meisei Univesity, Hino-city, Tokyo. (in Japanese)

#### **【Poster Presentation】**

- Hoshino Buho, Karamalla Abdelaziz, Ruichen JIA, Hiroshi Nawata, and A.T. Babiker *Remote sensing method for mesquite (*Prosopis spp.*) cotrol in coastal area of Red Sea*. 38th COSPAR Scientific Assembly of the Committee on Space Research, Jul 18, 2010-Jul 25, 2010, Bremen, Germany.
- Hoshino, Buho, Jia Ruichen, Hiroshi Nawata, Karamalla Abdelaziz, Kiyotsugu Yoda, and A.T. Babiker *Retrieve the soil moisture from RADAR Backscattering co-efficient using ALOS/PALSAR polarization (HH/VV) data*. 38th COSPAR Scientific Assembly of the Committee on Space Research, Jul 18, 2010-Jul 25, 2010, Bremen, Germany.

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

- Buho Hoshino *Is the earth dry? - from a view point of nature and life in Afro-Eurasia*. Public forum "Changing global environment part 1", Oct 23, 2010, .
- Kiyotsugu Yoda *Water transport in trees*. , Oct 14, 2010, Rakuno Gakuen University.
- Hiroshi Nawata *Global environment problems in post-oil era*. , Sep 17, 2010, Amagasaki, Hyogo, Department of international understanding, Hyogo Hanshin Senior college.. “”, Sep 17, 2010. .
- Shun Ishiyama *Let's ask about global environment to scientists*. Integrated study, Harano Kyoto municipal elementary school, Sep 02, 2010, RIHN, Kyoto.
- Hiroshi Nawata *General description of Sudan*. Pre-assignment training for human resources for international cooperation (experts), Jun 25, 2010, Training Center for International Cooperation.
- Abdelaziz Karamalla Gaiballa, Buho Hoshino *Environmental problems in eastern Sudan*. , Jun 09, 2010, Fuji Women's University.
- Abdelaziz Karamalla Gaiballa *Environment/resource and social problems in Sudan*. , Jun 08, 2010, Rakuno Gakuen University, Ebetsu sity.
- Abdelaziz Karamalla Gaiballa *Environment/resource and social problems in Sudan*. , Jun 08, 2010, Nohoro community center, Ebetsu sity.
- Shun Ishiyama *Cultural anthropology- Let's study life in arid lands in Africa. People in savanna, people in oasis*. Department of Environmental Systems Science, Faculty of Science and Engineering, Doshisha University, May 07, 2010, Faculty of Science and Engineering, Doshisha University.
- Hiroshi Nawata *General description of Sudan*. Pre-assignment training for human resources for international cooperation (experts), Apr 19, 2010, Training Center for International Cooperation.

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**Stage: PR**

**Project No.: R-06**

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

**Project Leader: KADA Ryohei**

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### ■ Research Subject and Objectives

The main purpose of this study organized by both Japanese and Philippines researchers is to critically examine the issues of how the resource degradation or pollution occurs, from where the pollution originates and the way in which the pollution stresses aquatic life, food, and subsequently, the public health in the watershed area, which involves heavy social and medical costs. A special attention would be focused on how ecological risks impact the sustainable linkage between agricultural & fishery products and food and health security, from social and natural science perspectives, in the watershed area of Lake Laguna region.

Food related issues, closely linked with environmental issues have become an important issue in the 21st century. However, due to recent ecological degradation, sedimentation, water quality degradation, frequent flood occurrence, have affected food supply and food safety leading to public health problems. Conceptually, the term food security or food risk treated in this research refers to the risks or the issues related to food supply as well as food safety. Health security refers to that of humans, mainly affected by the impacts of ecological issues.

This research project has four principal objectives shown as follows: (i) it documents the current levels of heavy metals (lead, mercury, and cadmium) in the aquatic resources of Lake Laguna, the routes of this pollution and its impact on public health; (ii) it investigates the health condition of people and the perception of food risks among those people; (iii) it analyses the effects of chemical inputs on agricultural fields and their impact on food production and relation to subsequent ecosystem deterioration; and finally (iv) it analyses the land use change in Lake Laguna area and the impact of these changes on material cycle (groundwater level and water quality, sedimentation).

This research combines the social, medical and physical sciences in order to develop strategies of ecological risk management for sustainable food, health security and watershed planning in Lake Laguna region which can also be expanded for other Asian watersheds. The current research is conducted solely in the Laguna Lake region since it represents a good model for Asian case studies and also due to its importance for its ecosystem services being threatened by ecological risks in line with rapid urbanization and land use changes.

### ■ Progress and Results in 2010

Although still at its early stage of implementation, major outputs of the research can be summarized as follows:

- One of the major environmental issues in the lake is the contamination of toxic and hazardous substances from the industrial and agricultural sectors. Heavy metals such as Lead, Chromium, Cadmium, Arsenic, and Mercury, at one time or another, have been found in concentrations exceeding the prescribed safe levels in the Lake water column.
- Lead has increased to toxic levels in tilapia as seen from market and open water samples; same holds true for some local crop plants such as kangkong (*Ipomoea aquatica*) and kamote (*Ipomoea batatas*).
- While heavy metals are a concern, it only represents one component of total water pollutants. The bulk of the pollutants are found to mainly belong to human waste. In this light, the realm of infectious diseases, particularly that which causes water-borne illnesses is of great importance.
- The continuing degradation of the terrestrial and aquatic resources has led to reduction of their current resource base. The combined effects of the Environment-Human as well as Human-Environment-Human types of risks had led to the reduction of household income, food insecurity and health deterioration of the inhabitants in the area.

- The major issue facing the respondents in the three study sites is how they would be able to improve, protect and expand their current resource base or level of acquirement given: (1) risk and uncertainty in upland agriculture and fishing activities as sustainable means of livelihood; (2) experience of household food insecurity; and (3) probable health risk due to unsafe or an unhealthy environment
- GIS-based risk mapping has been started to construct spatially defined human and environmental health risks to serve as common tool for integrating relational data and information for site resources, health, food and ecological risks as well as for unforeseen transboundary ecological risks to current and future land use changes in the target areas.

### ○Co-Researchers

- ◎ KADA Ryohei ( Research Institute for Humanity and Nature, Professor, Environmental Economics )
- RAZAFINDRABE Bam H.N ( Research Institute for Humanity and Nature, Senior Researcher, Disaster Risk Management )
- YUMOTO Takakazu ( Research Institute for Humanity and Nature, Professor, Forest Ecology )
- NAKANO Takanori ( Research Institute for Humanity and Nature, Professor, Isotopic Environmental Science )
- MATSUDA Hiroyuki ( Graduate School of Environment and Information Sciences, Yokohama National University, Professor, Environmental Ecology )
- MASUNAGA Shigeki ( Graduate School of Environment and Information Sciences, Yokohama National University, Professor, Environmental Chemistry )
- KANEKO Nobuhiro ( Graduate School of Environment and Information Sciences, Yokohama National University, Professor, Soil Ecology )
- MIZUSHIMA Shunsaku ( Graduate School of Medical Sciences, Yokohama City University, Professor, Preventive Epidemiology )
- NAGAI Takashi ( National Institute of Agro-Environmental Sciences, Researcher, Organic Chemistry Risk Analysis )
- TANAKA Katsuya ( Research Center for Sustainability and Environment, Shiga University, Associate Professor, Resource Economics )
- TAN, J. Galvez ( Medical School, University of the Philippines at Manila, Professor, Public Health )
- MOLINA, V. B. ( Medical School, University of the Philippines at Manila, Associate Professor, Public Health )
- RANOLA, R. F. ( College of Agriculture, University of the Philippines at Los Banos, Professor, Resource Economics )
- BORJA, A, C. SANTOS ( Research Department, Lake Laguna Development Authority, Director, Biological Limnology )
- CONCEPCION, R. N. ( College of Agriculture, University of the Philippines at Los Banos, Visiting Professor, Environmental & Resource Economics )

### ■Future Themes

During the Full Research period, the following main activities will be conducted by each research team:

Team 1. Environmental Risk Assessment: (i) a geochemical proposal on the environmental study of human-nature interaction: use of multiple elements and their stable isotopes for water, soil, and organisms which will provide invaluable information on human-nature interaction; (ii) water quality assessment based on the applicable water quality criteria combined with trophic state parameters and phytoplankton communities, then through aquatic macrophyte biosorption system (AMBS), address the stream turbidity issues, eutrophication, and heavy metal pollution

Team 2. Socio-Economic Evaluation: (i) characterization of other critical watersheds surrounding Laguna lake; (ii): food risk assessment; (iii): a bioeconomic model for evaluating the effects of land use patterns on lake water quality and commercial fish productivity in the region; (iv): household and community vulnerability to environmental risks induced by changing land uses in the Dampalit Subwatershed, Los Banos.

Team 3. Health Risk Evaluation: (i) baseline Evaluation: in order to clarify the degree and type of environmental exposure(s) affecting human health; (ii) health assessment on environmental pollutant

exposure among community residents near the Laguna Lake area; (iii) assessment of health risks from heavy metals via fish consumption and on other local food products such as shellfish, duck eggs, etc.

Team 4. Payment for Ecosystem Services: estimation of the difference between farmer's benefits from conversion to non-agricultural land use and agricultural conservation based on municipality-level socio-economic statistics; GIS data; other data on streamflow, water quality, and historical weather information.

Team 5. GIS-based Risk Mapping: (i) GIS-assisted transboundary flood risk and vulnerability mapping and assessment for water-related disasters; (ii) GIS-assisted risk-based comprehensive land use plans (CLUP) of selected municipalities in Laguna region.

## Research Presentations

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

- KADA Ryohei Managing Environmental Risks to Food and Health Security in Laguna Lake Watersheds, Philippines. The School of Environmental Science and Management, Mar 22, 2011, University of Philippines .

## Incubation Study

Exploring of social systems tolerant of climate variations by collaboration of high-resolution paleoclimatology with history and archeology

NAKATSUKA Takeshi (Graduate School of Environmental Studies, Nagoya University)

Purpose of this research is to analyze reactions of human societies in Japan against variations of climate such as drought and flood frequencies during last 2000 years by overlapping of high resolution paleoclimate data inferred from new proxies such as tree-ring isotope ratios onto the huge amounts of historical and archeological knowledge. In this year, following subjects were carried out. 1) Holding of domestic and international workshops to review current situations of high-resolution paleoclimatology. 2) Construction of tree-ring sample network and development of new analytical procedures, 3) Exploring of specific collaboration with historians and archeologists. Because there are many ongoing researches of high resolution paleoclimate reconstructions in Japan and Asia using various proxies, sufficient paleoclimate data can be provided during the study period by combination with the newly developed tree-ring network and analytical method of tree-ring isotope ratio. Besides, it was confirmed that many historians and archeologists are interested and can be incorporated into this research because the research targets can be shared successfully between historians, archeologists and paleoclimatologists.

Social changes in Micronesian area—Natural-social environment and life

NODA Shin-ichi (Research Center for the Pacific Islands, Kagoshima University)

Affected by globalization and climate change, traditional societies of Micronesia have weakened, and natural and social environments have deteriorated. Island nations in Micronesia are having difficulty in a geographic environment, surrounding by the sea, isolation and smallness, and breaking away from the fragile economy is no easy task. While the people are played with by the policies of developed nations, they have been living with pride. The variety of their lives must be respected. The purpose of this study was to clarify how the natural and social environmental changes in Micronesia affect individual life, and to recommend measures to enhance the empowerment of community life. During the study period, we conducted a survey of the natural and social environment in Pohnpei State, FSM, and exchanged views with local government agencies and research institutions. This work was reported to the IS symposium.

Water environment problems and futurability in the lakes of downstream/pollution-accumulating type

FUKUSHIMA Takehiko (University of Tsukuba Graduate School of Life and Environmental Sciences)

The lakes of downstream/pollution accumulating types (abbreviated as DPA-lakes) are considered to be less vulnerable to the risks on the water quantity, but more to the risks on the water quality compared with other types of lakes; in addition, Lake Kasumigaura is one of the representative DPA-lakes. First, the problems on the present and future (within 50 – 100 years) water environments in DPA-lakes were discussed by all members of our research team in order to determine the research targets. Then, two hypotheses were proposed to be the targets; the first was “the degree of pollution accumulation in the lake would increase with the amount of water use, resulting in damages on the use” and the second is “the decreases in the diversity of water use and population in the watershed would reduce the resiliency of the lake, resulting in loss of futurability”. Several lakes in East Asia were nominated for DPA-lakes and their information has been collected. Secondly, the hydrological characteristics in DPA-lakes were discussed with the analysis on the long-term changes in outflow rates and concentrations of several ions in Lake Kasumigaura. The amounts of water use were compared in four lakes of which the waters were used as drinking water. Thirdly, the

application of sustainability indices to the watershed of Lake Kasumigaura was attempted; in addition, the numbers of the topics relating the environment of Lake Kasumigaura were investigated in several newspapers for about 30 years, suggesting the interest in the lake.

#### The history and environment on Water and Human in livelihood mixed area of the east Asia

MURAMATSU Koichi (Research Institute for Oriental Cultures, Gakushuin University)

This research aims at the constructing of “Regional environmental history” about the relation between man and water in the region where farming and other occupations cross each other in east Asia. I named the region a “livelihood mixed area “. The livelihood mixed area is an area where the environmental transformation is caused easily naturally and artificially. In this year, we discussed about “North livelihood mixed area”, “southwest livelihood mixed area”, “southeast livelihood mixed area “,” livelihood mixed area network” We discussed a water control inscription in the north China, a river current amount in the northwest china, forest management of Guizhou and Yunnan minority, environmental histories of HuangHe and Ocher Plateau, and the management of a natural resource and Chinese history etc, themes concerning the water. In the future, we pay attention to “Water control community” and “Management of a natural resource” as a key word, and will establish the research project that relates the natural science (“ wood species in the area”) and the social science (execution and governance of the environmental law).

#### Changes of food-nutritional status and diseases in people living in dependence on the Mekong River

WATANABE Hisami (Tropical Biosphere Research Center University of the Ryukyus)

Japanese policy for the development of the Mekong Region is clearly indicated In the Japan-Mekong Region Partnership Program (2007) and “A Decade toward the Green Mekong” Initiative (2009) as follows: Japan and countries in the Mekong Region work together on the clinical issues, including strengthening the partnership, expanding trades and investment, global environment / climate change, poverty reduction, and control of infectious diseases.

Currently, economic development in Mekong region is progressing at the speed and scale not seen before. Then, a global and ecological approach is imperative to complement the Japanese Official Development Assistance (ODA) programs.

This study focuses on the populations living on the agricultural and aquatic resources along the Mekong River, because these populations are directly affected by the economic and environmental change. As an attempt to ensure and enhance the security in the region, this study elucidates the transition of the resistance (immunity) against diseases including the infectious and the endemics. In the analysis, this study examines the effect of changes in dietary life and nutritional status, which is brought on by the recent rapid economic development.

## The Center for Coordination, Promotion and Communication (CCPC)

The Center for Coordination, Promotion and Communication (CCPC) is responsible for crossproject, cross-domain investigation, research and support that concerns the entire institute. It has three divisions. The **Division of Coordination** maps out RIHN's mid- and long-term research trajectory and facilitates the cooperative arrangements necessary for its realization in domestic and international domains. The **Division of Promotion** develops and maintains the laboratory facilities necessary for research and fieldwork, particularly in staple isotope and DNA analyses, and builds the databases and archives of past and ongoing research. The **Division of Communication** decides how the new findings and outcomes of research may be best communicated in appropriate academic and public fora. Several recent activities are described in the pages on Research Communication. The CCPC also collaborates 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 will be established within the CCPC. Its immediate tasks are the continuing definition of the Futurability Initiatives, and facilitation of the innovative research projects adopted within them. These tasks will require it to create a higher level of academic coordination with RIHN's many partner institutes and to draw upon the collective wisdom of the wider environmental research community.

### • Building Research Data Networks

The CCPC plays 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 CCPC promotes cooperation between RIHN and research institutes both at home and abroad. One such activity is the Regional Environmental Information Network, a project to create environmental information networking nodes among twenty-four research centers at nineteen universities in the greater Asian region.

### • Facilities and Equipment

The Division of Promotion 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. International Symposium

#### RIHN 5th International Symposium

In order to diffuse the findings of the three FR projects concluding in March 2011, the RIHN 5th International Symposium 'The Past and Future of Diversity' was held on the 13, 14 and 15 of October 2010 at Lecture Hall, RIHN. The details of the symposium are as follows.

#### <Wednesday Oct 13>

##### Opening Session

Chair: UYAR, Aysun (RIHN)

- Opening Remarks: TACHIMOTO Narifumi (Director-General, RIHN)
- Objectives of the Symposium: NILES, Daniel (RIHN)
- Keynote Address: Cosmivison and Co-evolution of Bio-cultural Systems and Crop Diversity in Agrarian Landscapes: Consolidating an Alternative Paradigm for Agriculture and Conservation  
EYZAGUIRRE, Pablo (Bioersivity International, CGIAR)
- Keynote Address: Conservation and Adaptive Management of Globally Important Agricultural Heritage Systems (GIAHS)  
KOOHAFKAN, Parviz (FAO)

##### Session 1: Landscape as a Source of Cultural Diversity

Chairs: UCHIYAMA Junzo (RIHN) & NAKAMURA Oki (RIHN)

- Towards the East Asian Landscape Convention: Nurturing Diversity Via the Protection of Everyday Life-Worlds  
LINDSTRÖM, Kati (University of Tartu, Estonia)
- Torrents of Diversity: the Future of the Past in Riverine Landscapes  
KANER, Simon (Sainsbury Institute for the Study of Japanese Arts and Cultures, UK)
- A Historical Perspective for Mountainous Landscape in Hida, Central Japan  
KOYAMA Shuzo (RIHN)
- Making Alternative Landscape with Local Feelings -A Case of *Silsangsa* Buddhist Temple and People-  
CHO, Kyoung-Mann (Mokpo National University, Korea)
- Discussion

#### <Thursday Oct 14>

##### Session 2: On the Nature and Culture in Agrobiodiversity

Chairs: HOSOYA Leo Aoi (RIHN) & KURATA Takashi (RIHN)

- Before Monoculture: Archaeogenetics and the Diverse Field  
JONES, Martin K. (University of Cambridge, UK)
- Cattle Biodiversity in Past and Present in South to East Asia  
MANNEN Hideyuki (Kobe University, Japan)
- Diversity and Breeding of Flowering Cherry in Japan  
NAKAMURA Ikuo (Chiba University, Japan)
- Genetic Diversity of Rice in Japan: Social, Environmental and Historical Dimensions  
SATO Yo-Ichiro (RIHN)
- Discussion
- Commentator: HABU Junko (RIHN, University of California, Berkeley, USA)

**Session 3: Biodiversity and the Wisdom in Agrarian Landscapes**

Chairs: YUMOTO Takakazu (RIHN) & TSUJINO Riyuu (RIHN)

- Is there Satoyama in Europe?  
RACKHAM, Oliver (Corpus Christi College, UK)
- The History of Semi-natural Grasslands in the Japanese Archipelago: Changes of Human Activities and Persistence of Grassland Habitats  
SUKA Takeshi (Nagano Environmental Conservation Research Institute, Japan)
- Exploitation and Conservation of Forest Resources in a Mountain of Early Modern Japan  
SHIROUZU Satoshi (Chuo Gakuin University, Japan)
- Sustainability, Collapse and the Role of Management Appeared in the Satoyama's History of Natural Resource Use  
OSUMI Katsuhiko (Kansai Research Center, Forestry and Forest Products Research Institute, Japan)
- Discussion

<Friday Oct 15>

**Session 4: Summary and Round-Table Discussion**

Chairs: KUBOTA Jumpei (RIHN) & NILES, Daniel (RIHN)

- Summary of Session 1: UCHIYAMA Junzo (RIHN)
- Summary of Session 2: HOSOYA Leo Aoi (RIHN)
- Summary of Session 3: YUMOTO Takakazu (RIHN)
- Comments: EYZAGUIRRE, Pablo (Bioversity International, CGIAR)
- Comments: KOOHAFKAN, Parvis (FAO)
- Agenda Setting
- Round-Table Discussion
- Closing Remarks: AKIMICHI Tomoya (Deputy Director-General, RIHN)

**2. RIHN Forum**

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“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 ninth forum was held in fiscal 2010 as below.

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**The 9<sup>th</sup> RIHN Forum**

Date: 10 July, 2010

Theme: Biodiversity in Our Life

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. Five seminars were held in 2010 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 38<sup>th</sup> Public Seminar    16 April, 2010  
Garden Cities or Metrocivilization: Kyoto, Shibuya and the Cities of the Future  
NAKAGAWA Osamu (Kyoto Institute of Technology),  
MURAMATSU Shin (RIHN)
- The 39<sup>th</sup> Public Seminar    18 June, 2010  
*Haiku* and Global Environmental Problems  
TSUBOUCHI Toshinori (Bukkyo University)
- The 40<sup>th</sup> Public Seminar    17 September, 2010  
How Will You Live after Finishing Oil Resources? Part2  
TAKAKI Keiko (J. F. Oberlin University)  
ISHIYAMA Shun (RIHN)
- The 41<sup>st</sup> Public Seminar    30 November, 2010  
Oral History and Harmonious Coexistence with Nature: Tlingit Story-Telling by Bob Sam  
Bob Sam (Alaskan Tlingit)  
HABU Junko (RIHN / University of California, Berkeley)
- The 42<sup>nd</sup> Public Seminar    15 February, 2011  
Learning from Minamata: from Pollution to Global Environmental Problems  
HARADA Masazumi (previously at Kumamoto Gakuen University)

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#### 4. RIHN Area Seminar

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. In fiscal year 2010, one seminar was held as follows.

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##### The 8th RIHN Area Seminar

“Communicating Diversity – Nature and Culture for our Children”

Date: 10 October, 2010

Venue: Toyoda Auditorium, Nagoya University (Nagoya City, Aichi)

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#### 5. 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 430 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.

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Date: 8-10 December, 2010

Venue: Co-op inn Kyoto

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#### 6. 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.

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- The 43<sup>rd</sup> 7 June, 2010  
Problems with Integrating Social and Ecological Processes in a Unified Modeling Framework: A Case Study on the Drivers of Landscape Pattern  
MCCAULEY, Steve (Clark University / Worcester Polytechnic Institute)
- The 44<sup>th</sup> 17 June, 2010  
Food Security, Climate Variability and Land Use in Zambia: Methods for Spatial Analysis and Modeling Vulnerability and Resilience of Smallholder Systems  
EVANS, Tom (RHIN / Indiana University)
- The 45<sup>th</sup> 29 June, 2010  
How Can Academism Contribute to Global Environmental Issues? Agenda Setting as Commitment  
YONEMOTO Shohei (Research Center for Advanced Science and Technology, The University of Tokyo)
- The 46<sup>th</sup> 8 July, 2010  
Environmental Governance in China  
BAO, Maohong (RIHN / Peking University)
- The 47<sup>th</sup> 8 July, 2010  
Sustainable Development and Advancing Environmental Governance  
TOEPFER, Klaus (Institute for Advanced Sustainability Studies)
- The 48<sup>th</sup> 27 October, 2010  
New Perspectives on Sustainability: Research, Practice, and Education  
REDMAN, Charles L. (School of Sustainability, Arizona State University)
- The 49<sup>th</sup> 15 February, 2011  
The Effect of Climate and Nomadic Herding on Mongolian Grasslands  
NACHINSHONHOR, Urianhai (RIHN/Institute of Botany, Mongolian Academy of Sciences)

## 7. Lunch Seminars (Danwakai)

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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.

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- No.153 6 April, 2010  
Distribution Patterns of Five Mammals in the Jomon Period, Middle Edo period, and the Present, in the Japanese Archipelago  
TSUJINO Riyuu (Project Researcher)
- No.154 20 April, 2010  
Near-future Coastal Fishery Using an Ultra-high Resolution Ocean-prediction System with Interactive Fishery-participation  
NAKADA Satoshi (Project Researcher)
- No.155 18 May, 2010  
Agricultural Innovation, Land-Cover Change and Household Inequality: The Transition from Swidden Cultivation to Rubber Plantations in Laos PDR  
EVANS, Tom (Visiting Research Fellow)
- No.156 1 June, 2010  
Natural Disaster Seen from Space  
SAKAI Toru (Senior Project Researcher)

- No.157 15 June, 2010  
Climate Changes Simulated by General Circulation Models  
YASUTOMI Natsuko (Senior Project Researcher)
- No.158 29 June, 2010  
Quantifying the Effects of Tropical Forest Modification on the Biodiversity Using Insects as Indicators  
KISHIMOTO Keiko (Project Researcher)
- No.159 6 July, 2010  
Dynamics of Pathogen in Natural Environments  
HONJO Mie (Project Researcher)
- No.160 20 July, 2010  
Pilot Survey of the Human Activities in Surrounding Environment: Improvement of the Research Methods Using Portable GPS and Accelerometer  
JIANG, Hongwei (Project Researcher)
- No.161 5 October, 2010  
Fish Fauna Survey Using Environmental DNA  
MINAMOTO Toshifumi (Senior Project Researcher)
- No.162 19 October, 2010  
The Impacts of Deforestation and the Forest Plantation on the Local Community in South-east Asia  
KATO Yumi (Visiting Researcher)
- No.163 9 November, 2010  
Changing Lifeways of Hunter-Gatherer Groups in the Past and Present: An Approach from Historical Ecology  
HABU Junko (Visiting Research Fellow)
- No.164 16 November, 2010  
Global Warming in Siberia  
FUJIWARA Junko (Senior Project Researcher)
- No.165 30 November, 2010  
The Case of East Asian Regional Economic Cooperation  
UYAR, Aysun (Assistant Professor)
- No.166 11 January, 2011  
Springs in the Permafrost Zone of Eastern Siberia – Vulnerability Assessment under the Global Warming –  
HIYAMA Tetsuya (Associate Professor)
- No.167 18 January, 2011  
Wood Culture in Pre-Modern China and Wood Identification: Sculptures, Buildings, Excavated Remains  
MERTZ, Mechtild (Visiting Research Fellow)
- No.168 1 February, 2011  
Genetic Diversity of Rice Landraces in Northern Laos  
MUTO Chiaki (Project Research Associate)
- No.169 15 February, 2011  
How the Gourd was Transmitted  
TANAKA Katsunori (Project Researcher)

- No.170      1 March, 2011  
The Ideal and Reality of the “Grain for Green” Project  
MATSUNAGA Kohei (Research Fellow, NIHU Center for Area Studies/ RIHN Initiative for Chinese Environmental Issues (RIHN-China))
- No.171      15 March, 2011  
The Change of Human Diet and Relation with Animal in the Japanese Archipelago  
ISHIMARU Eriko (Project Researcher)
- No.172      29 March, 2011  
A New Approach for landscape Studies: Foundational and Diverse Aspects of the Chinese Culture  
MAKIBAYASHI Keisuke (Senior Project Researcher)

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**8. Publications****8-1. RIHN Series**

RIHN Series are books introducing RIHN’s research results to the general public. The following title was published in fiscal year 2010.

Uotsukirin no Chikyu Kankyo Gaku – Oyashio · Ohotsuku Kai wo Hagukumu Amuru Gawa (Global Environmental Studies on Fish-breeding Forest - Oyashio and Okhotsk’s Primary Production Fed by the Amur River-)

Written by SHIRAIWA Takayuki, Showado, March 2011 (in Japanese)

**8-2. 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 all-color, easy-to read content. Issues 25-30 were published in fiscal year 2010.

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**9. Press Conference**

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. Four press conferences were held in fiscal 2010.

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## Individual Achievements

A	ABE Akira	Project Researcher	
	ABE Ken-ichi	Professor	
	AKIMICHI Tomoya	Professor	
	AOYAMA Keisuke	Visiting Researcher	
B	BAO, Maohong	Visiting Research Fellow	
C	CAI, Guoxi	Project Researcher	
	CHENGZHI	Senior Project Researcher	
E	EVANS, Tom	Visiting Research Fellow	
	EVAWANI, Ellisa	Visiting Research Fellow	
F	FUJITA Noboru	Visiting Associate Professor	
	FUJIWARA Junko	Senior Project Researcher	
	FUKUI Kiichi	Visiting Professor	
	FUKUSHI Yuki	Project Researcher	
G	GOTO Tamon	Visiting Professor	
	GUSEVA, Anna	Project Researcher	
H	HABU Junko	Visiting Research Fellow	
	HAMADA Atsushi	Senior Project Researcher	
	HANAMATSU Yasunori	Visiting Researcher	
	HANDA Katsumi	Project Researcher	
	HANDOY Itsuki C.	Associate Professor	
	HAYASE Sayaka	Visiting Researcher	
	HAYASHI Kengo	Project Researcher	
	HAYASHIDA Sachiko	Visiting Professor	
	HIYAMA Tetsuya	Associate Professor	
	HONJO Mie	Project Researcher	
	HOSOYA Aoi	Project Researcher	
	I	ICHIKAWA Kotaro	Project Researcher
		IEDA Osamu	Visiting Professor
INOUE Gen		Professor	
ISHIKAWA Satoshi		Visiting Associate Professor	
ISHIMARU Eriko		Project Researcher	
ISHIMOTO Yudai		Project Researcher	
ISHIYAMA Shun		Project Researcher	
ITAYAMA Tomoaki		Project Researcher	
IWASAKI Shinpei		Visiting Researcher	
J		JAGO-ON, Karen Ann Bianet	Project Researcher
		JASHENKO, Roman	Visiting Research Fellow
	JIANG, Hongwei	Project Researcher	
	JORDAN, Peter David	Visiting Research Fellow	
K	KADA Ryohei	Professor	
	KATO Yumi	Visiting Researcher	
	KATO Yuzo	Assistant Professor	
	KAWABATA Zen'ichiro	Professor	
	KAWASAKI Masahiro	Visiting Professor	
	KIM, Heonsook	Project Researcher	
	KIMURA Emi	Project Researcher	
	KINUGAWA Takashi	Visiting Researcher	
	KISHIMOTO Keiko	Project Researcher	
	KOBAYASHI Mai	Visiting Researcher	
	KOBAYASHI Nakako	Project Researcher	

	KOHMATSU Yukihiko	Assistant Professor
	KOIZUMI Miyako	Project Researcher
	KOSAKA Yasuyuki	Project Researcher
	KOYAMA Shuzo	Visiting Professor
	KUBOTA Jumppei	Associate Professor
	KUME Takashi	Associate Professor
	KURATA Takashi	Associate Professor
	KUSANO Eiichi	Project Researcher
L	LEKPRICHAKUL, Thamana	Senior Project Researcher
M	MADELLA, Marco	Visiting Research Fellow
	MAKIBAYASHI Keisuke	Senior Project Researcher
	MASUDA Yasuhito	Visiting Researcher
	MATO Toru	Visiting Professor
	MATSUDA Hiroko	Project Researcher
	MATSUNAGA Kohei	Research Fellow, NIHU Center for Area Studies
	MERTZ, Mechtild	Visiting Research Fellow
	MEUTIA, Ami Aminah	Project Researcher
	MINAMOTO Toshifumi	Senior Project Researcher
	MISHRA, Anoop Kumar	Visiting Researcher
	MITsutANI Takumi	Visiting Professor
	MIYAZAKI Hidetoshi	Project Researcher
	MOJI Kazuhiko	Professor
	MORI Wakaha	Senior Project Researcher
	MURAKAMI Yumiko	Project Researcher
	MURAMATSU Shin	Professor
N	NACHINSHONHOR, Urianhai	Visiting Research Fellow
	NAGAO Seiya	Visiting Professor
	NAKADA Satoshi	Project Researcher
	NAKAJIMA Tsuneco	Visiting Professor
	NAKAMURA Oki	Project Researcher
	NAKAMURA Ryo	Project Researcher
	NAKANO Takanori	Professor
	NAOE Shoji	Visiting Researcher
	NARAMA Chiyuki	Project Researcher
	NAWATA Hiroshi	Associate Professor
	NILES, Daniel	Assistant Professor
	NISHIMOTO Futoshi	Project Researcher
O	OKUDA Toshinori	Visiting Professor
	OKUMIYA Kiyohito	Associate Professor
	ONISHI Masayuki	Senior Project Researcher
	OSADA Toshiki	Professor
P	POKHARIA, Anil Kumar	Visiting Research Fellow
R	RAZAFINDRABE, Bam Haja Nirina	Senior Project Researcher
	RIBA, Tomo	Visiting Research Fellow
S	SAKAI Shoko	Associate Professor
	SAKAI Toru	Senior Project Researcher
	SAKAMOTO Ryota	Project Researcher
	SASAKI Naoko	Project Researcher
	SATO Yo-Ichiro	Professor
	SEKINO Tatsuki	Associate Professor

	SEO Akihiro	Project Researcher
	SHIBAYAMA Mamoru	Visiting Professor
T	TACHIMOTO Narifumi	Director-General
	TAKAHARA Teruhiko	Project Researcher
	TANAKA Hiroki	Visiting Associate Professor
	TANAKA Katsunori	Project Researcher
	TANAKA Ueru	Visiting Associate Professor
	TANIGUCHI Makoto	Professor
	TERAMURA Hirofumi	Project Researcher
	TOJO Bumpei	Project Researcher
	TOYOTA Tomoyo	Project Researcher
	TSUJINO Riyo	Senior Project Researcher
U	UCHIBORI Motomitsu	Visiting Professor
	UCHIYAMA Junzo	Associate Professor
	UESUGI Akinori	Project Researcher
	UMETSU Chieko	Associate Professor
	UYAR, Aysun	Assistant Professor
W	WATANABE Mitsuko	Project Researcher
	WATANABE Tsugihiko	Professor
	WEBER, Steven A.	Visiting Research Fellow
Y	YAMAMOTO Keiko	Project Researcher
	YAMAMURA Norio	Professor
	YASUTOMI Natsuko	Assistant Professor
	YATAGAI Akiyo	Assistant Professor
	YONEZAWA Go	Assistant Professor
	YUMOTO Takakazu	Professor
Z	ZEBALLOS VELARDE, Carlos Renzo	Senior Project Researcher
	ZHAO, Tianbao	Visiting Researcher

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**AKIMICHI, Tomoya**


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Professor

**Born in 1946.****[Academic Career]**

Department of Anthropology, Faculty of Science, The University of Tokyo, D. Course (1977)

Department of Anthropology, Faculty of Science, The University of Tokyo, M. Course (1974)

Department of Zoology, Faculty of Science, Kyoto University (1968)

**[Professional Career]**

Professor, Research Institute for Humanity and Nature (2002)

Head of Department, Department of Cultural Research, National Museum of Ethnology (1999)

Adjunct Professor, School of Advanced Sciences, The Graduate University of Advanced Studies (1998)

Professor, Department of Cultural Research, National Museum of Ethnology (1995)

Professor, 1st Research Department, National Museum of Ethnology (1992)

Adjunct Associate Professor, Faculty of Cultural Research, The Graduate University of Advanced Studies (1988)

Associate Professor, 1st Research Department, National Museum of Ethnology (1987)

Assistant Professor, 2nd Research Department, National Museum of Ethnology (1977)

**[Higher Degrees]**

D.Sc. (The University of Tokyo, 1986), M.Sc. (The University of Tokyo, 1974)

**[Fields of Specialization]**

Ecological Anthropology, Ethno-Biology

**[Academic Society Memberships]**

The Society of the Bio-Sophia Studies, The Society of Human and Animal Relations, The Society of the Environmental Sociology, The Society of Ecological Anthropology, The Society of Tropical Ecology

**[Awards]**

Daido-Seimei Chiiki-Kenkyu Shorei-Sho in 1998 (Award for Promotion of Area Studies by Daido Life Insurance Company in 1998)

**—Achievements—****[Books]***[Authored/Co-authored]*

- Akimichi Tomoya Nov, 2010 Global History of the Commons In Search of the Common-Pool Resources in the Global Era.. Iwanami-Shoten, Chiyoda-ku, Tokyo, 319pp.

*[Chapters/Sections]*

- Akimichi Tomoya Mar, 2011 Corals in the Heaven: Coral Roads from Tibet. Iwasaki Akemi · Iwasaki Nozomu (ed.) Corals- Culture and History of Precious Coral. Tokai University Publisher, Kanagawa, pp.16-19. (in Japanese)
- Akimichi Tomoya Oct, 2010 Indigenous Knowledge and Quality of Life. Research Institute for Humanity and Nature (ed.) Encyclopedia of Global Environmental Studies. Kobundou, Chiyoda-ku, Tokyo, pp.558-559. (in Japanese)
- Akimichi Tomoya Oct, 2010 Food Manner and Ethics. Research Institute for Humanity and Nature (ed.) Encyclopedia of Global Environmental Studies. Kobundou, Chiyoda-ku, Tokyo, pp. 274-275. (in Japanese)

- Akimichi Tomoya Oct, 2010 Resource- Overview: Who owns the Resources on Earth?. Research Institute for Humanity and Nature (ed.) Encyclopedia of Global Environmental Studies. Kobundou, Chiyoda-ku, Tokyo, pp. 242-249. (in Japanese)
- Akimichi Tomoya Oct, 2010 Eco-History and Resource Use. Research Institute for Humanity and Nature (ed.) Encyclopedia of Global Environmental Studies. Kobundou, Chiyoda-ku, Tokyo, pp. 322-323. (in Japanese)
- Akimichi Tomoya Oct, 2010 Whaling Dispute and Environmental Conservation. Research Institute for Humanity and Nature (ed.) Encyclopedia of Global Environmental Studies. Kobundou, Chiyoda-ku, Tokyo, pp. 342-343. (in Japanese)
- Akimichi Tomoya Oct, 2010 Resource- A Short Summary: In Search for the Construction of the Resource View. Research Institute for Humanity and Nature (ed.) Encyclopedia of Global Environmental Studies. Kobundou, Chiyoda-ku, Tokyo, p. 350-350. (in Japanese)
- Akimichi Tomoya Oct, 2010 Resource Allocation in the Global Era. Research Institute for Humanity and Nature (ed.) Encyclopedia of Global Environmental Studies. Kobundou, Chiyoda-ku, Tokyo, pp. 340-341. (in Japanese)

## [Editing]

### [Editing / Co-editing]

- People and Nature Editorial Board (Chief Editor: Akimichi Tomoya) (ed.) Mar, 2011 People and Nature. Vol. 1. Showa-do, Kyoto, Japan, 32pp. (in Japanese) (Special Issue: Fire).
- SEEDer Editorial Board (Chief Editor: Akimichi Tomoya) (ed.) Mar, 2011 . SEEDer: Future of the Earth- Consideration from Informatics in Area and Environment, No. 4. Showado, Sakyo-ku, Kyoto, 96pp. (in Japanese) (Special Issue: A Wisdom in the Paddy Cultivation).
- Akimichi Tomoya (ed.) Dec, 2010 Nature, Water and People in Otsuchi - A Message for the Future. Tohoku Shuppan Kikaku, Tsuruoka City, Yamagata., 357pp. (in Japanese)
- BIOSTORY Editorial Board (Chief Editor: Akimichi Tomoya) (ed.) Dec, 2010 (Special Issue: How have Human utilized Oil?). BIOSTORY, Vol. 14. Seibundo-Shinkosha, Bunkyo-ku, Tokyo, 112pp.
- SEEDer Editorial Board (Chief Editor: Akimichi Tomoya) (ed.) Nov, 2010 . SEEDer: Future of the Earth- Consideration from Informatics in Area and Environment, No. 3. Showado, Sakyo-ku, Kyoto, 87pp. (in Japanese) (Special Issue: Informatics of Disasters).
- Research Institute for Humanity and Nature (ed.) Oct, 2010 Encyclopedia of Global Environmental Studies. Kobundou, Chiyoda-ku, Tokyo, 651pp. (in Japanese)
- BIOSTORY Editorial Board (Chief Editor: Akimichi Tomoya) (ed.) Jun, 2010 . BIOSTORY, Vol. 13. Seibundo Shinkosha, Bunkyo-ku, Tokyo, 111pp. (in Japanese) (Special Issue: Diversity of Ikimono and Japanese Culture).
- Tomoya Akimichi, Toshio Yamagata (ed.) 2010 Ship and Ocean Newsletter. Ocean Policy Research Foundation, Tokyo, 8pp.

## [Papers]

### [Original Articles]

- Akimichi Tomoya Feb, 2011 A Diversified View on Whales. *Human 1* :106-114. (in Japanese) (Special Issue 3: Whales).
- Akimichi Tomoya Dec, 2010 People and Nature in Ohtsuchi: Its Linkage for the Future. Akimichi Tomoya (ed.) Nature, Water and People in Ohtsuchi- A Message for the Future. ohoku Shuppan Kikaku , Tsuruoka-City, Yamagata, pp. 20-39. (in Japanese)
- Akimichi Tomoya Dec, 2010 Preface and Postscript. Akimichi Tomoya (ed.) Nature, Water and People in Ohtsuchi- A Message for the Future. Tsuruoka City, Yamagata, (in Japanese) p3, p335.
- Akimichi Tomoya Dec, 2010 Rethinking of Whale Tombs and Sacrifice- View on Life, Ritual and Memory. *In*

*the International Symposium on the Human Culture from the Perspective of traditional Maritime Communities* :17-23. Nihon Jomin-bunka Kenkyusho , Kanagawa University, Yokohama.

- Akimichi Tomoya Oct, 2010 On the Living organism in the Paddy. *Agriculture (Nogyo)* 1538 :6-17.
- Akimichi Tomoya Sep, 2010 Narrative on Water in Saijo. Research Institute for Humanity and Nature (ed.) *Futurable Linkage between Water and People- A Message from Saijo*. So-fu-sha Shuppan, Matsuyama City, Ehime, pp. 8-17. (in Japanese)
- Akimichi Tomoya, Taniguchi Makoto, Nakano Takanori, Abe Kenichi and Sasaki Takakazu Sep, 2010 Panel Discussion. (Research Institute for Humanity and Nature eds.) . *Futurable Linkage between Water and People- A Message from Saijo* :98-125. So-fu-sha Shuppan, Matsuyama, Ehime.
- Akimichi Tomoya Aug, 2010 Thinking of Salmon' s Blessing (Field Report Japan). *BIOSTORY* 13 :62-63. (in Japanese) (Special Issue: Biodiversity and Japanese Culture).
- Akimichi Tomoya Aug, 2010 Whale and Holothurian- Limits of Human Food Consumption with reference to Human-Animal relationships. (Based on the paper in Table ronde: La consommation animaux et ses limites). *VESTA* 79 :68-69.
- Akimichi Tomoya Apr, 2010 Ocean and People. Kumagai Keichi and Kazumichi Katayama (ed.) *Oceania*. Lecture of World Geography Courses, 15. Asakura Shoten, Shinjuku-ku, Tokyo, pp. 65-80.

## [Research Presentations]

### [Invited Lecture / Honorary Lecture / Panelist]

- Akimichi Tomoya Whaling Cultures in the World: Rethinking Human' s Relations with Whales. International Symposium: Past, Present and Future of the Whaling Cultures of the World, Mar 11, 2011-Mar 13, 2011, National Museum of Ethnology.
- Akimichi Tomoya Living Organisms in Satoyama and Human' s Mind. The 9th Public Lecture Forum for the Minds, Jan 29, 2011, Inamori Memorial Hall, Kyoto University.
- Akimichi Tomoya Exploring the Linkage between the Earth and the Area. Lecture for the Science Partnership Project, Jan 22, 2011, Muroran Kaisei high School, Muroran City, Hokkaido.
- Akimichi Tomoya The Question of Human Food from Integrative Perspective: What have Human consumed?. Panelist. The 22th KOSMOS Forum, Jan 16, 2011, Bellesalle Kudan, Tokyo.
- Akimichi Tomoya Chairperson for the Concluding Discussion. The 3rd International Conference on Forest Related Traditional Knowledge and Culture in Asia: Satoyama and Diversities, Dec 14, 2010-Dec 15, 2010, Siinoki Cultural Complex, Kanazawa, Ishikawa.
- Akimichi Tomoya Coastal Resource management and Governance on Coral Reef Ecosystem. The 2nd International Seminar on Islands and Oceans, Nov 29, 2010-Nov 30, 2010, The Nippon Foundation Building (Akasaka), Tokyo. Organized by Ocean Policy research Foundation (OPRF), Australian National Centre for Ocean Resources and Security (ANCDORS, University of Wellington), and Pacific Islands, Applied Geoscience Commission (SOPAC).
- Akimichi Tomoya For the Future of Lake Biwa. Commentator. Public Symposium For the Future of Lake Biwa- Fish, Fishery and Food Culture, Nov 27, 2010, Lake Biwa Museum, Shiga.
- Akimichi Tomoya We are the Maritime People- For the New Maritime People and maritime Nation!. Inauguration Forum on the NPO Japan as a Maritime Nation, Nov 16, 2010, Japan Press Center, Hibiya, Tokyo.
- Akimichi Tomoya Japanese Food Culture and Environmental Problems with reference to whale meat and whaling. , Aug 07, 2010, Kyoto City.
- Yumoto Takakazu, Akimichi Tomoya Sanya-KaKai: Cultural Services in Satoyama, Satochi and Satoumi and the History of the Commons. Symposium: Values and Management of Satoyama, Satochi and Satoumi: For the Development of a New Commons, Jul 09, 2010, Conference Hall of UNU Elizabeth Rose Hall, Yokohama.

CAI, Guoxi

Project Researcher

**Born in 1970.**

**[Academic Career]**

Graduate School of Biomedical Sciences, Nagasaki University, PH.D. course(2007)

Fujian Medical University, Bachelor of Medical Sciences(1993)

**[Professional Career]**

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

Research fellow, Nagasaki University Institute of Tropical Medicine(2007)

Doctor-in-charge, Center for Disease Control and Prevention, Ningde city, China(2002)

Medical doctor, Center for Disease Control and Prevention, Ningde city, China(2000)

**[Higher Degrees]**

PH.D. (Nagasaki University, 2007)

**[Fields of Specialization]**

Public health

International health

**[Academic Society Memberships]**

Japanese Society of Tropical Medicine

Chinese Academy of Science and Engineering in Japan

**—Achievements—**

**[Papers]**

*[Original Articles]*

- Li XM, Cai GX, et al Feb, 2011 Investigation of community healthcare services and programmed immunization of floating children: A study in Kunming City, China. *Information, An International Interdisciplinary Journal* 14(2) :651-656. (reviewed).
- SUN Jia-yu , CAI Guo-xi Aug, 2010 Prevalence of Chronic Diseases and their Influencing Factors among Peasants Participating in NCMS: A Study in 4 Districts of Kunming. *China Preventive Medicine* 11(8) :781-783. (reviewed).
- Z. Zhang, T. Yamamoto, K. Moji, G.X. Cai, C May, 2010 Educational intervention for preventing bloodborne infection among medical students in China. *Journal of Hospital Infection* 75(1) :47-51. (reviewed).

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**HAMADA, Atsushi**


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Senior Project Researcher

**Born in 1976.****[Academic Career]**

Department of Geophysics, Faculty of Science, Kyoto University, D.Course  
(2008)

Department of Geophysics, Faculty of Science, Kyoto University, M.Course  
(2001)

**[Higher Degrees]**

D.Sc. (Kyoto University, 2010)

M.Sc (Kyoto University, 2001)

**[Fields of Specialization]**

Tropical Meteorology

Satellite Meteorology

**[Academic Society Memberships]**

Meteorological Society of Japan

The Remote Sensing Society of Japan

American Meteorological Society

American Geophysical Union

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

- Yatagai, A., K. Kamiguchi, A. Hamada, O. Arakawa, and N. Yasutomi Nov, 2010 Daily precipitation analysis of using a dense network of rain gauges and satellite estimates over South Asia: Quality control. *Proc. SPIE* 7856. DOI:doi:10.1117/12.869648. (reviewed).
- Hamada, A., and N. Nishi Nov, 2010 Observation-based estimation of cloud-top height by geostationary satellite split-window measurements trained with CloudSat data. *Proc. SPIE* 7856. DOI:10.1117/12.869386. (reviewed).
- Hamada, A., and N. Nishi Sep, 2010 Development of a cloud-top height estimation method by geostationary satellite split-window measurements trained with CloudSat data. *J. Appl. Meteor. Climate* 49(9) :2035–2049. (reviewed).
- Suzuki, J., M. Fujiwara, A. Hamada, Y. Inai, J. Yamaguchi, R. Shirooka, F. Hasebe, and T. Takano Jul, 2010 Cloud-top height variability associated with equatorial Kelvin waves in the tropical tropopause layer during the Mirai Indian Ocean cruise for the Study of the MJO-convection Onset (MISMO) campaign. *SOLA* 6 :97–100. DOI:10.2151/sola.2010-025. (reviewed).
- K. Kamiguchi, O. Arakawa, A. Kitoh, A. Yatagai, A. Hamada, and N. Yasutomi May, 2010 Development of APHRO\_JP, the first Japanese high-resolution daily precipitation product for more than 100 years. *Hydrological Research Letters* 4 :60–64. (reviewed).

**[Research Presentations]**

*[Oral Presentation]*

- Hamada, A., and N. Nishi Observation-based estimation of cloud-top height by geostationary satellite split-window measurements¥break trained with CloudSat data. SPIE Asia Pacific Remote Sensing 2010, Oct 10, 2010–Oct 15, 2010, Incheon, Republic of Korea.
- Hamada, A., K. Kamiguchi, O. Arakawa, N. Yasutomi, and A. Yatagai A continental scale daily gridded precipitation dataset for Asia based on a dense network of rain-gauges –APHRODITE project-. SPIE Asia Pacific Remote Sensing 2010, Oct 10, 2010–Oct 15, 2010, Incheon, Republic of Korea.
- Yatagai, A., A. Kitoh, K. Kamiguchi, O. Arakawa, N. Yasutomi, A. Hamada, T. Watanabe, J. Kubota, and M. Taniguchi Asian precipitation – highly-resolved observational data integration towards evaluation of the water resources. Japan Geoscience Union Meeting 2010, May 23, 2010–May 28, 2010, Makuhari.
- Hamada, A., K. Kamiguchi, O. Arakawa, N. Yasutomi, and A. Yatagai Uncertainty analysis of daily gridded precipitation dataset based on a dense rain-gauge network. Japan Geoscience Union Meeting 2010, May 23, 2010–May 28, 2010, Makuhari.
- Yasutomi, N., K. Kamiguchi, O. Arakawa, A. Hamada, and A. Yatagai Changes in the seasonal march of the East Asian summer monsoon rainfall analysed in highly resolved daily gridded data. Japan Geoscience Union Meeting 2010, May 23, 2010–May 28, 2010, Makuhari.
- Hamada, A., N. Nishi, and T. Inoue Development of a cloud-top height estimation method by geostationary satellite split-window measurements trained with cloudsat data. EGU General Assembly 2010, May 02, 2010–May 07, 2010, Vienna.

*[Poster Presentation]*

- A. Hamada, K. Kamiguchi, O. Arakawa, N. Yasutomi, and A. Yatagai A continental scale daily gridded precipitation dataset for Asia based on a dense network of rain gauges –APHRODITE project-. 2010 AGU Fall Meeting, Dec 13, 2010–Dec 17, 2010, .
- Suzuki, J., M. Fujiwara, A. Hamada, K. Yoneyama, Y. Inai, R. Shirooka, and F. Hasebe Cloud-top-height variability associated with equatorial Kelvin waves in the tropical tropopause layer. Japan Geoscience Union Meeting 2010, May 28, 2010–May 28, 2010, Makuhari.
- Hamada, A., K. Kamiguchi, O. Arakawa, N. Yasutomi, and A. Yatagai A 57-year daily gridded precipitation dataset for Asia based on a dense network of rain gauges –APHRODITE project-. EGU General Assembly 2010, May 03, 2010–May 07, 2010, Vienna.

**HANDO, Itsuki C.**

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

## **—Achievements—**

### **[Papers]**

#### *[Original Articles]*

- Kawai, T., Handoh, I.C., Suzuki, N. Mar,2011 The roles of marine phytoplankton and ocean circulation in determining the global gate of polychlorinated biphenyls. Omori, K., Guo, X., Yoshie, N., Fujii, N., Handoh, I.C., Isobe, A., Tanabe, S. (ed.) Modeling and Analysis of Marine Environmental Problems. Interdisciplinary Studies on Environmental Chemistry, 5. TERRAPUB, Tokyo, pp.169–178. (reviewed).
- Handoh, I.C., and Kawai, T. Mar,2011 Bayesian uncertainty analysis of the global dynamics of persistent organic pollutants: Towards quantifying the planetary boundaries for chemical pollution. Omori, K., Guo, X., Yoshie, N., Fujii, N., Handoh, I.C., Isobe, A., Tanabe, S. (ed.) Modeling and Analysis of Marine Environmental Problems. Interdisciplinary Studies on Environmental Chemistry, 5. TERRAPUB, Tokyo, pp.179–187. (reviewed).
- Yamanaka, N., Sogabe, A., Handoh, I.C., and Kawabata, Z Feb,2011 The effectiveness of clove oil as an anaesthetic on adult common carp, *Cyprinus carpio* L.. *Journal of Animal and Veterinary Advances* 10(2) :210–213.
- Quegan, S., Beer, C., Shvidenko, A., McCallum, I., Handoh, I.C., Peylin, P., Rodenbeck, C., Lucht, W., Nilsson, S., and Schimmlius, C. Jan,2011 Estimating the carbon balance of central Siberia using a landscape-ecosystem approach, atmospheric inversion and dynamic global vegetation models. *Global Change Biology* 17(1) :351–365. DOI:10.1111/j.1365-2486.2010.02275.x.
- Nakayama, K., Handoh, I.C., Kitamura, S.I., Kim, E.Y., Iwata, H., and Tanabe Nov,2010 A microarray data analysis method to evaluate the impact of contaminants on wild animals. *Science of the Total Environment* 408(23) :5824–5827.
- Handoh, I.C., and Hidaka, T. Sep,2010 On the timescales of sustainability and futurability. *Futures* 42(7) :743–748. DOI:10.1016/j.futures.2010.04.023.

### **[Research Presentations]**

#### *[Oral Presentation]*

- Handoh, I.C., Song, J.Y., Kitamura, S.I., and Nakayama, K. A dynamic model to examine the tipping points in the aquatic infection system. The 6th International Conference on Marine Pollution and Ecotoxicology, June 2010, Hong Kong, China.

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**HONJO, Mie**


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Project Researcher

**[Academic Career]**

Department of Zoology, Division of Biological Science, Graduate School of Science, Kyoto University, D. Course (2006)

Department of Zoology, Division of Biological Science, Graduate School of Science, Kyoto University, M. Course (2001)

Department Ecosystem Studies, School of Environmental Science, The University of Shiga Prefecture (1999)

**[Professional Career]**

Research Fellow, Research Institute for Humanity and Nature (2006)

**[Higher Degrees]**

D.Sc. (Kyoto University, 2006)

M.Sc. (Kyoto University, 2001)

**[Fields of Specialization]**

Aquatic Microbial Ecology

Viral Ecology

Limnology

**[Academic Society Memberships]**

American Society for Microbiology

Ecological Society of Japan

The Japanese Society of Limnology

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

- Uchii, K., Telschow, A., Minamoto, T., Yamanaka, H., Honjo, M. N., Matsui, K., Kawabata, Z. Feb, 2011  
Transmission dynamics of an emerging infectious disease in wildlife through host reproductive cycles..  
*The ISME Journal* 5 :244-251. DOI:doi:10.1038/ismej.2010.123. (reviewed).

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

- Minamoto, T., Honjo, M. N., Yamanaka, H., Uchii, K., Kawabata, Z. A Nation-wide survey for cyprinid herpesvirus-3 in Japan. The 75th Annual Meeting of the Japanese Society of Limnology, Sep 17, 2010-Sep 20, 2010, Hirosaki City, Japan. (in Japanese)
- Honjo, M. N., Minamoto, T., Kawabata, Z. Detection of cyprinid herpesvirus-3 (CyHV-3) in environmental water and sediments. Workshop on the Linkage between CyHV-3 (KHV) and Humans, May 13, 2010-May 18, 2010, Jerusalem, Israel .
- Minamoto, T., Honjo, M. N., Kawabata, Z. Seasonal dynamics of CyHV-3 in natural freshwater environments. Workshop on the Linkage between CyHV-3 (KHV) and Humans, May 13, 2010-May 18, 2010, Jerusalem, Israel .

HOSOYA, Aoi

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Project Researcher

Born in 1967.

—Achievements—

[Editing]

[Editing / Co-editing]

- Leo Aoi Hosoya, Yo-Ichiro Sato, Dorian Q Fuller (ed.) Jun, 2010 The Archaeobotany of Early Rice Agriculture in Asia. *Archaeological and Anthropological Sciences*, Vol. 2 (1). Springer, Berlin / Heidelberg, Germany, 131pp.

[Papers]

[Original Articles]

- Leo Aoi Hosoya Mar, 2011 Staple or Famine Food?: Ethnographic and archaeological approaches to nut processing in East Asian prehistory. *Archaeological and Anthropological Sciences*. DOI:10.1007/s12520-011-0059-y. (reviewed).
- D. Q Fuller, L. A. Hosoya, Y. Zheng & L. Qin Sep, 2010 A contribution to the Prehistory of Domesticated Bottlegourds in Asia: Rind measurements from Jomon Japan and Neolithic Zhejiang, China. *Economic Botany* 64(3) :260-265. (reviewed).
- Leo Aoi Hosoya Aug, 2010 Surviving Tradition and Disappearing Tradition: 'Old days' landscape with raised-floor granaries in Bali and Amami Oshima Islands. A. Kinda, T. Komeie, S. Minamide, T. Mizoguchi, K. Uesugi (ed.) Proceedings of the 14th International Conference of Historical Geographers Kyoto 2009. Kyoto University Press, Kyoto, Japan, pp.218-219.
- Leo Aoi Hosoya, Michele Wollstonecroft, Dorian Q Fuller & Ling Qin Jul, 2010 Experimental Pilot Study of Peach/Apricot Kernel Detoxification: For reconstruction of Chinese early rice farmers broad spectrum subsistence strategy. NEOMAP Project, Research Institute for Humanity and Nature (ed.) Studies of landscape history on East Asian Inland Seas. NEOMAP Project, Research Institute for Humanity and Nature, Kyoto, Japan, pp.69-76.

[Research Presentations]

[Oral Presentation]

- Leo Aoi Hosoya & Keisuke Makibayashi Long Way to Agricultural Society: Rethinking Chinese Neolithic Yangtze environment and human society in transformation from broad spectrum economy to rice monoculture. Association for Environmental Archaeology Annual Conference 2010, Dec 01, 2010-Dec 02, 2010, International Research Center for Japanese Studies.
- Leo Aoi Hosoya Processed Food in Neolithic Experiments and Ethnography on Wild Food Plant Processing for Reconstruction of Prehistoric Subsistence Strategies in East Asia. Society for American Archaeology 75th Annual Meeting, Apr 14, 2010-Apr 18, 2010, St. Louis, USA.

[Poster Presentation]

- Leo Aoi Hosoya, Michele Wollstonecroft, Dorian Fuller & Ling Qin Experimental Pilot Study of Peach/Apricot Kernel Detoxification: For reconstruction of Chinese early rice farmers broad spectrum subsistence strategy. Japan Society for Scientific Studies on Cultural Properties 27th Annual Meeting, Jun 26, 2010-Jun 27, 2010, Kansei University, Osaka, Japan. (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—**

**[Papers]**

*[Original Articles]*

- ISHIYAMA, Shun Jun, 2010 Jun, 2010 Deforestation et foyer qmeliore au sub-Sahara -Efficacite sous les conditions pratiques dans les menages. . *Annals of Japan Association for Middle East Studies* 26(1) :185-213. (in French) (reviewed).
- ISHIYAMA, Shun Jun, 2010 Deforestation et foyer ameliorie au sub-Sahara -Efficacite sous les conditions pratiques dans les menages. *Annals of Japan Asspciation for Middle East Studies* 26(1) :186-213. (in French) (reviewed).. .

**[Research Presentations]**

*[Oral Presentation]*

- ISHIYAMA, Shun Life of Oasis in Algerian Sahara.. Historico-Ecological Studies of Afro-Eurasian Inner Dry Land Civilizations and Their Modern Changes from the Viewpoint of Pastoralism JSPS Grant-in-Aid

for Scientific Research(S), Dec 22,2010–Dec 24,2010, Nagoya University, Aich pref. Nagoya city, Chikusa ward. . .

- ISHIYAMA, Shun Change of Sahara Oasis. Key stone species of human subsistence in Arab societies, Dec 20,2010–Dec 21,2010, RIHN, Kyoto city, Kita ward.
- ISHIYAMA, Shun Savanna Culture and Oasis Culture. 50th Anniversary of Africa Nation States as Renaissance The 2nd International Symposium AA Science Platform Program Religious Dynamics of Contemporary Africa Concerning the destruction of Traditional Life Mode and New Religious Movement, Dec 13,2010–Dec 15,2010, Nagoya University, Aichi pref. Nagoya city. .

## KADA, Ryohei

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Professor

### **Born in 1949.**

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

Graduated from Graduate School of Agriculture, Kyoto University

Graduate School of Agricultural and Life Sciences, University of Wisconsin-Madison

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

Professor of Kyoto University

Policy Research Coordinator, Policy Research Institute of the Ministry of Agriculture, Forestry and Fisheries

President, AMITA Research Institute for Sustainable Economies

Visiting Professor, Graduate School of Environment and Information Sciences, Yokohama National University

Professor, RIHN

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

Ph.D. (Univ. of Wisconsin-Madison)

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

Agricultural Policy

Environmental Economics

Food Risk Management

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

Ecological Society of Japan

Society of Environmental Science, Japan

Japan Society on Water Environment

Japanese Association of Agricultural Economics

The Association of Rural Planning

The Food System Research Association of Japan

International Sustainable Development Research Society

International Association for Agricultural Economists

Asian Association for Agricultural Economists

#### **[Awards]**

Best Publication Award from Japanese Association of Agricultural Economics by “Part-time Family Farming” (in English)(1980)

Policy Research Memorial Award from NIRA (National Institute for Research Advancement) by the publication of “Environmental Conservation and Sustainable Agriculture” (in Japanese) (1991)

—Achievements—

**[Research Presentations]**

*[Invited Lecture / Honororary Lecture / Panelist]*

- KADA Ryohei Expanding Environmental Risk and Food Security Policies in Asia. The 2nd Symposium of Bangladesh JSPS Alumni Associaton and JSPS, Dec 21, 2010, Bangladesh.

KATO, Yumi

Visiting Researcher

**[Academic Career]**

Faculty of Letters Arts and Sciences, Waseda University (2003)

Graduate School of Human and Environmental Studies, Kyoto University (2006)

Graduate School of Asian and African Area Studies, Kyoto University (2009)

**[Professional Career]**

JSPS Research Fellow (DC, 2008)

JSPS Research Fellow (PD, 2010)

**[Higher Degrees]**

Master (Kyoto University, 2006)

**[Fields of Specialization]**

Cultural Anthropology

Ecological Anthropology

Ethnobiology

**[Academic Society Memberships]**

International Society of Ethnobiology (ISE)

Malaysian Social Science Association (PSSM)

Japanese Society of Cultural Anthropology

The Society for Ecological Anthropology

Japan Society for Southeast Asian Studies

Japan Society of Tropical Ecology

—Achievements—

**[Research Presentations]**

*[Invited Lecture / Honororary Lecture / Panelist]*

- Kato, Y. Living in a Plantation: Rural Development and Ethnic Minority in Sarawak. Exchange Lecture on Culture and Society in Southeast Asia, Sep 29, 2010, University Malaysia Sabah.

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**KAWABATA, Zen'ichiro**


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Professor

**Born in 1946.****[Academic Career]**

Department of Biology, Graduate School of Science, Tohoku University, unfinished D Course (1975)

Department of Biology, Graduate School of Science, Tohoku University, M. Course (1973)

Department of Biology, Faculty of Science, Tohoku University (1971)

**[Professional Career]**

Professor, Research Institute for Humanity and Nature(2005)

Professor(Concurrent), Center for Marine Environmental Studies, Ehime University(1999)

Professor, Center for Ecological Research, Kyoto University (1998)

Professor, Department of Environmental Conservation, Ehime University(1996)

Associate Professor, Department of Environmental Conservation, Ehime University(1983)

Lecturer, Department of Environmental Conservation, Ehime University(1981)

Assistant Professor, Faculty of Science, Biological Institute, Tohoku University (1977)

Technician, Faculty of Science, Biological Institute, Tohoku University (1975)

**[Higher Degrees]**

Dr. Sci. (Tohoku University, 1977)

Ms. Sci. (Tohoku University, 1973)

**[Fields of Specialization]**

Microbial Ecology, Aquatic Ecosystem Ecology

**[Academic Society Memberships]**

The Ecological Society of Japan

The Japanese Society of Microbial Ecology

The Japanese Society of Limnology

Japanese Society of Water Treatment Biology

Japanese Society for Environmental Biotechnology

The Japanese Society of Fisheries Sciences

Japan Society on Water Environment

Society of Environmental Science, Japan

International Association for Theoretical and Applied Limnology.

The Nature Conservation Society of Japan

**[Awards]**

Ehime Publication and Culture Prize, 2000(with coauthors) (2000)

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

- Uchii, K., Telschow, A., Minamoto, T., Yamanaka, H., Honjo, M. N., Matsui, K., Kawabata, Z Feb, 2011  
Transmission dynamics of an emerging infectious disease in wildlife through host reproductive cycles.  
*ISME Journal* 5(2) :244–251. DOI:10.1038/ismej.2010.123. (reviewed).
- Yamanaka, H., Sogabe, A., Handoh, I. C., Kawabata, Z Jan, 2011 The effectiveness of clove oil as an

- anaesthetic on adult common carp, *Cyprinus carpio* L. *Journal of Animal and Veterinary Advances* 10(2) :210-213. DOI:10.3923/javaa.2011.210.213. (reviewed).
- Yamamura, N., Telschow, A., Uchii, K., Kawabata, Z. Jan, 2011 A basic equation for population dynamics with destruction of breeding habitats and its application to outbreak of cyprinid herpesvirus 3 (CyHV-3). *Ecological Research* 26(1) :181-189. DOI:10.1007/s11284-010-0775-2. (reviewed).
  - Perrings, C., Naeem, S., Ahrestani, F., Bunker, D. E., Burkill, P., Ganziani, G., Elmqvist, T., Ferrati, R., Fuhrman, J., Jaksic, F., Kawabata, Z., Kinzig, A., Mace, G. M., Milano, F., Mooney, H., Prieur-Richard, A. H., Tschirhart, J., and Weisser, W. Dec, 2010 Biodiversity Transcends Services. *Science* 330(6012) :1744-1745. DOI:10.1126/science.330.6012.1744-c. (reviewed).
  - Perrings, C., Naeem, S., Ahrestani, F., Bunker, D. E., Burkill, P., Canziani, G., Elmqvist, T., Ferrati, R., Fuhrman, J., Jaksic, F., Kawabata, Z., Kinzig, A., Mace, G. M., Milano, F., Mooney, H., Prieur-Richard, A. H., Tschirhart, J., and Weisser, W. Oct, 2010 Ecosystem Services for 2020. *Science* 330(6002) :323-324. DOI:10.1126/science.1196431. (reviewed).
  - Yamanaka, H., Kohmatsu, Y., Minamoto, T. and Kawabata, Z. Apr, 2010 Spatial variation and temporal stability of littoral water temperature relative to lakeshore morphometry: environmental analysis from the view of fish thermal ecology. *Limnology* 11(1) :71-76. DOI:10.1007/s10201-009-0281-9. (reviewed).

### [Research Presentations]

#### [Oral Presentation]

- Kawabata, Z. Linkage of environment, KHV and humans. Workshop on the Linkage between CyHV-3(KHV) and Humans, May 13, 2010-May 18, 2010, The Hebrew University, Jerusalem, Israel.
- Mie N. Honjo, Toshifumi Minamoto, and Prof. Zen'ichiro Kawabata, Seasonal dynamics of CyHV-3 in natural freshwater environments. Workshop on the Linkage between CyHV-3(KHV) and Humans, May 13, 2010-May 18, 2010, The Hebrew University, Jerusalem, Israel.
- Toshifumi Minamoto, Mie N. Honjo, and Prof. Zen'ichiro Kawabata, Seasonal dynamics of CyHV-3 in natural freshwater environments. Workshop on the Linkage between CyHV-3(KHV) and Humans, May 13, 2010-May 18, 2010, The Hebrew University, Jerusalem, Israel.
- Tomoaki Itayama, Masahiro Koide, Nobuyuki Tanaka, Tomoyuki Yasukawa, Tomokazu Matsue, Zen'ichiro Kawabata, Development of microdevices and measurement methods in water environmental studies. Workshop on the Linkage between CyHV-3(KHV) and Humans, May 13, 2010-May 18, 2010, The Hebrew University, Jerusalem, Israel.

#### [Invited Lecture / Honorary Lecture / Panelist]

- Kawabata, Z. New idea of ecosystem conservation with an aspect of environmental disease. Special Symposium: Control of Infectious diseases from the view point of conservation medicine. Japanese Society of Zoo and Wildlife medicine, Sep 02, 2010, Fukuoka, Japan.
- Kawabata, Z. KHV and human linkage. Faculty of Fisheries Technology and Aquatic Resource. Maejyo University, Jun 07, 2010, Cheng Mai, Thailand.

KOSAKA, Yasuyuki

Project Researcher

—Achievements—

[Books]

*[Chapters/Sections]*

- Kosaka, Y. Mar, 2011 The regional history of development reflected by the distribution of invasive alien plants in Arunachal Pradesh, India. Okumiya, K. (ed.) Human life, aging and disease in Himalaya-Tibet Highland. Showado, Co., Ltd., pp.94-99. (in Japanese)

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

- Kosaka, Y., Saikia, B., Mingki, T., Tag, H., Riba, T., Ando, K., Okumiya, K. Mar, 2011 Characteristics of wild edible and medicinal plant use in Arunachal Pradesh, India. *Himalayan Study Monographs* 12 :101-116. (in Japanese) (reviewed).
- Kosaka, Y., Saikia, B., Mingki, T., Tag, H., Riba, T., Ando, K. Aug, 2010 Roadside distribution patterns of invasive alien plants along an altitudinal gradient in Arunachal Himalaya, India. *Mountain Research and Development* 30 (3) :252-258. (reviewed).

**KUBOTA, Jumpei**

Associate Professor

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

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

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

Department of Forestry, Faculty of Agriculture, Kyoto University (1981)

**[Professional Career]**

Associate Professor, Research Institute for Humanity and Nature (2002)

Associate Professor, Faculty of Agriculture, Tokyo University of Agriculture and Technology (1997)

Assistant Professor, Faculty of Agriculture, Tokyo University of Agriculture and Technology (1989)

Assistant Professor, University Forest, Kyoto University (1987)

**[Higher Degrees]**

D. Agr. (Kyoto University, 1987)

M. Agr. (Kyoto University, 1983)

**[Fields of Specialization]**

Hydrology

Forest Hydrology

Erosion Control Engineering

**[Academic Society Memberships]**

The Japanese Forestry Society

The Japan Society of Hydrology and Water Resources

The Japan Society of Erosion Control Engineering

**[Awards]**

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

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

- Akiko Sakai, Koji Fujita, Chiyuki Narama, Jumpei Kubota, Masayoshi Nakawo, and Tandong Yao 2010 Akiko Sakai, Koji Fujita, Chiyuki Narama, Jumpei Kubota, Masayoshi Nakawo, and Tandong Yao. *Hydrological Processes* . DOI:10.1002/hyp.7700. (reviewed).

**LEKPRICHAKUL, Thamana**

Senior Project Researcher

**Born in 1959.****[Academic Career]**

Department of Economics, University of Hawaii, USA (2001)

Faculty of Economics, Thammasat University, Thailand (1987)

**[Professional Career]**

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

Post-doctoral fellow, Social Science Research Institute, University of Hawaii (2006)

Research Assistant, Energy Technology Department, Asian Institute of Technology, Thailand (1898)

**[Higher Degrees]**

Ph.D. (University of Hawaii, 2001)

B.A., Honors (Thammasat University, Thailand, 1987)

**[Fields of Specialization]**

Health–Demographic Economics

Labor Economics

Development Economics

**[Academic Society Memberships]**

Member of American Economic Association

Member of Thai Economic Association

**[Awards]**

BA in Economics with honored (equivalent to summa cum laude in the USA) and a recipient of the King Bhumipol' s Outstanding Student Award

King Bhumipol' s first place award for an essay on “The King Bhumipol and His Contributions to Social Development” in 1986

Second place award from the United Nations for an essay on “Zimbabwe” in 1987

First place award from the department of economics, Thammasat University, for an essay on “International Trade and Protectionism” in 1987

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

- Lekprichakul, T., Umetsu, C. and Yamauchi, T. 2010 Child Growth as a Measure of Household Resilience: A Re-Examination of Child Nutrition Situation Using New Growth Reference Standard. Chieko Umetsu (ed.) Vulnerability and Resilience of Social-Ecological Systems Project Report, FY2009, . Research Institute for Humanity and Nature, Kyoto, pp.98-112.

## MAKIBAYASHI, Keisuke

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Senior Project Researcher

### Born in 1972.

#### [Academic Career]

Department of Literature, Hiroshima University, Ph.D Course (2004)  
 Postgraduate, Department of Archaeology, Beijing University (2000)  
 Postgraduate, Department of Literature, Hiroshima University (1998)  
 Department of Literature, Hiroshima University, M.Course (1997)  
 Department of History, Kumamoto University (1995)

#### [Professional Career]

Assistant, Archaeological Research Center, Hiroshima University (2007)  
 Assistant Professor, Archaeological Research Center, Hiroshima University (2005)  
 Assistant, Archaeological Research Center, Hiroshima University (2004)  
 Teaching Assistant, Hiroshima University (2001)  
 Researcher, RIHN(2008)

#### [Higher Degrees]

Ph.D (Literature) (Hiroshima University, 2004)

#### [Fields of Specialization]

Archaeology

#### [Academic Society Memberships]

Japanese Archaeological Association  
 Society of Archaeological Studies  
 Japanese Society for Chinese Archaeology  
 Study Group of Furnace

### —Achievements—

#### [Editing]

*[Editing / Co-editing]*

- MAKIBAYASHI, Keisuke; UCHIKADO, Megumi (ed.) Jul,2010 Studies of Landscape History on East Asian Inland Seas. NEOMAP Project, Research Institute for Humanity and Nature, Kyoto, 218pp.

#### [Research Presentations]

*[Oral Presentation]*

- MAKIBAYASHI, Keisuke Transformation of Neolithic Farming Culture in China. Lecture in Centre for Chinese Archaeology and Arts, Mar 20,2011, Hongkong. (in Chinese)
- MAKIBAYASHI,Keisuke;HOYOYA,Aoi Long way to agricultural society: Rethinking Chinese Neolithic Yangtze

environment and human society in transformation from broad spectrum economy to rice monoculture. Association for Environmental Archaeology Annual Conference, Dec 01, 2010–Dec 03, 2010, Kyoto.

## MINAMOTO, Toshifumi

Senior Project Researcher

### Born in 1973.

#### [Academic Career]

Division of Biological Science, Graduate School of Science, Kyoto University, D. Course (2003)

Division of Biological Science, Graduate School of Science, Kyoto University, M. Course (1999)

Faculty of Science, Kyoto University (1997)

#### [Professional Career]

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

Postdoctoral Researcher, Institute for Biological Resources and Functions, National Institute of Advanced Industrial Science and Technology (2005)

COE Research Fellow, Center for Ecological Research, Kyoto University (2003)

#### [Higher Degrees]

D. Sc (Kyoto University, 2003)

M. Sc (Kyoto University, 1999)

#### [Fields of Specialization]

Molecular Ecology

Microbial Ecology

Animal Physiology

Chronobiology

#### [Academic Society Memberships]

The Zoological Society of Japan

Japanese Society for Chronobiology

Ecological Society of Japan

The Japanese Society of Limnology

### —Achievements—

#### [Papers]

##### [Original Articles]

- Uchii, K., Telschow, A., Minamoto, T., Yamanaka, H., Honjo, M. N., Matsui, K., Kawabata, Z. Feb, 2011 Transmission dynamics of an emerging infectious disease in wildlife through host reproductive cycles. *ISME J.* 5 :244-251. DOI:10.1038/ismej.2010.123. (reviewed).
- Sugahara, M., Minamoto, T., Fuchikawa, T., Michinomae, M., Shimizu, I. Dec, 2010 *Apis cerana japonica* discriminates between floral color phases of the oriental orchid, *Cymbidium floribundum*. *Zool. Sci.* 27(12) :901-906. DOI:10.2108/zsj.27.901. (reviewed).
- Yamanaka, H., Kohmatsu, Y., Minamoto, T., Kawabata, Z. Apr, 2010 Spatial variation and temporal stability of littoral water temperature relative to lakeshore morphometry: environmental analysis from the view of fish thermal ecology. *Limnology* 11 :71-76. DOI:10.1007/s10201-009-0281-9. (reviewed).

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

- Minamoto, T., Honjo, M. N., Yamanaka, H., Uchii, K., Kawabata, Z. A Nation-wide survey for cyprinid herpesvirus-3 in Japan. The 75th Annual Meeting of the Japanese Society of Limnology, Sep 17, 2010–Sep 20, 2010, Hirosaki City, Japan. (in Japanese)
- Minamoto, T., Honjo, M. N., Kawabata, Z. Seasonal dynamics of CyHV-3 in natural freshwater environments. Workshop on the Linkage between CyHV-3 (KHV) and Humans, May 13, 2010–May 18, 2010, Jerusalem, Israel.
- Honjo, M. N., Minamoto, T., Kawabata, Z. Detection of cyprinid herpesvirus-3 (CyHV-3) in environmental water and sediments. Workshop on the Linkage between CyHV-3 (KHV) and Humans, May 13, 2010–May 18, 2010, Jerusalem, Israel.

*[Poster Presentation]*

- Yamanaka, H., Minamoto, T., Wu, D., Kong, H., Wei, Z-h, Liu, B., Kawabata, Z. Spatiotemporal distribution of water temperature in Lake Erhai, Yunnan, China. The 75th Annual Meeting of the Japanese Society of Limnology, Sep 17, 2010–Sep 20, 2010, Hirosaki City, Japan. (in Japanese)

*[Invited Lecture / Honorary Lecture / Panelist]*

- Minamoto, T. Fish diversity and molecular evolution of visual pigments. Diverted mechanisms produce biodiversity (2010 Symposium of Chubu Branch of the Zoological Society of Japan), Jul 24, 2010, Gifu City, Japan. (in Japanese)

**MIYAZAKI, Hidetoshi**

Project Researcher

**Born in 1975.****[Academic Career]**

Department of Soil Science, Graduate School of Agriculture, Kyoto University, D.Course(2007)

Division of Environmental Dynamics, Environmental Science Graduate School, The University of Shiga Prefecture, M.Course(2001)

Department of Biological Resources Management, School of Environmental Science, The University of Shiga Prefecture(1999)

**[Professional Career]**

Researcher, Research Institute for Humanity and Nature(2007)

JSPS Research Fellow(2003)

**[Higher Degrees]**

M.Environmental Science. (The University of Shiga Prefecture, 2001)

**[Fields of Specialization]**

Soil Science

**[Academic Society Memberships]**

Japanese Society of Soil Science and Plant Nutrition

Japanese Society of Regional and Agricultural Development

The Japanese Agricultural Systems Society

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

- H. Miyazaki, Y. Ishimoto, M. Yamashita, H. Shinjo, U. Tanaka Land Use Management and Coping Behaviors with Climate Change -A case study of Southern Zambia-. GLP 2010 Open Science Meeting, Oct 17, 2010–Oct 19, 2010, Arizona United States.
- M. Yamashita, H. Miyazaki, Y. Ishimoto, M. Yoshimura MULTI-TEMPORAL AND SPATIAL DATA INTEGRATION FOR UNDERSTANDING THE LIVELIHOOD IN VILLAGE LEVEL. ISPRS Technical Commission VIII 2010, August 2010–August 2010, Kyoto Japan.

*[Poster Presentation]*

- Hidetoshi Miyazaki, Megumi Yamashita, Yudai Ishimoto, Hitoshi Shinjo, Ueru Tanaka Small-Scale Farmers' Adaptive and Coping Behaviors to Climatic Variability: A Case Study of Southern Zambia. Resilience 2011, Mar 12, 2011–Mar 16, 2011, Arizona United States.

**MOJI, Kazuhiko**

Professor

**Born in 1953.****[Academic Career]**

Department of Human Ecology, Graduate School of Medicine, The University of Tokyo, D. Course (1983)  
 Department of Human Ecology, Graduate School of Medicine, The University of Tokyo, M. Course (1980)  
 Faculty of Medicine, The University of Tokyo (1976)

**[Professional Career]**

Professor, Research Institute for Humanity and Nature (2007)  
 Visiting Professor, Research Institute for Humanity and Nature (2006)  
 Head, Research Center of Tropical Infectious Diseases, Nagasaki University Institute of Tropical Medicine (2006)  
 Professor, Research Center of Tropical Infectious Diseases, Nagasaki University Institute of Tropical Medicine (2002)  
 Professor, School of Health Sciences, Nagasaki University School of Medicine (2001)  
 Professor, School of Allied Medical Sciences, Nagasaki University (1999)  
 Associate Professor, Department of Public Health, Nagasaki University School of Medicine (1987)  
 Instructor, Department of Human Ecology, School of Health Science, Faculty of Medicine, University of Tokyo (1983)

**[Higher Degrees]**

D. (The University of Tokyo, 1983)  
 M. (The University of Tokyo, 1980)

**[Fields of Specialization]**

Human Ecology, Population Health in the Tropics

**[Academic Society Memberships]**

The Japanese Society of Tropical Medicine, The Japanese Society of Health and Human Ecology

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

- Minematsu K, Takamura N, Goto K, Honda S, Aoyagi K, Moji K, Tsunawake N Feb, 2011 A proposed method for the evaluation of body fat in Japanese adults that predicts obesity. *Nutr Res* 31(2) :113-21. (reviewed).
- Sato M, Yoonuan T, Sanguankiat S, Nuamtanong S, Pongvongsa T, Phimmayoi I, Phanhanan V, Boupha B, Moji K, Waikagul J Jan, 2011 Short report: Human *Trichostrongylus colubriformis* infection in a rural village in Laos. *Am J Trop Med Hyg* 84(1) :52-54. (reviewed).
- Hossain M, Bulbul T, Ahmed K, Ahmed Z, Salimuzzaman M, Haque MS, Ali A, Hossain S, Yamada K, Moji K, Nishizono A. Nov, 2010 Five-year (January 2004-December 2008) surveillance on animal bite and rabies vaccine utilization in the Infectious Disease Hospital, Dhaka, Bangladesh. *Vaccine* 29(5) :1036-1040. (reviewed).
- Zhang Z, Yamamoto T, Wu XN, Moji K, Cai GX, Kuroiwa C. May, 2010 Educational intervention for preventing bloodborne infection among medical students in China. *J Hosp Infect.* 75(1) :47-51. (reviewed).
- Watanabe K, Muhoho ND, Mutua WR, Kiliku FM, Awazawa T, Moji K, Aoki Y. Apr, 2010 Assessment of Voiding Function in Inhabitants Infected with *Schistosoma haematobium*. *J Trop Pediatr.* (reviewed).
- Watanabe K, Muhoho ND, Mutua WR, Kiliku FM, Awazawa T, Moji K, Aoki Y. Apr, 2010 Assessment of Voiding Function in Inhabitants Infected with *Schistosoma haematobium*. *J Trop Pediatr* Apr 28. (reviewed).

**NAKAMURA, Ryo**

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—

#### [Papers]

##### [Original Articles]

- NAKAMURA, Ryo Aug, 2010 “Anthropological Study on the Ababda Maritime Society in the Southern Parts of the Red Sea coast in Egypt”. NAWATA, Hiroshi (ed.) *Investigative Report August 2010: Study of Human Impacts on Mangrove Habitats in Egypt (2009-2013)*. pp.12-21.
- NAKAMURA, Ryo Jul, 2010 “Direct and Environmental Uses of Mangrove Resources on Kilwa Island, Southern Swahili Coast, Tanzania”. *Annals of Japan Association for Middle East Studies* 26(1) :215-240. (reviewed).

#### [Research Presentations]

##### [Oral Presentation]

- NAKAMURA, Ryo “Boat Culture in the Western Indian Ocean”. JSPS Grant-in-Aid for Scientific Research(S): Historico-Ecological Studies of Afro-Eurasian Inner Dry Land Civilizations and Their Modern Changes from the Viewpoint of Pastoralism, 2nd International Symposium: Saharan Civilization, Dec 22, 2010-Dec 24, 2010, Nagoya University, Aichi, Japan.
- NAKAMURA, Ryo “The Dryland Fishing Culture of the Ababda Maritime Society along the Red Sea Coast of Southern Egypt”. RIHN Satellite Symposium for IAS International Conference 2010 at Kyoto, Keystone Species of Human Subsistence Ecosystems in Arab Societies, Dec 20, 2010-Dec 21, 2010, Research Institute for Humanity and Nature, Kyoto, Japan.
- NAKAMURA, Ryo “The Bantu and Arab Cultures on Kilwa Island as seen through *Jini*”. AA Science Platform Program: Religious Dynamics of Contemporary Africa Concerning the destruction of Traditional Life Mode and New Religious Movement, The 2nd International Symposium: 50th Anniversary of Africa Nation States as Renaissance, Dec 13, 2010-Dec 15, 2010, Nagoya University, Aichi, Japan.
- NAKAMURA, Ryo “Direct and Environmental Uses of Mangrove Resource in Kilwa Island, Southern Swahili Coast, Tanzania”. 26th Annual Meeting of Japan Association for Middle East Studies, May 08, 2010-May 09, 2010, Chuo University, Tokyo, Japan. (in Japanese)

##### [Invited Lecture / Honororary Lecture / Panelist]

- NAKAMURA, Ryo “Comparative Study on the Mangrove Culture in the Western Indian Ocean World: Tanzania, Kenya and Egypt”. 16th Annual Meeting of Japan Association for Mangroves, Nov 06, 2010-Nov 07, 2010, Toyko University of Agriculture, Tokyo, Japan. (in Japanese)

NAKANO, Takanori

**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]***[Authored/Co-authored]*

- Takanori Nakano, Tomoya Akimichi etc. Mar,2011 Gold connecting people with volcanoes. Collaborative research, "People and Nature" research communicative journal, 1. Showado, Sakyoku, Kyoto city, 31pp. (in Japanese)
- Nakano Takanori Jun,2010 Water in a vessel which is Planet from the point of view of a plastic bottle. Monthly Minpaku, Volume 34, 6 issue. National Museum of Ethnology, Suita city, Osaka prefecture, 1p. (in Japanese)
- Rikitake, T., Ie, M., Ogawa, U., Nagata, Y., Nakano, T., Hiei. E., Hirano, M., Honkura, Y., Asano, T., Ikeda, N., Shimizu, M. 2010 Koutougakkou Chigaku I -Chikyuu to utyu- (updated version). Suken Shuppan, 272pp. (in Japanese)
- Rikitake, T., Ie, M., Ogawa, U., Nagata, Y., Nakano, T., Hiei. E., Hirano, M., Honkura, Y., Asano, T., Ikeda, N., Shimizu, M. 2010 Koutougakkou Chigaku II -Chikyuu to utyu no tankyu- (updated version). Suken Shuppan, 264pp.
- Rikitake, T., Ie, M., Ogawa, U., Nagata, Y., Nakano, T., Hiei. E., Hirano, M., Honkura, Y., Asano, T., Ikeda, N., Shimizu, M. 2010 Koutougakkou Chigaku I Gaido. , Suken Shuppan, 383pp. (in Japanese)
- Rikitake, T., Ie, M., Ogawa, U., Nagata, Y., Nakano, T., Hiei. E., Hirano, M., Honkura, Y., Asano, T., Ikeda, N., Shimizu, M. 2010 Koutougakkou Chigaku II Gaido. Suken Shuppan, 394pp. (in Japanese)

**[Chapters/Sections]**

- Nakano Takanori, Saitoh Yu Dec, 2010 Stable isotope that connects creatures in the forest and in the sea. Akimichi Tomoya (ed.) Nature, Water and People in Otsuchi-A Message for the Future. Tohoku syuppan kikaku, Tsuruokashi hie, pp.166-197. (in Japanese)
- Nakano Takanori Oct, 2010 Traceability and Environmental management. Research Insititute for Humanity and Nature (ed.) The RIHN Encyclopedia of Global Environmental Studies. , Chiyoda-ku, Tokyo, pp.98-99. (in Japanese)
- Nakano Takanori Sep, 2010 See the global environment by Water in Saijyo. Research Institute for Humanity and Nature (ed.) People and Water for the future -From Saijyo-. Sofusya syuppan, Matsuyama city, Ehime prefecture, pp.38-65. (in Japanese)
- Takanori Nakano, Yu Saitoh, Toshinori Kobayashi, Seiichi Mori, Kichoel Shin, and Hiroshi Mizutani 2010 Strontium isotope ratios in water as an index of habitat and forging sites of aquatic organisms. Naohiko Ohkouchi, Ichiro Tayasu, and Keisuke Koba (ed.) Earth, Life, and Isotopes. Kyoto University Press, Sakyo-ku, Kyoto city, pp.71-84.

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

- Yu Saitoh, Toru Tamura, Yoshinori Komada, Takanori Nakano Mar, 2011 Strontium and neodymium isotopic signatures indicate the provenance and depositional process of loams intercalated in coastal dune sand, western Japan. *Sedimentary Geology* 236(3-4) :272-278. (reviewed).
- T. Hosono, F. Siringan, T Yamanaka, Y. Umezawa, S. Onodera, T. Nakano and M. Taniguchi 2010 Application of multi-isotope ratios to study the source and quality of urban groundwater in Metro Manila, Philippines. . *Applied Geochemistry* 25 :900-909. (reviewed).
- T. Hosono, T. Nakano, Y. Shimizu, S. Onodera, M. Taniguchi 2010 Hydrogeological constraint on nitrate and arsenic contamination in Asian metropolitan groundwater. *Hydrological Processes* . (reviewed).
- T. Hosono, C-H. Wang, Y. Umezawa, T. Nakano, S. Onodera, T. Nagata, C. Yoshimizu, I. Tayasu, M. Taniguchi 2010 Multiple isotope (H, O, N, S and Sr) approach elucidates complex pollution causes in the shallow groundwater of the Taipei urban area. . *Journal of Hydrology* . (reviewed).
- T Hosono, O Lorphenriand, S Onodera, H Okawa, T Nakano, T Yamanaka, M Tsujimura, M Taniguchi 2010 Dissimilatory sulfate reduction and bacterial disproportionation of elemental sulfur explaining two different isotopic evolutionary trends of  $\delta^{34}\text{S}$  and  $\delta^{180}$  values of dissolved sulfate in anaerobic deltaic aquifer system. . *Geochimica et Cosmochimica Acta* . (reviewed).
- T Hosono, R Delinom, T Nakano, M Kagabu, J Shimada 2010 Evolution model of  $\delta^{34}\text{S}$  and  $\delta^{180}$  in dissolved sulfate in volcanic fan aquifers from recharge to coastal zone, through Jakarta urban area, Indonesia. . *Science of the Total Environment* . (reviewed).

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

- Takanori Nakano Ecosystem risk evaluation of Laguna watershed based on traceability information using multi-stable isotopes. Mini-Workshop: RIHN, UPLB, UPM and LLDA teams, Mar 12, 2011, University of the Philippines Los Banos.
- Takanori Nakano Development and dissemination of traceability diagnosis toward self-resource community. , Feb 28, 2011, Center for Geo-Environmental Science, Akita University. (in Japanese)
- Takanori Nakano Exploring the underground water vein of Yoshide Mountain. , Feb 26, 2011, Yuza town office conference room. (in Japanese)
- Takanori Nakano Stable isotope traceability study of yellow sand and acid rain. , Jun 17, 2010, Waseda University. (in Japanese)
- Takanori Nakano Interactions between People and Global environment from the point of view of water

quality in Suita city. Suita City's 70th anniversary project [People and things connected with water], Jun 13, 2010, National Museum of Ethnology. (in Japanese)

- Takanori Nakano Amazing! Your water is also mineral water. Water and Vessels From Cupped Hands to the Planet, Jun 12, 2010, National Museum of Ethnology. (in Japanese)

*[Poster Presentation]*

- M. KATSUYAMA, S. NISHIMOTO, Y. SAITOH, T. NAKANO, M. TANI Application of Strontium isotope to hydrological study of groundwater dynamics in a weathered granite catchment. AGU Fall Meeting 2010, San Francisco, Dec 13, 2010–Dec 17, 2010, San Francisco.

*[Invited Lecture / Honororary Lecture / Panelist]*

- Takanori Nakano Traceability research of global environment. Board Committee on Science, Niigata Prefectural high school, Feb 25, 2011, Niigata Prefectural Niitsu High School. (in Japanese)
- Takanori Nakano The future of "UCHINUKI" that "Sen no Mizu" sees. Groundwater symposium The science of groundwater for the future -From Saijyo, a city of water-, Sep 23, 2010, Saijyo-city. (in Japanese)

## NARAMA, Chiyuki

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Project Researcher

**Born in 1972.**

**[Academic Career]**

Department of Geography, Tokyo Metropolitan University, D. Course (2002)

**[Professional Career]**

JSPS fellow PD (2004–2007)

Project researcher, RIHN (2007)

**[Higher Degrees]**

D.Sc (Tokyo Metropolitan University, 2002)

**[Fields of Specialization]**

Physical geography

**[Academic Society Memberships]**

The Association of Japanese Geography

The Japanese Society of Snow and Ice

Tokyo Geographical Society

International Glaciological Society (IGS)

Japan Society for Natural Disaster Science

**[Awards]**

Nakaya Ukichiro Science Award (2007)

**—Achievements—**

**[Papers]**

*[Original Articles]*

- Narama, C., Kicengge, Kubota, J., Shatravin, V., Duishonakunov, M., Moholdt, G., Abdrakhmatov, K. 2010 The lake-level changes in Central Asia during the last 1000 years based on historical map. *Proceedings of*

*international workshop on "Reconceptualizing Cultural and Environmental Change in Central Asia: An Historical Perspective on the Future" (RIHN) :11-27.*

- Narama, C., Duishonakunov, M., Kaab, A., Daiyrov, M., Abdrakhmatov, K. 2010 The 24 July 2008 outburst flood on the western Zyndan glacier lake and recent regional changes in glacier lakes of the Teskey Ala-Too range, Tien Shan, Kyrgyzstan.. *Natural Hazards and Earth System Sciences* 10(4) :647-659. (reviewed).
- Narama, C., Kaab, A., Duishonakunov, M., Abdrakhmatov, K. 2010 Spatial variability of recent glacier area changes in the Tien Shan Mountains, Central Asia, using Corona (~1970), Landsat (~2000), and ALOS (~2007) satellite data.. *Global and Planetary Change* 71 :42-54. (reviewed).
- Sakai, A., Fujita, K., Narama, C., Kubota, J., Nakawo, M., Yao, T. 2010 Reconstructions of annual discharge and equilibrium line altitude of glaciers at Qilian Shan, northwest China, from 1978 to 2002.. *Hydrological Processes* 24 :2798-2806. (reviewed).

## NAWATA, Hiroshi

Associate 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]

Associate Professor, Research Department, Research Institute for Humanity and Nature (2008-present)

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 Nov, 2010 Female genital cutting: A view from sexual intercourse and perfume cultures in Sudan. Hideo Oda, Junzo Kawada, Jun'ichiro Itani, Jiro Tanaka, and Toshinao Yoneyama (ed.) *Cyclopedia of Africa, new edition*. Heibonsya, Tokyo, pp.228. (in Japanese)
- Hiroshi NAWATA Oct, 2010 Islam and Nature Reserve Management. The Research Institute for Humanity and Nature (RIHN) (ed.) *The RIHN Encyclopedia of Global Environmental Studies*. Kobundo, Chiyoda-ku, Tokyo, pp. 328-329.

### [Papers]

#### [Original Articles]

- Ruichen JIA, Ren'ya SATO, Hiroshi NAWATA, Kouhei MATSUNAGA, Guobin LIU, Whnui ZHANG, and Norikazu YAMANAKA Mar, 2011 Marriage and wedding ceremony of a village in Loess Plateau: As a description of changing/persistent tradition. *Bulletin of the Graduate School of Social and Cultural Studies, Kyushu University* 17 :17-35. (reviewed).
- Hiroshi NAWATA Dec, 2010 Oil and Livelihood in Arid Land: A Case Study of the Beja in Eastern Sudan. *Biostory* 14 :18-27. (in Japanese)
- Hiroshi NAWATA Jul, 2010 Exploitation and Conservation of Middle East Tree Resources in the Oil Era: A Study of Human Subsistence Ecosystems in Arab Societies. *Annals of Japan Association for Middle East Studies* 26(1) :137-150. (reviewed).
- Hiroshi NAWATA, MUHAMMAD Ahmed Asiri and RABI Abd al-Rahman Hasanin Jul, 2010 Traditional Natural Resource Use and Conservation of Juniper Woodlands in the Arabian Peninsula: A Case Analysis of Raydah Nature Reserve, Southwestern Saudi Arabia. *Annals of Japan Association for Middle East Studies* 26(1) :151-184. (reviewed).

### [Research Presentations]

#### [Oral Presentation]

- Hiroshi NAWATA *Participation of Refugees in Development Assistance: Possibilities and Problems of African Foreign Workers for Environmental Conservation in Saudi Arabia*. International Symposium "Constructing 'Ordinary Life': Lessons from Peace Building Practices in Africa", Mar 05, 2011-Mar 06, 2011, National Museum of Ethnology, Senri.
- Hiroshi NAWATA *Function and Diversity of Vocal Sounds used for Livestock Management by the Beja of Eastern Sudan: Acoustic Analysis with a Sound Spectrograph*. The 4th International Workshop of "Historico-Ecological Studies Afro-Eurasian Inner Dry Land Civilization and their Modern Changes from

- the Viewpoint of Pastoralism" "Arid, Semi-arid Land Eco-system and Civilization in a Changing World", Feb 27, 2011–Feb 28, 2011, Rakuno Gakuen University, Ebetsu city. (in Japanese)
- Hiroshi NAWATA *Eco-history of Keystone Species and Ecotone Resources in the Drylands of the Middle East: Working Hypothesis of the RIHN "Arab Subsistence" Project*. The 3rd Ecohistory Program Symposium "The Ecohistory of Yellow Belt and Green Belt in the Afro-Eurasia, Feb 21, 2011, RIHN, Kyoto.
  - Hiroshi NAWATA *Keystone Species of Human Subsistence Ecosystems in Arab Societies*. RIHN Satellite Symposium for IAS International Conference 2010 at Kyoto "Keystone Species of Human Subsistence Ecosystems in Arab Societies", Dec 20, 2010–Dec 21, 2010, RIHN, Kyoto.
  - Hiroshi NAWATA *Historical and Ethnographical Studies on Operculum of Gastropods as Incense and Perfume in the Coastal Zones of Arid Tropics*. RIHN Satellite Symposium for IAS International Conference 2010 at Kyoto "Keystone Species of Human Subsistence Ecosystems in Arab Societies", Dec 20, 2010–Dec 21, 2010, RIHN, Kyoto.
  - Hiroshi NAWATA *Livestock Playing a Key Role in Mesquite Expansion in Local Ecosystems*. RIHN Satellite Symposium for IAS International Conference 2010 at Kyoto "Keystone Species of Human Subsistence Ecosystems in Arab Societies", Dec 20, 2010–Dec 21, 2010, RIHN, Kyoto.
  - Yoshiharu FUJII, Abdel Gabar BABIKER, Yukhiro SUGIMOTO, and Hiroshi NAWATA *Allelopathic Activity of Mesquite (Prosopis juliflora) and Screening of Allelopathic Plants in Sudan*. RIHN Satellite Symposium for IAS International Conference 2010 at Kyoto "Keystone Species of Human Subsistence Ecosystems in Arab Societies", Dec 20, 2010–Dec 21, 2010, RIHN, Kyoto.
  - Hiroshi NAWATA *Traditional Resource Use and Conservation of Juniper Woodlands in the Arabian Peninsula: A Case Analysis of Raydah Nature Reserve, Southwestern Saudi Arabia*. Islamic Area Studies Third International Conference 2010 "New Horizons in Islamic Area Studies: Continuity, Contestations and the Future", Dec 17, 2010–Dec 19, 2010, Kyoto International Conference Center, Kyoto.
  - Hiroshi NAWATA *Studies on Social Development in the Loess Plateau*. 2010 Annual Meeting of the Joint Research Program of Arid Land Research Center, Tottori University, Dec 04, 2010, Arid Land Research Center, Tottori University, Tottori. (in Japanese)
  - Sin'ichi NISHIMOTO, Yoshihumi YASUOKA, Aya YASUOKA and Hiroshi NAWATA *Architectural Survey and Restoration Work of Coral Buildings in Sinai Peninsula, Egypt*. Annual Meeting of RIHN Arab Subsistence Project, Sep 18, 2010–Sep 20, 2010, RIHN, Kyoto. (in Japanese)
  - Hiroshi NAWATA *To Combat a Negative Heritage of Combating Desertification: Learning from Problems caused by Planting the Alien Invasive Species Mesquite*. Annual Meeting of RIHN Arab-Subsistence Project, Sep 18, 2010–Sep 20, 2010, RIHN, Kyoto. (in Japanese)
  - Hiroshi NAWATA *Creating a New Form of Social Networks through a Camel Race in the Sahara Desert*. Annual Meeting of RIHN Arab-Subsistence Project, Sep 18, 2010–Sep 20, 2010, RIHN, Kyoto. (in Japanese)
  - Hiroshi NAWATA *Introduction: How Will You Live without Oil? Part 2*. The 40th RIHN Public Seminar, Sep 17, 2010, RIHN, Kyoto. (in Japanese)
  - Hiroshi NAWATA, Shun ISHIYAMA, and Ryo NAKAMURA *Sudanese people may have a longest history of sorghum production in the world: Anthropological understanding of its domestication and co-evolution with Striga*. SATREPS-JSPS AA Science Platform Program Joint Seminar on Striga spp., the food security scourge in Africa, Sep 15, 2010, Awaji Yumebutai International Conference Center, Awaji, Hyogo.
  - Hiroshi NAWATA *Extinct Species and Humans*. The First RIHN Kids Seminar, Aug 23, 2010, RIHN, Kyoto. (in Japanese)
  - Hiroshi NAWATA *A Future Proposal: Our Livelihoods during the Oil Boom*. The Second Public Symposium of RIHN Ecohistory Program, Aug 22, 2010, The Museum of Kyoto. (in Japanese)
  - Buho HOSHINO, Abdelaziz KARAMALLA, Ruichen JIA, Hiroshi NAWATA, and Abdel Gabar BABIKER *Remote Sensing Method for Mesquite (Prosopis spp.) Control in Coastal Area of Red Sea*. 38th COSPAR Scientific Assembly of the Committee on Space Research, Jul 20, 2010, Bremen, Germany.

- Hiroshi NAWATA *Nature Conservation through Cooperative Work with Foreign Workers: About Herding Issue in and around the Nature Reserve of the Juniper Woodlands.* the 47th Annual Meeting, Japan Association for African Studies, May 30, 2010, Nara City Hall, Nara. (in Japanese)
- Hiroshi NAWATA *Traditional Natural Resource Use and Conservation of Juniper Woodlands in the Arabian Peninsula: A Case Analysis of Raydah Nature Reserve, Southwestern Saudi Arabia.* The 26th Annual Meeting, Japan Association for Middle East Studies, May 19, 2010, Chuo University, Hino-city, Tokyo. (in Japanese)
- Hiroshi NAWATA *Exploitation and Conservation of Middle East Tree Resources in the Oil Era.* the 26th Annual Meeting, Japan Association for Middle East Studies, May 09, 2010, Chuo University, Hino-city, Tokyo. (in Japanese)
- Hiroshi NAWATA *Islam and Nature Reserve Management: Rehabilitation of the Traditional Resource Management System Hima in the Arabian Peninsula.* The 19th Annual Meeting, Japan Association for Nilo-Ethiopian Studies, Apr 17, 2010, Meisei University, Hino-city, Tokyo. (in Japanese)

**[Poster Presentation]**

- Buho HOSHINO, Ruichen JIA, Hiroshi NAWATA, Abdelaziz KARAMALLA, Kiyotsugu YODA, and A.T. BABIKER *Retrieve the soil moisture from RADAR Backscattering co-efficient using ALOS/PALSAR polarization (HH/VV) data.* 38th COSPAR Scientific Assembly of the Committee on Space Research, Jul 18, 2010–Jul 25, 2010, Bremen, Germany.
- Buho HOSHINO, Abdelaziz KARAMALLA, Ruichen JIA, Hiroshi NAWATA, and A.T. BABIKER *Remote sensing method for mesquite (Prosopis spp.) control in coastal area of Red Sea.* 38th COSPAR Scientific Assembly of the Committee on Space Research, Jul 18, 2010–Jul 25, 2010, Bremen, Germany.

**[Invited Lecture / Honororary Lecture / Panelist]**

- Hiroshi NAWATA, Ren'ya SATO, Ruichin JIA, Buho HOSHINO, Ryota NAGASAWA, Kohei MATSUNAGA, Wehnui ZHANG, Guobin LIU, and Norikazu YAMANAKA *Traditional land use on the Loess Plateau (China) and the 'Grain-for-Grain' project research uniting the Humanities/Social Sciences and the Natural Sciences.* China-Japan Interdisciplinary Academic Salon for Young Scientists: Forestry Environment and Sustainable Development, Co-hosted by China Association for Science and Technology (CAST) and Japan Science and Technology (JST), Nov 03, 2010, Fuzhou, China.
- Hiroshi NAWATA *The Cultural Dimensions of Energy Sustainability.* "Workshop 3 Climate Change: A Focus on Energy Sustainability" Deutsch-Japanisches Wissenschafts- und Innovationsforum 2010, Oct 06, 2010, Roppongi Academy Hills 49.

## ONISHI, Masayuki

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Senior Project Researcher

**[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—**

### **[Books]**

#### *[Chapters/Sections]*

- Kazuya Inagaki, Nozomi Kodama, Masayuki Onishi, Toshiki Osada, Yoshinobu Takahashi, Hirofumi Teramura  
 Jul, 2010 § 1.1, § 2, § 3.1.1, § 3.1.4-9, § 3.1.11, all tables. Toshiki Osada, Masayuki Onishi (ed.)  
 Language Atlas of South Asia. RIHN, Kita-ku, Kyoto, Japan, pp. i-160.

### **[Research Presentations]**

#### *[Oral Presentation]*

- Masayuki Onishi Bougainville (Papua New Guinea): a struggle for keeping traditional languages and cultures alive in the globalising world. Chotro III, Sep 11, 2010-Sep 16, 2010, Delhi/Shimla, India.

## **SASAKI, Naoko**

Project Researcher

### **[Academic Career]**

Department of Forest and Biomaterials Science, Graduate School of Agriculture, Kyoto University, D. Course (2005)  
 Department of Bio-resources, Graduate School of Agriculture, Ehime University, M. Course (2001)  
 Faculty of Agriculture, Ehime University (1997)

### **[Professional Career]**

Visiting Fellow, The Australian National University (2009)  
 Project Research Fellow, Research Institute for Humanity and Nature (2006)  
 Technical Assistant, Research Institute for Humanity and Nature (2005)

### **[Higher Degrees]**

D. Agr. (Kyoto University, 2006)

M. Agr. (Ehime University, 2001)

**[Fields of Specialization]**

Vegetation History

Forest History

Palaeoecology

**[Academic Society Memberships]**

The Ecological Society of Japan

Japanese Association of Historical Botany

Palynological Society of Japan

American Quaternary Association

**—Achievements—**

**[Papers]**

*[Original Articles]*

- Sasaki, N., Yoshioka, T., Ogawa, A., Katsuyama, M., Hino, S. and Takahara, H. Jun, 2010 A 50-year vegetation reconstruction for the Lake Shumarinai watershed, Hokkaido, Japan based on Pb-210 and Cs-137 dating and pollen analysis. *Japanese Journal of Palynology* 56(1) :31-43. (in Japanese) (reviewed).

**SEO, Akihiro**

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Project Researcher

**Born in 1972.**

**[Academic Career]**

Department of Botany, Graduate School of Science, Kyoto University (2002)

Department of Biology, Graduate School of Science, Kagoshima University (1998)

Faculty of Science, Kagoshima University (1996)

**[Professional Career]**

Research Fellow, Research Institute for Humanity and Nature (2006)

Postdoctoral Scientist, Kyoto University (2002)

**[Higher Degrees]**

D.Sc (Kyoto University, 2002)

M.Sc (Kagoshima University, 1998)

**[Fields of Specialization]**

Plant Taxonomy

Biogeography

**[Academic Society Memberships]**

The Botanical Society of Japan

The Japanese Society for Plant Systematics

The Society for the Study of Species

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

- Iwasaki, T., A. Tono, K. Aoki, A. Seo, N. Murakami Apr, 2010 Phylogeography of *Carpinus japonica* Blume and *Carpinus tschonoskii* Maxim. growing in Japanese deciduous broad-leaved forests, based on chloroplast DNA variation.. *Acta Phytotaxonomica et Geobotanica* 61 :1-20. (reviewed).
- Tsujino, R., N. Fujita, M. Katayama, D. Kawase, K. Matsui, A. Seo, T. Shimamura, Y. Takemon, N. Tsujimura, T. Yumoto, A. Ushimaru 2010 Restoration of floating mat bog vegetation after eutrophication damages by improving water quality in a small pond. . *Limnology* 11 :289-297. (reviewed).
- Kawase, D., Y. Tsumura, N. Tomaru, A. Seo, and T. Yumoto 2010 Genetic structure of an endemic Japanese conifer, *Sciadopitys verticillata* (Sciadopityaceae), by using microsatellite markers.. *Journal of Heredity* 101 :292-297. (reviewed).
- Shinohara, W., Y. Ushio, A. Seo, N. Nakato, M. Kono, H. Kudoh, H. Tobe, and N. Murakami. 2010 Evidence for Hybrid Origin and Segmental Allopolyploidy in Eutetraploid and Aneutetraploid of *Lepisorus thunbergianus* (Polypodiaceae).. *Systematic Botany* 35 :20-29. (reviewed).

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

- A. Seo, N. Murakami, and T. Yumoto What kind of barrier prevent gene flow between southwestern and northeastern populations of wild plant and animal species in Japan?. East Asian Botany: International Symposium 2011., Mar 19, 2011–Mar 21, 2011, Tsukuba University, Tsukuba.
- A. Tono, A. Seo, T. Iwasaki, and N. Murakami. Genetic boundary observed in the component species of deciduous forests in Chugoku and Kinki regions (Japan).. East Asian Botany: International Symposium 2011., Mar 19, 2011–Mar 21, 2011, Tsukuba University, Tsukuba.
- D. Kawase, N. Tomaru, Y. Tsumura, A. Seo, and T. Yumoto Population genetic structure of endemic Japanese conifer, *Sciadopitys verticillata* (Sciadopityaceae).. East Asian Botany: International Symposium 2011., Mar 19, 2011–Mar 21, 2011, Tsukuba University, Tsukuba.

**TANIGUCHI, Makoto**

Professor

**Born in 1959.****[Academic Career]**

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

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

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

**[Professional Career]**

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

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

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

Department of Earth Sciences, Nara University of Education, Research Associate (1988 – 1990)

Division of Water Resources, CSIRO, Australia, Visiting Scientist (1987 – 1988)

**[Higher Degrees]**

D.Sc (The University of Tsukuba, 1987)

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

**[Fields of Specialization]**

Environmental dynamic analysis

Hydrology/Weather/Oceanic physics

**[Academic Society Memberships]**

American Geophysical Union

International Association of Hydrological Sciences

International Association of Hydrogeology

Japanese Association of Groundwater Hydrology

Japanese Association of Hydrological Science

Japan Society of Engineering Geology

The Japan Society of Hydrology and Water Resources

The Association of Japanese Geographers

The Japanese Society of Limnology

**[Awards]**

Award of 7th Japanese Association of Limnology (Yoshimura Prize, 2005)

Research award from the Association of Japanese Geographers (1987)

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

- Umetsu, C., Taniguchi, M., Watanabe, T., Yachi, S. 2010 Transdisciplinary Research in Watershed Conservation: Experience, Lessons, and Future Directions. J.A. Roummasset, K. Burnett, and A. M. Balisacan (ed.) Sustainability Science for Watershed Landscapes. Southeast Asian Regional Center for Graduate Study and Research in Agriculture. Institute of Southeast Asian Studies, Los Banos, Philippines, pp.77-102.

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

- Glesson, T., VanderSteen, J., Sophocleous, A. M., Taniguchi, M., Alley, Diana, W. M., Allen, M., Zhou, Y. Jun, 2010 Groundwater sustainability strategies. *Nature Geoscience* VOL 3 :378-379. (reviewed).
- Hosono, T., Chih-Chieh, Su., Okamura, K., Taniguchi, M. 2010 Historical record of heavy metal pollution deduced by lead isotope ratios in core sediments from the Osaka Bay, Japan. *Journal of Geochemical Exploration* 107 :1-8. (reviewed).
- Hosono, T., F. Siringan, T. Yamanaka, Y. Umezawa, S. Onodera, T. Nakano and M. Taniguchi 2010 Application of multi-isotope ratios to study the source and quality of urban groundwater in Metro Manila, Philippines. *Applied Geochemistry* 25 :900-909. (reviewed).

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

- Taniguchi, M. . Consortium formation meeting, Mar 01, 2011, Bangkok, Thailand.
- Taniguchi, M. . 3rd Feedback seminar from RIHN project C05, Feb 28, 2011, Bangkok, Thailand.
- Taniguchi, M. . 2nd Feedback seminar from RIHN project C05, Jan 06, 2011, Jakarta, Indonesia..

- Taniguchi, M. . American Geophysical Union, Dec 16, 2010, San Francisco, USA..
  - Taniguchi, M. . UNESCO-IHP Training Course " Discussion" , Nov 19, 2010, Nagoya University, Nagoya.
  - Taniguchi, M. . UNESCO-GRAPHIC Expert Meeting, Nov 15, 2010, RIHN, Kyoto.
  - Taniguchi, M. . UNESCO - IHP Training Course "Global groundwater problems and adaptation to the changing climate and society", Nov 08, 2010, Nagoya University, Nagoya.
  - Taniguchi, M. . 1st Feedback seminar from RIHN project C05, Nov 03, 2010, University of Philippines, Manila, Philippines.
  - Taniguchi, M. . World Water Week, Sep 07, 2010, Stockholm, Sweden.
  - Taniguchi, M. . American Society of Limnology and Oceanography, Jun 07, 2010, Santa Fe, USA.
  - Taniguchi, M. Human impacts on urban subsurface environment. JpGU, May 23, 2010, Makuhari, Chiba.
  - Taniguchi, M. . Symposium on Water in Middle East " Religion and groundwater" , May 06, 2010, Waseda University, Tokyo.
  - Taniguchi, M. . European Geoscience Union, May 05, 2010, Vienna, Austria.
- [Poster Presentation]*
- Taniguchi, M. . American Geophysical Union, Dec 16, 2010, San Francisco, USA.
- [Invited Lecture / Honorary Lecture / Panelist]*
- Taniguchi, M. Is submarine groundwater important pathway for water and material transports?. Symposium on Coastal Water Resources , Oct 22, 2010, Pusan University, Pusan.

## TSUJINO, Riyou

Senior Project Researcher

**Born in 1976.**

### **[Higher Degrees]**

D.Sc (Kyoto University, 2006)

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

Forest Ecology

Plant-Animal Interaction Ecology

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

Ecological Society of Japan

Mammalogical Society of Japan

Mycological Society of Japan

## **—Achievements—**

### **[Papers]**

#### *[Original Articles]*

- Tsujino R, Ishimaru E, Yumoto T Sep, 2010 Distribution patterns of five mammals in the Jomon period, middle Edo period, and the present, in the Japanese Archipelago. *Mammal Study* 35 :179-189. (reviewed).
- Tsujino R, Fujita N, Katayama M, Kawase D, Matsui K, Seo A, Shimamura T, Yasuhiro Takemon Y, Tsujimura N, Yumoto T, Ushimaru A 2010 Restoration of floating mat bog vegetation after eutrophication damages by improving water quality in a small pond. *Limnology* 11 :289-297. DOI:10.1007/s10201-010-0312-6.

(reviewed).

## UCHIYAMA, Junzo

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Associate Professor

### **Born in 1967.**

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

Graduate School of Human and Environmental Studies, Kyoto University, D. Course (1997)

Department of Archaeology, Durham University, M.A. Course (1996)

Graduate School of Human and Environmental Studies, Kyoto University, M. Course (1993)

Department of Archaeology, Faculty of Literature, The University of Tokyo, B.A. Course (1991)

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

Associate Professor, Research Institute for Human and Nature (2003)

Associate Professor, Faculty of Humanities, University of Toyama (2001)

Lecturer, Faculty of Humanities, University of Toyama (1998)

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

Ph.D. (The Graduate University for Advanced Studies, 2002)

M.A. (Environmental Archaeology) (with distinction, Durham University, 1996)

M.A. (Human-environmental Studies) (Kyoto University, 1993)

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

Prehistoric Anthropology

Zooarchaeology

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

The Society of Bio-Sophia Studies

### **—Achievements—**

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

*[Invited Lecture / Honororary Lecture / Panelist]*

- UCHIYAMA, Junzo Understanding Neloithisation of East Asian Inland Seas. Guest lecture at Tallinn University, Oct 21, 2010, Tallinn, Estonia.

## UMETSU, Chieko

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Associate Professor

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

Ph.D. (Agricultural and Resource Economics, University of Hawaii at Manoa, Honolulu Hawaii USA 1995),

M.A. (International Relations, International University of Japan, Niigata, Japan, 1989)

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

Science & Math Teacher(0 level), Kiriani High School, Meru, Kenya, Japan Overseas Cooperation Volunteers, JICA. (1979)

Training Co-ordinator, Tohoku Branch Office, Japan International Cooperation Agency (JICA) (1982)

Visiting Fellow, Program on Environment, East-West Center, Honolulu, Hawaii. U.S.A. (1995)

Assistant Professor, The Graduate School of Science and Technology, Kobe University, Japan (1997)

Visiting Scholar, Environmental Studies, Research Program, East-West Center, Honolulu, Hawaii, U.S.A. (2001)

Associate Professor, Research Institute for Humanity and Nature, Inter-University Research Institute Corporation, National Institutes for the Humanities, Kyoto, Japan (2002)

### **[Higher Degrees]**

Ph.D. (University of Hawaii, 1995)

M.A. (International University of Japan, 1989)

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

Environmental and Resource Economics

Development Economics

Agricultural and Rural Development

Applied Microeconomics

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

International Association of Agricultural Economists,

American Agricultural Economics Association (AAEA),

International Society for Ecological Economics (ISEE),

Agricultural Economics Society of Japan (AESJ), 1998-2009.

Society for Environmental Economics and Policy Studies (SEEPS),

Japan Society for International Development (JASID),

Japanese Society of Irrigation, Drainage and Rural Engineering (JSIDRE)

### **[Awards]**

IAAE-JB Research Award (2001)

Best Article Award from the Agricultural Economics Society of Japan (2003)

## **—Achievements—**

### **[Books]**

#### *[Chapters/Sections]*

- Umetsu, Chieko Oct, 2010 “Resilience: A way to consider how to respond to environmental variability” . Research Institute for Humanity and Nature (ed.) The RIHN Encyclopedia of Global Environmental Studies. Kobundo, Tokyo, pp.556-557. (in Japanese)
- Umetsu, Chieko Oct, 2010 “Poverty and food security: towards empowerment of individuals and households” . Research Institute for Humanity and Nature (ed.) The RIHN Encyclopedia of Global Environmental Studies. Kobundo, Tokyo, pp.280-281. (in Japanese)
- Umetsu, Chieko, Makoto Taniguchi, Tsugihiko Watanabe, Shigeo Yachi, May, 2010 “Transdisciplinary Research in Watershed Conservation: Experiences, Lessons, and Future Directions” . J. A. Roumasset, K. Burnett, and A.M. Balisacan (ed.) Sustainability Science for Watershed Landscapes. Institute of Southeast Asian Studies, Singapore, pp.77-102. ISBN: 978-981-4279-60-4

### **[Papers]**

#### *[Original Articles]*

- Kume, Takashi, Chieko Umetsu, K. Palanisami Apr, 2010 “Examination of Recovery from Salinization of Agricultural Area in Tamil Nadu State, India due to the December 2004 Tsunami”. *Transactions of the Japanese Society of Irrigation Drainage and Rural Engineering* 78(2) :83-88. (in Japanese) (reviewed).

### [Research Presentations]

#### [Oral Presentation]

- Umetsu, Chieko, Thamana Lekprichakul, K.Palanisami, M. Shanthasheela, Takashi Kume “Resilience of Tsunami Affected Farm Households in Coastal Region of Tamil Nadu, India”. Resilience2011 Meeting, Mar 12, 2011-Mar 16, 2011, Arizona State University, Tempe, U.S.A..
- Umetsu, Chieko “Resilience of farm households in Semi-Arid Tropics in Africa” Organized session “Resilience of Social-Ecological Systems and Poverty Reduction”. Japan Society for International Development (JASID) 21st Annual Meeting, Dec 04, 2010-Dec 05, 2010, Waseda University, Tokyo. (in Japanese)
- Umetsu, Chieko, Thamana Lekprichakul, K.Palanisami, M. Shanthasheela, Takashi Kume “Resilience of Tsunami Affected Households in Coastal Region of Tamil Nadu, India”. The 2010 Meeting of the Society of Environmental Economics and Policy Studies, Sep 11, 2010-Sep 12, 2010, Nagoya University, Nagoya. (in Japanese) Proceedings, pp.224-225..

#### [Invited Lecture / Honorary Lecture / Panelist]

- Organized Session: “Resilience of Social-Ecological Systems and Poverty Reduction”. Japan Society for International Development (JASID) 21st Annual Meeting, Dec 04, 2010-Dec 05, 2010, Waseda University, Tokyo. .

## UYAR Aysun

Assistant Professor

### Born in 1980.

#### [Academic Career]

Department of International Relations, Faculty of Economics and Administrative Sciences, Middle East Technical University, Ankara, Turkey (2001)

Institute of Social Sciences, Middle East Technical University, Ankara, Turkey (2004)

Graduate School of East Asian Studies, Yamaguchi University, Yamaguchi, Japan (2008)

#### [Professional Career]

Research assistant, Department of International Relations, Faculty of Economics and Administrative Sciences, Hacettepe University, Ankara, Turkey (2001-2005)

Project assistant, Graduate School of East Asian Studies, Yamaguchi University, Japan (2005-2008)

Post-doc research fellow, Afrasian Centre for Peace and Development Studies, Ryukoku University, Kyoto, Japan (2008-2010)

Part-time lecturer, Faculty of Intercultural Communication, Ryukoku University (2009-)

Part-time lecturer, Faculty of Social Studies, Doshisha University (2010-)

Part-time lecturer, Institute for International Education, Doshisha University (2011-)

#### [Higher Degrees]

Ph. D. (Yamaguchi University, 2008)

M.Sc. (Middle East Technical University, 2004)

#### [Fields of Specialization]

International Relations

International Political Economy

**[Academic Society Memberships]**

International Studies Association (ISA)

The Japan Association of International Relations (JAIR)

Japan Association for Asian Studies (JAAS)

European Association for Japanese Studies (EAJS)

Association for the Study of Political Society (ASPOS)

Japan-Turkey Friendship Association

**[Awards]**

The First Prize (Paper Contest), Institute for International Monetary Affairs (2005)

Yamaguchi University President Award (2008)

**—Achievements—**

**[Research Presentations]**

*[Oral Presentation]*

- Aysun Uyar Considering Environment Assertion of Preferential Trade Agreements in East Asia. ISA-International Studies Association Convention, Mar 16, 2011–Mar 19, 2011, Montreal, Canada.
- Aysun Uyar Environment Aspect of Free Trade Agreements in East Asia: Any Hope for Potential China–Japan–Korea Free Trade Agreement?. International Conference on Social Sciences, Oct 08, 2010–Oct 09, 2010, Izmir, Turkey.
- Aysun Uyar Women Researchers in Japan`s Integrated Environmental Studies. International Symposim on Women`s Education in Turkey and Japan for Social Development, Oct 06, 2010–Oct 07, 2010, Canakkale, Turkey.
- Aysun Uyar Regional Trade Agreements in East Asia: Searching for New Regional Mechanisms for Environmental Issues. Seventh Pan-European Conference on International Relations, Sep 09, 2010–Sep 11, 2010, Stockholm, Sweden.

*[Invited Lecture / Honoronary Lecture / Panelist]*

- (Media appearance) News-Haberler. BBC Turkish Radio, Mar 11, 2011, . (in Turkish)
- (MC) The Earth Forum Kyoto. Research Institute for Humanity and Nature, Feb 12, 2011, Kyoto, Japan. (in Japanese)
- (Participant) Research Institute for Humanity and Nature. SIWI-World Water Week, Sep 05, 2010–Sep 11, 2010, Stockholm, Sweden.
- (MC) The 1st RIHN Kids Seminar. Research Institute for Humanity and Nature, Aug 23, 2010, Kyoto, Japan. (in Japanese)

**WATANABE, Mitsuko**

Project Researcher

**Born in 1977.**

**[Academic Career]**

School of Integrated Sciences, Graduate School of Humanities and Sciences, Nara Women`s University, D.

Course (2005)

Department of International Studies for History, Sociology and Geography, Graduate School of Humanities and Sciences, Nara Women's University, M. Course (2002)

Faculty of Letter, Nara Women's University (2000)

### **[Professional Career]**

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

Technical Assistant, Research Institute for Humanity and Nature (2005)

Postdoctoral Research Fellow, Graduate School of Humanities and Sciences, Nara Women's University (2005)

Research Assistant, Nara Women's University, 21st century COE Program (2004)

Research Assistant, Graduate School of Humanities and Sciences, Nara Women's University (2002)

### **[Higher Degrees]**

D.Sc. (Nara Women's University, 2005)

M.Litt. (Nara Women's University, 2002)

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

Physical geography

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

Association of Japanese Geographers

Japan Association for Quaternary Research

Japanese Association for Arid Land Studies

Japanese Geomorphological Union

### **[Awards]**

Best poster Award(The Japanese Association for Arid Land Studies, Spring meeting 2010)

## **—Achievements—**

### **[Editing]**

*[Editing / Co-editing]*

- Mitsuko Watanabe and Jumpei Kubota (ed.) Aug, 2010 Reconceptualizing Cultural and Environmental Change in Central Asia: An Historical Perspective on the Future. Ili Project, Research Institute for Humanity and Nature, Kyoto, Kita-ku, 215pp.

### **[Papers]**

*[Original Articles]*

- M. Watanabe, Y. Konagaya, T. Akiyama and J. Kubota Aug, 2010 Socialist Modernization and Landscape Change in the Middle Reach of the Ili River, Republic of Kazakhstan. Mitsuko Watanabe and Jumpei Kubota (ed.) Reconceptualizing Cultural and Environmental Change in Central Asia: An Historical Perspective on the Future. Ili Project, Research Institute for Humanity and Nature, Kyoto, Kita-ku, pp. 205-215.

### **[Research Presentations]**

*[Oral Presentation]*

- Mitsuko WATANABE (RIHN), Tomoko NAKAMURA (Tohoku Univ.), Olzhas ABDESHOV (Graduate Student of Tokai Univ.) Agricultural development and regional specialization in Kazakhstan during the Soviet era: A case study of the kolkhoz named '40th anniversary of the October Revolution' in Panfilov District, Almaty Province.. The Study Meeting of the Association of Japanese Geographers, Spring 2010, Mar 29, 2011-Mar 30, 2011, Meiji Univ., Tokyo, Chiyoda-ku.. (in Japanese)

*[Poster Presentation]*

- Mitsuko Watanabe, Yuki Konagaya, Tomohiro Akiyama, Jumpei Kubota Historical change of the natural resource use in the semi-arid region in Central Eurasia during the last 100years: A case study of the Ili River basin, Kazakhstan.. The Japanese Association for Arid Land Studies Annual meeting 2010, May 29, 2010–May 30, 2010, GE Collage hall, IDEA Consultants, Inc. Tokyo.. (in Japanese)
- Mituko WATANABE Historical changes of the pasturage and the natural resource use in Almaty Region, Republic of Kazakhstan. Japan Geoscience Union Meeting 2010, May 23, 2010–May 28, 2010, Makuhari Messe International Conference Hall, Chiba City.. (in Japanese)

**WATANABE, Tsugihiro**

Professor

**Born in 1953.****[Academic Career]**

Department of Agricultural Engineering, Graduate School of Agriculture, Kyoto University, D. Course (1983)

Department of Agricultural Engineering, Graduate School of Agriculture, Kyoto University, M. Course (1979)

Department of Agricultural Engineering, Faculty of Agriculture, Kyoto University (1977)

**[Professional Career]**

Professor, Research Institute for Humanity and Nature (2003)

Associate Professor, Research Institute for Humanity and Nature (2001)

Associate Professor, Arid Land Research Center, Tottori University (2001)

Associate Professor, College of Agriculture and Bioscience, Osaka Prefecture University (1995)

Associate Professor, Faculty of Agriculture, Kyoto University (1989)

Research Assistant, Faculty of Agriculture, Kyoto University (1984)

Research Fellow, Japan Society for Promotion of Science (1983)

**[Higher Degrees]**

D. Agr. (Kyoto University, 1989)

M. Sc. (Kyoto University, 1979)

**[Fields of Specialization]**

Irrigation and Drainage Engineering

**[Academic Society Memberships]**

Japanese Society of Irrigation Drainage and Reclamation Engineering

Japan Society of Hydrology and Water Resources

Japanese Association for Water Resources and Environment

Japan Society of Civil Engineers

The Japanese Society for Arid Land Studies

International Commission on Irrigation and Drainage

International Water Resources Association

The Association of Rural Planning

## —Achievements—

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

- Tsugihiko Watanabe Mar, 2011 Local Wisdom of Land and Water Management: The Fundamental Anthroscape of Japan. Selim Kapur, Hari Eswaran, W.E.H. Blum (ed.) Sustainable Land Management. Springer, pp.351-362. DOI:10.1007/978-3-642-14782-1\_16.
- Tsugihiko WATANABE Aug, 2010 . The Japanese Society of Irrigation, Drainage and Rural Engineering Handbook Revised Edition No. 7. , pp.766-769.
- Tsugihiko WATANABE Aug, 2010 . The Japanese Society of Irrigation, Drainage and Rural Engineering Handbook Revised Edition No. 7. , pp.771-772.
- Chieko Umetsu, Makoto Taniguchi, Tsugihiko Watanabe, and Shigeo Yachi Apr, 2010 TRANSDISCIPLINARY RESERACH IN WATERSHED CONSERVATION: EXPERIENCES, LESSONS, AND FUTURE DIRECTIONS. JAMES A. ROUMASSET, KIMBERLY M. BURNETT, ARSENIO M. BALISACAN (ed.) SUSTAINABILITY SCIENCE FOR WATERSHED LANDSCAPES. ISEAS PUBLISHING, INSTITUTE OF SOUTHEAST ASIAN STUDIES, 30 HENG MUI KENG TERRACE, PASIR PANJANG, SINGAPORE 119614, pp.77-102.
- Dawen YANG • Kyoichi OTSUKI • Tetsuo KOBAYASHI • Daisuke YASUTAKE • Hiroyuki CHO • Masaharu KITANO • Makito MORI • Tsugihiko WATANABE • Kuniyoshi TAKEUCHI • Hiroshi ISHIDAIRA and Changrong YAN 2010 Water Resources and Use. Tetsuya KUSUDA (ed.) The Yellow River:Water and Life. World Scientific, pp.25-72.
- Tsugihiko WATANABE 2010 Irrigation as "Wisdom on land and Water Management". Tomoya AKIMICHI et al. (ed.) Water and Life . Bensei-shuppan, pp.107-134.

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

- Tsugihiko WATANABE Mar, 2011 Migratory birds fly into paddy fields -connecting fields to the earth. *SEEDer* 4 :35-43. (in Japanese)
- Takashi KUME • Erhan AKCA • Takanori NAGANO • Selim KAPUR • Tsugihiko WATANABE 2010 Seasonal Changes of Fertilizer Impacts on Agricultural Drainage in a Salinized Area in Adana, Turkey. *Science of the Total Environment* :3319-3326.
- Tsugihiko WATANABE 2010 Trend and Tasks of Global Change Studies in Irrigation, Drainage and Rural Engineering. *Journal of the Japanese Society of Irrigation, Drainage and Rural Engineering* 78(1) :3-7.

**[Research Presentations]***[Invited Lecture / Honoronary Lecture / Panelist]*

- Tsugihiko WATANABE Impacts of Climate Change and Adaptation Strategy in Irrigation Management. ISAP2010 (International Forum for Sustainable Asia and the Pacific), Jul 13, 2010, Kanagawa, Japan.

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**YAMAMOTO, Keiko**

Project Researcher

**Born in 1974.**

—Achievements—

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

- Yamamoto, K., Fukuda, Y., Nakaegawa, T., Hasegawa, T. Terrestrial Water Storage Change Observed by GRACE (Bangkok). RIHN Feedback Seminar, Feb 28, 2011, Bangkok, Thailand.
- Hasegawa, T., Fukuda, Y., Yamamoto, K., Nakaegawa, T., Tamura, Y., McQueen, H. Long-term trends of terrestrial water storage in south-east Australia revealed by GRACE and superconducting gravimeter. EGU General Assembly 2010, May 02, 2010–May 07, 2010, Vienna, Austria.

*[Poster Presentation]*

- Yamamoto, K., Fukuda, Y., Nakaegawa, T., Hasegawa, T., Taniguchi, M. Interpretation of the Mass Trend Change over the Indochina Peninsula Observed by GRACE. 2010 AGU Fall Meeting, Dec 13, 2010–Dec 17, 2010, San Francisco, USA.
- Yamamoto, K., Nakaegawa, T., Fukuda, Y., Taniguchi, M. Interpretation of interannual mass change over the Bangkok area observed by GRACE. 2nd Hydrology delivers Earth System Science to Society Joint meeting for GSWP/GLASS AsiaFlux/FLUXNET LandFlux-EVAL, Jun 22, 2010–Jun 25, 2010, Tokyo, Japan.
- Yamamoto, K., Fukuda, Y., Nakaegawa, T., Hasegawa, T., Taniguchi, M. Interannual mass variation over Chao Phraya river basin observed by GRACE. EGU General Assembly 2010, May 02, 2010–May 07, 2010, Vienna, Austria.

**YAMAMURA, Norio**

Professor

**Born in 1947.****[Academic Career]**

Faculty of Science, Kyoto University, B. Course (Graduated, 1969)

Graduate School of Science, Kyoto University, M. Course (Graduated, 1971)

Graduate School of Science, Kyoto University, D. Course (Accomplished credits for doctoral program, 1975)

**[Professional Career]**

Associate Professor, Saga Medical School, Faculty of Medicine, Saga University (1978)

Professor, Saga Medical School, Faculty of Medicine, Saga University (1995)

Professor, Center for Ecological Research, Kyoto University (1996)

Professor, Research Institute for Humanity and Nature (2007)

**[Higher Degrees]**

D.Sc (Kyoto University, 1977)

M.Sc. (Kyoto University, 1971)

**[Fields of Specialization]**

Mathematical Ecology

Evolutionary biology

**[Academic Society Memberships]**

Ecological Society of Japan

The Society of Population Ecology

Society of Evolutionary Studies Japan

Japanese Society for Mathematical Biology

International Union for the Study of Social Insects  
Japan Ethological Society

### [Awards]

Ecological Society of Japan Award (2007)

### —Achievements—

#### [Papers]

##### [Original Articles]

- Nakazawa, T., Sakai, Y., Hsieh, C., Koitabashi, T., Tayasu, I., Yamamura, N. and Okuda, N. 2010 Is The Relationship Between Body Size and Trophic Niche Position Time-Invariant in a Predatory Fish? First Stable Isotope Evidence. . *PLoS ONE* (5: e9120.). (reviewed).
- Saizen, I., Maekawa, A. and Yamamura, N 2010 Spatial analysis of time-series changes in livestock distribution by detection of local spatial associations in Mongolia.. *Applied Geography* .
- Hironaga, R. and Yamamura, N. 2010 Effects of extinction on food web structures on an evolutionary time scale. . *Journal of Theoretical Biology* 263 :161-168. (reviewed).

## 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—

### [Papers]

#### [Original Articles]

- K. Kamiguchi, O. Arakawa, A. Kitoh, A. Yatagai, A. Hamada, N. Yasutomi May, 2010 Development of APHRO\_JP, the first Japanese high-resolution daily precipitation product for more than 100 years. *Hydrological Research Letters* 4 :60-64. (reviewed).

### [Research Presentations]

#### [Oral Presentation]

- N. Yasutomi, A. Yatagai, H. Hamada, K. Kamiguchi, O. Arakawa Changes in the seasonal march of East summer Asian summer monsoon rainfall analysed in a 57-year highly resolved daily precipitation dataset. Western Pacific Geophysics Meeting, Jun 22, 2010–Jun 25, 2010, Taipei, Taiwan.
- N. Yasutomi, K. Kamiguchi, O. Arakawa, A. Hamada, A. Yatagai Changes in the seasonal march of the East Asian summer monsoon rainfall analysed in highly resolved daily gridded data. Japan Geoscience Union Meeting, May 23, 2010–May 28, 2010, Chiba, Japan.

## YATAGAI, Akiyo

Assistant Professor

### Born in 1968.

### [Academic Career]

Department of Geoscience, University of Tsukuba, D. Course (1996)

Department of Geoscience, University of Tsukuba, M. Course (1992)

Department of Natural Sciences, 1st cluster of colleges, University of Tsukuba (1990)

### [Professional Career]

Assistant Professor, Research Institute for Humanity and Nature (RIHN) (2002) – present

Lecturer (temporary), Meiji University (2003) – present

COE Research Fellow, Disaster Prevention Research Institute, Kyoto University (2001)

Research Fellow, National Space Development Agency of Japan/Earth Observation Research Center (NASDA/EORC) (1995)

### [Higher Degrees]

Ph. D (Science) (University of Tsukuba, 1996)

M. Sc. (University of Tsukuba, 1992)

### [Fields of Specialization]

Atmospheric science

Climatology

Hydrology

Satellite Remote Sensing

Geography

**[Academic Society Memberships]**

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

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

- A. Yatagai 2010 Meteorological Observation Launched at Domkar, Ladakh. *Himalayan Study Monographs* 11. (reviewed). (in press).

**YUMOTO, Takakazu**

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Professor

**Born in 1959.****[Academic Career]**

Faculty of Science, Kyoto University (1982),  
 Department of Botany, Graduate School of Science, Kyoto University, M. Course (1984),  
 Department of Botany, Graduate School of Science, Kyoto University, D. Course (1987)

**[Professional Career]**

Research Fellow, Japan Society for the Promotion of Science (1987),  
 Assistant Professor, College for Liberal Arts, Kobe University (1989),  
 Lecturer, College for Liberal Arts, Kobe University (1992),  
 Lecturer, Faculty of Science, Kobe University (1992),  
 Associate Professor, Center for Ecological Research, Kyoto University (1994),  
 Professor, Research Institute for Humanity and Nature (2003)

**[Higher Degrees]**

D. Sc (Kyoto University, 1987)  
 M.Sc (Kyoto University, 1984)

**[Fields of Specialization]**

Ecology

**[Academic Society Memberships]**

The Ecological Society of Japan,  
 The Botanical Society of Japan,  
 The Japan Society of Tropical Ecology,  
 Japan Society for African Studies,  
 The Society for the Study of Plant Species,  
 Japanese Association of Historical Botany,  
 Wildlife Conservation Society

## —Achievements—

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

- Yumoto, T. & Osumi, K. Mar, 2011 From forests to woods, and villages. Yumoto, T. (ed.) *Environmental History of Villages and Woods. 35,000 Years of the Japanese Archipelago: An Environmental History between Humanity and Nature*, 3. Bun-ichi Sogo Shuppan, Shinjuku-ku, Tokyo, pp.11-16. (in Japanese)
- Osumi, K. & Yumoto, T. Mar, 2011 Sustainable use and its collapse on forest resources. Yumoto, T. (ed.) *Environmental History of Villages and Woods. 35,000 Years of the Japanese Archipelago: An Environmental History between Humanity and Nature*, 3. Bun-ichi Sogo Shuppan, Shinjuku-ku, Tokyo, pp.249-264. (in Japanese)
- Yumoto, T. Feb, 2011 Why the Japanese Archipelago is one of biodiversity hotspots?. Yumoto, T. (ed.) *What is Environmental History?. 35,000 Years of the Japanese Archipelago: An Environmental History between Humanity and Nature*, 1. Bun-ichi Sogo Shuppan, Shinjuku-ku, Tokyo, pp.21-32. (in Japanese)
- Yumoto, T. Feb, 2011 "Wise use" and layered governance in the Japanese Archipelago. Yumoto, T. (ed.) *What is Environmental History. 35,000 Years of the Japanese Archipelago: An Environmental History between Humanity and Nature*, 1. Bun-ichi Sogo Shuppan, Shinjuku-ku, Tokyo, pp.11-20. (in Japanese)

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

- Yumoto, T. (ed.) Mar, 2011 *Environmental History of Villages and Woods. 35,000 Years of the Japanese Archipelago: An Environmental History between Humanity and Nature*, 3. Bun-ichi Sogo Shuppan, Shinjuku-ku, Tokyo, 284pp. (in Japanese)
- Yumoto, T. & Suka, T. (ed.) Mar, 2011 *Grasslands of Shinshu: Their History*. Hozuki Shoseki, Nagano, 175pp. (in Japanese)
- Yumoto, T. (ed.) Mar, 2011 *Environmental History of Mountains and Forests. 35,000 Years of the Japanese Archipelago: An Environmental History between Humanity and Nature*, 5. Bun-ichi Sogo Shuppan, Shinjuku-ku, Tokyo, 381pp. (in Japanese)
- Yumoto, T. (ed.) Mar, 2011 *Environmental History of Islands, Sea and Forests. 35,000 Years of the Japanese Archipelago: An Environmental History between Humanity and Nature*, 4. Bun-ichi Sogo Shuppan, Shinjuku-ku, Tokyo, 351pp. (in Japanese)
- Yumoto, T. (ed.) Mar, 2011 *Environmental History of Grasslands and Pasture. 35,000 Years of the Japanese Archipelago: An Environmental History between Humanity and Nature*, 2. Bun-ichi Sogo Shuppan, Shinjuku-ku, Tokyo, 333pp. (in Japanese)
- Yumoto, T. (ed.) Feb, 2011 *What is Environmental History ?. 35,000 Years of the Japanese Archipelago: An Environmental History between Humanity and Nature*, 1. Bun-ichi Sogo Shuppan, Shinjuku-ku, Tokyo, 310pp. (in Japanese)

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

- Kawase, D., Yumoto, T. & Sato, K. 2010 Phylogeography of serpentine rare plants *Arenaria katoana* (Caryophyllaceae). *Acta Phytotaxonomica et Geobotanica* 60 :19-25. (reviewed).
- Yumoto, T. 2010 Trans-disciplinary study on the dynamic process of semi-natural grasslands. *Japanese Journal of Grassland* 56 :220-224. (in Japanese) (reviewed).
- Kusaka, S., Hyodo, F., Yumoto, T. & Nakatsukasa, M. 2010 Carbon and nitrogen analysis on the diet of Jomon populations from two coastal regions of Japan. *Journal of Archaeological Science* 37 :1968-1977. (reviewed).

- Kawase, D., Tsumura, Y., Tomaru, N., Seo, A. & Yumoto, T. 2010 Genetic structure of an endemic Japanese conifer, *Sciadopitys verticillata* (Sciadopityaceae), by using microsatellite markers. *Journal of Heredity* 101 :292-297. (reviewed).
- Kawase, D., Hayashi, K., Takeuchi, Y. & Yumoto, T. 2010 Population genetic structure of *Lilium japonicum* and serpentine plant *Lilium japonicum* var. *abeanum* by using developed microsatellite DNA polymorphism marker. *Plant Biosystems* 144 :29-37. (reviewed).
- Tsujino, R., Fujita, N., Katayama, M., Kawase, D., Matsui, K., Seo, A., Shimamura, T., Takemon, Y., Tsujimura, N., Yumoto, T. & Ushimaru, A. 2010 Restoration of floating mat bog vegetation after eutrophication damages by improving water quality in a small pond. *Limnology* 11 :289-297. (reviewed).
- Tsujino, R., Ishimaru, E., & Yumoto, T. 2010 Distribution patterns of five mammals in the Jomon period, middle Edo period, and the present, in the Japanese Archipelago. *Mammal Study* 35 :179-189. (reviewed).
- Yumoto, T. 2010 Why the Japanese Archipelago is one of biodiversity hotspots?. *Seibutsukagaku* 61(2) :117-125. (in Japanese) (reviewed).

## [Research Presentations]

### [Oral Presentation]

- Yumoto, T. Lessons from environmental history in the Japanese Archipelago. Convention of Biodiversity: Harmony between Utilization and Conservation, Feb 26, 2011, Chiyoda-ku, Tokyo. (in Japanese)
- Yumoto, T. Satoyama landscape and its implication for biodiversity conservation. The Third International Conference on Forest Related Traditional Knowledge and Culture in Asia, Dec 14, 2010-Dec 15, 2010, Kanazawa.
- Yumoto, T. & Matsuda, H. Ecosystem management at community initiative in Biosphere Reserves in Japan. 5th EAFES Conference, Sep 14, 2010-Sep 17, 2010, Sanju, Korea.
- Yumoto, T. History of Satoyama Japan and its implication in the modern environmental issues. 5th EAFES Conference, Sep 12, 2010-Sep 17, 2010, Sanju, Korea.
- Yumoto, T. Satoyama concept: The case of bio-cultural landscape in the Japanese Archipelago. International Conference on Biological and Cultural Diversity for Development, Jun 08, 2010-Jun 10, 2010, Montreal, Canada.
- Yumoto, T. Human-nature interaction and climate in the Japanese Archipelago. PAGES Regional Conference, Jun 05, 2010-Jun 06, 2010, Nagoya.
- Yumoto, T. Ecosystem service provided by Satoyama and culture. URBI0: 2nd International Conference of Urban Biodiversity and Design, May 18, 2010-May 22, 2010, Nagoya.

### [Invited Lecture / Honorary Lecture / Panelist]

- Yumoto, T. . COP10 satellite meeting "A joint programme of work on biological and cultural diversity", Oct 25, 2010, Nagoya.
- Yumoto, T. Historical changes of ecosystem services provided by Satoyama. Meeting of Environmental Sociology "Satoyama Reflections", Oct 24, 2010, Tokyo. (in Japanese)
- Yumoto, T. Forests as a global environmental issue. COP10 Forum: A Dialogue between Society and Academic Community, Sep 04, 2010-Sep 05, 2010, Nagoya. (in Japanese)

ZHAO Tianbao

Visiting Resercher

**Born in 1976.**

**[Academic Career]**

Climatology, Institute of Atmospheric Physics(IAP), Chinese Academy of Sciences(CAS), Ph.D. (2006)

Agricultural meteorology, Nanjing Institute of Meteorology(2000)

**[Higher Degrees]**

Ph.D. (Institute of Atmospheric Physics(IAP), Chinese Academy of Sciences(CAS), 2006)

B.S. (Nanjing Institute of Meteorology, 2000)

**[Fields of Specialization]**

Climatology

**—Achievements—**

**[Research Presentations]**

*[Poster Presentation]*

- Tianbao Zhao, Akiyo Yatagai, Ailikun Evaluation of Reanalysis and TRMM Products Using a New Gauge-Based Analysis of Daily Precipitation over China. Japan Geoscience Union Meeting 2010, May 23, 2010–May 28, 2010, Chiba.



**Appendix1 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-05 (FR5)	Human Impacts on Urban Subsurface Environments	79	4	38	2	10	0	10	0	0	15
C-06 (FR4)	Effects of Environmental Change on the Interactions between Pathogens and Humans	50	11	19	0	3	0	2	2	0	13
C-07 (FR2)	Global Warming and the Human-Nature Dimension in Siberia : Social Adaptation to the Changes of the Terrestrial Ecosystem, with an Emphasis on Water Environments	58	9	26	0	1	1	5	2	0	14
C-08 (FR1)	Megacities and the Global Environment	33	6	15	0	5	0	0	2	0	5
D-02 (FR5)	A New Cultural and Historical Exploration into Human-Nature Relationships in the Japanese Archipelago	128	8	45	10	32	3	16	10	4	0
D-03 (FR3)	Human Life, Aging, and Disease in High-Altitude Environments: Physio-Medical, Ecological and Cultural Adaptation in "Highland Civilizations"	46	5	25	2	5	0	2	2	3	2
D-04 (FR3)	Collapse and Restoration of Ecosystem Networks with Human Activity	78	9	49	1	6	1	5	1	0	6
R-03 (FR4)	Historical Interactions between Multi-Cultural Societies and the Natural Environment in a Semi-Arid Region in Central Eurasia	105	7	49	6	21	5	1	1	3	12
R-04 (FR3)	Environmental Changes and Infectious Disease in Tropical Asia	82	11	31	2	8	1	3	1	1	24
R-05 (FR2)	A Study of Human Subsistence Ecosystems in Arab Societies: To Combat Livelihood Degradation for the Post-oil Era	98	9	15	1	9	1	4	4	8	47
H-02 (FR5)	Agriculture and Environment Interactions in Eurasia: Past, Present and Future —A ten-thousand-year history	97	13	28	2	11	5	13	7	5	13
H-03 (FR4)	Environmental Change and the Indus Civilization	59	11	24	2	4	4	1	1	0	12
H-04 (FR4)	Neolithisation and Modernisation: Landscape History on East Asian Inland Seas	66	11	7	3	13	4	6	1	0	21
E-04 (FR4)	Vulnerability and Resilience of Social-Ecological Systems	37	5	19	0	2	0	2	1	1	7
PR (KADA)	Managing Environmental Risks to Food and Health Security in Asian Watersheds	20	4	7	1	0	0	1	0	0	7
FS (ISHIKAWA)	Coastal Area Capability in Southeast Asia	39	1	30	0	6	0	1	0	0	1

Project Number	Title of the project	Total	RIHN	University / College			Inter-University Research Institute	Public Institution	Private Institution	Others	Overseas institution
				National	Public	Private					
FS (OKUDA)	The Effect of Local Governance on Incentive Programs for Forest Ecosystem Service Conservation	10	2	8	0	0	0	0	0	0	0
FS (TANAKA Ueru)	Desertification, Local Husbandry and Livelihoods in Sub-Saharan Africa	7	0	5	0	0	0	2	0	0	0
FS (TANAKA Hiroki)	The Hydrological Cycle and Water Problems in the Changjiang River Basin: Human-Nature Interaction in a Transforming China	40	1	24	1	1	0	0	3	0	10
FS (NAGAO)	Environmental Peninsula Science for Establishment of a Sustainable Society on Noto Peninsula	28	0	24	2	2	0	0	0	0	0
FS (HAYASHIDA)	Atmospheric Methane and Agriculture in Monsoon Asia	29	2	13	2	4	0	0	7	0	1
FS (FUKUJ)	Green Earth: Plant, Human and Earth Interactions	9	0	6	1	0	0	0	1	1	0
FS (MATOH)	Designing Agriculture in the Era of Petroleum Scarcity	8	0	5	0	1	0	0	1	0	0
FS (WATANABE)	Historical Evaluation and Future of Irrigation	19	1	8	0	3	0	0	0	0	7
	Total	1225	130	520	38	147	25	84	37	27	217

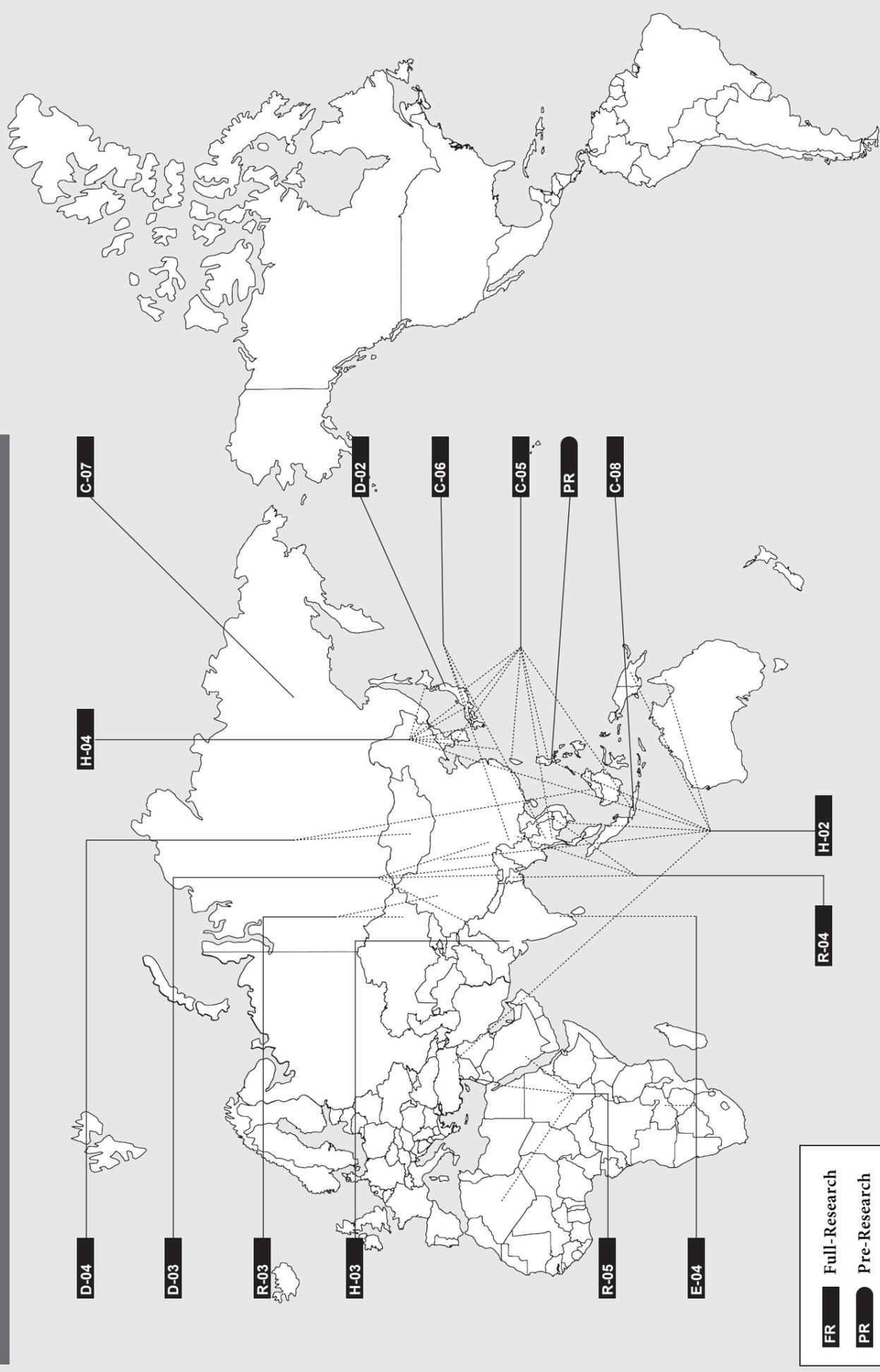
As of March 31, 2011

**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 and Social Sciences	Multidisciplinary	Total	
C-05 (FR5)	Human Impacts on Urban Subsurface Environments	43	24	12	79	(Natural Sciences) Hydrology, Volcanology, Groundwater analysis, Earth system science, Geochemistry, Gravity satellite analysis, Seismology, Environmental analysis, Biogeochemistry, Meteorology, Isotope hydrology, Geothermics, Engineering geodesy, Hydrogeomorphology, Hydraulics, Oceanography, Physical hydrology, Geology, Analysis of subsurface temperature, Marine geology, Isotope science, Geosciences, Environmental resource production, Hydrological sciences (Humanities and Social Sciences) Social development study, Environmental economics, Geography, Politics, Environmental engineering, Urban geography, Cultural geography and urban study, Socio economics analysis, Material flow analysis, Historical geography, Analysis of urban environmental, Environmental policy, GIS, City planning, Demography, Analysis of subsurface environment, Analysis of water resources (Multidisciplinary) Environment conservation study, Analysis of urban climate, Regional environment study, Analysis of subsurface temperature, Geography, Analysis of subsurface environment, Groundwater analysis, Analysis of water resources
C-06 (FR4)	Effects of Environmental Change on the Interactions between Pathogens and Humans	33	9	8	50	(Natural Sciences) Nanotechnology, Ecology, Fish ecology, Molecular biology, Molecular ecology, Environmental conservation, Plant breeding, Mathematical ecology, Aquatic ecology, Legionella ecology, Behavioral ecology, Stable isotope ecology, Plant ecology, Animal ecology, Ecosystem ecology, Environmental resource geology, Isotope geosciences, Toxicology, Environment assessment and ecopolicy, Environmental fate analysis, Bioinformatics, Fish ecology, Medical science, Environmental science and microbiology, Microbial ecology, Fisheries biology, Sanitary, Water metabolic system (Humanities and Social Sciences) Economics, Food culture, Law, Environmental economics, Sociology, Geoenvironmental science, Economics (Multidisciplinary) Ecology, Health science, Sanitary, Medical science, Environmental conservation, Environmental medicine
C-07 (FR2)	Global Warming and the Human-Nature Dimension in Siberia : Social Adaptation to the Changes of the Terrestrial Ecosystem, with an Emphasis on Water Environments	44	11	3	58	(Natural Sciences) Forestry, Limnology, Remote sensing, Modeling, Ecohydrology, Earth science, Forest meteorology, Plant physiological ecology, Animal physiological ecology, Conservation ecology, Ecosystem impact, Civil engineering, Meteorology, Atmospheric model, Water and energy cycle, Ecological model, Isotope hydrology, Ecology, Ethology, River engineering, Hydrology, Climatology, Marine physics, Limnology, Ecology, Environmental conservation, Dendrochronology, Frozen ground science, Cryosphere landscape, Geochemistry, Atmospheric chemistry, Meteorology, Forest science, Forest hydrology, Forest meteorology & hydrology, Climatology (Humanities and Social Sciences) Social anthropology, International relations, Sociology, Politics, Cultural anthropology, Russian economy, Descriptive linguistics, History (Multidisciplinary) Atmospheric chemistry, Meteorology, Ecohydrology
C-08 (FR1)	Megacities and the Global Environment	7	10	16	33	(Natural Sciences) Infrastructure planning and management, Hydrology, Urban landscape planning, City sustainability, Remote sensing (Humanities and Social Sciences) Japanese economic history, Marketing and distribution, Economic history of Dutch East Indies, Religion, Soundscape studies, Regional resources management, Geographic information system, Environmental economics, Axiology (Multidisciplinary) Architectural history, Urban history, Urban policy planning, Studies of colonial architecture, Urban history in southeast Asia, Islamic architecture and architectural history, City planning and spatial information science, Urban redevelopment, City planning, Western urban history, Historical demography, Economic geography, Studies of China-towns
D-02 (FR5)	A New Cultural and Historical Exploration into Human-Nature Relationships in the Japanese Archipelago	64	54	10	128	(Natural Sciences) Ecology, Forest ecology, Physical anthropology, Animal ecology, Stable isotope ecology, Theoretical ecology, Plant phylogeny, Anthropology, Plant taxonomy, Plant genetic resources, Paleoenvironmental science, Primatology, Zooarchaeology, Reproductive ecology, Ecological anthropology, Environmental design, Botany, Chronology, Isotopic-geochemical study, Paleoecology, Plant ecology, Forest biology, Natural geography, Vegetation history, Molecular ecology, Wood anatomy, Tephro-chronology, Paleo-biology, Population genetics, Animal phylogeny, Primate ecology, Molecular phylogeny, Molecular phylogenetics, Historical botany, Volcano geology, Natural history, Wood research (Humanities and Social Sciences) Philosophy, Cultural anthropology, Environmental history, Ethnology, Archaeology, History, Historical economics, Linguistic ethnology, Folklore, Geography, Ecological anthropology, Cultural geography, Environmental history, Environmental economics, Commons studies, Paleolithic archeology, Japanese modern history (Multidisciplinary) Conservation ecology, Crop sciences, Forest biosphere, Landscape resource, Paleo-environmental sciences, Ecological anthropology, Primatology
D-03 (FR3)	Human Life, Aging, and Disease in High-Altitude Environments: Physio-Medical, Ecological and Cultural Adaptation in “Highland Civilizations”	22	8	16	46	(Natural Sciences) Forest resource management, Public health, Geoecology, Psychosomatic medicine, Field medicine, Cardiology, Chrono-medicine, Ecology of water resource, Physical geography, Ecology, Primatology, Forest science, Physical geography, Glaciology, Agrology, Pastoral ecology, Meteorology, Climatology, Animal husbandry, Geriatrics, Epidemiology, Food microbiology (Humanities and Social Sciences) Ethnobotany, Resource economics, Anthropology, African area studies, History of Chinese thought, Study of nature, Tibetan Buddhism, History of Indian and Tibetan Buddhism, Archaeology (Multidisciplinary) Field medicine, Geriatrics, Agroecology, Cultural anthropology, Agricultural economics, Ethnobotany, Human geography, Area studies, Agricultural management, Grassland science, Neurology, Primatology, Environmental history, Forest ecology, Mountain anthropology
D-04 (FR3)	Collapse and Restoration of Ecosystem Networks with Human Activity	56	19	3	78	(Natural Sciences) Theoretical ecology, Interaction ecology, Grassland ecology, Forest ecology, Ecology, Entomology, Insect ecology, Forest mesuration, Remote sensing, Environmental ecology, Environmental sciences, Physical environmental science, Mathematical ecology, Soil science, Isotope ecology, Forest soil animals, Systematic botany, Nomad ecology, Tropical ecology, Fungal diversity, Physical geography, Geocryology, Tree physiological ecology (Humanities and Social Sciences) Cultural anthropology, Sociology, Environmental economy, Agricultural economy, Anthropology, Environmental sociology, Ethnobotany, Geography, Theoretical sociology, Area study, Area development study, Politics, Economics, GIS (Multidisciplinary) Area environmental science, Global environmental sciences
R-03 (FR4)	Historical Interactions between Multi-Cultural Societies and the Natural Environment in a Semi-Arid Region in Central Eurasia	54	40	11	105	(Natural Sciences) Hydrology, Glacier biology, Glaciology, Soil science, Climate change, Forest ecology, Remote sensing analysis, Ice core analysis, Sedimentology, Landscape ecology, Physical geography, Modeling of soil organic matter, Agricultural land planning, Glaciology, Remote sensing, Hydrological modeling, Glacier biology, Dendrochronology, Irrigation system, Landscape development, Quaternary research, Tectonic landform, Isotope hydrology, Water circulation, Archaeology, Satellite analysis, Risk analysis of ecosystem, Environmental architecture design, Landscape ecology, Irrigation system planning, Snow and ice chemistry, Geochemistry, Synthesis of natural proxies and historical documents, Botany & entomology, Climatology, Snow/ice hydrology, Forest science, Natural environmental changes, Geology (Humanities and Social Sciences) Politics, Ethnology, Pastoral nomadism, Archaeology, International relations on water resources, Folklore of religion, Social anthropology, Silla history, Silla agricultural history, Ethnology, Oriental studies, Social anthropology, Archaeological survey, Politics, History of central Asia development, Modern Kazakhstan history, Agricultural history of Kazakhstan, Chinese history, Central Eurasian history, Manchurian documents, Environmental politics, Western and southern Asian history, Cultural anthropology, History, History of religious art (Multidisciplinary) Ethnology, Area studies, Archaeology, Geographical studies, Geoarchaeology, Geography, Environmental Studies
R-04 (FR3)	Environmental Changes and Infectious Disease in Tropical Asia	47	17	18	82	(Natural Sciences) Infectious disease epidemiology, Demography, Forest ecology, Parasitology, Environmental epidemiology, Climate change and diseases, Infectious disease epidemiology, Biological anthropology, Public health, Environmental microbiology, Microbiology, Clinical chemistry, Infectious diseases and immunology, Environmental health, Malariaology, Parasitology, Demography, International health, Tropical environmental health, Disaster information studies, International school health, Laboratory medicine, Insect ecology, Spatial epidemiology, Medical entomology, Epidemiology, Meteorology, Tropical medicine, Health and environmental health, Helminthology, Environmental toxicology, Human ecology, Immunology, Tropical medicine, Isotope environment, Regional planning, Ecology, Agriculture, Limnology (Humanities and Social Sciences) Medical sociology, History of medicine, Public system programming, Cultural anthropology, Medical anthropology, International cooperation, Area studies, Social anthropology, International health, International medical cooperation, Project management, Geography, Modern Chinese history, GIS, Medical history, Postwar economic history (Multidisciplinary) Human ecology, Population health, Health planning, International agriculture, Social research, Health policy, Public health nutrition, International community health, Informatics, Epidemiology, Public health, Regional information, Southeast Asian area studies, Nursing science, Health education, Commons studies, Social healthcare survey, Behavioral epidemiology, International nursing, Geoinformatics
R-05 (FR2)	A Study of Human Subsistence Ecosystems in Arab Societies: To Combat Livelihood Degradation for the Post-oil Era	55	28	15	98	(Natural Sciences) Nutrient physiology, Bio-chemistry, Forest ecology, Fungology, Aquatic biological informatics, Bioacoustics, Animal physiology, Water resource management, Plant ecophysiology, Forest hydrology, Soil hydrology, Plant ecology, Revegetation technology, GIS, Marine biology, Agricultural chemistry, Natural geography, Hydrology, Tree physiology, Tree environmental physiology, Irrigation and drainage, City planning, Forestry, Entomology, Agricultural engineering, Food science, Nutritional physiology, Weed science (Humanities and Social Sciences) Archaeology, Agro-economics, Cultural anthropology, Islamic culture, Folklore, Religious anthropology, History, Developmental study, Education, Information science (Multidisciplinary) Cultural anthropology, Rural development, Geography, Remote sensing, Afforestation, Architectonics, Landscape ecology, Architectural history, Environmental topography, Social anthropology, Forestry
H-02 (FR5)	Agriculture and Environment Interactions in Eurasia: Past, Present and Future —A ten-thousand-year history	42	46	9	97	(Natural Sciences) Plant genetics, Breeding, Plant breeding, Anthropology, Archaeobotany, Plant cytogenetics, Plant molecular genetics, Molecular genetics, Agronomy, Plant genetic resources, Tame plant origins, Palynology, Crop science, Genetics, Genetic evolution, Genetic ecology, Glacial biology, Weed ecology, Geochemistry, Isotonic biological earth science, Botany, Cell biology, Architecture, Plant ecology, Environmental archaeology, Applied zoological genetics, Genetic resources, Ethnobotany (Humanities and Social Sciences) Cultural anthropology, History of tea culture, Philosophy, Archaeobotany, Folklore, Japanese culture, Archaeology, Chinese ancient history, Loulan history, Ethnology, Linguistics, Business management for the middle mountains area, Human geography, Natural science, Geography, Southeast Asian archaeology, Pre-modern farming history, Regional planning, Plant breeding and exploration of plant genetic resources, Chinese literature and silk road, Japanese archaeology, Assyriology, Art history, Japanese history, Oriental history (Multidisciplinary) Archaeology, Anthropology, Folklore, Geography, Environmental archaeology, Botany, Ethnobotany, Mountainous-area anthropology, Jomon archaeology, Hunter-gatherer archaeology, Historical ecology
H-03 (FR4)	Environmental Change and the Indus Civilization	24	25	10	59	(Natural Sciences) Agriculture, Physical geography, Archaeology, Biological science, Earth science, Seismology, Physical geography, Civil engineering, Hydrology, Earth science, Glacial biology, Earthphysics, Geochronology, Resource geography, Geology, Geomorphology, Genetics, Tectonic geomorphology, Ecology, Climatology (Humanities and Social Sciences) Linguistics, Archaeology, Indology, Linguistics (Kinnauri), Economics, Cultural anthropology, History of west Asia (Multidisciplinary) Archaeology, DNA Archaeology, Ethnology, Plant genetics and evolution, Archaeo-zoology, Archaeo-botany
H-04 (FR4)	Neolithisation and Modernisation: Landscape History on East Asian Inland Seas	5	41	20	66	(Natural Sciences) Ichthyology, Landscape engineering, Social engineering, Micropaleontology, Diet (Humanities and Social Sciences) Sociolinguistics, Trade history, Japanese history, Philosophy, English language, Religious folklore, Folklore, Landscape history, Euro-Japan archaeology, Archaeology, Japanese archaeology, Cultural anthropology, Chinese archaeology, English literature, Japanese linguistics, Chinese folklore, Korean archaeology, Medieval history, Prehistoric anthropology, Political science, History, Computer engineering, Medieval archaeology, Historical geography, Linguisticinformatics, Environmental sociology, Human geography (Multidisciplinary) Ecological anthropology, Theory of landscape, Prehistoric anthropology, Ecological anthropology, Ethnology, Landscape archaeology, Archaeology, Folklore, Japanese archaeology, Jomon and western archaeology, Cultural anthropology, Landscape engineering, Landscape history, Information culture, Archaeobotany, GIS archaeology
E-04 (FR4)	Vulnerability and Resilience of Social-Ecological Systems	16	11	10	37	(Natural Sciences) Atmospheric physics, Soil environmental science, Agronomy, Remote sensing, Soil science, Agricultural meteorology, Forest ecology, Crop science, Botany, Meteorology, Mathematical ecology (Humanities and Social Sciences) Resource & environmental economics, Development economics, Agricultural economics, Development study, Cultural anthropology, Sociology, Geography (Multidisciplinary) Environmental geography, Environmental & health economics, Ecological anthropology, Palliative medicine, Soil hydrology, Human ecology, Geographic information, Mathematics
PR (KADA)	Managing Environmental Risks to Food and Health Security in Asian Watersheds	13	3	4	20	(Natural Sciences) Soil ecology, Isotope environmental studies, Environmental chemistry, Environmental ecology, Plant ecology, Environmental risk epidemiology, Organic chemistry, Preventive medicine, Lake environmental studies, Earth science, Biology, Plant ecology, Public health (Humanities and Social Sciences) Environmental economics, Agricultural economics, Resource economics (Multidisciplinary) Public health, Resource economics, Rural planning, Disaster management

Project Number	Title of the Project	The number of projects members				Research Background of Project Members
		Natural Sciences	Humanities and Social Sciences	Multidisciplinary	Total	
FS (ISHIKAWA)	Coastal Area Capability in Southeast Asia	18	9	12	39	(Natural Sciences) Coastal ecology, Population genetics, Genetics, Fisheries science, Ichthyology, Beach ecosystem, Coral reef ecology, Environmental resource geology, Fishing method, Water analysis, Genetics, Marine engineering, Telemetry, Beach ecology, Coastal Ecology, Study of tropical forest (Humanities and Social Sciences) Regional development, Fisheries economics, Regional economics, Economics, Fishery economics, Area study (Multidisciplinary) Conservation ecology, Fisheries science, Cultural anthropology, Global fisheries science, Area study, Regional development, Resource management, Satoyama Satoumi
FS (OKUDA)	The Effect of Local Governance on Incentive Programs for Forest Ecosystem Service Conservation	8	2	0	10	(Natural Sciences) Sociology, Ethnobiology (Humanities and Social Sciences) Ecology, Animal ecology
FS (TANAKA Ueru)	Desertification, Local Husbandry and Livelihoods in Sub-Sahara Africa	3	1	3	7	(Natural Sciences) Soil ecology, Weed science, Tropical soil science (Humanities and Social Sciences) Development Sociology (Multidisciplinary) Terrestrial ecosystems management, Residential environment, Regional development
FS (TANAKA Hiroki)	The Hydrological Cycle and Water Problems in the Changjiang River Basin: Human-Nature Interaction in a Transforming China	19	11	10	40	(Natural Sciences) Biological oceanography, Climatology, Silvics, Eco-hydrometeorology, Geomorphogeny, Physical oceanography, Meteorology, Hydrometeorology, Plant ecology, Environmental remote sensing, Forest hydrology, Satellite meteorology (Humanities and Social Sciences) Sociology, Anthropology, Environmental economics, Agricultural marketing, Ethnology, Regional sociology, Rural sociology, Environmental sociology, Environment policy (Multidisciplinary) Environmental hydrology, Environmental system engineering, Erosion control engineering, Water-resource engineering, Historical studies in civil engineering, Impact assessment, Environmental remote sensing, Ethnobotany
FS (NAGAO)	Environmental Peninsula Science for Establishment of a Sustainable Society on Noto Peninsula	17	2	9	28	(Natural Sciences) Nuclear and radiochemical sciences, Ecology, Public health, Microbial technology, Atmospheric science, Hydrology, Forest ecology, Soil science, Organic geochemistry, Geochemistry, Sedimentology, Neuropsychiatry, Neurology and neurobiology of aging, Laboratory medicine (Humanities and Social Sciences) Cultural anthropology, Japanese history (Multidisciplinary) Epidemiology, Geography, Environmental protection engineering, Hydrology, Landscape architecture, Food science, Health science, Geography, Remote sensing
FS (HAYASHIDA)	Atmospheric Methane and Agriculture in Monsoon Asia	19	0	10	29	(Natural Sciences) Atmospheric science, Remote sensing, Geochemistry, Agriculture, Drainage engineering, Inverse modeling, Hydrometeorology, Agriculture, Agro-environmental sciences (Multidisciplinary) Environmental systems engineering, Agriculture, Environmental economics, Hydrometeorology, Statistics
FS (FUKUI)	Green Earth: Plant, Human and Earth Interactions	4	5	0	9	(Natural Sciences) Cell biology, Breeding, Environment engineering, Molecular biology (Humanities and Social Sciences) Area study, Religious studies, Cultural anthropology, Theoretical economics, Agricultural policy
FS (MATOH)	Designing Agriculture in the Era of Petroleum Scarcity	5	2	1	8	(Natural Sciences) Plant nutrition, Genetic ecology, Soil fertility (Humanities and Social Sciences) Agricultural economics, Food science (Multidisciplinary) General science
FS (WATANABE)	Historical Evaluation and Future of Irrigation	9	6	4	19	(Natural Sciences) Hydrospheric atmospheric system, Environmental fate analysis, Natural disaster science, Water control science, Regional planning, Drainage engineering, Environmental informatics, Soil science, Land resource science, Agricultural engineering, Hydrological environment engineering, Forest resources and environmental science (Humanities and Social Sciences) Cultural anthropology, Economic anthropology, Geography, History of Islamic art, History of Islamic culture, Archaeology, Sociology (Multidisciplinary) Global environmental studies, Agricultural engineering, Drainage engineering, Rural planning, Water resources and environmental engineering, Hydrology and global environment
	Total	618	378	210	1225	

As of March 31, 2011



## Full-Research

- C-05** Human Impacts on Urban Subsurface Environments
  - Asian coastal basins including Tokyo, Osaka, Seoul, Taipei, Bangkok, Jakarta and Manila
- C-06** Effects of Environmental Change on the Interactions between Pathogens and Humans
  - Lake Biwa, Japan, Erhai in Dali, Yunnan, China and Pin River, Chiang Mai, Thailand
- 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
  - Lena River Basin, East Siberia
- C-08** Megacities and the Global Environment
  - Jakarta Mega-Urban Region
- D-02** A New Cultural and Historical Exploration into Human-Nature Relationships in the Japanese Archipelago
  - The Japanese Archipelago
- D-03** Human Life, Aging and Disease in High-Altitude Environments: Physio-Medical, Ecological and Cultural Adaptation in “Highland Civilizations”
  - The Himalaya, Tibet and the other highlands in the world
- D-04** Collapse and Restoration of Ecosystem Networks with Human Activity
  - East-Asia Tropical Rainforest (Malaysia, Sarawak) and Central-Asia Grassland (Mongolia)

## Full-Research

- R-03** Historical Interactions between Multi-Cultural Societies and the Natural Environment in a Semi-Arid Region in Central Eurasia
  - Ili River basin and its surrounding areas in semi-arid regions of Central Eurasia (Kazakhstan, China)
- R-04** Environmental Change and Infectious Disease in Tropical Asia
  - Tropical Asia (Leo PDR; Bangladesh; Yunnan, China)
- R-05** A Study of Human Subsistence Ecosystems in Arab Societies: To Combat Livelihood Degradation for the Post-oil Era
  - Semi-arid lands in Sudan, the Sinal Peninsula in Egypt, the Red Sea coast in Saudi Arabia, and a Saharan oasis in Algeria
- H-02** Agriculture and Environment Interactions in Eurasia: Past, Present and Future — A ten-thousand-year history
  - Eurasian Continent and Oceania
- H-03** Environmental Change and the Indus Civilization
  - Northwestern India
- H-04** Neolithisation and Modernisation: Landscape History on East Asian Inland Seas
  - The Japan Sea rim, the East China Sea rim
- E-04** Vulnerability and Resilience of Social-Ecological Systems
  - Rural societies in Southern and Eastern Provinces of Zambia in Semi-arid tropics where environmental variability such as rainfall is large

## Pre-Research

- PR** Managing Environmental Risks to Food and Health Security in Asian Watersheds
  - Philippines; Laguna Lake area