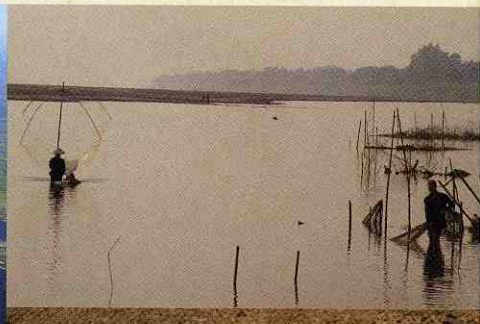
Inter-University Research Institute Corporation
National Institutes for the Humanities, Japan

RESEARCH INSTITUTE FOR HUMANITY AND NATURE

2005-2006



CONTENTS

Message from Director-General

HIDAKA, Toshitaka
Director-General, Professor

Five years have passed since the establishment of RIHN. By the grace of warm support of the Ministry of Education, Culture, Sports, Science and Technology and all hands, the number of research staff reached the full strength, and more number of researchers are gathering from various study areas. And this innovative research institute has started to present its research results as was expected.

It is our basic understanding that the root of the so-called global environmental problems lies behind the human culture in the broadest sense of the word, that is, the way of living of the humans which wish to control nature. The English name "Research Institute for Humanity and Nature" aims to fulfill its mission to endeavor to understand the manifold relationship between the humanity and the nature. Its "research project system" aims to effectively integrate studies beyond the barrier between the so-called scientific-technological and humanistic approaches. By its system of "fluid association" researchers of various fields meet to collaborate within this new sphere of study. Its "Research Promotion Center" transmits the Institute's research achievements and its contribution to the people. Everything is a new and enthusiastic trial.

Parallel to corporatization of Japanese national universities, we became one of member institutes of the National Institutes for the Humanities (NIHU). RIHN, National Museum of Ethnology, International Research Center for Japanese Studies, National Museum of Japanese History, and National Institute of Japanese Literature comprise this new organization. It would be a desirable position for RIHN and our academic studies to take a cross-disciplinary, integrated approach toward the radical solution of global environmental problems.

Though corporatization itself might connote problems and demerit, we have to overcome them to realize our aim and succeed. We believe these enthusiastic trials are a truly significant challenge for the world and Japan.

We hope that you follow our progress in this young research institute, RIHN.

Mission of RIHN

The Research Institute for Humanity and Nature (RIHN) was founded in April 2001. This inter-university research institute, under the Japanese Ministry of Education, Culture, Sports, Science and Technology, was established to carry out integrated research that innovates solutions to problems related to the global environment.

Environmental problems, such as global warming, loss of biodiversity, and depletion of water resources are said to be the consequences of humanity-nature interactions being manifested today in various parts of the world. It is fundamentally a problem of human life style or culture in the broadest sense of the word.

One of the difficulties in assessing global environmental problems is that many of them have appeared across the vast regions of the earth in most unpredictable manner. There are a number of problems facing us caused by factors seemingly far removed from reality both in time and space. Moreover, recent studies show that not only natural-scientific but also economic, politic, historical, and philosophical, and other factors in the broadest sense are exerting strong influences.

The complexity of this work means that these multi-faced problems cannot be solved by conventional thinking. In fact, the measures hitherto taken are based on the idea of controlling nature, which has yielded few solutions.

Our first and most fundamental posit is to define what is meant by problems in the global environment and to re-examine the conventional ways of thinking which developed during the 20th century.

Firstly we examine keenly how man interacts with nature, an intricately complex matter. It must be hard work. However this is our primary mission.

Secondly, from such perspective we need to consider how we can sustain the global environment that has all the future possibilities and what sorts of life style we must adopt in order to achieve it. To achieve these goals, a new academic approach is called for.

To embody the result, RIHN is tackling a new trial stated in the message from Director-General of RIHN. And we intend to announce to the public how mankind can benefit from our research, while building academic "knowledge" to further contribute to resolving the problems now present in the environment.

Roles and Functions of RIHN

Integration

In recent years many studies aimed at solving global environmental problems have been conducted in various ways in the world, but we now have reached a point where new directions are needed. We are faced with questions such as "What sorts of lifestyles will be acceptable in the future, and how large an area of tropical forest should be retained?" To answer these simple but socially demanding questions, it is necessary to develop a new integrated approach, bringing together different disciplines of the natural sciences, social sciences, humanity studies, engineering, land and food sciences, medical sciences, and others.

Fluidity

It is extremely important to maintain high fluidity in the academic center to integrate research in cross-disciplinary fields. RIHN proposes a research organization with the highest possible fluidity meeting the requirements of the "project-based format."

Globalization

It is essential to build a research organization with international vision in order to take a cross-disciplinary, integrated approach toward the solution of global environmental problems. RIHN will develop strong links with international as well as national research organizations, actively

The first stage of Pre-International Symposium was held on June 6-8, 2005. The total number of participants was 202, including 69 foreign visitors from 11 countries.

promote international research projects, and participate in the planning and operation of international research projects. It will also appoint many non-Japanese professors and researchers as integral members of its research staff. RIHN Inaugural International Symposium to present outcomes of research projects is planned to offer in 2006. Pre-International Symposiums are held twice in 2005. (Photo: The first-stage)

Leadership Strong leadership is necessary to carry out integrated research in such a fluid organization. RIHN will have its own professors to act as leaders in the planning and operation of multidisciplinary research projects to maintain its leading role in these studies.

Research Project System

RIHN will carry out cross-disciplinary, integrated studies according to the "project-based format" without dividing research activities into traditional disciplinary areas.

RIHN has no "Research Sections." It will carry out its research, not based on traditional research areas, but by establishing 5 research axes that represent integrated perspectives of the global environmental problems and identifying each research project along the direction of the appropriate axis.

Each project will be organized through the period of incubation (IS) and tested in the feasibility study (FS) of about one year. Then the result of the feasibility study will be evaluated and, if assessed as suitable, the project will proceed to the full-scale study of about 5 years. In this process the evaluation of the project is given by the Evaluation Committee and approval by the Advisory Committee.

National Institutes for the Humanities (NIHU)

National Institutes for the Humanities (NIHU) was established on April 1st., 2004 based on the National University Corporation Law. RIHN became one of member institutes of the NIHU along with the following institutes, National Museum of Ethnology, International Research Center for Japanese Studies, National Museum of Japanese History, National Institute of Japanese Literature, which all are concerned with different viewpoints surrounding cultural problems. RIHN intends to contribute to the solution of global environmental issues within this group, and construct an academic concept on which to base human culture.

History

Fiscal Year

1995 • A proposal of Japan Science Council of Ministry of Education, Science, Sports and Culture: "On the promotion of the global environmental sciences" (April). "It is necessary to examine the founding of a central research organization that will promote integrated cooperative research toward the solution of global environmental problems."

1997 • Investigation of the possible forms that the proposed research organization for the global environmental sciences may take. The Ministry of Education, Science, Sports and Culture established the Chosa-kyoryokusha-kaigi (Committee of Investigation Collaborators) for the establishment of a central research organization and made a budget for the concrete investigations.

• The Ministerial Council for the global environmental conservation made an agreement on the "Provisional measure for global environmental conservation," in preparation for the UN General Assembly's Special Session on the Environment and Development (June). "The Council will investigate the means of possible adjustments necessary for the research organization to carry out integrated research in broad academic fields in addressing global environmental problems."

1998 • Preparatory work for the establishment of the "Research Institute for the Global Environment Sciences" (tentative).

1999 • The preparation Committee of the Institute compiled a report in March 2000 and proposed the foundation of the "Research Institute for the Global Environment Sciences" (tentative) for promoting integrated research projects, by amalgamating various broad disciplines from humanity and social sciences to natural sciences and using a network to be formed among workers in universities and research institutes within and outside the country.

2000 • Investigation for the founding of the "Research Institute for Humanity and Nature" (tentative). Report "On the Fabric of the Research Institute for Humanity and Nature" (tentative) was completed in February.

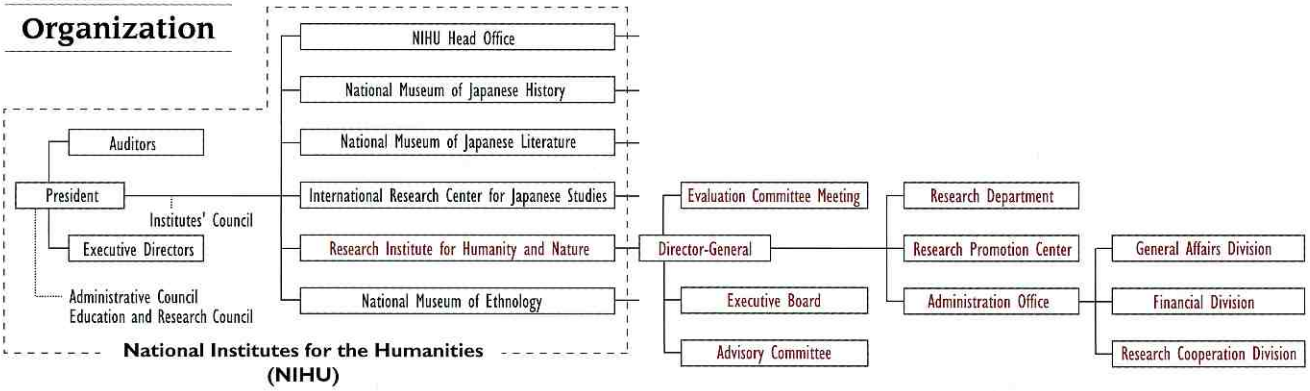
2001 • Foundation of the Research Institute for Humanity and Nature. Following the execution of the government ordinance (No.151 of the year 2001) amending part of the ordinance on the law concerning the establishment of national schools (Kokuritsu-gakko-settchi-ho-shikorei), the Research Institute for Humanity and Nature was founded (Director-General: Professor Toshitaka Hidaka). The Institute commenced its research activity on the campus of Kyoto University.

2002 • The Institute moved to the site of the old Kasuga Primary School of Kyoto City.

2004 • Inter-University Research Institution Corporation, National Institutes for the Humanities (NIHU) established on April 1st based on the National University Corporation Law. RIHN became one of the member institutes of the NIHU.

2005 • The new facilities will be completed by December. The move is planned during February 11-19, 2005.

Organization



Budget

Expenditure (Fiscal Year 2004)

Category	Amount (Yen in thousands)
Personnel Expenses	571,930
Non-Personnel Expenses	1,481,987
Total	2,053,917

External Sources of Funding (Fiscal Year 2004)

Category	Amount (Yen in thousands)
Fund for Promotion of Academic and Industrial Collaboration	90,259
Grants-in-Aid for Scientific Research	66,570
Donation for Research	7,225

Board and Committees

(in alphabetical order)

Advisory Committee

Deliberates on important matters relative to personnel, planning, administration and operation of the institute.

FUJII, Yoshiyuki
— Vice-Director, National Institute of Polar Research, Research Organization of Information and Systems
FURUSAWA, Iwao
— President, Tottori University of Environmental Studies
NAKAMAKI, Hirochika
— Professor, Department of Cultural Research, National Museum of Ethnology, NIHU
NAKAMURA, Kenji
— Professor, Hydrospheric-Atmospheric Research Center, Nagoya University
SHIRAHATA, Yozaburo
— Professor, Research Department, International Research Center for Japanese Studies, International Research Center for Japanese Studies, NIHU
TACHIMOTO, Narifumi
— Dean, College of International Studies, Chubu University
TANAKA, Masayuki
— Vice-President, Tohoku Institute of Technology
YAMAMURA, Norio
— Professor, Center for Ecological Research, Kyoto University
AKIMICHI, Tomoya
— Program Director, Research Institute for Humanity and Nature
FUKUSHIMA, Yoshihio
— Program Director, Research Institute for Humanity and Nature
HAYASAKA, Tadahiro
— Program Director, Research Institute for Humanity and Nature
NAKAWO, Masayoshi
— Program Director, Research Institute for Humanity and Nature
SAITO, Kiyoaki
— Director, Research Promotion Center, Research Institute for Humanity and Nature
SATO, Yo-Ichiro
— Program Director, Research Institute for Humanity and Nature

Evaluation Committee Meeting

Undertakes eveluation of the feasibility studies and selects research projects to be forwarded to full-scale research; interim and post-evaluation of the research subjects under full-scale research.

APPANAH, Simmathiri
— Senior Programme Advisor, Forestry Research Support, Programme for Asia and the Pacific(FAO), Thailand
EHLERS, Eckart
— Professor, University of Bonn, Germany
FURUSAWA, Iwao
— President, Tottori University of Environmental Studies
HEINTZENBERG, Jost
— Director, Institute for Tropospheric Research, Germany
IWASA, Yo
— Professor, Graduate School of Sciences, Kyushu University
KIKKAWA, Jiro
— Professor Emeritus, The University of Queensland, Australia
LEGENDRE, Louis
— Director, Villefranche Oceanography Laboratory, France
MORISHIMA, Akio
— Chair of the Board of Directors, Institute for Global Environmental Strategies
MURAKAMI, Yoichiro
— Professor, International Christian University
NIWA, Masako
— Professor Emeritus, Nara Women's University
SAWA, Takamitsu
— Director, Institute of Economic Research, Kyoto University
SUN, Honglie
— Professor, Institute of Geographical Science and Natural Resources Research, Chinese Academy of Science, P.R.China
TACHIMOTO, Narifumi
— Dean, College of International Studies, Chubu University
TANAKA, Masayuki
— Vice-President, Tohoku Institute of Technology
WATANABE, Okitsugu
— Auditor, The Graduate University for Advanced Studies
YASUNARI, Tetsuzo
— Professor, Hydrospheric-Atmospheric Research Center, Nagoya University

Executive Board

Discusses important matters of the institute.

AKIMICHI, Tomoya
— Program Director, Research Institute for Humanity and Nature
FUKUSHIMA, Yoshihiro
— Program Director, Research Institute for Humanity and Nature
HAYASAKA, Tadahiro
— Program Director, Research Institute for Humanity and Nature
HIDAKA, Toshitaka
— Director-General, Research Institute for Humanity and Nature
NAKAWO, Masayoshi
— Program Director, Research Institute for Humanity and Nature
SAITO, Kiyoaki
— Director, Research Promotion Center, Research Institute for Humanity and Nature
SATO, Yo-Ichiro
— Program Director, Research Institute for Humanity and Nature
OKAZAKI, Shoji
— Director, Administration Office, Research Institute for Humanity and Nature

RIHN organizes other committees, if necessary, for smooth operation.

Partner Organizations for Fluid Association (Fiscal Year 2005)

·Center for Ecological Research, Kyoto University
·Hydrospheric-Atmospheric Research Center, Nagoya University
·Arid Land Research Center, Tottori University
·Institute of Industrial Sciences, University of Tokyo
·National Museum of Ethnology
·Graduate School of Science, Tohoku University
·Institute of Low Temperature Science, Hokkaido University
·Tropical Biosphere Research Center, University of Ryukyus

Staff Members

DIRECTOR-GENERAL HIDAKA, Toshitaka

RESEARCH DEPARTMENT

Program Directors
AKIMICHI, Tomoya
FUKUSHIMA, Yoshihiro
HAYASAKA, Tadahiro
NAKAWO, Masayoshi
SATO, Yo-Ichiro

Professor Emeritus
NAKANISHI, Masami
WADA, Eitaro

Professors
AKIMICHI, Tomoya
FUKUSHIMA, Yoshihiro
HAYASAKA, Tadahiro
KAWABATA, Zen'ichiro
KINOSHITA, Tetsuya
NAKANO, Takanori
NAKASHIZUKA, Tohru
NAKAWO Masayoshi
OSADA, Toshiki
SATO, Yo-Ichiro
TAKASO, Tokushiro
WATANABE, Tsugihiro
YUMOTO, Takakazu

Visiting Professors
INOUE, Takashi
KUWAMURA, Tetsuo
SUGIMOTO, Takashige

Invited Research Fellows
LEE, Ya-Fu
PALANISAMI, Kuppannan
QI, Wuyun
SHEN, Weirong
ZHENG, Hongxing

Associate Professors
ICHIKAWA, Masahiro
KANAE, Shinjiro
KUBOTA, Jumpei
NONAKA, Kenichi
OKUMIYA, Kiyohito
SHIRAIWA, Takayuki
TANIGUCHI, Makoto
UCHIYAMA, Junzo
UMETSU, Chieko
YACHI, Shigeo
YOSHIOKA, Takahito
ZHENG, Yuejun

Assistant Professors
ABE, Hiroshi
ENDO, Takahiro
KATO, Yuzo
KAWAMOTO, Kazuaki
SAEKI, Tazu
TAKEUCHI, Nozomu
YATAGAI, Akiyo

Research Fellows
IMAMURA, Akio
ISHII, Reiichiro
KATAGIRI, Shuichiro
KIMOTO, Yukitoshi
KUME, Takashi
MORIYA, Kazuki
MURATA, Fumie
NISHIMURA, Yuichiro
TAKAHASHI, Atsuhiro
TATENO, Ryunosuke
TERASHIMA, Motoki
YAMASHITA, Satoshi

Research Fellows (RR)
HOSHIKAWA, Keisuke
MATSUOKA, Masayuki
SATO, Yoshinobu

Research Fellows (JSPS)
CHEN, Zhi
HYODO, Fujio
KUROKAWA, Hiroko
NAGANO, Takanori
NAKAGAWA, Michiko
SATAKE, Shinsuke

Visiting Research Fellows
LI, Aelia
McGOWAN, Kelly, T.

Clerks
FUKETA, Yoshimi
HARADA, Atsuko
HASE, Noriko
ICHIDA, Koichiro
ISODA, Maki
IWATA, Atsuko
NAGAOKA, Kumiko
NAKAMURA, Yumiko
OKITA, Hiroko
ONAKA, Yoriko
SASAKI, Noriko
SHIONO, Keiko
SHIMIZU, Hiromi
TAKAHASHI, Keiko
TAKINO, Kayoko

Technicians
AKEDO, Masako
FUJIWARA, Yoichi
HASHIMURA, Osamu
HOSONO, Takahiro
IGETA, Akitake
IMADA, Miho
INOUE, Mitsuyuki
ISHITOBI, Tomotoshi
KATSUYAMA, Masanori
KASHIWAO, Tamaki
LINDSTRÖM, Kati
MATSUKAWA, Taichi
MIYAJIMA, Toshiaki
MIYAWAKI, Chie
MURAKAMI, Yumiko
NAKANISHI, Nozomi
OGAWA, Akiko
OGURA, Asayo
OISHI, Taro
ONISHI, Hideyuki
SASAKI, Naoko
TAIRA, Hiroyo
TANAKA, Takuya
UENO, Aki

RESEARCH PROMOTION CENTER

Director, Professor
SAITO, Kiyoaki

Associate Professors
MOMOKI, Akiko
SEKINO, Tatsuki
YOSHIMURA, Mitsunori

Assistant Professor
KOHMATSU, Yukihiro

Technicians
IGI, Setsuko
TAKI, Chiharu
TANAHASHI, Toshiyuki

ADMINISTRATION OFFICE

Director OKAZAKI, Shoji

GENERAL AFFAIRS DIVISION

Head INOUE, Akio
Deputy Head KOSEKI, Kenichi

• **General Affairs Section**
Head MURATA, Satoshi
Clerk OKITA, Masaki
ISHIHARA, Naoko
Secretary MURATA, Chiyo

• **Personnel Section**
Head MINATO, Hideto
Chief NAKANISHI, Seiji
Clerk IWASAKI, Rie

ACCOUNTING DIVISION

Head MORI, Takashi
Deputy Head NISHIGAKI, Soji

• **Budgeting Section**
Head URASHIMA, Shinji
Clerk MORIKAWA, Akiko

• **Accounting Section**
Head TANAKA, Yoshiro
Clerk SETA, Yoriko
HOSOGUCHI, Miyo

• **Supply Section**
Head MIYAZAKI, Yoshihito
Chief MATSUKI, Toshiyuki
Clerk KIMURA, Minako
TAMEISHI, Miki
Janitor ONISHI, Kazuma

• **Facilities Section**
Head SHINO, Ayumi
Clerk SHINTANI, Tomohiro

RESEARCH COOPERATION DIVISION

Head MATSUDA, Mitsunori
Deputy Head MAENO, Masayo

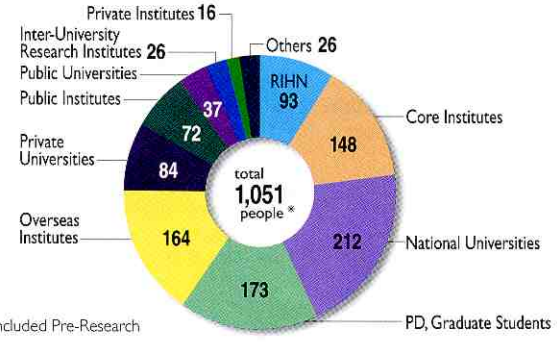
• **Research Cooperation Section**
Head OKAZAKI, Akihiko
Clerk MATANO, Makiko
IMAI, Masatoshi
SODEOKA, Sachiko
HIROSE, Kumi
ARAKI, Keiko

• **Team Research Section**
Head OOSUGI, Akira
Clerk OMAE, Yoko
Technicians FUJITA, Masanobu
KANEMATSU, Takako
SUEZAWA, Reiko
MATSUDA, Kaeko

• **International Affairs Section**
Head SUMIKURA, Mariko
Clerk OSHIMA, Minako
OHMOTO, Emi

External Research Collaboration

As one of the Inter-University Research Institutes, RIHN promotes integrative and cross-disciplinary joint researches in the field of global studies. For this goal, RIHN intends to collaborate with not only the universities, national agencies, public organizations, and private sectors in Japan, but also relevant overseas institutions.



*Included Pre-Research

Research Axes and Research Projects

Each project will be organized through the period of incubation (IS) and tested in the feasibility study (FS) of about one year. Then the result of FS will be evaluated and, if assessed as suitable, will proceed to the full-scale study of about 5 years, including the pre-research (PR) period. In this process the evaluation of the project is given by the Evaluation Committee and approval by the Advisory Committee.

AXIS 1 Environmental Change Impact Assessment

To study possible changes in natural environment and their impacts on human-ecological system.

- **1-1** Impact of Climate Changes on Agricultural Production System in the Arid Areas
- **1-2** Recent Rapid Change of Water Circulation in the Yellow River and Its Effects on the Environment
- **1-3FS** Vulnerability and Resilience of Social-Ecological Systems

AXIS 2 Human Activity Impact Assessment

To study impacts on global environment of human industrial and economic activities and their changes that are induced by reforms and replacement of political and ideological domains.

- **2-1** Emissions of Greenhouse Gases and Aerosols, and Human Activities in the East Area
- **2-2** Sustainability and Biodiversity Assessment on Forest Utilization Options
- **2-3** Human Activities in Northeastern Asia and Their Impact on the Biological Productivity in North Pacific Ocean
- **2-4PR** Human Activity Impacts on Urban Subsurface Environments
- **2-5PR** Erosion of Genetic Diversity as a Social, Ecological and Environmental Problem
- **2-6FS** Clarification of Materials Circulatory Systems Changes in East Asia as a Result of the Use of Geo-spherical Resources

AXIS 3 Spatial Scale

To clarify the whole interactions between human and nature in a given region, and explore for constructing sustainable society.

- **3-1** Multi-Disciplinary Research for Understanding Interactions between Humans and Nature in the Lake Biwa-Yodo River Watershed
- **3-2** Interactions between Natural Environment and Human Social Systems in Subtropical Islands
- **3-3FS** Environmental Change and the Indus Civilization

AXIS 4 History and Time Scale

To demonstrate sustainability and transformation by examining historical and temporal processes of interactions between global environmental changes and human activity.

- **4-1** Historical Evolution of the Adaptability in an Oasis Region to Water Resource Changes
- **4-2** A Trans-Disciplinary Study on the Regional Eco-History in Tropical Monsoon Asia: 1945-2005
- **4-4FS** Neolithisation and Modernisation in East Asia: The History of Environmental Development at the Great River System
- **4-5FS** Historical Interactions between Hybrid Society of Ethnic Groups and the Natural Environment in a Semi-arid Region, Central Eurasia

AXIS 5 Conceptual Framework for Global Environmental Issues

Theoretical and empirical analysis for building conceptual framework of global environmental issues.

- **5-1** Global Water Cycle Variation and the Current World Water Resources Issues and Their Perspectives
- **5-2** Interactions between the Environmental Quality of a Watershed and the Environmental Consciousness: With Reference to Environmental Changes Caused by the Use of Land and Water Resources
- **5-3PR** A New Cultural and Historical Exploration into Human-Nature Relationships in the Japanese Archipelago

Incubation Studies

1. Better understanding the interaction between carbon circulation and human activities in Asia (HONDA, Yoshiaki – Chiba Univ.)
2. Interactions betweens human and harmful biological agents in degraded freshwater ecosystems (KAWABATA, Zen'ichiro*)
3. Infectious diseases as a global environmental problem - A human ecological approach to insect-mediated diseases in tropical Asia (MOJI, Kazuhiko – Institute of Tropical Medicine, Nagasaki Univ.)
4. Environmental changes and human life in loess Plateau: the chinese environmental history (MURAMATSU, Koichi – Gakushuin Univ.)
5. Hypoxic environment at high altitude -Human aging and diseases in association with ecology, culture and nature- (OKUMIYA, Kiyohito*)
6. On-farm conservation: Environmental compatibility of a traditional farming system and lifestyle (SATO, Tadashi – Tohoku Univ.)
7. Historical Interaction between Nomadic States' Activities and Environmental Transformation in the High-Latitude Asian Steppe Region (SHIRAISHI, Noriyuki – Niigata Univ.)
8. A design of the self-reliant and sustainable local communities: A case study on Ise Bay basin area (TAKANO, Masao – Graduate School of Environmental Studies, Nagoya Univ.)
9. Change and stability in environment: Why do people have a fear of environmental change? (TAKEUCHI, Nozomu*)
10. Reconstruction of the high resolution environmental history and high-precision chronology by the analysis of annually laminated sediments (YASUDA, Yoshinori – International Research Center for Japanese Studies)
11. Cooperative society development for cross-national environmental issues in East Asia (ZHENG, Yuejun*)

*: RIHN

Research Axis 1

Environmental Change Impact Assessment

Impact of Climate Changes on Agricultural Production System in the Arid Areas

What impacts will the global warming or climate change have on the agricultural production system in arid areas? How can the system adapt to the changes and what measures should be applied to sustain productivity? This research project aims at identifying the direction and dimension of potential impacts and adaptations in the agricultural production system, based on the projection of future regional climate changes in the east coast of the Mediterranean Sea as the case study region. The basic structure and problems of the agricultural production system are to be elucidated through analyzing land and water management.

PROJECT LEADER ■ **WATANABE, Tsugihiro** — RIHN

CORE MEMBERS ■ **FUJINAWA, Katsuyuki** — Faculty of Engineering, Shinshu University
KIMURA, Fujio — Terrestrial Environment Research Center, University of Tsukuba
KOBATA, Tohru — Faculty of Life and Environmental Science, Shimane University
KOJIRI, Toshiharu — Disaster Prevention Research Institute, Kyoto University
TAMAI, Shigenobu —Arid Land Research Center, Tottori University
TANAKA, Kenji — Disaster Prevention Research Institute, Kyoto University
TSUJII, Hiroshi — Faculty of Bioresources and Environmental Sciences, Ishikawa Prefectural University
UMETSU, Chieko — RIHN
YANO, Tomohisa — Professor Emeritus, Tottori University
YATAGAI, Akiyo — RIHN
KANBER, Rıza (coordinator of the Turkish Team) — Faculty of Agriculture, University of Çukurova
ALTAN, Türker — Faculty of Agriculture, University of Çukurova
AYDIN, Mehmet — Faculty of Agriculture, Mustafa Kemal University
EKMEKÇİ, Mehmet — Faculty of Engineering, Hacettepe University
ERKAN, Onur — Faculty of Agriculture, University of Çukurova
EVERENDİLEK, Fatih — Faculty of Agriculture, Mustafa Kemal University
SAYDAM, Cemal — Faculty of Engineering, Hacettepe University
ÖZEKİCİ, Bülent — Faculty of Agriculture, University of Çukurova

Objectives of the Project — Consideration of Agricultural "Wisdom" through Projecting Impacts

As the world population grows and the demand for food increases, agriculture in arid areas is required to improve its productivity, while its development is severely restricted by water availability. In many arid regions of the world, the development of agriculture and irrigation has resulted in land degradation and desertification, and has also caused serious problems in the hydrological regime. The changes in agricultural land and water management practices pose serious threats to the sustainability of agriculture itself.

Moreover, future global climate change can provide climatological and hydrological conditions in arid region with substantial changes in temperature, rainfall and evapotranspiration, thus present another challenge or constraint to the agricultural production system.

Agricultural is basically a human activity. To cope with climate and other subsequent changes in natural conditions, humans have adapted to the new environment, or taken appropriate measures accordingly. Then now, is the conventional 'wisdom' of region or agriculture adequate enough to overcome the future global climate change?

This research project attempts to comprehend 'the agriculture as a system of relationship between human and nature', with a view to identifying current and future challenges, and effective countermeasures against possible climate changes.

Study Areas and Methods

The research of this project is being implemented in the Seyhan River basin (19,300km²) in the eastern

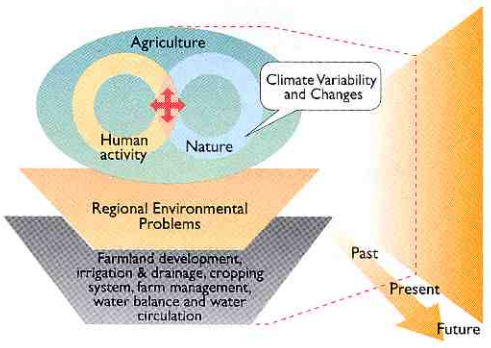


Figure 1 **Scope and Framework of the Research**
Agriculture is based on the interaction of human activities with the natural system including climate changes. This relationship is complex and causes various problems if they malfunction. This project aims at considering this interaction through the investigation of fundamental structure of land and water management as well as through the projections of abrupt climate changes and the assessment of their impacts.

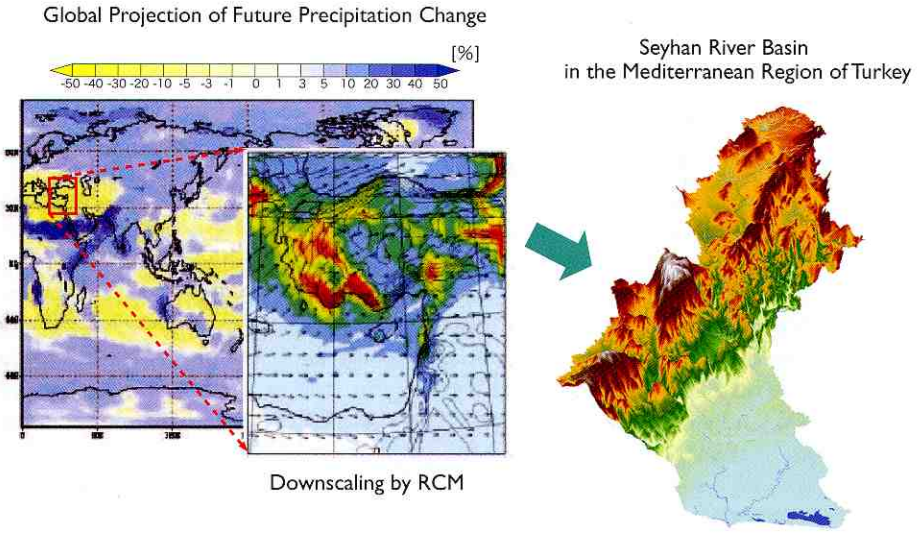


Figure 2 **Climate Change Projections and the Case Study Basin**

Mediterranean region of Turkey as its main case study area. In the upper hilly area of the basin, rainfed wheat production is widespread and large-scale irrigated agriculture producing maize, wheat, cotton, citrus etc., extends over the lower plain, which is dependent on the supply of water in reservoirs that receive run-off from winter precipitation in upper mountainous areas. Field research is carried out in cooperation with TÜBİTAK (The Scientific and Technical Research Council of Turkey).

We have been carrying out a comprehensive assessment of the basic structure of the agricultural production system with special reference to regional climate, land and water use, cropping patterns and the irrigation system. In parallel with this process, regional climate change prediction with higher resolution is being done using the latest Regional Climate Model to make a precise impact assessment.

Progress and Outcomes of the Project

Based on the baseline assessment of land and water management and future regional climate projections, at this stage, we are estimating the impact on the regional water resources, the irrigation and drainage system, natural vegetation, growth of crops, farm management and cropping patterns as well as the effect on food production and marketing, with some sub-models for various aspects of these issues.

Furthermore, we are going to integrate the results of the sub-topics or predictions in some specific phases or domains, developing a framework for predicting and evaluating the impact of future climate change and regional adaptability, with a diagram outlining elements that could be affected by climate change and their relationship. We aim at providing suggestions for regional policies and monitoring systems as well as accumulating information that will assist to analyze the relationship between climate/natural systems and human activities.

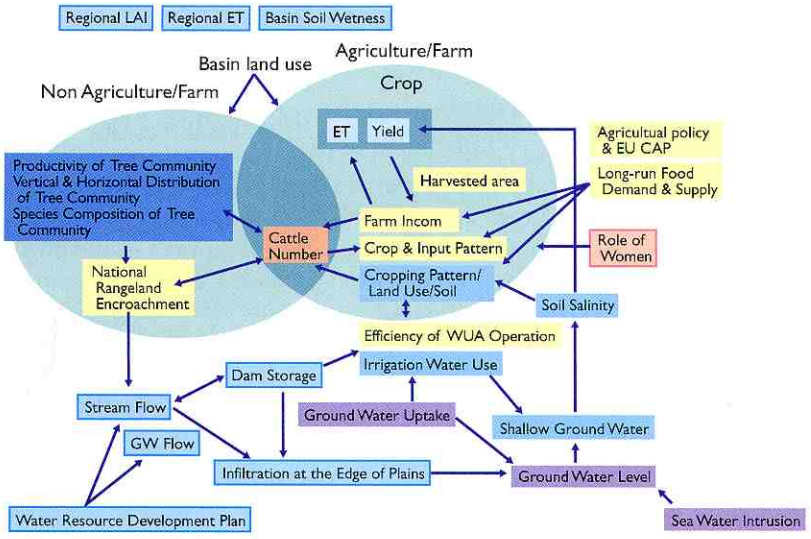


Figure 3 **Framework for Assessment of Climate Change Impacts on Agriculture Production System**

The framework diagram, developed for integrating the assessment of climate change impact on various aspects or spheres of agriculture in the case study, shows the elements that could be affected by climate change and their relationship. It represents the mechanism of how climate change impacts on an agricultural production system.

Research Axis I

Environmental Change Impact Assessment

Recent Rapid Change of Water Circulation in the Yellow River and Its Effects on the Environment

The recent crisis occurred in the Yellow River basin is complicated because natural climate fluctuation, global warming and change of land utilization may affect one another. We try to evaluate how land use changes affect to the water cycle over the Yellow River drainage basin and what kinds of effect may occur by the decreases of groundwater storage in the downstream to marine circumstance, through five years research. This study may be at the forefront of the ecological studies in the coastal zones where many people live, and we may be able to evaluate the effects on the marine products in the Sea of Japan through Bohai Sea and Yellow Sea.

PROJECT LEADER ■ **FUKUSHIMA, Yoshihiro** — RIHN

CORE MEMBERS ■
CHEN, Jianyao — School of Geographical Science & Planning, Zhongshan University
GAO, Huiwang — College of Environmental Science and Engineering, Ocean University of China
GUO, Xinyu — Center for Marine Environmental Studies, Ehime University
HIGUCHI, Atsushi — Center for Environmental Remote Sensing Research, Chiba University
HIYAMA, Tetsuya — Hydrospheric-Atmospheric Research Center, Nagoya University
IMURA, Hidefumi — Graduate School for Environment, Nagoya University
LIU, Changming — Institute of Geographical Sciences and Natural Resources, CAS
MA, Xieyao — Frontier Research System for Global Change
ONODERA, Shin-ichi — Faculty of Integrated Arts and Sciences, Hiroshima University
SATO, Yoshinobu — RIHN
SHINODA, Taro — Hydrospheric-Atmospheric Research Center, Nagoya University
TAKAHASHI, Atsuhiro — RIHN
TANIGUCHI, Makoto — RIHN
XIA, Jun — Institute of Geographical Sciences and Natural Resources, CAS
YANAGI, Tetsuo — Research Institute for Applied Mechanics, Kyushu University

Background and Objectives

Environmental problems related to water resources and management have been occurring all over the world. Since 1990, the frequency which river water in the Yellow River does not reach to the Bohai Sea has rapidly increased due to uptake of river water for irrigation in the midstream area. In the lower reaches area of the Yellow River basin, people suffer from a water shortage for irrigation, industrial purposes and drinking. In addition to these, the shortage of river water induces a decrease of the groundwater level and an increase of water pollution. Due to the increase in population and food demand on earth, it appears that cases like this will increase and become more widespread in the near future, worldwide. How we can recognize and resolve this problem is the most important and urgent issue facing humanity. The recent crisis, which occurred in the Yellow River basin, is complicated because factors like natural climate fluctuation, global warming and change of land utilization may affect each another. This research aims at enhancing knowledge for planning countermeasures in the Yellow River drainage basin, through the contribution from specific research fields by international collaboration with the Chinese Academy of Science and IGBP/LOICZ community.

Methods

We plan to achieve this study through the following sub-studies:

(1) Field observations and analyses on land-atmosphere interactions in the Loess Plateau,
(2) Field observations and analyses on interactions between river water, groundwater, and seawater in the Yellow River delta,
(3) Development of socio-economical model for sustainable developments,
(4) Development of ecological model of Bohai Sea, and then,
(5) Development of an integrated model to evaluate the effects of land use change on the water circulation in the Yellow River basin.

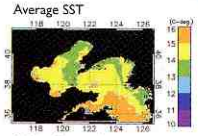
Expected Results

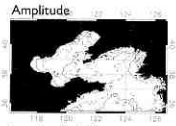
We wish to get how land use change affect to water cycle over the Yellow River drainage basin and what kinds of effects may occur by the decrease of groundwater storage in the downstream to marine circumstance through five years research. This study may be at the forefront of the ecological studies in the coastal zones where many people live, and we may be able to evaluate the effects on the marine products in the Sea of Japan through Bohai Sea and Yellow Sea.

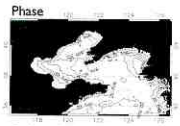
Basin area: 752,443km^2
River length: 5,464km
Precipitation: 452mm (upstream from Zhengzhou)
Discharge: 581.6×10^{8}m^3 (Lijin)
Modified from Wang et al., 2001, and Zhang et al., 2001

Study area: Yellow River Basin

Harmonic analysis of SST (Sea Surface Temperature) of the Bohai Sea from satellite



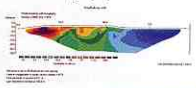


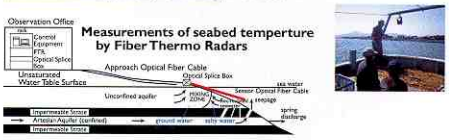


Development of ecological model of Bohai Sea

Continuous measurements of SGD by automated seepage meters

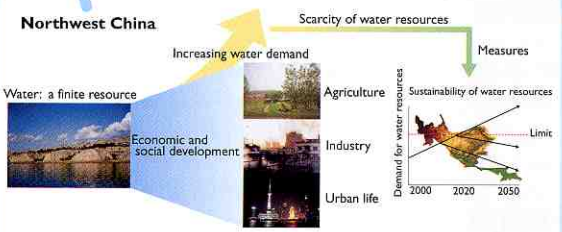
Evaluation of freshwater-seawater interface by resisitivity measurements with tomography



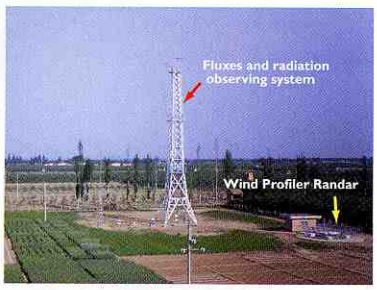


Interaction between groundwater, seawater and river water

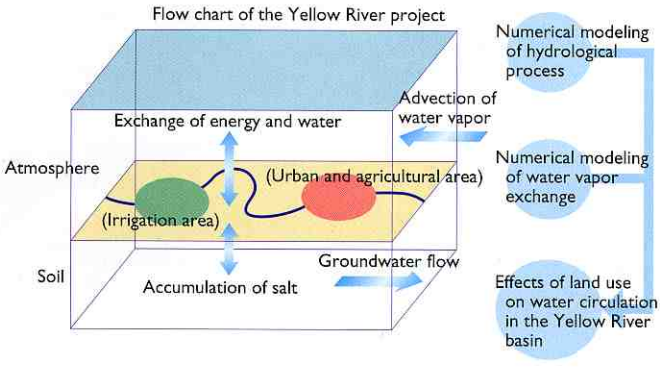
Northwest China



Socio-economical model for sustainable development



Land-Atmosphere Interacions



Synthesis by development of hydrological model

Research Axis 2

Human Activity Impact Assessment

Emissions of Greenhouse Gases and Aerosols, and Human Activities in the East Asia

The recent economic growth in the East Asian region is being watched with keen interest. The relationship between human activities and emissions of greenhouse gases and aerosols in this region are being studied through the collaboration of socioeconomic analysts and atmospheric scientists. This research project consists of a macro-analysis of the economic situation, development of an emission inventory, analysis of atmospheric transport using the model and satellite data, and ground-based observation within Japan and China.

PROJECT LEADER ■ **HAYASAKA, Tadahiro** — RIHN

CORE MEMBERS ■ **HAYASHIDA, Sachiko** — Nara Women's University
IWAMI, Toru — The University of Tokyo
KAWAMOTO, Kazuaki — RIHN
NAKAJIMA, Teruyuki — The University of Tokyo
NAKAZAWA, Takakiyo — Tohoku University
SAEKI, Tazu — RIHN
SHI, Guangyu — Institute of Atmospheric Physics, CAS, China

Objectives

The objectives of the present research project are to investigate:

1) the relationship between changes in the economy, industry, social systems under globalization and changes in anthropogenic emissions of greenhouse gases and aerosols, and
2) influences of these greenhouse gases and aerosols emitted in the Asian region on global-scale atmospheric environment and climate change.

Strategy

While most studies similar to this research project are primarily carried out by atmospheric scientists, viewpoints on human activities are emphasized in this study.

1) Socioeconomic analyses on the anthropogenic emissions are being carried out. Changes in land use, consumption, quality, and transport process of energy for the past 20 years in Asia, are being analyzed.
2) Regional emissions of greenhouse gases and aerosols due to human activities are being estimated through the analysis of observed and atmospheric transport model simulations.
3) The effects of greenhouse gases and aerosols emitted by human activities in Asia are being evaluated synthetically.

Outcomes up to the Present

- It has been discovered that the energy consumption in the energy transformation sector has increased dramatically since 1980 in China. Coal consumption has tended to decrease slightly while oil and gas consumption is increasing (Fig. 1)
- Emission inventories of CO_2, SO_2, NOx, BC and OC in the Asian region have been developed for 1980-2000.
- Atmospheric transport models have been developed and improved for the analysis of greenhouse gases and aerosols. This shows that spatial resolution is quite important for consistency of observed data. The aerosol indirect effect is estimated by comparing the simulated aerosol concentration and effective particle radius and optical thickness of clouds retrieved from satellite measurements (Fig. 2).
- Surface shortwave radiation in China for the past few decades was analyzed by using pyranometer data,

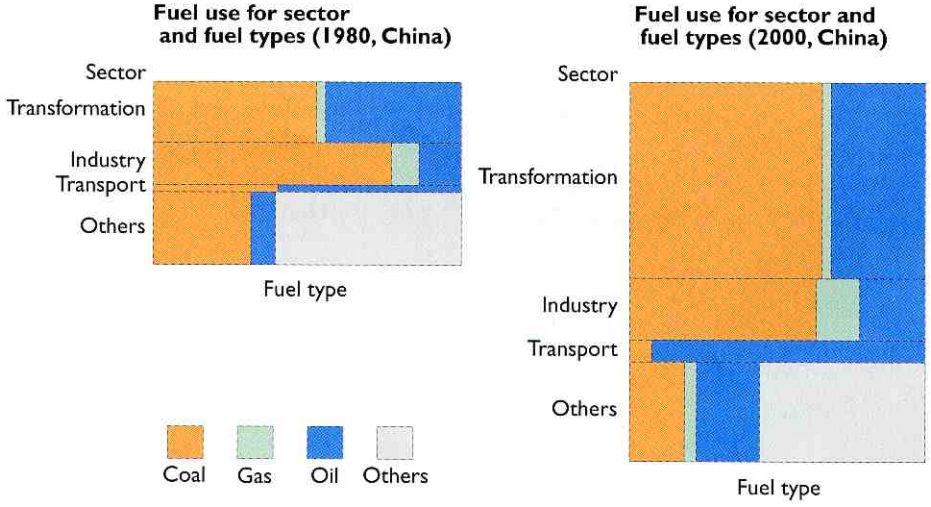


Figure 1 **Changes in Energy Consumption in China between 1980 and 2000**
It is found that an increase in the energy transformation sector is large.

satellite data and parameterized data with meteorological data. All these data show a decrease trend in surface shortwave radiation in this region. Cloud amount decreased while aerosols increased. It is deduced that both the direct and indirect effects of aerosols have given rise to the decrease in shortwave radiation,

- CO_2 and CH_4 measurements in LongFengShan, ShangDianZi, and LinAn in China were obtained. These are the first measurements in China except for WaliGuan which has the WMO/Gaw station. The observed data shows that the average concentration and seasonal variation of CO_2 are greater than that observed in Japan (Fig. 3).

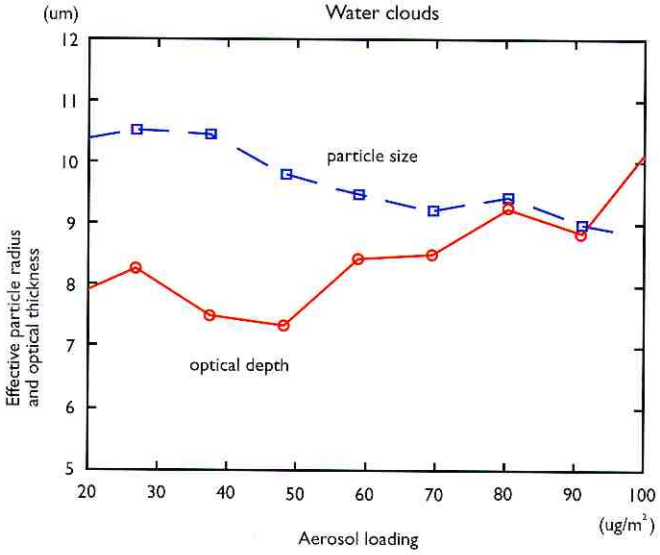


Figure 2 **The Relationship between Aerosol Loading Calculated by Atmospheric Transport Model and Cloud Properties, i.e., Effective Particle Radius and Optical Thickness, Retrieved from Satellite Measurements**

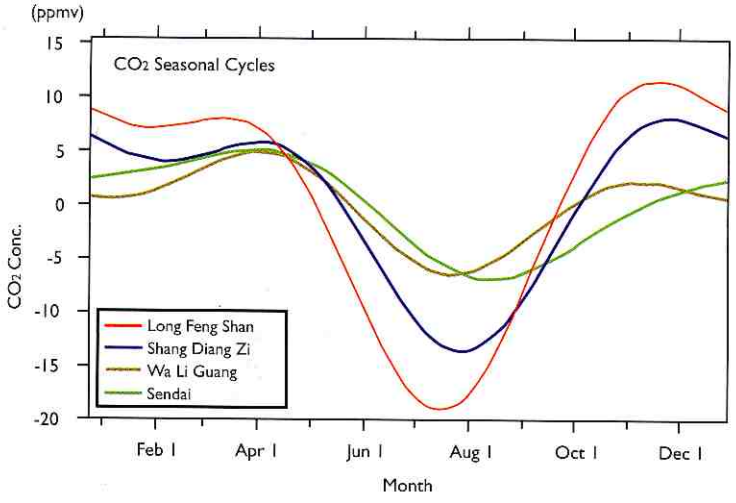


Figure 3 **Seasonal Variations of CO_2 Concentration in China and Japan (The vertical axis shows the difference from each annual average value)**

Research Axis 2

Human Activity Impact Assessment

Sustainability and Biodiversity Assessment on Forest Utilization Options

Terrestrial biodiversity has decreased mainly because of the loss and/or deterioration of forest ecosystems. A system to utilize forest resources while conserving biodiversity should be developed. This project aims to elucidate the socio-economic background causing forest decrease, its effects on biodiversity, and ecological services that might be lost as a consequence of biodiversity loss. We also evaluate the forest-use options both from ecological and socio-economical aspects to develop a sustainable utilization system.

PROJECT LEADER ■ **NAKASHIZUKA, Tohru** — RIHN

CORE MEMBERS ■
AIBA, Shin-ichiro — Faculty of Science, Kagoshima University
AKAO, Ken-ichi — Graduate School of Social Sciences, Waseda University
ICHIKAWA, Masahiro — RIHN
KITAYAMA, Kanehiro — Center for Ecological Research, Kyoto University
KOHYAMA, Takashi — Graduate School of Environmental Earth Science, Hokkaido University
MOMOSE, Kuniyasu — Faculty of Agriculture, Ehime University
NIIYAMA, Kaoru — Forestry and Forest Products Research Institute
SATO, Jin — Graduate School of Frontier Science, the University of Tokyo

Background

The decrease in and deterioration of forest ecosystems is the major reason for a drastic loss of terrestrial biodiversity.

A sustainable management system to conserve biodiversity should be developed.

Purposes of the Project

(i) To clarify historical change in forest utilization and its social- and economic background.
(ii) To assess the impact of forest utilization on biodiversity.
(iii) To evaluate the function and ecosystem service provided by forest biodiversity.
(iv) To develop an integrated evaluation system for sustainable forest utilization.

Research Sites

1) Lambir National Park, Malaysia (Tropical rain forest area)
2) Kinabalu National Park, Malaysia (Tropical montane forest area)
3) Yaku Island (Temperate evergreen forest area)
4) Abukuma Mountains (Temperate deciduous forest area)

Expected Results

1) Basic information applicable for criteria and indices of sustainable forest management.
2) Evaluation methodology for the ecological services that will be lost by a decrease in biodiversity.
3) Elucidation of socio-economic causes that brought about forest deterioration and global comparisons.

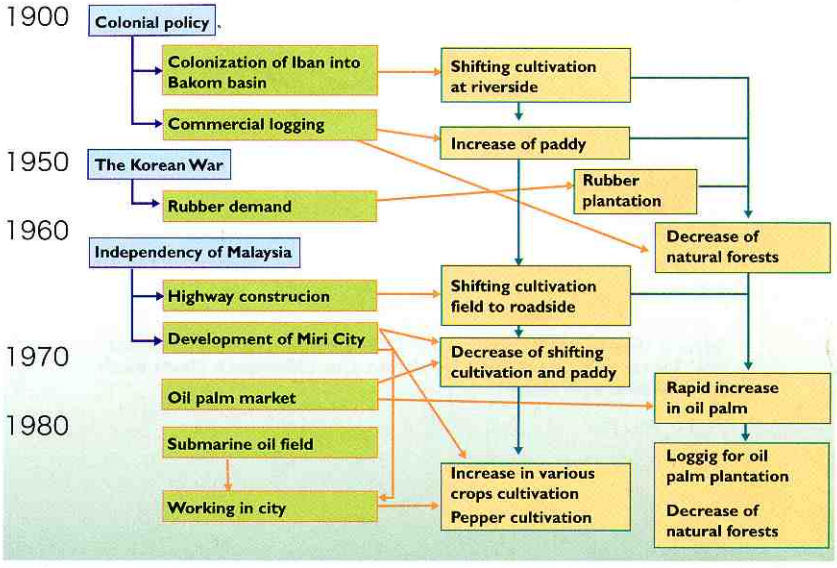


Figure 1 **Drivers to Cause the Change in Land Use in Lambir**

4) Models to predict the change in forest-use and biodiversity in the future and criteria to design spatial arrangements of forest-use.

Outcome Up to the Present

1) The change in forest utilization and the factors driving it have been analyzed for the past 40-100 years (Fig. 1).
2) A biodiversity assessment was conducted for various types of forest use, and tools for future projection of the biodiversity are being developed (Fig. 2).
3) Ecological services that are in crisis due to the loss of biodiversity have been analyzed.
4) Biodiversity resource utilization by local people has been elucidated in terms of forest use (Fig. 3).

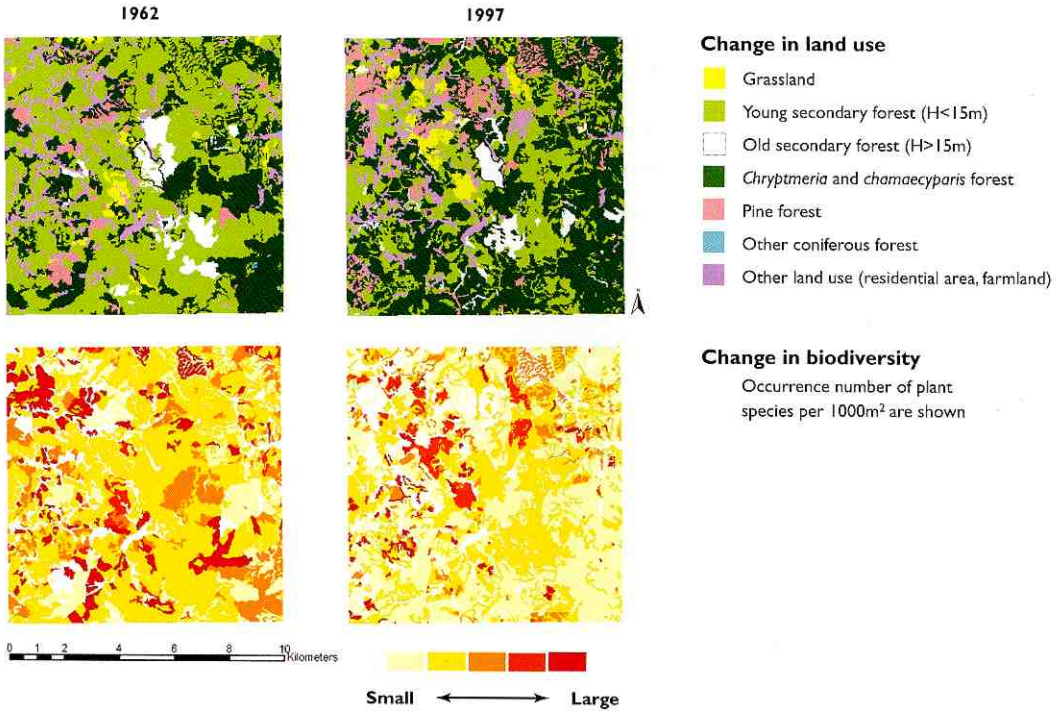


Figure 2 **Spatial Aassessment of Biodiversity Change**

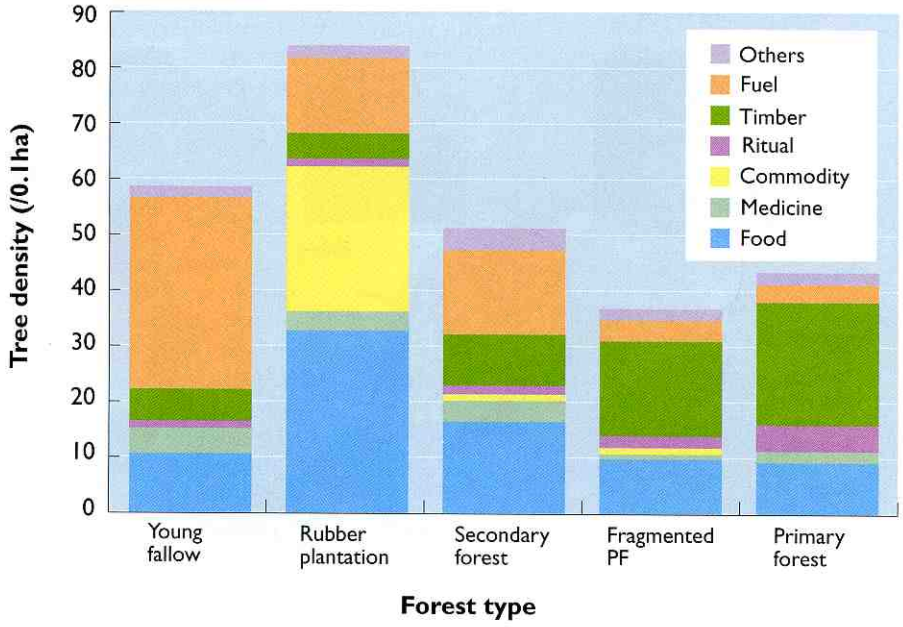


Figure 3 **Plant Resource Utilization and Forest Types**

Research Axis 2

Human Activity Impact Assessment

Human Activities in Northeastern Asia and Their Impact on the Biological Productivity in North Pacific Ocean

Recently, we have recognized a possible function of continental forests feeding fish in ocean. In this study, we will investigate how the Amur River transports nutrients such as iron from forests to the Sea of Okhotsk and supports biological productivity there, and clarify to what extent the human activities on the Amur basin may disturb this material linkage, in order to create an ideal relationship between land and ocean ecosystems including humankind.

PROJECT LEADER ■ **SHIRAIWA, Takayuki** — RIHN

CORE MEMBERS ■
HARUYAMA, Shigeko — Graduate School of Frontier Sciences, the University of Tokyo
KAKIZAWA, Hiroaki — Graduate School of Agriculture, Hokkaido University
KISHI, Michio — Graduate School of Fisheries Sciences, Hokkaido University
KONDOH, Akihiko — Center for Environmental Remote Sensing, Chiba University
KUMA, Kenshi — Graduate School of Fisheries Sciences, Hokkaido University
MATSUDA, Hiroyuki — Graduate School of Environment and Information Sciences, Yokohama National University
NAGAO, Seiya — Graduate School of Environmental Earth Science, Hokkaido University
NAKATSUKA, Takeshi — Institute of Low Temperature Science, Hokkaido University
SHIBATA, Hideaki — Field Science Center for Northern Biosphere, Hokkaido University
TACHIBANA, Yoshihiro — Liberal Arts Education Center, Tokai University
UEMATSU, Mitsuo — Ocean Research Institute, the University of Tokyo
WAKATSUCHI, Masaaki — Institute of Low Temperature Science, Hokkaido University
YOH, Muneoki — Institute of Symbiotic Science and Technology, Tokyo University of Agriculture & Technology

Background

Recent studies in the northern North Pacific have revealed that biological productivity is limited by iron availability there. Because iron can be hardly dissolved in water, phytoplankton largely relies on the iron supply from land via the atmosphere and/or rivers. In contrast to the central region of the northern North Pacific, the phytoplankton productivity is very high in the Sea of Okhotsk, probably due to the sufficient supply of iron from the Amur River. Riverine iron cannot keep dissolved in the seawater without being a complex with humic substances created in forest and wetland. Therefore, changes in land uses on the Amur basin such as deforestation, forest fire, cultivation, urbanization and/or reduction of wetland may possibly reduce the biological productivity in the Sea of Okhotsk and the northwestern area of North Pacific Ocean.

Objectives

In this study, we try to answer following four questions. 1) How large is the discharged flux of materials such as iron from the Amur River, how far the iron is transported offshore and to what extent the iron is con-

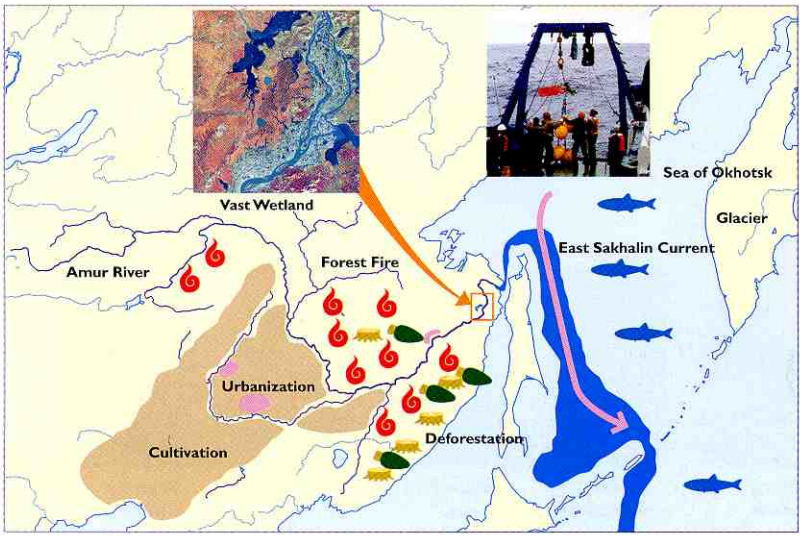


Figure 1 **Study Area**
Human activities in Amur River basin and flowing out of the river water into Okhotsk sea and North Pacific Ocean.

tributing to the biological productivity in the Sea of Okhotsk. 2) What is the factors controlling the release of materials such as iron from the land to the Amur River in the natural and/or artificially altered land surface conditions in the Amur basin. 3) To what extent the economic and political systems around Northeast China and Far East Russia change the land uses in the Amur basin in the past, present and future. 4) How variable are the water and material cycles around the Amur basin and the Sea of Okhotsk in the natural conditions.

Current Status

We have conducted 1) preliminary field trips to various parts of the Amur River basins; 2) compilation and preliminary analyses of the biogeochemical data collected historically in the Amur River system; and 3) the construction of a cooperative research network with Russian and Chinese institutions, during the Pre Research stage in 2004. A ship cruise was operated from Blagoveshchensk to Nikolaevsk-na-Amure, where we took preliminary samples of river water. In addition, we visited Sanjyang Plain where the land surface has most significantly changed recently. From Chinese scientific articles we found that approximately 10,000 km^2 of wetland was reclaimed to form paddy fields from 1980 to 2000. As for the historical biogeochemical data, we mapped the distribution of Fe concentration (mg/l) in the middle and the lower parts of the Amur River basin. We also attempted to map spatial distribution of areas where land-surfaces were disturbed by natural and/or anthropogenic reasons. The impact factors include forest fire, forest cutting, urbanization and various types of agricultural activities. From the analyses mentioned above, we came to a preliminary conclusion that Sanjyang Plain is one of the key areas on which we need to focus, during the project. We have decided to collaborate with a total of 8 different institutions from Russia and China. The international collaborative project will start from April 2005 and continue to March 2010.

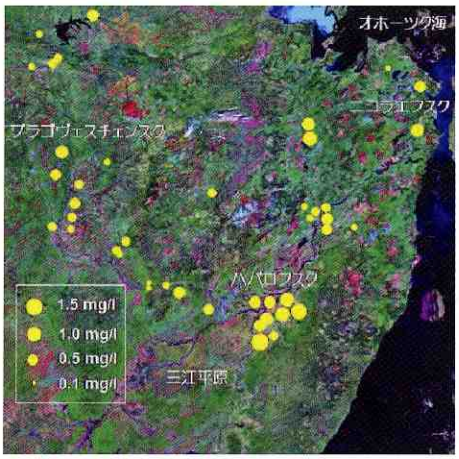


Figure 2 **Land Surface Conditions and Fe Concentrations in the Middle and the Lower Amur Bsin**

Spatial distribution of Forest (green), disturbed forest and land surfaces by forest fire, logging and agricultural activities (red and pink) in the Amur River basin. The sizes of the yellow circle indicate Fe concentration (mg/l) in the middle and the lower Amur River system in 2002.

Figure 3 **Research Platforms and Experimental Drainage Basins of the Project 2-3**

Multi-Disciplinary Research for Understanding Interactions between Humans and Nature in the Lake Biwa-Yodo River Watershed

Focusing on the importance of the characteristic spatial scales of a watershed, we develop and test a methodology for watershed diagnosis and consensus-building through interdisciplinary research. This methodology will help the residents and administration to conduct watershed management, and to elucidate possible future scenarios of the watershed. This is a challenge towards a synthetic understanding and resolution of global environmental problems.

PROJECT LEADER ■ **YACHI, Shigeo** — RIHN

CORE MEMBERS ■ **HARA, Yuuichi** — Pacific Consultants Co., Ltd.
NAKANO, Takanori — RIHN
TANAKA, Takuya — RIHN
TAYASU, Ichiro — Center for Ecological Research, Kyoto University
WAKITA, Ken-ichi — Faculty of Sociology, Ryukoku University

Aim of the Project: Watershed Management Research to Contribute Towards Synthetic Global Environmental Studies

The land on Earth contains watersheds that are diverse in climate, culture and history. Today, human activities relating to each watershed cause not only regional environmental problems but also global environmental problems through climatic, oceanic processes and global economy beyond the watershed spatial scale of each. Thus, revealing inherent environmental problems in each watershed and its management is an important basis to work on *global environmental issues in the sense of a global scale*.

A watershed, however, is a spatially heterogeneous unit. It contains not only an incline structure of upstream and downstream but is also composed of a main river as well as various tributaries branching out like a tree. This hierarchical (or nested) structure of its river systems affects not only characteristics of ecosystems but also human activities, administrative districts and social decision making therein. Therefore, in the process of building consensus with regards to a watershed, it is important to pay careful attention to this fact, i.e., there can be much disagreement between scales regarding what the main issue is on watershed management.

A watershed environmental issue is characterized by its own natural conditions and history, however, at the same time, it is driven to emerge on the Earth independently through the common properties of watersheds such as in the hierarchical structure mentioned above. Thus, a watershed environmental issue, which seemingly has a limited effect as to spatial scale, is also a *global environmental issue in the sense that the mechanism of emerging is universally built into watersheds on the Earth*.

Based on this thought process, this project's aim is to seek an effective partnership of scientists, residents and administration through field work on a watershed environmental issue, aiming to develop a methodology for watershed diagnosis and consensus-building as a synthetic approach to global environmental problems.

Methods: Watershed Management Scheme Considering Hierarchy and Interdisciplinary Partnership

To overcome the difficulty arising from the watershed nested structure, we proposed a *watershed management scheme considering hierarchy explicitly*, as a model watershed management system. Based on this model, we are working on a water environmental issue in the *Lake Biwa-Yodo River watershed* (Fig. 1), one of the most intensively human-dominated watersheds in Japan.

In the Lake Biwa watershed, we are focusing our research on the relationship between agricultural drainage and Lake Biwa as a representative case of a trans-scale issue (Fig. 2). For this purpose, we conduct our research activities at three spatial scales related to water environmental management (Fig. 3). We are seeking for a way which enables both the conservation of regional environment and the reduction of the environmental load to Lake Biwa through an interdisciplinary partnership of four working groups; *material cycling, social & cultural system, ecosystem, and watershed information & modeling*. 1) We will test the possibility of adaptive management by stakeholders with our aid of monitoring and developing diagnosis indicators at each scale, and 2) develop a methodology for sharing what the main issue is for watershed management between scales.

In the Yodo River watershed, we aim to extract a critical structure of water environmental issues based on the research activities in the Lake Biwa watershed.

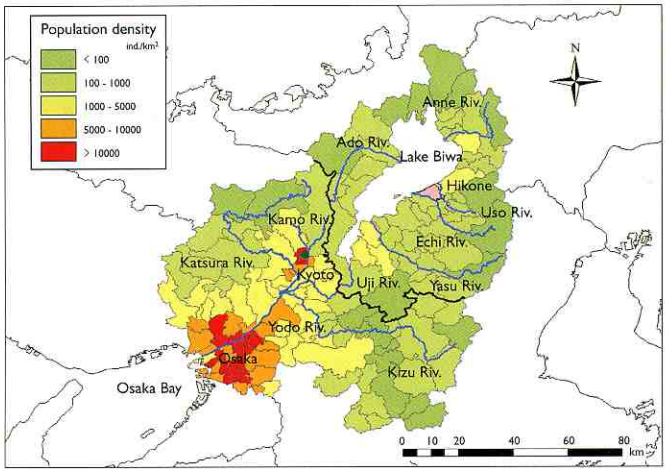


Figure 1 **The Lake Biwa-Yodo River Watershed**

The Lake Biwa-Yodo River watershed consists of two parts. (1) *The Lake Biwa watershed* (the upstream part) contains Lake Biwa, the largest lake in Japan, the catchment area of which roughly coincides with Shiga prefecture and has a large farming area. (2) *The Yodo River watershed* (the downstream part to Osaka Bay) contains city areas like Kyoto and Osaka. Only the main stream of each river system is indicated. Our principal research field, Inae district ■ in Hikone city, lies in the Lake Biwa watershed, and RIHN ● in Kyoto in the Yodo River watershed. The population density is based on the data of the year 2003.

Figure 2 **An Example of Turbid Water Flowing into the Lake Biwa**

Agricultural drainage flows into Lake Biwa (paddy field→drainage →river→Lake Biwa). The muddiness of lake water is remarkable at the estuary of rivers and along the coast of Lake Biwa, especially from the Eastern Area to the Northern Area of the watershed.

Figure 3 **Research Activities at the Three Scales**

Our research activities are done with the aid of the residents and administrations at the three spatial scales in the Lake Biwa watershed (Shiga prefecture): the Lake Biwa watershed, Inae district in Hikone city, and the towns in Inae district. In addition to research activities in the three scales, modeling and GIS are used for bridging the scales, to find a watershed management methodology.

Progress and Future Perspective

(1) Relationship between Lake Biwa and the rivers

The results of watershed diagnosis methods including stable isotope ratios, suggest that small rivers in the East Area of the Lake Biwa watershed may have a large impact on the water quality of Lake Biwa.

(2) A synthetic image of the agricultural drainage issue in the Lake Biwa watershed

By synthesizing the results of sociological, ecological and material cycling research at macro, meso and micro scales, we obtained a synthetic image of the agricultural drainage issue from upstream (change of farming policy, community and its irrigation system) to downstream (pollutant load from agricultural drainage on water quality and ecosystems of Lake Biwa).

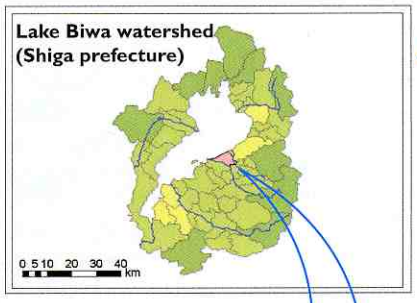
(3) Research on the Yodo River watershed

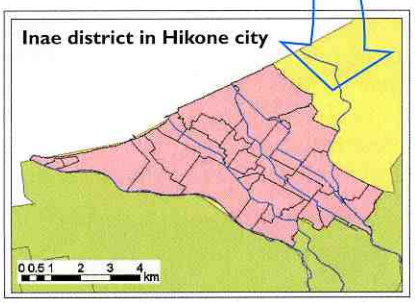
The human pollutant load in the Lake Biwa-Yodo River watershed has accumulated and affects ecosystems at the estuary of the Yodo River, leading to for e.g., enhancement of eutrophication of Osaka Bay. Based on water quality sampling along the Yodo River and existing data sets, we estimated the nutrient load and made an intensive review of the frequency of algal bloom and the mechanisms of the emergence of anoxic water at the estuary of the Yodo River.

This 2005 fiscal year, we are working to finish the fieldwork. By promoting the project products, such as the GIS database, modeling, the synthetic report, we are extracting the essence of a methodology for watershed management.

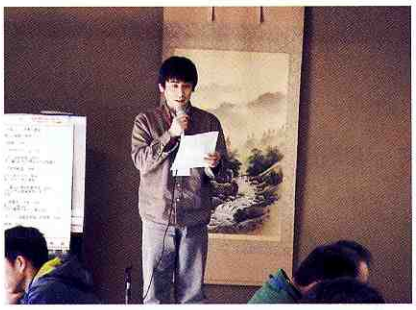
A Fixed Point Observation of Lake Biwa by the Observatory Ship Hasu (CER, Kyoto Univ.)

Measurement of the Agricultural Drainage Effect on Water Quality





Towns in the Inae district



Workshop on Making a Regional Environmental Vision

For details, please see the project home page:
http://www.chikyu.ac.jp/biwayodo/index_e.html

Research Axis 3

Spatial Scale

Interactions between Natural Environment and Human Social Systems in Subtropical Islands

A variety of environmental problems have arisen on islands around the world, leading to the deterioration of precious natural environments and the disappearance of local cultures. In order to resolve environmental issues on islands, it is necessary to thoroughly understand the interaction between natural environments unique to islands and the human social systems on those islands. This research project focuses on the vulnerability of islands as a clue to resolving these problems using Iriomote Island in Okinawa Prefecture as a model. Based on these research results, it aims to provide guidelines for building island human social systems with future possibilities.

PROJECT LEADER ■ **TAKASO, Tokushiro** — RIHN

CORE MEMBERS ■ **ARAMOTO, Mitsunori** — Tropical Biosphere Research Center, University of the Ryukyus
INOKURA, Youji — Faculty of Agriculture, Kagoshima University
KUBOTA, Yasuhiro — Faculty of Education, Kagoshima University
MAEKADO, Akira — Faculty of Law and Letters, University of the Ryukyus
OSHIRO, Hajime — Center for Asia-Pacific Island Studies, University of the Ryukyus
SAKAI, Kazuhiko — Tropical Biosphere Research Center, University of the Ryukyus
SATOI, Yoichi — Faculty of Education, University of the Ryukyus

Research Background and Objectives

On islands around the world, precious natural environments are falling into ruin as a result of water resources, industrial and other development programs and this is leading to the disappearance of local cultures. A thorough understanding of the interaction between the natural environment and human social systems on islands is required to resolve these issues. Islands have a limited geographical expanse and, therefore, display a combination of uniqueness and vulnerability in both the natural environment and human social systems. In this project, environmental issues related to these island characteristics are selectively studied. Iriomote Island is a typical humid subtropical island that, even today, has rich water and forest resources, and, therefore, can be considered an ideal locale for the study of island environments.

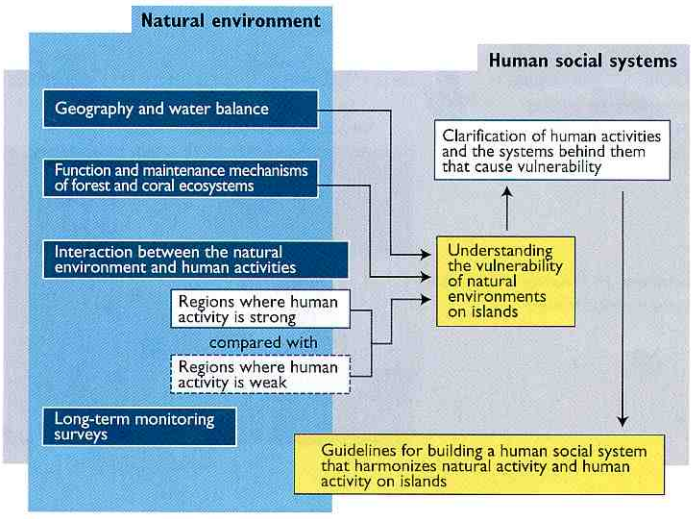


Figure 1 **Framework of the Project**

Research Contents

The project will initially focus on studies to identify the current state of natural environments and human social systems on Iriomote Island. Then, based on the results, research will be developed to deepen understanding of the vulnerabilities of islands with a view to finding solutions to problems confronting them.

1) We will review the topographical changes that have taken place over time in forests, rivers and coasts, together with the state of land use for agriculture and other purposes. We will clarify the relevance of these changes to natural disasters, government policies and measures, and industrial activities. A water balance model will be created for Iriomote Island based on precipitation, river water and evaporation measurements and this model will be used as a guide for future water usage. Hydrologic data have been accumulated since the fiscal year 2004.

2) We will conduct studies into the functions and maintenance mechanisms of broadleaf and mangrove forest ecosystems, as well as those of coral reef ecosystems, along with investigations into the biodiversity of these ecosystems and the interactions among organisms living there. We have commenced ecosystem monitoring surveys, keeping in mind global warming anticipated for the future. Also surveyed will be the routes by which foreign plants and animals have been introduced and their impact on the indigenous ecosystems.

3) We will study the impact of industrial human activities on the natural environment through a comparison of areas where such impact has been strong and where it has been weak. Specifically, comparisons will be made between afforested land and nearby broadleaf

forests, as well as coral reefs that have been strongly affected by soil washout and other such phenomena and those not affected.

4) We will study the background of human activities that lead to deterioration of the environment from the perspectives of types of industry that form the foundation of life, population demographics, and government policies and measures. A particular focus of attention will be social system changes characterized by the transition from a community based on traditional agriculture to the present one dependent on tourism. We have collected information relevant to the above mentioned aspects and produced data bases.

Expected Results

The following results will contribute to building island social systems with future possibilities.

1) Detailed examples on Iriomote Island can deepen understanding of the vulnerabilities of islands and, at the same time, can provide guidelines for solving environmental problems many islands have in common.

2) Theoretical explanations of the rich water resources characteristic of Iriomote Island can be attained. This will provide a guide for solving water shortage problems on other islands as well.

3) Clarification of the interactions among organisms on Iriomote Island will deepen understanding of what is necessary to continuously support the forest and coral reef ecosystems of subtropical islands.

4) Appreciating the characteristics of islands and better understanding the impact that human activities have on the natural environment, as well as the human social systems behind these activities, will increase comprehension of the whole concept of resilient and complementary human activities and human social systems that do not place a burden on the natural environment.

Scichi Festival (Sonai area): Iriomote Island is a globally rare typical humid subtropical island located at the southwestern tip of the Ryukyu island chain. This island provides a suitable place to conduct the study of the natural environment. The island's lifestyle developed uniquely despite influence from neighboring countries and regions. (photo: F. Sakuma, Nature image)

Evaluation of Water Balance on Iriomote Island (photo: Watanabe hydrologic planning)

Clarification of Forest Functions and Maintenance Mechanisms

Evaluation of Industries that form the Foundation of Life

Research Axis 4

History and Time Scale

Historical Evolution of the Adaptability in an Oasis Region to Water Resource Changes

The Oasis Project is a research project aiming at reconstructing the history of the interaction between people and nature for the last 2000 years in a Chinese arid region. The project adopts a trans-disciplinary approach, integrating the studies of history, archeology, ethnology, economics, hydrology, meteorology, climatology, glaciology, biology, and agriculture. In this way, we may learn something important for creating our new manner of living that could assure future capability.

PROJECT LEADER ■ **NAKAWO, Masayoshi** — RIHN

CORE MEMBERS ■ **ENDO, Kunihiko** — Collage of Humanities and Sciences, Nihon University
FUJII, Yoshiyuki — National Institute of Polar Research
FUJITA, Koji — Graduate School of Environmental Studies, Nagoya University
KATO, Yuzo — RIHN
KONAGAYA, Yuki — National Museum of Ethnology
KUBOTA, Jumpei — RIHN
SATO, Atsushi — National Institute for Earth Science and Disaster Prevention
SOHMA, Hidehiro — Faculty of Letters, Nara Women's University
SUGIYAMA, Masaaki — Graduate School of Letters, Kyoto University
TAKEUCHI, Nozomu — RIHN
WATANABE, Tsugihiro — RIHN

Research Content

The major research field is in and around the Heihe region in central Eurasia, where outstanding human cultures have developed, for the last 2000 years. The history of the region will be reconstructed by examining historical documents, and varieties of proxies such as ice cores from glaciers, tree-ring samples, and lake sediment cores. The water circulation system in the basin: water resources and demands placed on them will be also studied, in order to interpret the data properly from documents and the proxies. Interviews with local people and field observations will help determine how much water is required for agriculture and nomadic lifestyles, and the transport of water from rainwater, to glaciers, rivers, ground water, and evapo-transpiration. This will enable us to understand what "development" and "sustainability" is, which are considered most crucial in facing "global environmental problems."

Recent Water Shortage

The Heihe River, the second largest inner river in China, flows from a glaciated zone in the Qilian Mountains north through Gansu Province and disappears into terminal lakes in Inner Mongolia. The basin is divided into three zones depending on altitude. The upper reaches are in a mountain zone, where many glaciers have developed, and where the Yugu people keep animals in the piedmont area. The middle reaches include several oases, where many Han people have moved, dependant mainly on irrigation agriculture (oases zone). The lower reaches are in a desert zone, where Mongol people are dependant on stock farming.

It was recently found that terminal lakes of the Heihe River have disappeared. Also, the vegetation in the lower reaches is becoming poorer and poorer, and many shallow wells have dried up. Thus, the water shortage has become obvious, especially in the lower reaches.

Examining the change of the July First Glacier in Qilian Mountains, shown in Photo, we found that as much as one tenth of the glacier volume has been lost during the 28 years from 1975 to 2003. This could be attributed to the recent warming, which has been recorded at many meteorological stations in and around the basin. This indicates that the amount of volume loss has been supplied additionally to the river: the total amount of river discharge is larger than the total amount of precipitation. A gradual increase of discharge observed at a site where the river flows into the oases zone, as shown with blue symbols in Figure 1, is in agreement with the glacier shrinkage.

Photo **The July First Glacier**
Melt water discharges from the terminus.

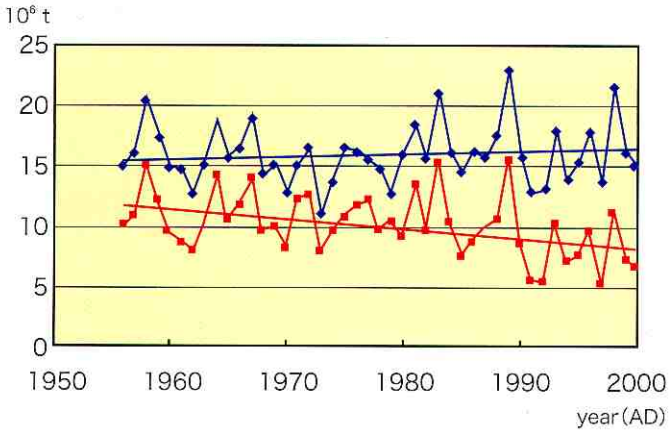


Figure 1 **Change in River Discharge (10^6 t/a)**

Figure 1 shows a change in rate of river discharge for the last half a century at two gauging stations: one at the mountain foot between the upper and middle reaches (blue), and the other at the exit from the oases zone to the desert zone located between the middle and lower reaches (red). It can be seen that the amount of river flow into the oases zone from the mountain zone has increased slightly as mentioned above, while outflow from the oases zone to the desert zone has decreased significantly in the same time period. This indicates that the water use in the middle reaches (oases zone) has risen very rapidly. The rapid increase would have been caused by a sharp increase of farm land corresponding with a rapid increase of the population in the basin. In order to compensate for the shortage of river water, water use from wells has drastically increased: 0.06 Gt/a in 1980s and 0.37 Gt/a in 1999, a six-fold increase in only 20 years. The increase in groundwater consumption could also be attributed to the so called "Environmental Immigration," which means in this case the relocation of stock farming people from the piedmont area to oases zone, in order to prevent their animals from damaging the forest and encourage them to keep the animals in barns. With this change in the style of animal keeping, they started requiring feed, which is to be planted on newly cultivated land. Also, the water for the feed plantation is to be supplied from groundwater, because water rights to river water have long been kept, among traditional farmers. A similar situation takes place in the lower reaches, where the stock farmers who keep their animals in Gobi-areas, started using groundwater quite intensively. It is considered, therefore, that the water shortage is only being overcome by heavily consuming the groundwater, leading to a decrease in the amount of water storage in the basin.

Historical View

Increase in population in the basin has taken place in the past. In the lower reaches, there are several old cities and old towers for fire signals, which were constructed in the Han Dynasty for protection against invasions by the Hunnu. The Heicheng city in this area is considered to have been founded in the Xixia Dynasty, and then enlarged in the Yuan Dynasty. At Lucheng city, there are relics of old irrigation channels, showing development of large-scale hydraulic construction in old times. The distribution of many ruined cities and farmland, extending from the irrigation channels, indicates that the lower reaches of the basin were in a state of prosperity and had sufficient water for at least certain eras in history. Even at the beginning of 20th century, when many explorers visited the lower reaches, a very dense forest existed, which was recorded in a film taken by an explorer. As past societies in the area used irrigation systems for agriculture, similar water shortages could have occurred in the basin when the population was as large as the present population. Figure 2 shows the irrigation system in the Qing Dynasty. Some of the channels are still presently in use.

An ice core analysis from Qilian Mountains indicates that air temperature seems to have decreased gradually through the end of the Yuan Dynasty into the early Ming Dynasty, which is in contrast with the present warming trend. Cooling should have caused glaciers to develop, and river discharge could have been smaller with the development of glaciers. Old documents provide a clue that flooding was a problem rather than water shortage in the Xixia Dynasty, while water shortage was a problem in the Yuan Dynasty.

Nonetheless, to obtain more clues to help solve the present water shortage problems, it is important to examine the historical evolution of the inter-relation between natural and social systems in the basin.

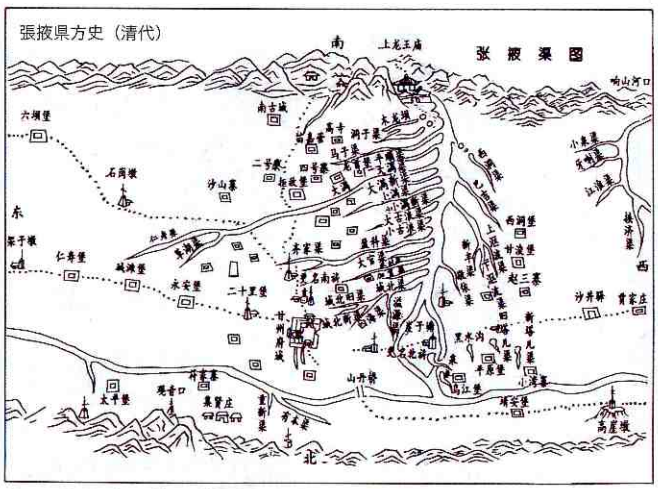


Figure 2 **Irrigation Channels in the Qing Dynasty**

Research Axis 4

History and Time Scale

A Trans-Disciplinary Study on the Regional Eco-History in Tropical Monsoon Asia: 1945-2005

This research project aims to demonstrate human-nature interactive consequences in the tropical monsoon Asia within the regional eco-historical framework, focusing on post-war through present-day period (1945-2005). This region is characterized by diverse ecological environments and marked seasonal monsoon climate where a number of ethnic groups have inhabited with different historical and cultural backgrounds. Since after the post-war time, these people have experienced enormous changes in their lives due to modernization, environmental alteration and expanding market economy. Focusing on subsistence complex, nutrition and health, and natural resource management as three major domains of research themes, we may seek to verify dynamic and transformational processes between people and the environment, as the regional eco-history as a whole.

PROJECT LEADER ■ **AKIMICHI, Tomoya** — RIHN

CORE MEMBERS ■ **ABE, Kenichi** — The Japan Center for Area Studies, National Museum of Ethnology
CHRISTIAN, Daniels — Institute for Language Study in Asia and Africa, Tokyo University of Foreign Studies
IKEYA, Kazunobu — National Museum of Ethnology
KONO, Yasuyuki — Institute for Southeast Asian Studies, Kyoto University
KUBO, Masatoshi — National Museum of Ethnology
MOJI, Kazuhiko — Institute of Tropical Medicine, Nagasaki University
NAKAMURA, Satoshi — International Medical Center of Japan
NONAKA, Kenichi — RIHN

Nature and Human in Transition

Extending from Yunnan in southwestern China to Laos and Thailand, this region has a seasonal monsoon climate. In diverse ecological environments, extending from the lowland plains and basins to hillsides and mountains, inhabitants of different ethnic backgrounds have lived in towns, villages and in small hamlets (Photo 1). Since the post-war period, revolutionary change in political regimes, Indo-China and Viet Nam Wars, and global market economy have swept through this region. It has made people's lives precarious and disturbed them physically, culturally and socially and the process is still going on now.

To clarify this process concretely as eco-historical consequences in tropical monsoon Asia, it is crucial for us to examine people's interaction with their surrounding environment from an integrative approach, taking environmental, human ecological, socio-economic and cultural factors into account.

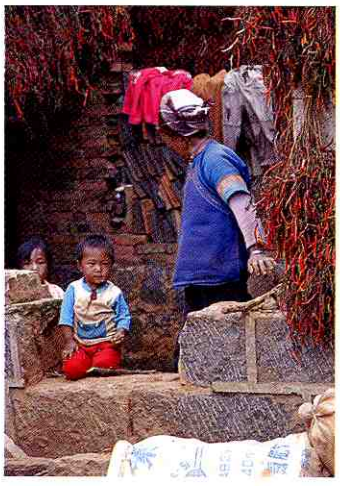


Photo 1 **A Yi Nationality Village in Yanshan District, Wenshan County**

The Yi belongs to the Tibet-Burman linguistic family, and in this village chili and maize are the major cultivated plants of South American origin.

Eco-History Seen From Body, Material Culture and Activity

Taking eco-sensitive factors such as the subsistence complex, nutrition and health, and resource management into account, this project is a collaboration of discipline-oriented studies with the aim of integrating them. Practically, four major approaches are proposed; 1. Human-ecological analysis of water-borne and food-borne diseases, nutrition and health of children and the aged, population change as evidence of human interactions with the environment (Figure 1); 2. People's adaptation and resilience to changes that have occurred are compared among: hill people who

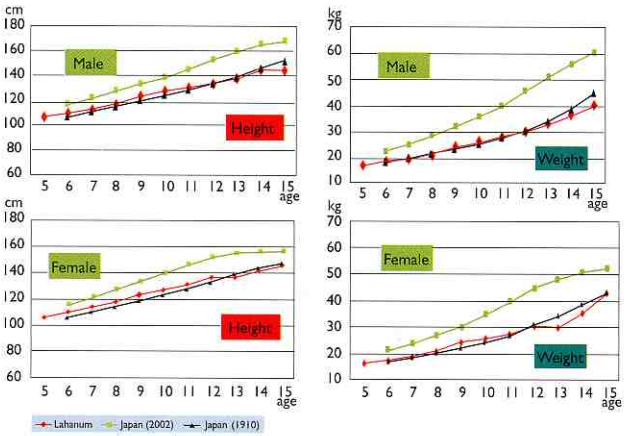


Figure 1 **Nutrition and Growth of Children in Lowland Communities in Central-South Laos**

This figure suggests a comparable trend to that of Japanese children in 1910.

depend on agro-forestry and lowland people who depend on aquatic environments for their subsistence in the domains of resource management, life structure, economy, land use, distribution networks and social behavior (Figure 2, 3), 3. Analyses of historical documents and inscriptions (Photo 2), and 4. To find evidence of changes in material culture and the use of tools for subsistence activities.

From Individuals to the Whole and Towards Integration

The following four approaches have been chosen as integrative analyses for constructing the eco-history of the region;

a. An encyclopedic accumulation of knowledge and information for selected plant and animal resources as proximal agencies for delineating networks embedded in the regional eco-history,

b. A compilation of environment-related events and phenomena in the region as an eco-chronicle; using historical documents, ethnographic materials, and field data (Photo 3),

c. Reconstruction of the rice culture complex (RCC) and the fishing culture complex (FCC) as region-specific human cultures. These cultural complexes are examined in terms of transformation through time, taking nutrition, health, and resource management as key factors of change;

d. Database preparation on material culture and information collected by Japanese researchers since the 1950s and that collected by project members, and by using these, a synthesis of data and information can be constructed as eco-historical archives,

Through combining these four approaches and methodologies (from **a.** to **d.**), we take up the challenge to construct a regional eco-history of tropical monsoon Asia.

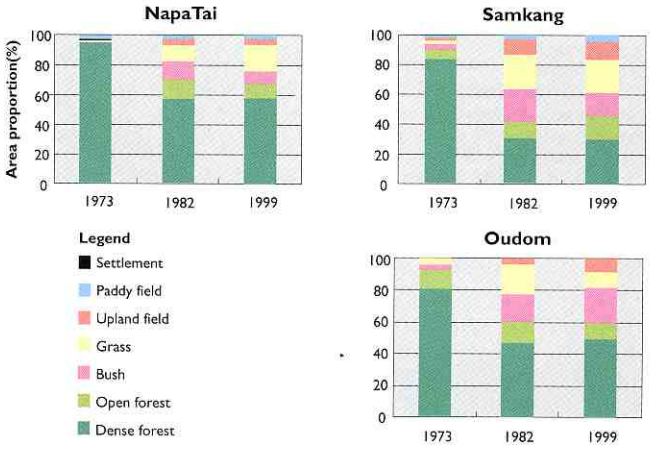


Figure 2 **Changes of Land Use in Northern Laos between 1973 and 1999**

Change of Government Policy for Agro-Forestry and Expanding border trade with China has greatly changed land use pattern in remote villages in Laos.

Photo 2 **Inscriptions Exhibiting Evidence of Community-based Environmental Conservation during the Middle and Late Ching Dynasty in Yunnan, China**

Forest conservation and a ban on fish poison were declared.

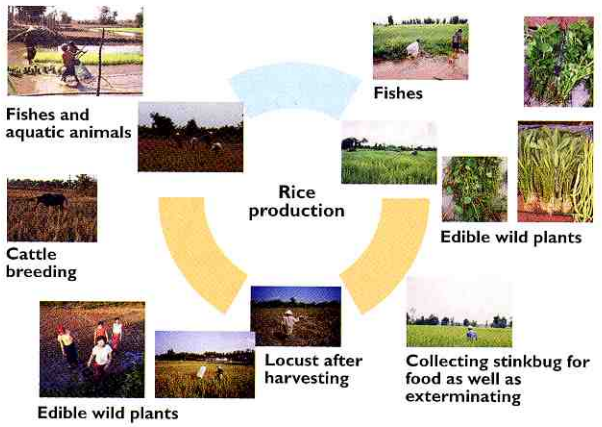


Figure 3 **Use of Wild Resources in the Paddy Ecosystem in Xaythani District, Central Laos**

A variety of wild resources in paddy fields are utilized both for subsistence and commercial purposes.

Photo 3 **County Gazetteers of Yunnan Province**

In compiling "the Eco-Chronicle" for the eco-history project, translation and data analysis of 26 sample County Gazetteers, which border Myanmar, Laos and Viet Nam, are in progress.

Research Axis 5

Conceptual Framework for Global Environmental Issues

Global Water Cycle Variation and the Current World Water Resources Issues and Their Perspectives

It is alleged that the 21st century is the "century of water." Wars over water might happen like the wars over oil that occurred in the last century. The rapid increase in population and the coming global climate change could be causes of water scarcity. This project attempts to develop global perspectives and enlighten social recognition of such water resource issues by integrating field observations, predicting natural water cycles and human's water usage in the future, and by establishing guidelines for sustainability development from the viewpoint of water resource issues.

PROJECT LEADER ■ **KANAE, Shinjiro** — RIHN

CORE MEMBERS ■
ARAMAKI, Toshiya — Graduate School of Engineering, the University of Tokyo
ENDO, Takahiro — RIHN
HIRABAYASHI, Yukiko — Institute of Materials and Environmental Technology, Yamanashi University
HIRAKAWA, Yukiko — Graduate School of International Development and Coopetation, Hiroshima University
KAWASHIMA, Hiroyuki — Graduate School of Agricultural and Life Sciences, the University of Tokyo
KIM, Wonsik — National Institute for Agro-Environmental Science
KITSUREGAWA, Masaru — Institute of Industrial Science, the University of Tokyo
KURAJI, Koichiro — Graduate School of Agricultural and Life Sciences, the University of Tokyo
MATSUMOTO, Jun — Graduate School of Science, the University of Tokyo
MATSUMOTO, Mitsuo — Department of Economics and Social Sciences, Kochi University
OHTE, Nobuhito — Graduate School of Agriculture, Kyoto University
OKI, Taikan — Institute of Industrial Science, the University of Tokyo
SATOMURA, Takehiko — Graduate School of Science, Kyoto University
SHIBASAKI, Ryosuke — Center for Spatial Information Science, the University of Tokyo
SHIRAKAWA, Naoki — Institute of Engineering Mechanics and Systems, University of Tsukuba
YASUOKA, Yoshifumi — Institute of Industrial Science, the University of Tokyo

World Water Resources Issues

The population increase, expected mainly in developing countries, increases water demand for human life, food production, and industry, resulting in more intense use of water resources in the world. Not only for developing countries but for Japan or European countries, where population increase is not expected, water resources issues will be serious because water resources can degraded due to global climatic change, such as global warming. Even in case of no change in natural water cycles, available water resources for human society will decrease where inappropriate water management is performed and when water quality is deteriorated.

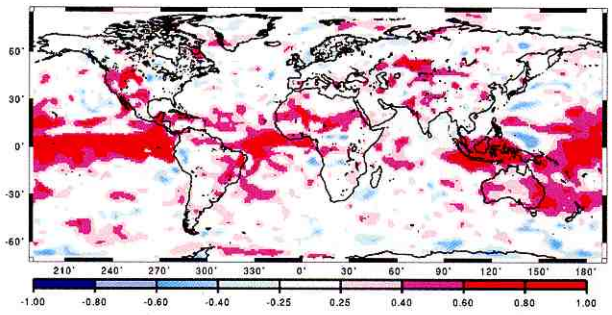


Figure 1 **Potential Predictability of Seasonal-scale Precipitation**

For drought and flood management, prediction of seasonal-scale precipitation is one of the most important key items which have not been realized yet. This figure shows potential predictability of precipitation in boreal summer calculated with an atmospheric general circulation model. In the calculation, both the ocean and land information was assumed to be "perfectly" predictable in advance. Although predictability is shown over some tropical regions and semi-arid regions, predictability is absent over much part of the globe. People probably need some more efforts for seasonal prediction of precipitation and water resources.

With such anticipation on future water resources, water issues are currently considered to be one of the most critical problems in the world. For example, the United Nations declared to halve the proportion of people who has no access to safe drinking water by 2015.

In addition, water issues are closely related to other various environmental issues, such as global warming, food production, energy resources issues, desertification, and forest destruction, indicating significance and transdisciplinary feature of water. As for a problem affecting human health, water issues are related to waste disposal issues, because pollutants leaked from waste are diffused through underground water. Thus, water issues are related to global environmental problems in various cross-cutting ways.

What are the Problems?

Much information about water issues is widely available nowadays. However, some information is less evident, or not well examined, or just propaganda. And it is also a problem that only a little information is dis-

Photos **Field Survery of a Great Flood Disaster in South Asia**

The most severe of floods in these past decades affected India and Bangladesh in July 2004. Many people were forced to live in tents on higher ground because their houses sank under water. It is apprehended that the frequency of severe floods will increase due to climate change. Floods are caused by heavy rain, but prediction is difficult because even data of rainfall distribution is insufficient. Taking this situation into consideration, this project is pursuing ways to realize a system of weather/floods prediction applicable to local areas, through gathering rainfall data from the past and present, and understanding the mechanisms involved.

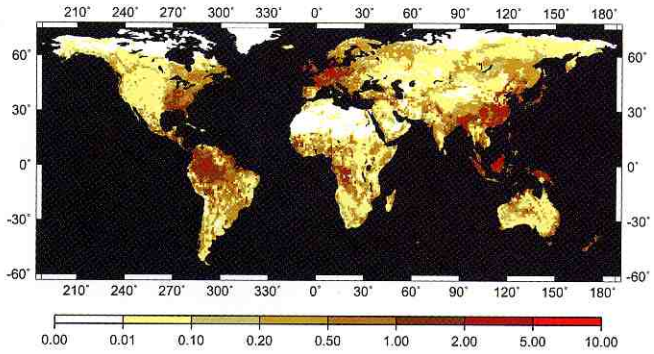


Figure 2 **Nitrate-Nitrogen Leaching (tN/km^{-2}/yr)**

The amount of Nitrate leaching in the world. A large nitrate concentration found in Europe, East Asia and South-East Asia is mainly caused by injection of nitrogenous fertilizer for food production. This leads to water pollution and it is feared that such injection will be increased.

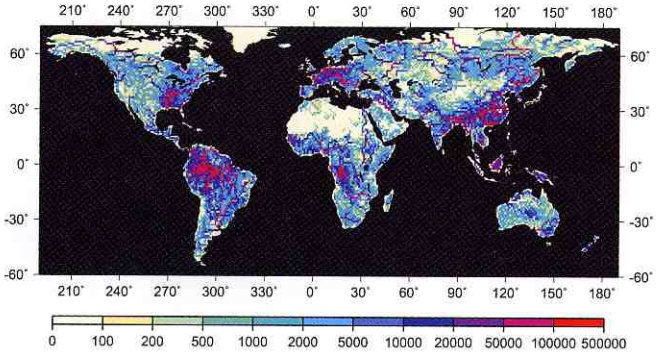


Figure 3 **Nitrate-Nitrogen Discharge (tN/yr)**

Nitrate concentration in the world's main rivers using TRIP. This is important not only as an index of water quality but also as a criterion of negative impacts on the sea and fish.

patched by Asian countries including Japan; most information is actually dispatched by the U.S. and European countries. In fact, regional characteristics should be well considered for water issues in each region, because both natural water cycles and water usage interact with climatic, cultural, and historical characteristics of the region. For example, present and future water issues in Asian countries need to be considered with regards to the uniqueness of the Asian monsoon climate and the culture of paddy farming.

World Water Issues as Global Environmental Sciences

This project aims at clarifying the real truth regarding of world water issues and presenting perspectives of water management in the future. We have made reports on freshwater, and submitted them to IPCC and the United Nations millennium assessment. We also make efforts to formulate concrete resolutions for regional water issues, for example, in South-East Asia.

So far, in addition, we have succeeded in quantifying the amount of "virtual water" in the international trade of food and agricultural products in the past several decades. We found that virtual water trade between nations has almost doubled in the last 30 years. We also found that Japan depends on foreign countries for water, *in virtual form*, to the equivalent of the supply of water from domestic sources. Hereafter, in order to also make concrete resolutions for Japan, we have begun dealing with domestic issues, for example, headwater conservation, coastal environment preservation, and we are trying to present effective solutions for peoples who are facing similar problems in other parts of the world.

Research Axis 5

Conceptual Framework for Global Environmental Issues

Interactions between the Environmental Quality of a Watershed and the Environmental Consciousness: With Reference to Environmental Changes Caused by the Use of Land and Water Resources

People's value judgment system of environment, or the environmental consciousness, is explored through theoretical analyses and empirical surveys in order to identify the environmental elements and the human-sociological factors that are affecting the formation of this consciousness. Environmental changes caused by virtual impact to a watershed environment are predicted and posed to people. People's judgment of such environmental changes are analyzed to elucidate the relationship between people's environmental consciousness and the environmental quality. We will develop response-prediction models for a watershed environment and the methodology to clarify the changes in people's value judgment of the environment.

PROJECT LEADER ■ **YOSHIOKA, Takahito** — RIHN

CORE MEMBERS ■ **FUJIHIRA, Kazutoshi** — Institute of Environmentology
HINO, Shuji — Faculty of Science, Yamagata University
KOBA, Keisuke — Interdisciplinary Graduate School of Science and Engineering, Tokyo Institute of Technology
KONOHIRA, Eiichi — Graduate School of Environmental Studies, Nagoya University
NAGATA, Motohiko — Faculty of Humanities and Social Sciences, Mie University
NAKATA, Kisaburo — School of Marine Science and Technology, Tokai University
OHTE, Nobuhito — Graduate School of Agriculture, Kyoto University
SEKINO, Tatsuki — RIHN
SHIBATA, Hideaki — Field Science Center for Northern Biosphere, Hokkaido University
SUGIMAN, Toshio — Graduate School of Human and Environmental Studies, Kyoto University
TAKAHARA, Hikaru — Graduate School of Agriculture, Kyoto Prefecture University
TOKUCHI, Naoko — Field Science Education and Research Center, Kyoto University
YASUE, Koh — Faculty of Agriculture, Shinshu University
ZHENG, Yuejun — RIHN

Aim of the Project

How do we perceive the environment? Human beings have enjoyed the benefits of nature, while people's perception of the environment affects their value judgments of the environment as a basis to determine their attitudes toward it. We define this value judgment system as "environmental consciousness." What changes in environmental qualities affect the formation of environmental consciousness? Quantitative evaluations of environmental changes are required for us to understand the present status of the environment and to predict its future. On the other hand, to clarify the relationship between environmental quality and environmental consciousness should be important for utilizing and conserving natural environments. In the project, we will develop response-prediction models for environmental changes and a methodology for: presenting the predicted environmental changes to people, and for analyzing people's value judgment of environmental changes. Although the project will be conducted mainly in the Lake Shumarinai watershed, Hokkaido, Japan, the methodology will be developed to be applicable to other environments.

Methods and Results

In this project, several environmental changes are assumed. People's value judgments to these changes will be elucidated. The methodology requires several functions: (1) quantitative prediction of changes of environmental elements caused by virtual environmental modifications, such as logging, and dairy farming, (2) appropriately informing the people of environmental changes and (3) analysis of the relationship between changes in the people's value judgment and in the environmental elements. Interactive Device between Environments and Artifacts (IDEA) will be developed as the main tool that provides these functions. IDEA is composed of the response-prediction model for the environment and tools for preparing and analyzing the attitude surveys.

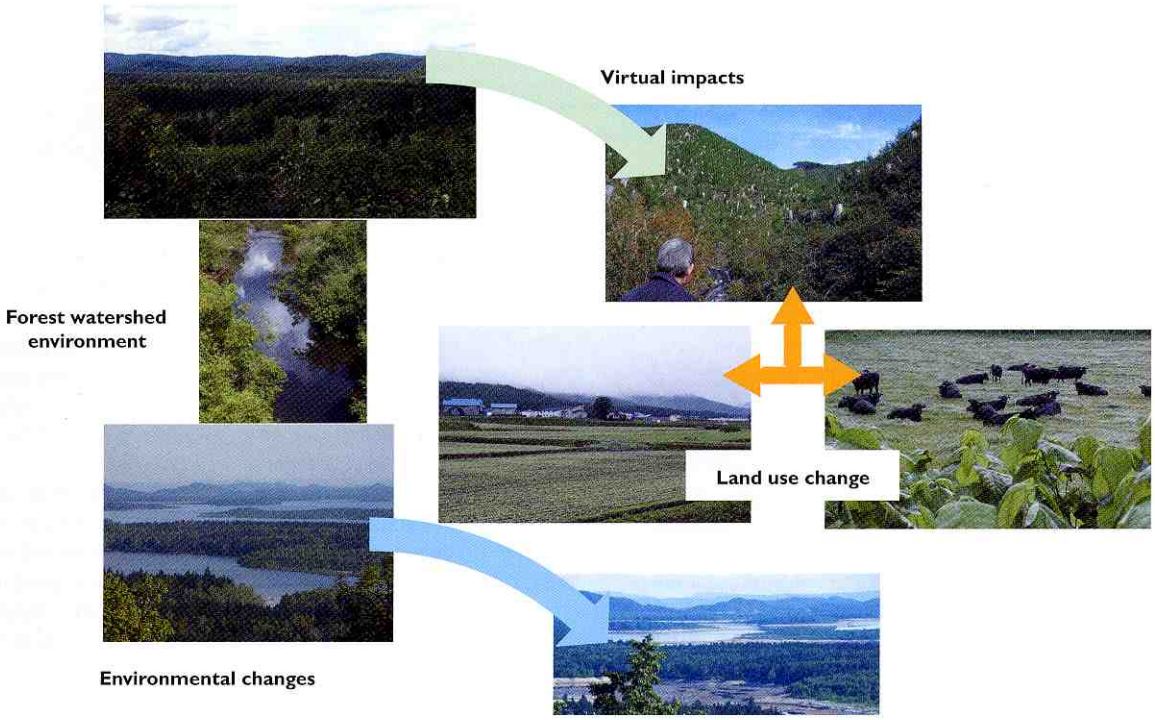
The response-prediction model includes several sub-models for forest, river and lake environments (Figure bottom center panel). The PnET model has been developed for simulating material cycles in northern American forests. In order to apply the PnET model to Japanese forests, it will be tailored to the hydrological processes of the study area because of differences in climatic conditions such as the Asian Monsoon. The stream water chemistry of more than 1,200 streams has been surveyed to estimate the effects of climatic conditions, land use, and atmospheric acid deposition on water quality. Geographic information system (Figure bottom right and left panels) and the river hydraulic model will be introduced to combine forest, river and lake environments. For the lake environment, the flow model of lake water will be combined with

biochemical processes. Simulation using an observational dataset has been conducted to check the model's performance.

Interest in the environment is estimated through interviews and a questionnaire. The relationship between people's environmental consciousness and environmental change will be analyzed using scenario questionnaires, based on the environmental changes predicted by the response-prediction model. The questionnaire should be prepared using a traceable method, in order to secure the universal applicability of the methodology to other environments and for stakeholders. Interviews of residents around the Lake Shumarinai watershed have been conducted to extract specific interests in the subject of the environment. These interests will be considered in further attitude surveys.

Plan Hereafter

Modification and validation of the PnET models will be carried out using the observational dataset collected in the project. The river hydraulic model will be modified to treat the quantities (concentrations) of the materials. Bathometric survey and chemical analyses of the lake sediments will be conducted in the fiscal year 2005. Attitude surveys in places far from the watershed, as well as in the watershed, will be conducted to extract people's interest in social and natural circumstances. The information will be used to select the type and intensity of the impact to the environment in the scenario questionnaires, conducted in years to follow.



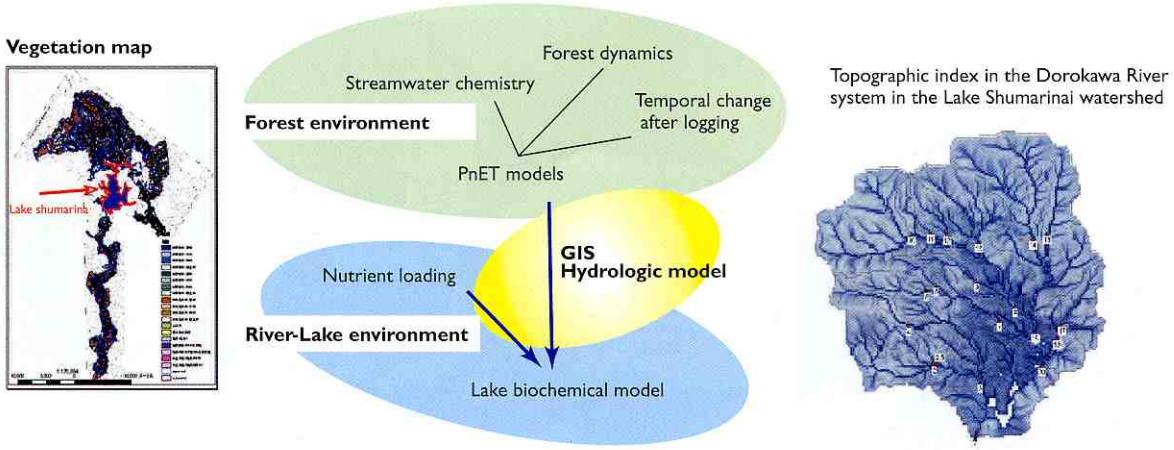


Figure **Prediction of Environmental Changes**

The forest watershed environment, which is composed of forest, river, and lake, is the objective environment of the project. Environmental changes caused by a virtual environmental modification, such as logging and land use change, are predicted with the response-prediction models (bottom center panel). The response-prediction model is composed of sub-models for forest and freshwater environments. GISs (bottom left panel: vegetation, Ikegami and Komiya 2004; bottom right panel: topography, Ogawa 2003) for the Lake Shuimarinai watershed are used to integrate the small watershed level results of the PnET model, as an input to the streams.

Research Axis 2

Human Activity Impact Assessment

Human Activity Impacts on Urban Subsurface Environments

This project will assess the effect of human activities on the urban subsurface environment, although an important aspect of human life in the present and future it has not yet evaluated. This is especially true in Asian coastal cities where population numbers and density have expanded rapidly and uses of subsurface environment have increased. The primary goal of this project is to evaluate the relationship between the developmental stage of cities and various subsurface environmental problems, including extreme subsidence, groundwater contamination, and subsurface thermal anomalies. We will address sustainable use of groundwater and subsurface environments to provide for better future development and human well-being.

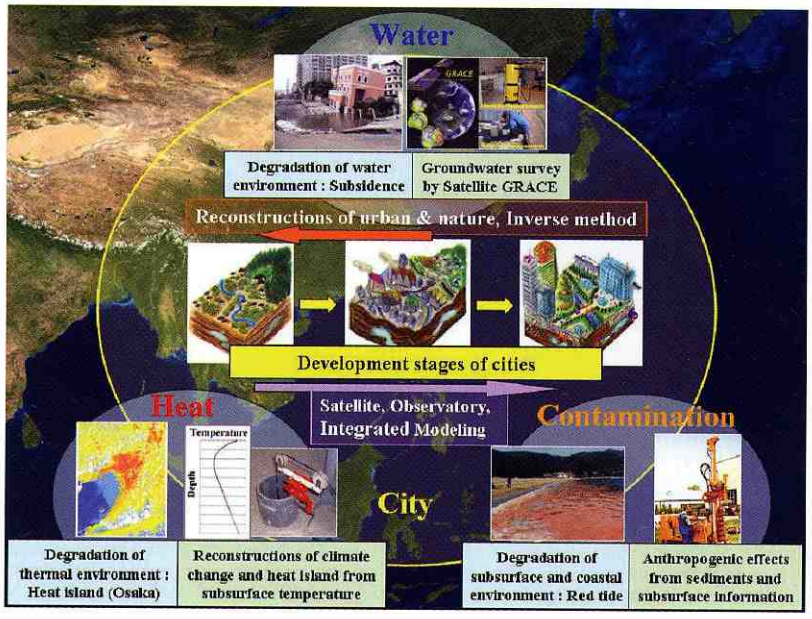
PROJECT LEADER ■ **TANIGUCHI, Makoto** — RIHN

CORE MEMBERS ■
ADACHI, Itsu — JICA
EHARA, Sachio — Kyushu University
FUKUDA, Youichi — Kyoto University
KANEKO, Shinji — Hiroshima University
KITAGAWA, Hiroyuki — Nagoya University
NAKANO, Takanori — RIHN
SHIMADA, Jun — Kumamoto University
ONODERA, Shin-ichi — Hiroshima University
YAMANO, Makoto — The University of Tokyo
YOSHIKOSHI, Akihisa — Ritsumeikan University

Securing water resources and clearing contaminated water caused by human activities in urban areas are global environmental issues in the 21st century. Heat island phenomena created by human activities are also a big environmental problem in addition to global warming. These global environmental issues that are caused by urbanization, should be addressed strongly and prevented, because population increase and concentration is occurring rapidly in urban areas.

This project will suggest better models for future development for human beings by reconstructing changes in urban environments (from present to past), and by developing integrated nature-social models (from past, present to future). Subsurface environmental indexes will be used from the points of view of (1) climate changes, (2) human impact, and (3) stages of urban development and social policies. Water, heat, and material environments will be evaluated by investigating changes in groundwater resources using satellite data, reconstructions of climate changes and urbanization using subsurface thermal regimes, evaluations of contamination from preserved subsurface indexes.

Expected results of this project are evaluations of; (1) the relationship between urbanization and heat island phenomena, (2) changes in groundwater resources and its effective uses, (3) origins of contamination and pass ways of contaminants from land to ocean, (4) the relationship between stages of urban development and long term changes of environments mentioned above. This project will be partially advised by international projects such as UNESCO-GRAPHIC, GWSP, and IGBP - LOICZ.



Four Subjects and Methods of this Project

Research Axis 2

Human Activity Impact Assessment

Erosion of Genetic Diversity as a Social, Ecological and Environmental Problem

The present project deals with the loss of genetic diversity, *genetic erosion*, in man-made habitats of Eurasia and its neighboring regions during the latest 10,000 years, as a social, ecological and environmental problem. Genetic erosion in domesticated plants and their relatives has accelerated in the last 100 years, through habitat modification and increasing dependence on a narrow range of domesticated species and varieties. The project will focus on, (i) The social, ecological and environmental history of plant genetic diversity and genetic erosion, (ii) Models for understanding genetic erosion, to incorporate advances in biological, environmental, and social history, (iii) Recovering genetic diversity in man-made habitats, and (iv) *In situ* preservation and development of genetic diversity.

PROJECT LEADER ■ **SATO, Yo-Ichiro** — RIHN

CORE MEMBERS ■ **FUKUNAGA, Kenji** — IRCJS
JONES, Martin — Cambridge University
KADOWAKI, Ko-Ichi — NIBR
KATO, Kenji — Okayama University
MATTHEWS, Peter — National Museum of Ethnology
MUGURUMA, Yumi — Tohoku University of Art & Design
NAKAMURA, Ikuo — Chiba University
SHINODA, Kenichi — National Science Museum
WILLCOX, George — Institut de Prehistoire Orientale, France
YANG, Haiying — Shizuoka University

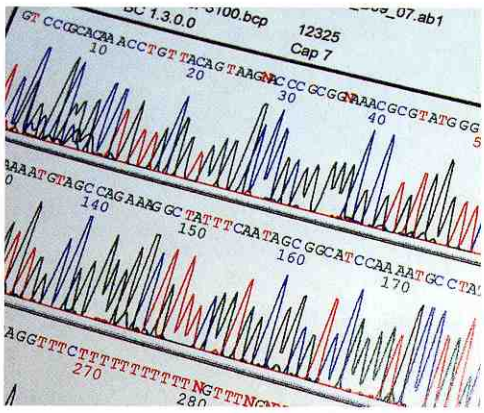
Genetic Diversity

Genetic diversity is a biodiversity that is specific to within-species diversity. It is particularly important to consider the diversity in agricultural land. *(man-made habitat)*

The project deals with genetic diversity of wheat in the northwestern provinces of China. In 2004, some members visited Urumqi-city to discuss the project and to exchange MOA. The area to be studied is now covered by desert, but, judging from the excavated plant remains, forests or agricultural land has occupied this area. How and why did the land turn into desert? This is a question to be resolved during the project period.

High resolution DNA analysis will be performed to identify species/varieties grown in ancient times. Changes in man-made habitat will be traced through excavated pollen grains or other microfossils.

An Archaeological Site from which Ancient Wheat was Discovered



Nucleotide Sequence of DNA extracted from Ancient Plant

Genetic Diversity in a Field

Research Axis 5

Conceptual Framework for Global Environmental Issues

A New Cultural and Historical Exploration into Human-Nature Relationships in the Japanese Archipelago

The objective of the present project is to reconstruct human-nature relationships as historical processes. The following will be examined, firstly, how the natural environment has been changed since the late Paleolithic Age, when human beings are first known to have existed in the Japanese Archipelago; secondly, how the biota has changed during that process; and third, what kind of perceptions, knowledge and skills humans possessed, concerning both nature in general, and specific life forms. Our aim is to present a foundation for contemplating how human-nature relations should be developed, and to suggest concrete measures for preventing further extinction of species in the near future.

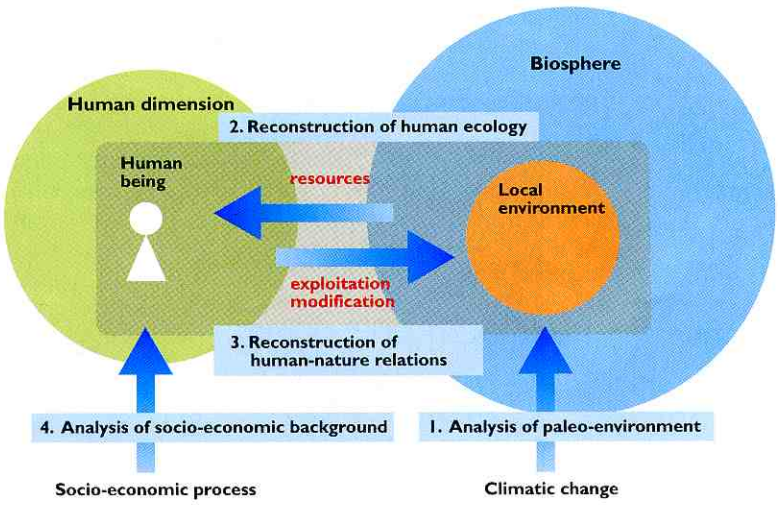
PROJECT LEADER ■ **YUMOTO, Takakazu** — RHIN

CORE MEMBERS ■
ABE, Hiroshi — RHIN
IKEYA, Kazunobu — National Museum of Ethnology
KATAYAMA, Kazumichi — Graduate School of Science, Kyoto University
MATSUDA, Hiroyuki — Graduate School of Environment and Information Sciences, Yokohama National University
MURAKAMI, Noriaki — Graduate School of Science, Kyoto University
NAKANO, Takanori — RHIN
SHIMIZU, Isamu — Center for Ecological Research, Kyoto University
TAKAHARA, Hikaru — Graduate School of Agriculture, Kyoto Prefectural University
TAYASU, Ichiro — Center for Ecological Research, Kyoto University
UCHIYAMA, Junzo — RHIN
YAHARA, Tetsukazu — Graduate School of Sciences, Kyushu University
YAMAGUCHI, Hirofumi — Graduate School of Agriculture and Biological Sciences, Osaka Prefectural University

The Japanese Archipelago has been extremely densely populated since the Neolithic Age, and most of the natural environment has been strongly influenced by human activities. The lifestyle patterns of humans have, in turn, been shaped by the use of biological resources, by fauna and flora. Moreover, although Japanese biota is derived from life forms which migrated from the continental mainland during periods when sea levels were lower, it has been further augmented by human beings, who have introduced additional species at various times. However, in spite of the intensive intervention by humans on the natural environment, there is still a rich biota in the Japanese Archipelago, which includes, for example, an abundance of indigenous species of angiosperm and freshwater fish. Because of this, it has been widely assumed that human-nature relations in pre-modern Japan were governed by some kind of traditional wisdom that prevented people from exhausting biological resources; or even that it was the moderate human activity itself that preserved the abundant biota and sustainability of biological resources in Japan.

However, the question of exactly how stable the coexistence of nature and humans was in the past has not been resolved. Could it be that even in the Japanese Archipelago there has been a history of exhausting biological resources? If the wisdom and will to use biological resources in a sustainable way existed, how common was it? Moreover, could there have been any major social changes that occurred as a result of exhausting certain biological resources?

Although each of these questions has been tackled within the limits of one historical period, region, or one academic discipline, they have not been researched using a trans-disciplinary approach, over an area that would represent the whole Japanese Archipelago, or over a time span that encompasses the whole period from the earliest human habitation of Japan to modern times. The objective of the present project is to reconstruct historical processes. The following will be examined, first, how the natural environment has been changed since the late Paleolithic Age, when human beings are first known to have existed in the Japanese Archipelago; second, how the biota has changed during that process; and third, what kind of perceptions, knowledge and skills the humans possessed, concerning both nature in general, and specific life forms. Our aim is to present a foundation for contemplating how human-nature relations should be developed, and to suggest concrete measures for preventing mass extinction of species in the near future.



Reconstruction Human-Nature Relations in the Past

Research Axis I

Environmental Change Impact Assessment

Vulnerability and Resilience of Social-Ecological Systems

The 20th century witnessed many occurrences of natural disasters due to global climate change that resulted in severe damage to humans, such as famines. In addition to the direct effect of natural disasters, the main cause of damage to humans is considered to be the vulnerability of social security systems or a lack of resilience in production activity, due to chronic poverty. This project aims at identifying the factors affecting resilience of social-ecological systems and the ways to enhance resilience of rural people in developing countries against environmental variability.

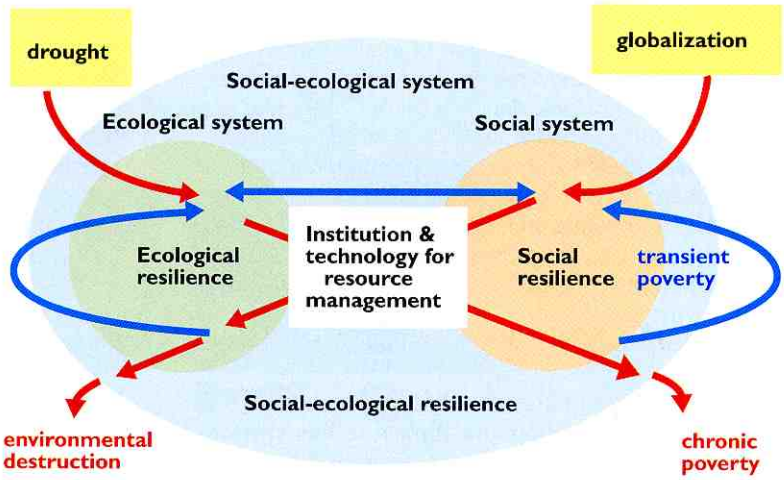
PROJECT LEADER ■ **UMETSU, Chieko** — RIHN

CORE MEMBERS ■ **PALANISAMI, Kuppannan** — Water Technology Centre, Tamil Nadu Agricultural University
SAKURAI, Takeshi — Policy Research Institute, Ministry of Agriculture, Forestry and Fisheries
SHIMADA, Shuhei — Graduate School of Asian and African Area Studies, Kyoto University
SHINJO, Hitoshi — Graduate School of Agriculture, Kyoto University
TANAKA, Ueru — Graduate School of Global Environmental Studies, Kyoto University
YOSHIMURA, Mitsunori — RIHN

In the past, no serious attention has been paid to the vulnerability and resilience of people whose livelihoods and production systems heavily depend on environmental resources. Thus the projects for disaster relief and environmental conservation in drought-affected areas have not sufficiently taken into account the resilience of local people. Especially for farmers and nomads in developing countries who rely on environmental resources, a loss of resilience of social-ecological systems, due to an increase in population and the collapse of rural communities, is of critical importance. The aim of this project is to consider human activity within the context of environmental change in view of social-ecological resilience. Thus, to clarify the effects of local environmental change on social-ecological systems as well as the mechanism through which they recover from shock. Also from various case studies, we will try to identify household and community factors that determine the capacity for resilience, and the role of institutions on resilience. By analyzing factors influencing social-ecological resilience, it is possible to introduce policy interventions for enhancing human security in developing countries.

We develop a method for comprehensive assessment of resilience from farmer, household and district level analysis linked with information on variability of climate, resources and institutions. Intensive interviews in villages will provide the farmer/household level analysis. Household surveys in selected villages will identify the factors affecting resilience and the process of collapse and recovery of resilience in different communities. District level analysis; utilizing statistics, remote sensing data and aerial photographs, will help to trace long-term changes in soil and forestry resources. Analysis of data on rainfall, temperature, soil and forestry resources will be further useful for the comparison of results. Furthermore the long-term changes in resources will be analyzed, along with institutional changes by government policies. The main field area is sub-Saharan Africa and South Asia where the resource base is critical for livelihood. This project thus aims at identifying ways to enhance the resilience of rural people against environmental variability by developing a method to assess the resilience of social-ecological systems.

Adopted from URL http://www.mapquest.com



Close relation of social and ecological resilience

Research Axis 2

Human Activity Impact Assessment

Clarification of Materials Circulatory Systems Changes in East Asia as a Result of the Use of Geo-spherical Resources

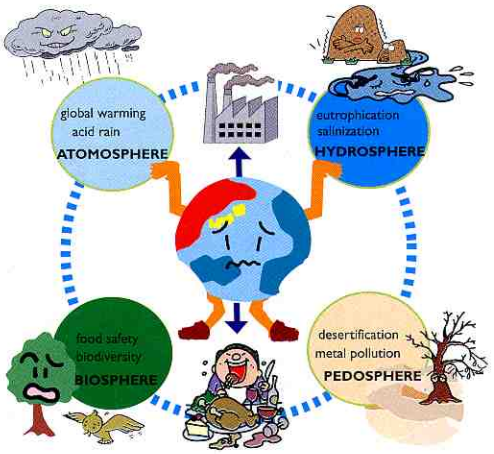
Many global environmental problems are the result of man's excessive use of exhaustible resources, but the extent of those problems differs greatly depending on the region. One reason for this is that the materials circulation systems fundamentally found in nature, as well as those created by man, vary according to region. In this project, while making use of the abundant chemical information contained in the geo-sphere, which has so far not been fully considered, we will establish methods for tracking materials generated in the surface environment from natural processes and human activities. By incorporating these methods into the research being conducted in various regions of East Asia, we will clarify changes in those materials circulatory systems and explore the whole concept of the use of exhaustible resources.

PROJECT LEADER ■ **NAKANO, Takanori** — RIHN

CORE MEMBERS ■
FUKUSHIMA, Takehiko — Graduate School of Life and Environmental Sciences, University of Tsukuba
IMAI, Akira — Department of Earth Resources Engineering, Faculty of Engineering, Kyushu University
KAWAHATA, Hodaka — Ocean Research Institute, the University of Tokyo
KAWANO, Yoshinobu — Faculty of Culture and Education, Saga University
TANAKA, Tsuyoshi — Graduate School of Environmental Studies, Nagoya University
TAYASU, Ichiro — Center for Ecological Research, Kyoto University
YAMASHITA, Katsuyuki — Department of Earth & Planetary Sciences, Faculty of Science, Kobe University
YANAGISAWA, Fumitaka — Department of Earth and Environmental Sciences, Faculty of Science, Yamagata University
YURIMOTO, Hisayoshi — Department of Earth & Sciences, Faculty of Science, Hokkaido University

Humans have created diverse cultures over time and, since the industrial revolution, have developed a variety of artifacts from many metals and using fossil fuel energies, including making stone implements and earthenware from rocks and soil, as well as bronze and iron ware from copper, tin and steel ores. While large volumes of resources derived from the geo-sphere in clever ways, develops a rich material society and advanced science and technology, it generates major qualitative changes in the entire earth's surface (atmosphere, hydrosphere and biosphere, including humans) and poses the challenge of global environmental problems to mankind. Japan's surface environment has been impacted by various materials generated not only from within its own borders, but also from its continental neighbors, as a result of the sophistication and globalization of this kind of resource use. With the predicted future economic development in China and other parts of East Asia, there is concern about the kind of qualitative changes that may take place overall. The extent of the environmental impact not only depends on the volume of and qualitative differences in man's use of geo-resources, but it is also greatly influenced by the inherent natural environment of the region. In regions like ours, where natural environments and human activities are diverse, it is important to keep these kinds of conditions in mind when making environmental diagnoses, after tracking the movement of materials in many spheres and constructing environmental indicators suited to the region.

This project will specifically focus on a range of geospherical information and apply it to this environmental research. In other words, analysis technology used in solid earth sciences will be introduced and developed. For example, although in minute amounts, the universal and greatly varying mineral elements found in air, water and living organisms are derived from the geosphere, as in exhaustible resources, and their composition changes greatly depending on the region in which they are found. By combining geospherical information, which contains these kinds of characteristics, with old and new environmental chemistry methods, we will track the movement of materials throughout the environment and establish an "Environment Traceability Method" to further diagnose and assess their safety. In addition to developing an "Environment Traceability Method" while incorporating it into environmental research being conducted by various organizations, we will apply this information to environmental education rooted in the region, using it to restore environmental quality that has changed over the past 50 years or so in Japan and surrounding regions, and even to predict changes that will take place from now on. Through this integrated research, we will organize, from the perspective of materials circulation, environmental problems arising from the use of resources, such as acid rain, desertification, water and soil pollution, eutrophication, food safety and waste disposal, and explore the whole concept of resource use for the future.



While developing and using various environmental indicators, we will diagnose materials circulatory system disorders that are emerging in Japan and the surrounding regions as a result of resource binging.

Research Axis 3

Spatial Scale

Environmental Change and the Indus Civilization

From ancient times human being have intensively cultivated habitable space that has a sustainable food supply, sometimes utilizing the natural environment and sometimes fighting against the natural environment. Thus human beings constructed ancient civilization. The Indus is one of the world's four great ancient civilizations, which flourished in a semi-arid ecological zone in the Indian subcontinent. Our project aims to develop a holistic understanding of this civilization against the background of the middle and late Holocene environment. In addition, a special emphasis will be given to develop a better understanding of its undeciphered script.

PROJECT LEADER ■ **OSADA, Toshiki** — RIHN

CORE MEMBERS ■ **EINO, Shingo** — Graduate School of Interdisciplinary Information Studies, the University of Tokyo
GOTO, Toshifumi — Graduate School/Faculty of Art and Letters, Tohoku University
KHARAKWAL, Jeewan Singh — Rajasthan Vidyapathi (Deemed) University
KODAMA, Nozomi — Faculty of Letters, Kumamoto University
OHTA, Shoji — Faculty of Biotechnology, Fukui Prefecture University
SHOGAITO, Masahiro — Graduate School of Letters, Kyoto University
TANAKA, Masakazu — Institute for Research in Humanities, Kyoto University
UNO, Takao — International Research Center for Japanese Studies

The Indus Civilization (2600-1900 BCE), which was spread over one million square kilometers in the northwestern part of the Indian subcontinent, is known for its forts, long distance trade, beautiful ceramics, jewelry, unparalleled town planning and so on. Its authors were the first urban, literate people of South Asia. Like other old world civilizations the Indus people also developed a range of technologies to exploit natural resources with and to gain control over local environments, which not only made their survival easier but also brought stability and prosperity to them. On the other hand it is held that environmental problems were one of the main reasons for their downfall. The Indus people did understand the local natural resources, environment and climate well and attempted to make the best use of it for their agriculture, trade, range of tools and so on. This eventually enabled them to develop hierarchical societies.

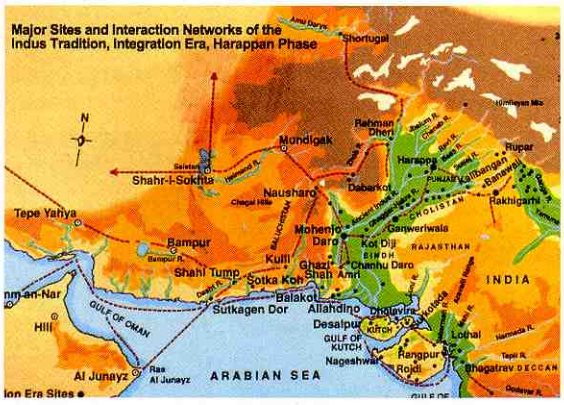
Methodology

One of our main goals is to understand the Indus Civilization from a linguistic point of view; i.e. to decipher its script and to reconstruct its material culture through comparative linguistics. But without understanding the archaeology of its material culture, the environment and climate where this script developed as well as other known contemporary languages, we cannot arrive at any solid conclusions. Therefore we plan to do multidisciplinary studies involving the palaeo-environment, linguistics, archaeology, genetics, transmitted cultural properties and so on. Thus our methodology will involve both humanistic and scientific approaches.

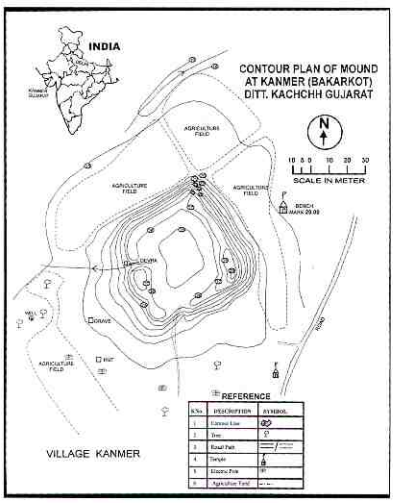
Indus Seal And Indus Script

Plan for This Year

We are starting to excavate at the Kanmer site, Gujarat, India, where we lay a new foundation. We will make a Digital Elevation Map (DEM) of Indus Civilization sites. This is the basic database for our future plan.



Major Sites and Interaction Networks of the Indus Civilization (from Professor Kenoyer's map)



Contour Plan of Mound at Kanmer, Gujarat, India

Research Axis 4

History and Time Scale

Neolithisation and Modernisation in East Asia: The History of Environmental Development at the Great River System

Today, most of the resources we use come from faraway places. Massive exploitation of resources and the circulation of products has created environmental problems throughout the world. After its birth, the human race lived a nomadic life in small foraging groups for a long time. About 10,000 years ago human lifestyle underwent several changes and transformed into a lifestyle of permanent settlements and active exchange of products between groups. Our present way of living is more or less its extension. This project investigates the human history from the perspective of landscape research, looking at the periods of extensive change in the way human beings relate to their environment, and how these changes influence culture.

PROJECT LEADER ■ **UCHIYAMA, Junzo** — RIHN

CORE MEMBERS ■ **BAUSCH, Ilona** — Leiden University
FUKUZAWA, Hitoshi — Faculty of Urban Environmental Sciences, Tokyo Metropolitan University
HARUTA, Naoki — Faculty of Education, Kumamoto University
IKEYA, Kazunobu — National Museum of Ethnology
KANER, Simon — The Sainsbury Institute for the Study of Japanese Arts and Cultures
KATO, Yuzo — RIHN
LINDSTRÖM, Kati — RIHN
NAKAI, Seiichi — Faculty of Humanities, Toyama University
NAKAJIMA, Tsuneo — Lake Biwa Museum
NISHITANI, Masaru — National Museum of Japanese History
YASUMURO, Satoru — National Museum of Japanese History

Neolithisation and Modernisation

Historically, there were two major revolutions in the production and use of resources. First was Neolithisation, which saw the birth of agriculture. A system of permanent settlements and long distance trading appears, which has basically remained the same until today. In that sense we can even say that the root of modern environmental problems lies in the period of Neolithisation. The second revolution, Modernisation, changed many socio-economic aspects of life and led us to the energy revolution. Cities of unprecedented size emerged and the modern lifestyle was born on the grounds of the global trading network based on extensive resource development and regional division of labour. This project analyses these two periods of extensive change from the perspective of landscape research that unifies a whole range of different disciplines like history, geography, anthropology, biology, etc.

The World Created by the Great River System

This project focuses mainly on human lifestyle during the period of Neolithisation and Modernisation on the Japanese Archipelago, projecting this onto the background of the living environment on the banks of the East Asian inland sea, i.e. the Japan Sea Rim and the East China Sea Rim. An important role in shaping the life standards of the people on the shores of the Japan and East China Seas was played by two great river systems: the Amur and Yellow River systems. During the Neogene period the two water systems gave birth to many coastal rivers, which later started to play an important part in connecting the cultures of the inland and coastal areas and also provided these cultures with their main food, freshwater fish. The question is: how did human life in such a natural environment change during the two periods in respect to the material and cultural aspects of landscape? Are there any similarities between the two periods? And what kind of similarities and differences can be found here in comparison with other inland seas, like the North Sea? Taking the Jomon period as a departing point, the research would be developed further to also include the ancient history of the continental areas. Upon analysing the landscape change in each region from the Middle Ages up to the modern times, a comparative analysis between Neolithisation and Modernisation periods will be carried out.

Figure 2 **Research Area**

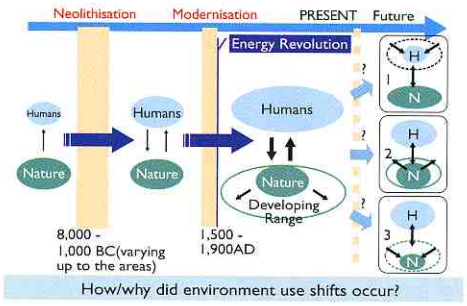


Figure 1 **Human History of Resource Development and Use**

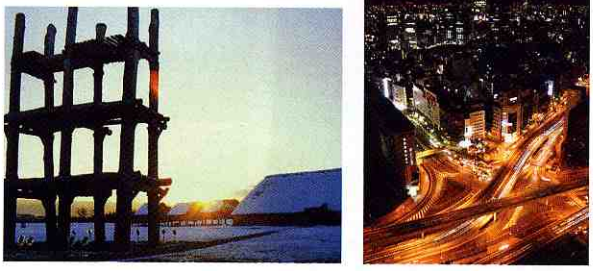


Photo 1 **Jomon Village and Modern City**

Research Axis 4

History and Time Scale

Historical Interactions between Hybrid Society of Ethnic Groups and the Natural Environment in a Semi-arid Region, Central Eurasia

The project aims to clarify the historical interactions of human activities and natural systems in the context of the rise and fall of ethnic groups or countries and change of subsistence in a semi-arid region of Central Eurasia. This should not only contribute to providing or examining desirable modes of living for the future, but also providing guidelines for solving projected environmental problems in multicultural regions.

PROJECT LEADER ■ **KUBOTA, Jumpei** — RIHN

CORE MEMBERS ■
CHENG, Zhi — RIHN
FUJITA, Koji — Graduate School of Environmental Studies, Nagoya University
KATO, Yuzo — RIHN
KONAGAYA, Yuki — National Museum of Ethnology
MATSUYAMA Hiroshi — Fac. of Urban Environmental Sciences, Tokyo Metropolitan University
NAKAWO, Masayoshi — RIHN
SOHMA, Hidehiro — Fac. of Letters, Nara Women's University
SUGIYAMA, Masaaki — Graduate School of Letters, Kyoto University
TAKEUCHI, Nozomu — RIHN
UYAMA, Tomohiko — Slavic Research Center, Hokkaido University
YOSHIKAWA, Ken — Graduate School of Natural Science and Technology, Okayama University
YOSHIDA, Setsuko — Department of Applied Sociology, Shikoku Gakuin University

Background

In the semi-arid region that extends widely through Central Eurasia, human life has been strongly controlled by available water resources. Peoples in this region, who had lived mostly as nomads, with the exception of those in oasis areas, experienced great changes in their lifestyle, caused by the immigration of farmers, the settlement of nomadic groups and agricultural development, in association with the expansion of Russia and Qing. After the long transition of the rise and fall of many ethnic groups or countries, there was a border that divided the regions of Russia and Qing. Finally, the Russian side was divided into many republics because of the decay of the Soviet Union. Against the background of various environmental problems in the world, change of subsistence and trans-boundary issues commonly exist. How did the people in this region adapt their lifestyle to agricultural development and changes in the natural system? The project aims to clarify the historical interactions of human activities and natural systems in the context of the rise and fall of ethnics groups or countries and change of subsistence in the semi-arid region of Central Eurasia, which should provide important keys for solving present environmental problems in future.

Content

The study area is the Ili river watershed, and the surrounding areas, which extends from China to Kazakhstan, terminating at Balkhash Lake. This region is recognized geographically and historically as the key point of East and West interactions, where information and a variety of goods representing the culture of both sides have passed through. It has been pointed out recently, however, that it is not only the transit region, but also the people in the region that have assimilated the information successfully and developed their own unique culture. This area also contains regions where peoples were forcibly removed by policy or agricultural development as well as regions where desertification has occurred.

The historical changes of both human activities and natural systems is investigated by analyzing the historical documents as well as varieties of proxies such as ice cores, lake sediments, tree ring samples and wind blown deposits. For interpreting the information, the present processes of human activities and natural systems are also investigated through field observations

Expected Results

The study will contribute to finding desirable modes of living for the future or seeking a way to sustainable in semi-arid regions through reconstructing the history of interactions between human activities and the natural environment. Also, the study aims to provide new ideas for solving projected environmental problems in multicultural regions.

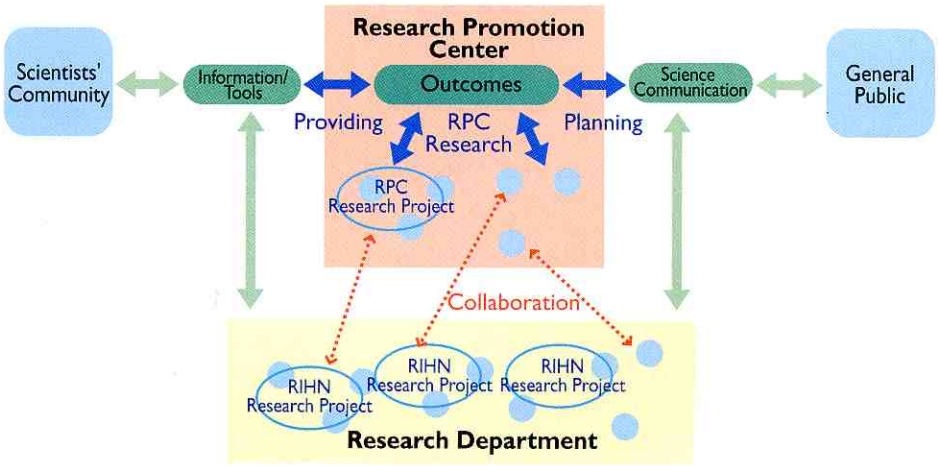
Location of the Ili River and Landscapes

Activities of Research Promotion Center

The Research Promotion Center, in accordance with the principles of the Institute, has been engaged in building the basis for finding a new research perspective beyond the scope of the existing disciplinary framework.

The Institute organizes its activities in the framework of the newly established National Institutes for the Humanities, whose Medium-term Action Program stipulates that "Research Institute for Humanity and Nature will make necessary arrangements to consolidate the Research Promotion Center for activities including information collection and processing, science communication, and relevant basic research, in relation to the global environment studies." Accordingly, the Research Institute has set up the Committee for the Operation of the Research Promotion Center.

The Center, in such framework, will take further steps in its own research for promoting the "global environment studies." Such research will constitute the basis for "planning science communication" to the public (for example, RIHN Forum), related to the RIHN's research activities, and for "providing information and its processing tools" (databases, observation technologies, etc.) for promoting the "global environmental studies."



RPC (Research Promotion Center) Research Project: "Global environment studies": what is the way to go?

To do research from the perspective of the "global environmental studies," what will be needed? First we shall have a clear idea about the conceptual framework of the "global environmental studies," then shall study carefully the appropriate processes and tools used in such research. This Project is to study the possible arguments and standpoints involved in the global environment studies, and try to suggest the way these sciences shall go. The outcomes of this Project will provide basic pieces of information and their processing tools that will promote the "global environmental studies," and will constitute materials necessary for communicating RIHN's research activities to the public.

Publications

The RIHN series of one volume "Biodiversity, Why it is important?" (Japanese) was published in March 2005. This book explores how RIHN is observing, thinking about and questioning Biodiversity.

Activities of RIHN

■RIHN Forum

RIHN Forum is organized, based on the principles and outcomes of RIHN's research activities, and especially on the understanding that "the so-called environmental problems are fundamentally problems of human culture," with the aim to raise questions and animate discussion about up-to-date topics around these problems, to help find answers to the fundamental questions to the global environmental problems.

No.	Title	Date	Venue
1st	The global environmental problems —Toward an integrated approach	17 May, 2002	Kyoto International Conference Hall
2nd	Global warming —Nature and culture	13 June, 2003	Kyoto International Conference Hall
3rd	What comes after biodiversity loss?	10 July, 2004	Kyoto International Conference Hall
4th	Extinguished water	9 July, 2005	Kyoto International Conference Hall

■RIHN Public Seminars

This seminar aims to provide the opportunity to share opinions with citizens in Kyoto as to various topics concerning the environmental problems related to human lifestyles.

No.	Title	Date	Speaker
1st	The fascination and the reality of the Silk Road Region	5 November, 2004	NAKAWO, Masayoshi (Professor, RIHN)
2nd	A Multi-disciplinary challenge towards the lake Biwa watershed management	3 December, 2004	YACHI, Shigeo (Associate Professor, RIHN) NAKANO, Takanori (Professor, RIHN)
3rd	Iriomote island with its subtropical nature and life	4 February, 2005	TAKASO, Tokushiro (Professor, RIHN) Mr. KOMI etc.
4th	World water issues in the 21st century	4 March, 2005	KANAE, Shinjiro (Associate Professor, RIHN)
5th	Global warming, is it real?	1 April, 2005	HAYASAKA, Tadahiro (Professor, RIHN)
6th	Impacts of climate change on life and environment	3 June, 2005	WATANABE, Tsugihiro (Professor, RIHN)

□RIHN Seminars

RIHN Seminars are organized to provide opportunities for RIHN's scientists to share the latest topics and research trends in different fields of global environment research with speakers invited from Japanese or foreign institutes, and to get inspired for new directions of research. (Seven seminars were held in 2004.)

□Luncheon Meetings (Danwakai)

At RIHN, the luncheon meetings provide an unique opportunity for mutual inquiry and exchange of opinions among institute members, as well as visiting professors, part-time researchers, foreign researchers and so on. It will be held on a biweekly basis. (Eighteen meetings were held in 2004.)

□Evening Seminars

The evening seminars are intended to promote the free exchange of opinions and to stir up discussion. Ordinarily these study meetings will be held on a monthly basis, beginning at five p.m. and lasting for approximately two hours. (Six seminars were held in 2004.)

□Research Project Presentation

The leaders of the research projects overview the on-going process in an interim report, in which several hundred joint researchers take part as discussants. This annual meeting plays an important role of providing the opportunity for sharing through discussions and practically, for the academic evaluation of research activities of RIHN. (Date: December 16-17, 2004)

Research Staff Profiles

(in alphabetical order)

ABE, Hiroshi

- Assistant Professor, Project 5-3PR
- Background: philosophy and environmental thought

Having studied phenomenological philosophy, especially that of M. Heidegger, and having much to learn from the latest research results of natural sciences at RIHN, I try to reconsider and reconstruct elemental concepts of the global environmental problems, e.g. "Symbiosis" and "nature."

AKIMICHI, Tomoya

- Professor, Project 4-2
- Background: ecological anthropology, ethnobiology

I have conducted ecological anthropological research so far. I intend to explore a new approach to the environmental issues in Southeast Asia, focusing on historical relations between wildlife and indigenous populations.

ENDO, Takahiro

- Assistant Professor, Project 5-1
- Background: political science

How does political science contribute to solve environmental problems? I think a key viewpoint is to focus on "the role of government." Speaking concretely, I am concerned with the role of government in solving environmental problems such as headwater conservation and marine litter.

FUKUSHIMA, Yoshihiro

- Professor, Project 1-2
- Background: eco-hydrology

I'm very concerned with the role of biosphere on hydrological cycle in climate formation system. Actually, recent water crisis such as flood and drought events seems to occur in the region which has severe water demand. We are going to implement studies of the Yellow River in order to recognize the relationship between natural phenomena and human activities.

HAYASAKA, Tadahiro

- Professor, Project 2-1
- Background: atmospheric physics

I am interested in global warming issues, particularly the relationship between globalization of socio economic activities and emissions of greenhouse gases and aerosols, and those effects on the climate change.

HIDAKA, Toshitaka

- Director-General
- Background: biology, ethology

I wish to realize in this novel institute what I was feeling and doubting during my research at the University of Tokyo, Tokyo University of Agriculture and Technology, Kyoto University and the University of Shiga Prefecture.

HOSHIKAWA, Keisuke

- Research Fellow, Projects 1-1, 1-2
- Background: GIS, agricultural engineering

I will analyze and integrate hydrologic data in the Yellow River basin, China, with GIS, and try to develop a model that describes relationship of human activities and water environment in the basin more deeply.

ICHIKAWA, Masahiro

- Associate Professor, Project 2-2
- Background: area study

I have studied the natural resource uses by native people of Sarawak, Malaysia. Being affected by the market economy and development policies, will the resource uses change considerably, or will its property retain in the core? It is my interest for the studies in RIHN.

IMAMURA, Akio

- Research Fellow, Project 5-3PR
- Background: ecology of plants and fungi

I am trying to understand better the essence of Nature by studying how fungi and plants in forests are living and by investigating what their relationships like. I intend to get suggestions on the relationship between *Homo sapiens* and the other organisms and that between Humans and Nature.

INOUE, Takashi

- Visiting Professor, Project 4-1
- NHK special TV program center executive producer

By making the TV programs of "The Yellow River", "Great Mongolia", and "Four Great Ancient Civilizations", I became interested in relations between the civilizations and the nature. I hope I could use these experiences in my studies.

ISHII, Reiichiro

- Research Fellow, Project 3-1
- Background: Theoretical ecology

I seek the key mechanisms and conditions that account for the realized (observed) biodiversity and functions of ecosystems, believing that provides us the better ways of thinking and living in ecosystems.

KANAE, Shinjiro

- Associate Professor, Project 5-1
- Background: civil engineering, hydrology, climate system

Keeping in mind the criticism that a scholar tends to follow what is already solved in the real society, I hope to make efforts on finding/realizing something new which is socially and environmentally relevant.

KATAGIRI, Shuichiro

- Research Fellow, Project 2-1
- Background: atmospheric radiation

I have studied cirrus clouds using satellite remote sensing. At RIHN, I will observe clouds from the ground and space to figure out how they interact with human activities.

KATO, Yuzo

- Assistant Professor, Project 4-1
- Background: chinese legal history

I am interesting in studies that are out of existing structures. I intend to reconstruct the "environment" including the social milieu in historical context, and present it in writing.

KAWABATA, Zen'ichiro

- Professor, Projects 3-1, 4-2
- Background: microbial ecology, aquatic ecosystem ecology

I will try to clarify the interactions between humans and harmful biological agents in degraded freshwater ecosystems in order to promote aquatic environments which ensure the well-being of humans and wild life organisms drawing on my experience so far in aquatic ecosystem analyses at different levels from genes to ecosystems.

KAWAMOTO, Kazuaki

- Assistant Professor, Project 2-1
- Background: atmospheric radiation, satellite climatology

My research interest is to explore the relationship between humanity and atmosphere using particles such as aerosols, clouds and rainfall as clues. I like to enjoy creating my own earth environmental study in this laboratory of RIHN, groping about uniting multi-disciplines.

KHARAKWAL, Jeewan Singh

- Visiting Professor, Project 3-3FS
- Background: south asian archaeology

I have been engaged in excavating Bronze and Iron Age sites in Western India for several years. I am trying to understand the role of rural Bronze Age cultures in the urbanization process of the Indus Civilization. In addition to this, I have also been working on the development of indigenous technologies.

KIMOTO, Yukitoshi

- Research Fellow, Project 3-2
- Background: plant morphology, anatomy, phylogeny

I have studied the diversity of the external and internal structures of reproductive organs in angiosperms –flower buds, flowers and fruits (seeds). I am interested in the relationships between their structures and functions, especially in the relationships of plants and their partners.

KINOSHITA, Tetsuya

- Professor
- Background: Chinese philosophical history

Fourteen years old I read Chinese classic "Laotzü". And then I decided myself to be a researcher into Chinese classics as my life work. The philosophy of Laotzü is the one origin of anti-artificial-ism in classic China and Japan. I feel that led along this line I have come to RIHN.

KOHMATSU, Yukihiro

- Assistant Professor, Research Promotion Center
- Background: ecology, geography

I have studied the evolution of life-histories of animals which live in temporally waters. I try to develop the methods of inter-disciplinary studies based on the methods of geography which any materials and matters study focusing on spatial problems.

KUBOTA, Jumpei

- Associate Professor, Projects 4-1, 4-5FS
- Background: forest hydrology

I have been involved in scientific projects for studying hydrological processes and the role of the forest in hydrological cycle. I will try to figure out interactions between humans and nature from hydrological aspects.

KUME, Takashi

- Research Fellow, Project 1-1
- Background: soil hydrology

I have been studied irrigation-drainage and soil salinization at large irrigation district in Inner Mongolia, China. I will figure out the impact of climate changes on agricultural production system in arid areas based on water and material cycles without losing cultivated experiment at there.

MATSUOKA, Masayuki

- Research Fellow, Project 1-2
- Background: remote sensing

My research subject is the optical remote sensing of land surface. The analysis of land cover and its change over the Yellow River basin is the primary research objective in RIHN.

MOMOKI, Akiko

- Associate Professor, Research Promotion Center
- Background: biology, ethology (especially human)

My experiences in human ethology research, a discipline in which all aspects of "humanity" are studied, will contribute to the RIHN's research activities and science communication with the public.

MORIYA, Kazuki

- Research Fellow, Project 4-1
- Background: Chinese social history

So far I have been studied about what human beings thought about and what they did. In RIHN, I am going to research on the relationship between human and nature, and its impact on social systems.

MURATA, Fumie

- Research Fellow, Project 5-1
- Background: tropical meteorology

I have been studying abount mechanizm of precipitation in tropical Asian region, especially Sumatera Island, Indonesia. The main method of my study is in situ observation. In this institute, I would like to think about too much water problem, like floods, in tropical Asia.

NAKANO, Takanori

- Professor, Projects 3-1, 2-6FS
- Background: resource geology, isotope geology

Humans have developed prosperous societies through exploitation of non-renewable resources. I shall examine the complex system of material transportation in the ecosphere in terms of my specialized field of research, which is chemical information from the geosphere. This examination will advance the design and scope of future sustainable societies.

NAKASHIZUKA, Tohru

- Professor, Project 2-2
- Background: forest ecology (forest dynamics, biological diversity)

How extensively humans have been depending on biological diversity? What we suffer when biological diversity is lost in front of us? It is important for me to study biodiversity issue as a global environmental problem.

NAKAWO, Masayoshi

- Professor, Project 4-1
- Background: glacioclimatology, cryosphere hydrology

I wish to review the history from the viewpoint of interactions between people and nature. This would yield a clue to creating our new manner of living that could assure future capability.

NISHIMURA, Yuichiro

- Research Fellow, Project 4-2
- Background: socio-economic geography, time-geography

My research aims to show how the daily human time use and living space is changed by the effect of modernization and globalization, and to analyze these changes from the gender perspective. I wish to study the relationship between daily human activity, natural environment and social conditions in Southeast Asia.

NONAKA, Kenichi

- Associate Professor, Project 4-2
- Background: geography, ecological anthropology, and ethnobiology

I have been studying mutual relationship between human and nature through cognition and usage of natural resources. I wish to clarify and describe the reality and dynamism of human-nature relationship by focusing on diversified people's life as well as characteristics.

OKUMIYA, Kiyohito

- Associate Professor, Project 4-2
- Background: field medicine, geriatrics, neurology

I have conducted field medicine for community-dwelling people and I assessed their health, comprehensive geriatric assessment, QOL totally. I intend a new approach to geriatrics and neurology in association with culture and nature internationally.

OSADA, Toshiki

- Professor, Project 3-3FS
- Background: linguistics, south asian studies

I have spent more than 6 years in India to study on languages and cultures of indigenous peoples. In our project I would like to carry out the research focussed on Indus Civilization by the interdisciplinary methodology.

PALANISAMI, Kuppannan

- Invited Research Fellow, Projects 1-1, 1-3FS
- Background: agricultural economics and water management

As a water policy economist, I have done extensive research on tank irrigation in south India and Thailand. Also done water technology transfer projects in Tamilnadu state, India. Currently working on groundwater management issues where specific focus is given for externalities related to groundwater over-exploitation.

QI, Wuyun

- Invited Research Fellow, Project 4-1
- Background: pollen analysis, environmental changes, environmental archaeology

I have studied pollen samples deposited in lake cores and archaeological relics to reconstruct past environment, and tried to explore the relationship between human and environmental in history. In RIHN, I will work on the pollen analysis of the lake cores and ice cores in the Research Project 4-1 to restore historical climate and vegetation in Heihe river basin.

SAEKI, Tazu

- Assistant Professor, Project 2-1
- Background: atmospheric physics

My research subject is to investigate global cycles of greenhouse gases such as carbon dioxide and methane using numerical models. I am interested in keeping up with those human and natural activities that have direct impact on observed changes in these trace gases.

SAITO, Kiyoaki

- Director Professor, Research Promotion Center
- Background: journalism, study of nature

During the past 33 years, I have been the newspaper writer, wanting to study biology from the first. The Arctic, Antarctic, Himalaya, etc. visited every place of the earth, and various experiences were carried out. At RIHN, I wish to pile new alcohol in a new leather bag.

SATO, Yo-Ichiro

- Professor, Project 2-5PR
- Background: plant genetics

I am interested in the domestication of crop species, and have been studying on the origin of rice using the tool of DNA archaeology. In the research at RIHN, I started a research project entitled: Erosion of Genetic Diversity as a social, Ecological and Environmental Problem.

SATO, Yoshinobu

- Research Fellow, Project 1-2
- Background: forest hydrology

I had been studying the hydrological cycle in several forested watersheds through local observation. At RHIN, I wish to develop a hydrological model which takes not only climate change but also the influence of human activities into consideration for suitable water-resource management of the Yellow River Basin, China.

SEKINO, Tatsuki

- Associate Professor in charge of information processing, Research Promotion Center
- Background: limnology, ecology

I have applied information technology to my limnological and ecological studies. With this experience, I will try to construct a knowledge base concerning the global environment, which is required in the activities of RIHN and its projects.

SHEN, Weirong

- Invited Research Fellow, Project 4-1
- Background: history, comparative religious studies, sino-tibetan buddhist studies

I intend to uncover the true story of religious interactions among Chinese, Tibetan, Tanguts and Mongols by investigating Khara Khoto manuscripts, so as to contextualize the uniqueness of the Khara Khoto area as a platform of multi-religious interactions and as a natural reservoir of great cultural heritages of various people.

SHIRAIWA, Takayuki

- Associate Professor, Project 2-3
- Background: physical geography, glaciology

I have been studying glacier variations and their relation to climate. I wish to expand my research interest to include interactions among the atmosphere, cryosphere, ocean and the ecosystem including human activities by contributing to the Amur-Okhotsk Project, which I will direct for the next five years.

SUGIMOTO, Takashige

- Visiting Professor, Professor of Ocean Research Institute in Tokai University
- Speciality : coastal oceanography and fisheries environmental oceanography

The management of river water quality will be reconsidered from the viewpoint of coastal oceanography. For this purpose, characteristics of the nutrient fluxes from the Yodo River into the inner part of the Osaka Bay, the formation processes of the red tide and anoxic water mass, as well as, hydro-ecotechnology to conserve or restore estuarine ecosystems, will be investigated.

TAKAHASHI, Atsuhiro

- Research Fellow, Project 1-2
- Background: eco-meteorology

I have been engaged on the study of micrometeorology in a forest for investigation of a physical interaction between a forest ecosystem and the environment, by means of measurements and modeling. As a work at RIHN, I am interested in how human society influences natural system.

TAKASO, Tokushiro

- Professor, Project 3-2
- Background: plant morphology (especially pollination and fertilization in gymnosperms)

I am interested in the study of adaptive mechanisms of subtropical plants and would like to present the results of the study to people in a manner they can enjoy plants. I would like to contribute to the study of insular environments based on our Iriomote project.

TAKEUCHI, Nozomu

- Assistant Professor, Project 4-1
- Background: glacial biology

I have studied unique organisms living on snow and ice in Himalayas, Arctic, Patagonia, and Alaska. In this institute, I will work on ice cores to reconstruct past environment, and try to use the organisms stored in the core as an indicator of the past environment.

TANIGUCHI, Makoto

- Associate Professor, Projects 1-2, 2-4PR and 1-1
- Background: hydrology, geophysics, hydrogeology, natural geography

I have been studying process-oriented groundwater hydrology from global aspects. I am going to focus on the researches about Atmosphere-Land-Ocean interactions and Human-Nature interactions under the international research frameworks.

TATENO, Ryunosuke

- Research Fellow, Project 5-2
- Background: forest ecology

I have been studying forest ecosystems from the perspective of the tree-soil relationships. In my work at RIHN, I want to expand the perspective to the human-nature interactive systems that includes human and human activities.

TERASHIMA, Motoki

- Research Fellow, Project 2-3
- Background: environmental chemistry, analytical chemistry

My research interest is in the molecular interaction of humic substances with biogeochemical materials as well as environmental pollutants. In my current research project, I will study the role of humic substances as a carrier of iron from river to sea.

UCHIYAMA, Junzo

- Associate Professor, Projects 5-3PR, 4-4FS
- Background: zooarchaeology, cultural anthropology

I am studying the long-term sequence of the human-nature relationships from the viewpoint of resource management. On the basis of the analysis of faunal remains from archaeological sites, my research mainly focuses on the reconstruction of subsistence activities, land use systems and socio-economic structures among prehistoric foraging groups such as the Jomon era in Japan.

UMETSU, Chieko

- Associate Professor, Projects 1-1, 1-3FS
- Background: biology, international relations, resource and environmental economics, development economics

I am interested in development issues, especially environment and poverty linkages in rural areas in Asia and Africa. At RIHN, I wish to be involved in research agenda that directly deal with human and environment/resource nexus.

WATANABE, Tsugihiro

- Professor, Projects 1-1, 1-2 and 4-1
- Background: irrigation engineering, rural hydrology.

At RIHN, I am coordinating the research project on climate change impacts on agriculture in arid region, based on diagnostic studies on land and water management.

YACHI, Shigeo

- Associate Professor, Project 3-1
- Background: theoretical ecology (modeling in evolutionary ecology, ecology of biodiversity and watershed management)

I want to promote an inter-disciplinary approach in our watershed management project. For this purpose, I am working on a modeling methodology to bridge the gaps in decision making between scales in a watershed.

YAMASHITA, Satoshi

- Research Fellow, Project 2-2
- Background: forest protection, community ecology

I have studied the community structure of mushroom-feeding insects and its functional roles in a forest ecosystem. At RIHN, I will elucidate how human activities, especially forest utilization, affect the biodiversity of fungi and insects and their relationships.

YATAGAI, Akiyo

- Assistant Professor, Projects 1-1, 4-1 and 1-2
- Background: atmospheric science, climatology, hydrology, remote sensing, physical geography

I am interested in the relationships between hydrological circulation and climate change. I would like to approach environmental issues with my professional experiences in data analysis. Also, hope to approach them from the point of view of a mother as well as a scientist.

YOSHIMURA, Mitsunori

- Associate Professor in charge of observation and analysis support, Research Promotion Center
- Background: geographic information system, remote sensing

I wish to try to develop an advanced system for field observation of measurement and approach to scale-up methodology for environmental monitoring by GIS and remote sensing technologies.

YOSHIOKA, Takahito

- Associate Professor, Project 5-2
- Background: biogeochemistry, limnology

I want to elucidate the relationships between the people's environmental consciousness and the environmental quality. A method of exchanging information between people and the nature will be developed in this project.

YUMOTO, Takakazu

- Professor, Projects 5-3PR, 2-2
- Background: ecology (biodiversity, plant-animal interactions)

I have been studying the symbiotic relations between plants and animals in forest ecosystems and these consequences on biodiversity. In RIHN, I would like to investigate the history of symbiosis among organisms in the Japanese Archipelago, and relationships between humans and nature, by interdisciplinary approach.

ZHENG, Xongxing

- Invited Research Fellow, Project 1-2
- Background: hydrology and water resources management

I am interested in hydrological responses to climatic changes as well as land use and land cover changes, which may subsequently have impacts on socioeconomic development and environmental or ecological health. Distributed hydrological model and GIS are used in my case study on the Yellow River domain, China.

ZHENG, Yuejun

- Associate Professor. Project 5-2
- Background: environmental statistics, environmental economics, social survey

My research interests are in analyzing the connection between human behaviors and environmental changes in temporal and spatial scales. Especially, I am developing the framework of cooperative society for environmental issues through exploring the essence of environmental consciousness in East Asia.

New Facilities at Kamigamo, Kyoto

(Expected start in spring 2006)

It is great pleasure to have our new campus, since our members have occupied a temporary building.

Features of the campus were specifically designed to facilitate the central theme of RIHN. Our concept is that, the root of so-called global environmental problems lies in human 'culture' in the widest meaning of the word; and that solutions can be found through a culture of improved communication.

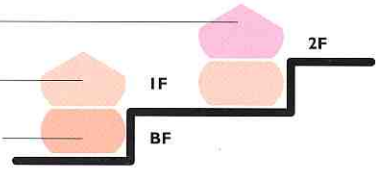
RIHN aims to elucidate the complex and varied relationships linking humanity and nature. We are trying to synthesize new approaches beyond the existent, formal disciplines of natural, social and human sciences. This requires communication, which the new campus architecture enables on a face-to-face basis, especially. Our new laboratory is far from a mere set of small, closed rooms. Rather, it consists of various research groups residing in large, open hub spaces that allow much free conversation. The wide open corridors encourage spontaneous discussions when meeting colleagues with a variety of backgrounds. Modern science is advanced by the vehicles of critical discussion, teamwork, and the stimulation of competition - all modes which are eased by the new physical environment at RIHN. Our new campus may be said to be, so to speak, a network of channels for "intellectual excursion."

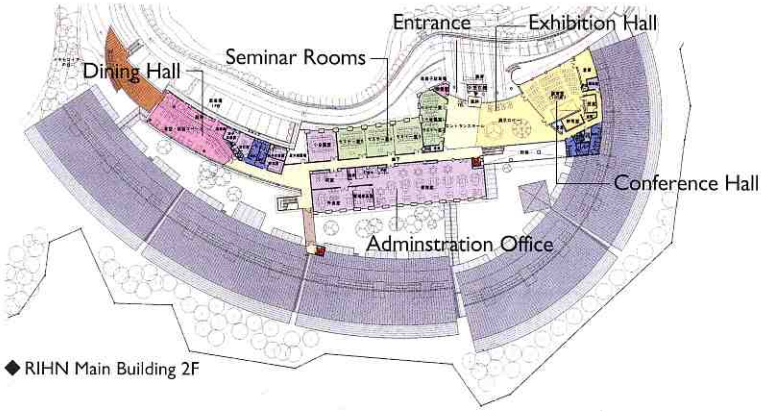
Computer graphic of the whole facilities

2F: Administration Floor
- Entrance Hall
- Exhibition Hall
- Conference Hall
- Adminstration Office
- Seminar Rooms
- Dining Hall

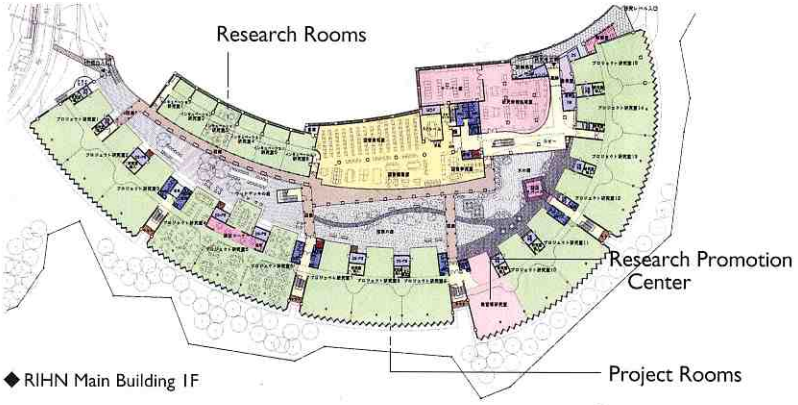
1F: Research Floor
- Project Rooms
- Research Rooms
- Research Promotion Center
- Library

BF: Laboratory Floor
- Experimental Laboratories
- Library Stacks
- Utilities

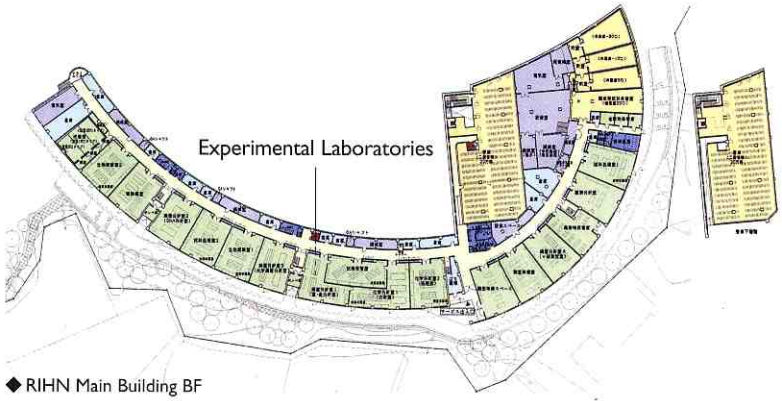




◆ RIHN Main Building 2F

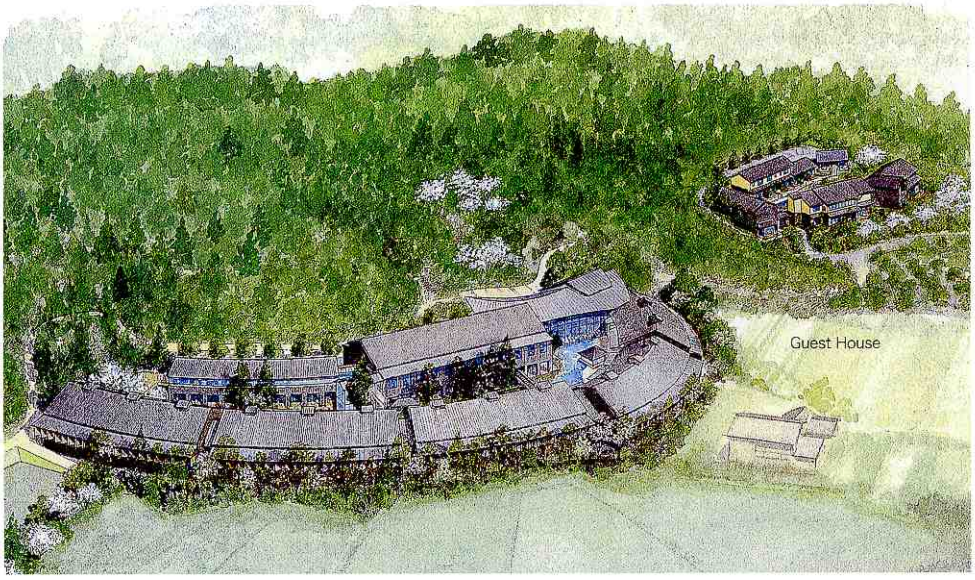


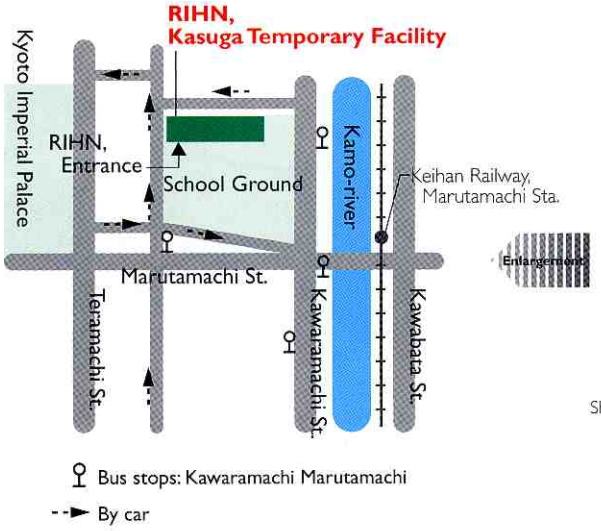
◆ RIHN Main Building 1F

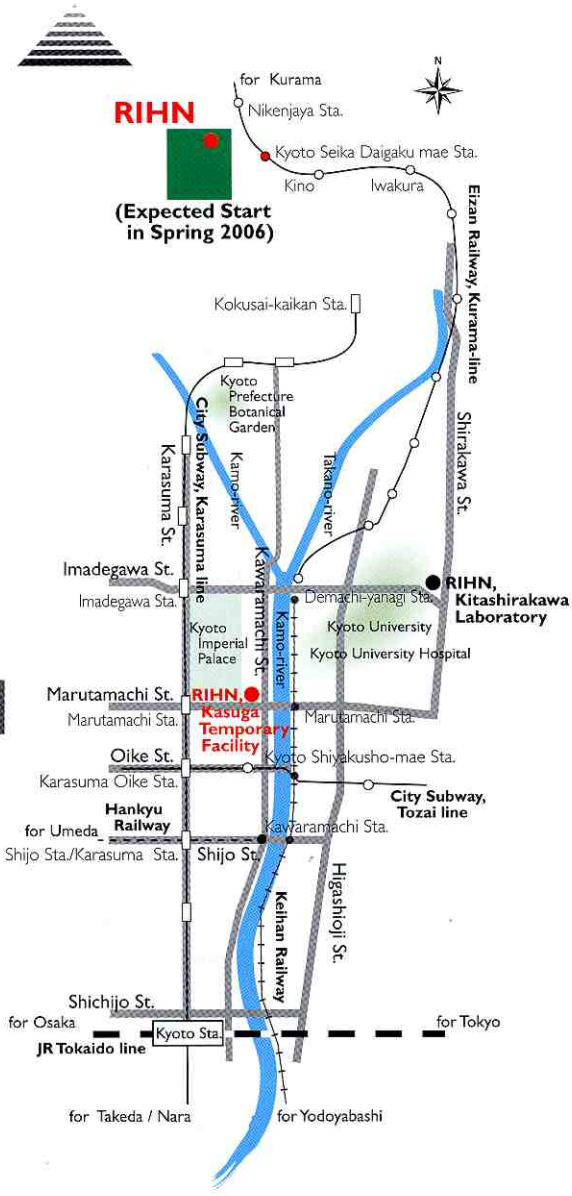


◆ RIHN Main Building BF

courtyard







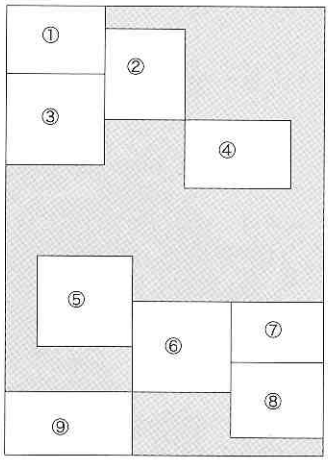
Access

by Train: Take Keihan Line to Marutamachi Station and walk 5 minutes.

by Subway: Take Karasuma Line to Marutamachi Station and walk 10 minutes.

Take Tozai Line to Kyoto Shiyakusho-mae Station and walk 10 minutes.

by City bus: From Kyoto Station Terminal A2: Take No. 4/17/205 bus to Kawaramachi-Marutamachi and walk 2 minutes.



Notes of cover page photos

1. Lake Shumarinai, Hokkaido, Japan. Usually submerged coastline and underwater objects have been exposed to the air due to the lowering of water level.

2. Qiubei county, Zhuang and Miao Nationalities Autonomous Prefecture, Yunnan, China. Sun-dried maize is used as feed. In this area, the large-scale cultivation of cash crops such as maize, chilly, and medicinal plants is rapidly being implemented, which may bring about environmental deterioration.

3. A food market in Yanshan, Wenshan county, Zhuang and Miao Nationalities Autonomous Prefecture, Yunnan, China. Dried mushroom, fruits, and medicinal plants are sold. An inventory of various wild and cultivated plants exemplifies the change in use of the environment.

4. Lahanam, Savannakhet Province, Laos. In this area, the cotton textile industry is popular, making use of indigenous cotton and indigo materials. Recently, a joint venture industry between Laos and Japan to produce hand-made brand textiles from natural materials has started. As this industry includes planning, manufacture and exporting processes, it may greatly affect the means of subsistence and life of the local inhabitants.

5. Ice core drilling on a glacier in the Kalik-Shan Mountains, Xinjiang Uighur Autonomous Region of China. Ice cores tell us about past environmental conditions, such as air temperature and precipitation.

6. Flood plain of the Lower Amur River. This area is inundated in high water in the period of June and August. Dissolved iron which forms here is transported to the Sea of Okhotsk and utilized to grow phytoplankton.

7. Vientiane, Laos. In the Great Mekong River, lift net and branch-bundle fish-attractant devices are employed to catch fish in the dry season. In line with seasonal water level fluctuation, and depending on fishing grounds and target species, a variety of fishing techniques are applied. However, recent development projects along the river basin such as dam construction have altered water levels that may also have a serious impact on the traditional fishing cycle.

8. A farmer working with camels in Xinjiang Uighur Autonomous Region of China. Farmers living in such arid regions cultivate their land with limited amounts of water from glaciers in the mountains.

9. Heihe city in China viewed from Blagoveshchensk in Russia. The city, located at the middle of Amur River, is developing rapidly and becoming a trading base from China to Russia.

Research Institute for Humanity and Nature

335 Takashima-cho, Marutamachi-dori
Kawaramachi nishi-iru,
Kamigyo-ku, Kyoto, 602-0878, JAPAN
Phone: +81-(0)75-229-6111
Fax: +81-(0)75-229-6150
http://www.chikyu.ac.jp
e-mail: kokusai@chikyu.ac.jp