



RESEARCH INSTITUTE FOR HUMANITY AND NATURE

2004-2005



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

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Message from Director-General

HIDAKA, Toshitaka
Director-General, Professor



Four 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



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.

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)

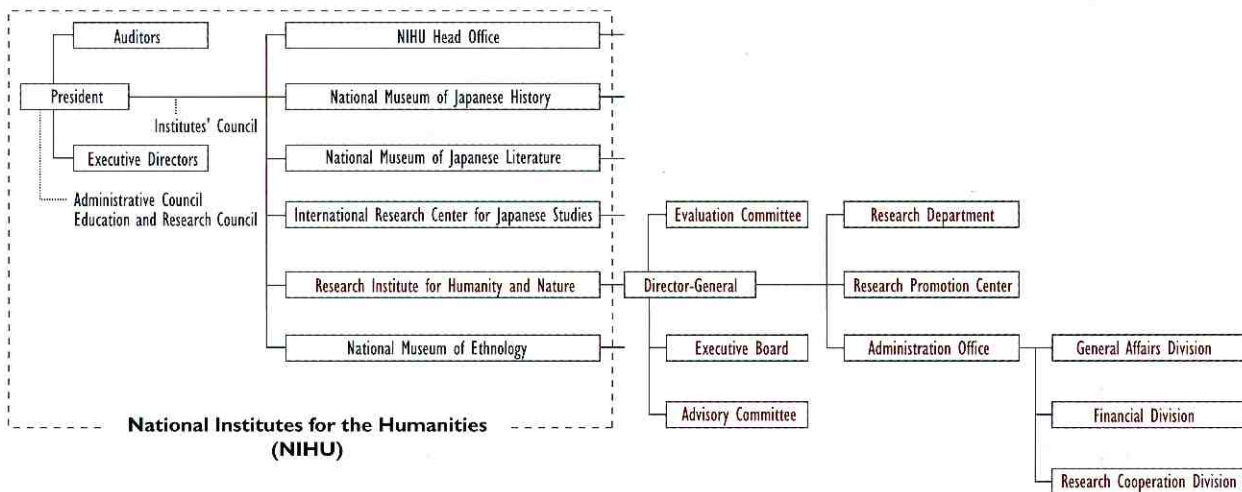
National Institutes for the Humanities (NIHU) was established on April 1st., 2004 based on the National University Corporation Law. RIHN became one of member institutes of the NIHU along with the following institutes, National Museum of Ethnology, International Research Center for Japanese Studies, National 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.

Organization



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

— Professor, Faculty of Life Science, Fukuyama University

NAKAMAKI, Hirochika

— Professor, Department of Cultural Research National Museum of Ethnology, NIHU

NAKAMURA, Kenji

— Director, 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

SAITO, Kiyooki

— Director, Center of Research Promotion Center, Research Institute for Humanity and Nature

NAKAWO, Masayoshi

— Program Director, Research Institute for Humanity and Nature

WADA, Eitaro

— Program Director, Research Institute for Humanity and Nature

Evaluation Committee

Undertakes evaluation 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

— Professor, Faculty of Life Science, Fukuyama University

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

LEGENRE, Louis

— CNRS Research Professor, 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

— Director-General, National Institute of Polar Research

OKAZAKI, Shoji

— 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, Kiyooki

— Director, Research Promotion Center, Research Institute for Humanity and Nature

WADA, Eitaro

— 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.

Budget

Expenditure (Fiscal Year 2003)

Category	Amount (Yen in thousands)
Personnel Expenses	506,639
Non-Personnel Expenses	1,196,427
Total	1,703,066

External Sources of Funding (Fiscal Year 2003)

Category	Amount (Yen in thousands)
Fund for Promotion of Academic and Industrial Collaboration	63,934
Donation for Research	2,500
Grants-in-Aid for Scientific Research	52,346

Staff Members

RESEARCH DEPARTMENT

Program Directors

AKIMICHI, Tomoya
FUKUSHIMA, Yoshihiro
HAYASAKA, Tadahiro
NAKAWO, Masayoshi
WADA, Eitaro

Professor Emeritus

NAKANISHI, Masami

Professors

AKIMICHI, Tomoya
FUKUSHIMA, Yoshihiro
HAYASAKA, Tadahiro
KINOSHITA, Tetsuya
NAKANO, Takanori
NAKASHIZUKA, Tohru
NAKAWO Masayoshi
OSADA, Toshiki
SATO, Yo-Ichiro
TAKASO, Tokushiro
WADA, Eitaro
WATANABE, Tsugihiko
YUMOTO, Takakazu

Visiting Professors

HANNAN, Md. Abdul
(Apr. 1, 2004 - Mar. 31, 2005)
Research Fellow, Center for Natural
Resource Studies, Bangladesh
INOUE, Takashi
Executive Producer, NHE Special TV
Program Center
KHARAKWAL, Jeewan Singh
(May 10, 2004 - May 9, 2005)
Assistant Professor, Department of
Archaeology, Institute of Rajasthan
Studies, Rajasthan Vidyapeeth
University, India
SUGIMOTO, Takanari
The University of Tokyo, Professor
Emeritus
WAN, Genxu
(Apr. 1, 2004 - Dec. 15, 2004)
Professor, Cold and Arid Regions
Environmental and Engineering
Research Institute, Chinese Academy
of Science, P.R.China

Associate Professors

ICHIKAWA, Masahiro
KANAE, Shinjiro
KUBOTA, Jumpei
NARITA, Hideki
NONAKA, Kenichi
OKUMIYA, Kiyohito
TANIGUCHI, Makoto
UCHIYAMA, Junzo
UMETSU, Chieko
YACHI, Shigeo
YOSHIOKA, Takahito
ZHENG, Yuejun

RESEARCH PROMOTION CENTER

Director

SAITO, Kiyooki

Associate Professors

MOMOKI, Akiko
SEKINO, Tatsuki
YOSHIMURA, Mitsunori

DIRECTOR-GENERAL HIDAKA, Toshitaka

Assistant Professors

ABE, Hiroshi
KATO, Yuzo
KAWAMOTO, Kazuaki
SAEKI, Tazu
TAKEUCHI, Nozomu
YATAGAI, Akiyo

Research Fellows

FUJITA, Wataru
IMAMURA, Akio
INOUE, Mitsuyuki
KATAGIRI, Shuichiro
KIMOTO, Yukitoshi
KUME, Takashi
MURATA, Fumie
NISHIMURA, Yuichiro
TAKAHASHI, Atsuhiko
TATENO, Ryunosuke

Research Fellows (RR, etc.)

MIYAKE, Takayuki
HOSHIKAWA, Keisuke
MATSUOKA, Masayuki

Research Fellows (JSPS)

HARROLD, Timothy Ives
HYODO, Fujio
NAGANO, Takanori
NAKAGAWA, Yachiko
ONISHI Hideyuki

Clerks

HARADA, Atsuko
HASE, Noriko
HATTORI, Yumiko
ICHIDA, Koichiro
IWATA, Atsuko
KAWAMURA, Mika
KITAMURA, Ayako
NAGAOKA, Kumiko
NAGASAKA, Junko
NAKAMURA, Yumiko
NINOMIYA, Mayu
ONAKA, Yoriko
SASAKI, Noriko
SIMIZU, Hiromi
TAKINO, Kayoko
UENO, Aki

Technicians

AKEDO, Masako
CHENG, Zhi
HIRATA, Masahiro
IGETA, Akitake
IMADA, Miho
KUDO, Aiko
OGAWA, Akiko
MIYAJIMA, Toshiaki
SHIMIZU, Ikuro
TAGUCHI, Rie
TANAKA, Takuya
UEDA, Atsushi
USHIMARU, Atsushi

Assistant Professor

KOHMATSU, Yukihiko

Technicians

IGI, Setsuko
TAKI, Chiharu
TANAHASHI, Toshiyuki

ADMINISTRATION OFFICE

Director OKAZAKI, Shoji

GENERAL AFFAIRS DIVISION

Head INOUE, Akio

Deputy Head

NAKANISHI, Masahiko

• General Affairs Section

Head MURATA, Satoshi

Clerk UEMURA, Saeko

OTSUKA, Miki

Secretary

OMORI, Mami

• Personnel Section

Head MINATO, Hideto

Chief NAKANISHI, Seiji

Clerk IWASAKI, Rie

FINANCIAL DIVISION

Head KANOMATA, Nirou

Deputy Head

HAMASAKI, Yasuhiro

• Budgeting Section

Head KOMAMURA, Masaaki

Clerk ENOMOTO, Isao

MORIKAWA, Akiko

• Accounting Section

Head TANAKA, Yoshiro

Clerk SETA, Yoriko

HOSOGUCHI, Miyo

• Supply Section

Head MIYAZAKI, Yoshihito

Chief YAMADA, Tetsuya

Clerk KIMURA, Minako

TAMEISHI, Miki

Janitor ONISHI, Kazuma

• Facilities Section

Head OOE, Nobuhiro

Clerk SINTANI, Tomohiro

RESEARCH COOPERATION DIVISION

Head MATSUDA, Mitsunori

Deputy Head

KOSEKI, Kenichi

• Research Cooperation Section

Head YOSHIDA, Ren

Clerk MATANO, Makiko

ARAKI, Keiko

SOEOKA, Sachiko

• Team Research Section

Head OKAZAKI, Akihiko

Clerk IMAI, Masatoshi

HIROSE, Kumi

KANEMATSU, Takako

SUEZAWA, Reiko

• International Affairs Section

Head SUMIKURA, Mariko

Chief KAJI, Sachiko

Clerk OMOTO, Emi

Partner Organizations for Fluid Association (Fiscal Year 2004)

• 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

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 the feasibility study will be evaluated and, if assessed as suitable, 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.

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

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
- 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
- 2-4FS Human Impacts on Subsurface Environments
- 2-5FS Evolution of Cultivated Plants and Man-made Habitat

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 An Attempt to Reconstruct the Environmental Condition of Ancient Civilization with Special Reference to 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
- 4-3FS Historical Research into Eurasian Cultures of Daily Life as the Emergent System from Interaction between Human Beings and Nature

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 Human Use of Land and Water Resources
- 5-3FS Reconstructing the Concept of Symbiosis: A Historical Approach to the Cases in the Far Eastern Archipelago and Surrounding Areas

INCUBATION STUDIES

1. What is the limit of human impacts on sustainability in the environment? A case study in arid regions in China (KUBOTA, Jumpei)
2. Global environment and infectious diseases (MOMOKI, Akiko)
3. Creation of environmental traceability science (NAKANO, Takanori)
4. A comparative study between the Dominican Republic and Malaysia on the influence of European origin logic and systems on the natural resource uses (ICHIKAWA, Masahiro)
5. Nature of Archaeologically-Hydrologically Synthetic Flood (NOAH'S Flood) (YATAGAI, Akiyo)
6. Study of Nature (SAITO, Kiyooki)
7. The study of food – A cross point of human and nature – (NONAKA, Kenichi)
8. Construction of harmonious society for the cross-national environmental issues based on integrated evaluation on environment in East Asia (ZHENG, Yuejun)
9. Integrated studies depending on national policy during the inter-war period (KATO, Yuzo)
10. Towards resilience of social-ecological systems against environmental variability (UMETSU, Chieko)
11. Long-term dynamics of the prehistoric socio-economic structures in the Holocene from resource use perspectives (UCHIYAMA, Junzo)

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, Tsugihiko** — 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
TAMAI, Shigenobu — Arid Land Research Center, Tottori University
TSUJII, Hiroshi — Graduate School of Agriculture, Kyoto 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 — Hacettepe University and TÜBİTAK
ÖZEKİCİ, Bülent — Faculty of Agriculture, University of Çukurova

Problems and Challenges for Agriculture in Arid Areas

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 with irretrievable changes in the regional hydrological cycle. 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. What measures are required to sustain productivity in such an environment?

Objectives of the Project — Consideration of Agricultural “Wisdom” through Assessing Impacts

Agricultural production is intricately related to its surrounding natural elements and phenomena, such as soils, crops, and fauna and flora as well as meteorological, hydrological, geographical and geological conditions of the region. Any change in these conditions, which may result from global climate change, inevitably affects the dynamics of the agricultural ecosystem. This aspect has been the focal point of conventional assessment of climate change impacts on

agriculture. However, agriculture 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. This reaction is a fundamental characteristic of agriculture. Then now, is the conventional ‘wisdom’ of agriculture adequate enough to overcome the future global climate change?

Transcending the traditional framework of studies, this 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.

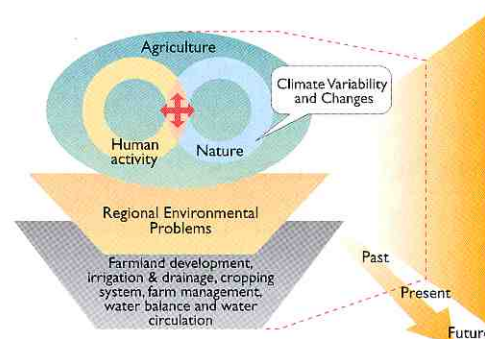
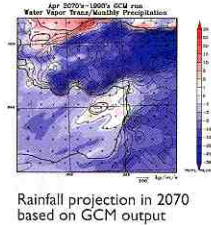
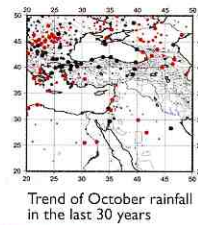
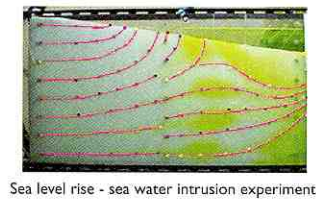


Figure 1 Scope and framework of the research

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.



Field observation-crop production, photosynthesis, evapotranspiration



Vegetation research in watershed

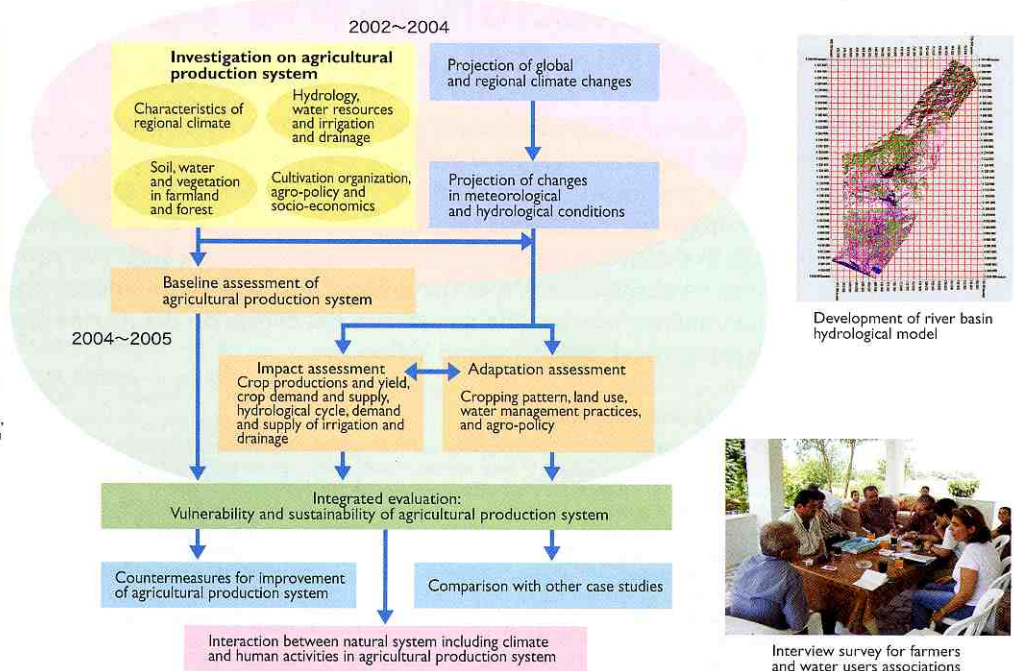


Figure 2 Research procedure

First the characteristics of regional agricultural production system are analyzed. Then the regional climate change and its adaptability are assessed for integrated evaluation of vulnerability and sustainability of the agricultural production system. This approach comprehensively examines the relation between changes in nature and human activities.

Study Areas and Methods

The research of this project is being implemented in the arid and semi-arid areas in the east coast of the Mediterranean Sea, including the Seyhan River basin in Turkey as a main case study area. Firstly we carry out a comprehensive assessment of the basic structure of agricultural production system with special reference to regional climate, land and water use, cropping pattern and irrigation system. Then, it attempts to predict and evaluate the impacts of future climate changes and the regional adaptability, and finally through these analyses, the correlations between changes in nature and human activities are to be examined in an integrated manner.

In this process, regional climate change prediction with higher resolution is critical to precise impact assessment. Furthermore, impacts on the regional water resources, irrigation and drainage system, natural vegetation, growth of crops, farm management and cropping patterns as well as the effect on the food production and marketing will be taken into account. Also feedback of agricultural production systems on regional climate will be considered. We aim at providing suggestions for regional policies and monitoring systems as well as

accumulating information that will assist to analyze relationship between climate/natural systems and human activities.

Research works in Turkey are carried out in cooperation with TÜBİTAK (The Scientific and Technical Research Council of Turkey). In the future, we plan to expand the study area into the Nile Delta in Egypt and other arid areas.



Figure 3 Study area

The study area of this project is mainly the Seyhan River Basin (19,300km²) in the Mediterranean region of Turkey where wheat is the main crop. This river basin includes upstream rainfed agriculture region producing mainly wheat and irrigated region in downstream delta producing mainly corn and cotton, where grazing also takes place.

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.

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Background and Objectives

Since 1972, 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 to irrigation in the midstream area. In the lower reaches area of the Yellow River basin, people suffer water shortage for irrigation, industrial and drinking water. In addition to these, the shortage of river water induces decrease of groundwater level and increase of water pollution. Chinese Academy of Sciences had carried out a synthetic national project from 1999 to 2003. According to the increase in population and food demand on the earth, such a case seems to increase and to spread much more in the near future worldwide. How we can recognize and resolve this problem is the most important and urgent for human being. 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. This research aims at enhanced knowledge on planning countermeasures in the Yellow River drainage basin through the contribution from specific research fields under the international collaboration with Chinese Academy of Sciences and IGBP/LOICZ community.

Methods

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

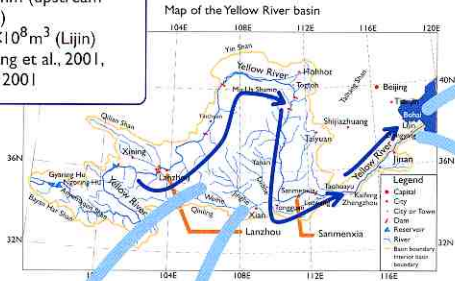
- (1) Field observations and analyses on land-atmosphere interactions in the Loess Plateau,
- (2) Field observations and analyses on interactions between river water, groundwater, and seawater in the Yellow River delta,

- (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.

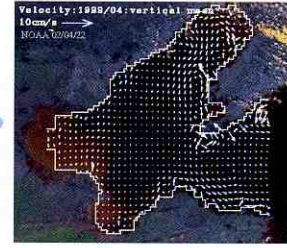
Expected Results

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: 752,443km²
 River length: 5,464km
 Precipitation: 452mm (upstream from Zhengzhou)
 Discharge: 581.6×10⁸m³ (Lijin)
 Modified from Wang et al., 2001, and Zhang et al., 2001



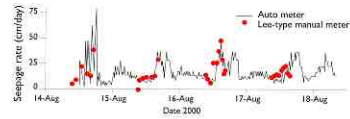
Study area: Yellow River Basin



Ecological model of the Bohai Sea

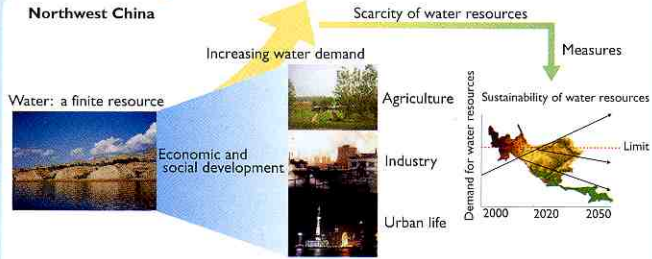


Installation of automated seepage meters
 Seepage rates measured by an automated seepage meter

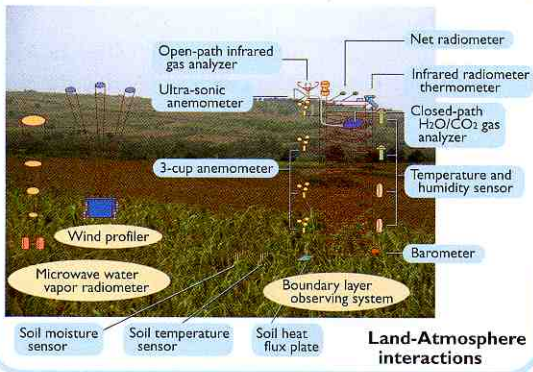


Interaction between groundwater, seawater and river water

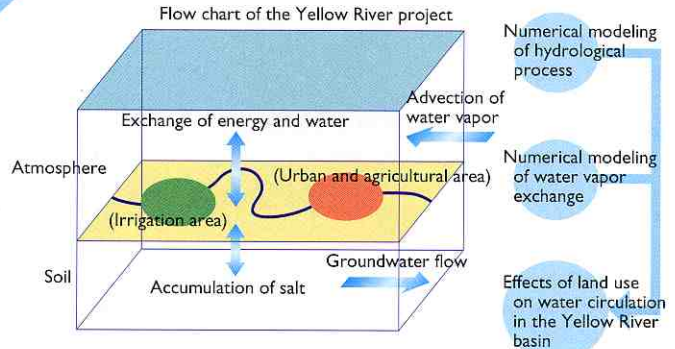
Northwest China



Socio-economical model for sustainable development



Land-Atmosphere interactions



Synthesis by development of hydrological model

Emissions of Greenhouse Gases and Aerosols, and Human Activities

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

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Background and Objectives

Most of human activities have been based essentially on each individual climate, culture, and social economic system, but recently they are being changed drastically by the influences of the globalization and developing market of economy, and global-scale climate change. The human activities affected by various global phenomena give rise to various environmental issues and emissions of greenhouse gases and aerosols, which again bring about many problems in large area or over the world. In this research project, the atmospheric constituents are studied, taking account of global warming issues. Therefore, it is not a mere local air pollution study, but the study on the relationship between human activities and climate change through emissions of greenhouse gases and aerosols.

With the background described above, the objectives of the present research project are to investigate

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

Strategy

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

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

Expected Results

It will be understood how human activities in Asian region under the globalization affect not only the local change but also the global change. The synthesis of all the results are expected to show how the globalization affects human activities in a region, and how regional scale human activities are related to the global change of the atmosphere. It is helpful for developing the academic bases for policy making and future plans of enterprises.

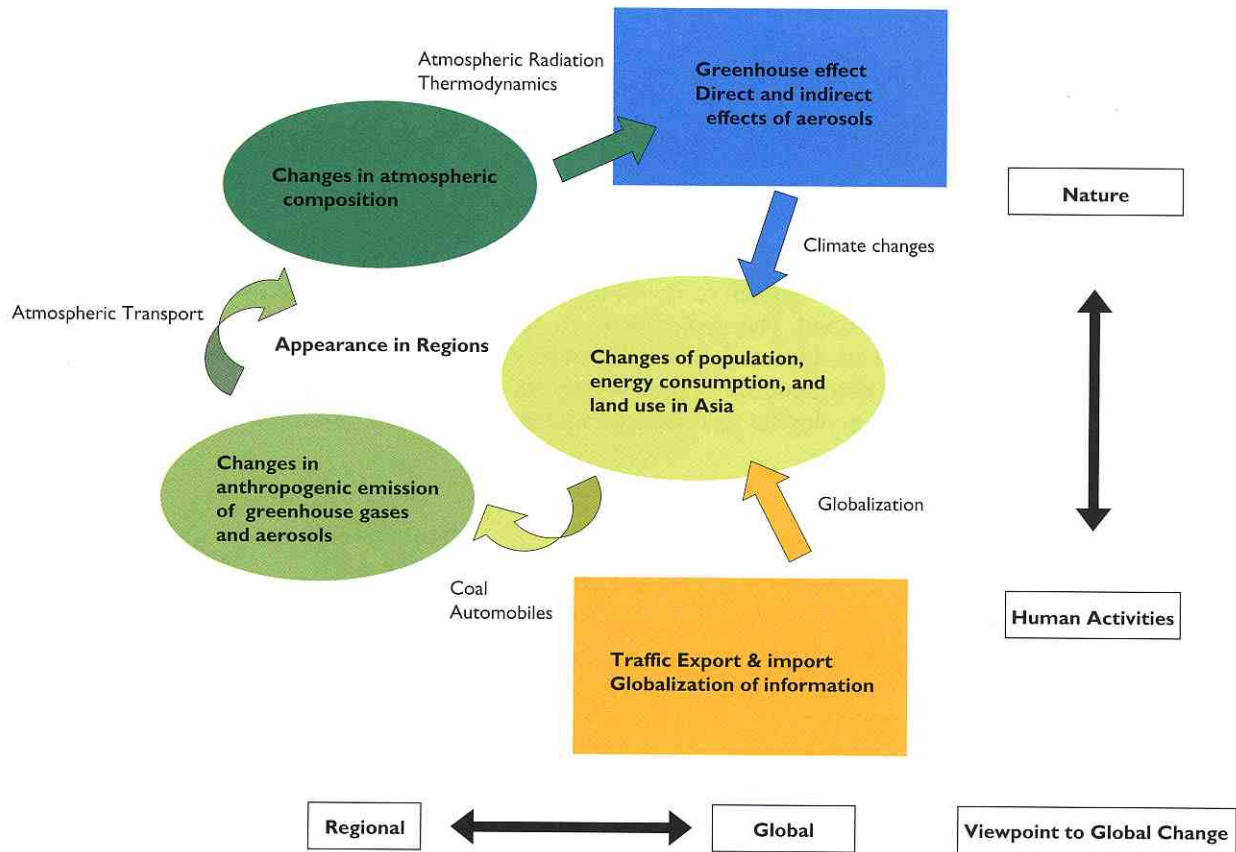


Figure 1 Viewpoint to global change in this study

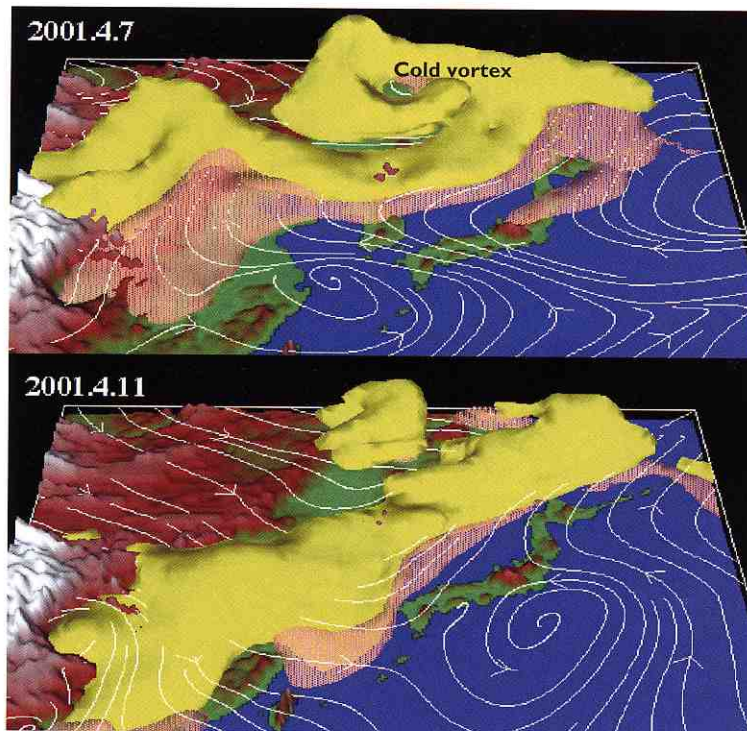


Figure 2 Outflow of Yellow Sand dust and sulfate aerosols calculated with atmospheric transport model. (Prof. I. Uno, Kyushu University)

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.

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Background and Objectives

Biodiversity in terrestrial ecosystems has been lost mainly by decrease and deterioration of forest ecosystems, especially tropical rainforest ecosystems. Many natural forests have been converted into plantations for timber production or for cultivation fields since ancient times. Some traditional systems are said to be sustainable in long history of utilization. However, the recent over-use of forests caused extremely rapid forest degradation and loss in forested area without waiting for the scientific evaluation of their sustainability and ecological services. To develop the sustainable forest utilization systems, with which high biodiversity should be kept, is an urgent target to be studied.

In this project, we try to elucidate the social and economic forces that have caused the change from traditional to modern forest utilization systems, their impacts on biodiversity, and how ecosystem functions and services are lost or kept. Evaluations from the ecological and socio-economical aspects are assessed for forest utilization options including the traditional systems in order to obtain the insight on the future forest management systems, which would preferably be smaller in long-term costs with long-lasting yields.

Contents

The four sites which have various forest utilization types including natural systems, traditional and rather sustainable forest utilization systems, and rapidly-changing modern systems are selected: Lambir Hills National Park (Tropical Rainforests, Sarawak, Malaysia), Kinabaru National Park (Tropical Montane Rainforests, Sabah, Malaysia), Yaku Island (Sub-Tropical or Warm-

Temperate Forests, Japan), and Abukuma Mountains (Temperate Deciduous Forests, Japan). We address the following objectives commonly in these selected sites.

- 1) To clarify historical change in forest utilization and its socio-economic backgrounds.
- 2) To evaluate impacts of forest utilization on biodiversity.
- 3) To evaluate functions and ecosystem services provided by forest biodiversity.
- 4) Integrated evaluation of forest utilization.

Expected Results

We evaluate the present forest utilization options and establish appropriate criteria and indices of forest sustainability according to the outcome of this project. We will be able to forecast future change in forest utilizations depending on the knowledge of the driving forces and incentives that have changed forest utilization in the past. Also, we can predict which and how ecosystem functions and services are lost with decreasing biodiversity due to inappropriate forest use. Furthermore, we will propose new criteria or way of thinking to evaluate the forest utilization systems with higher biodiversity from both ecological and socio-economical view points. With these criteria, zoning and spatial arrangement of forest types could be modeled.

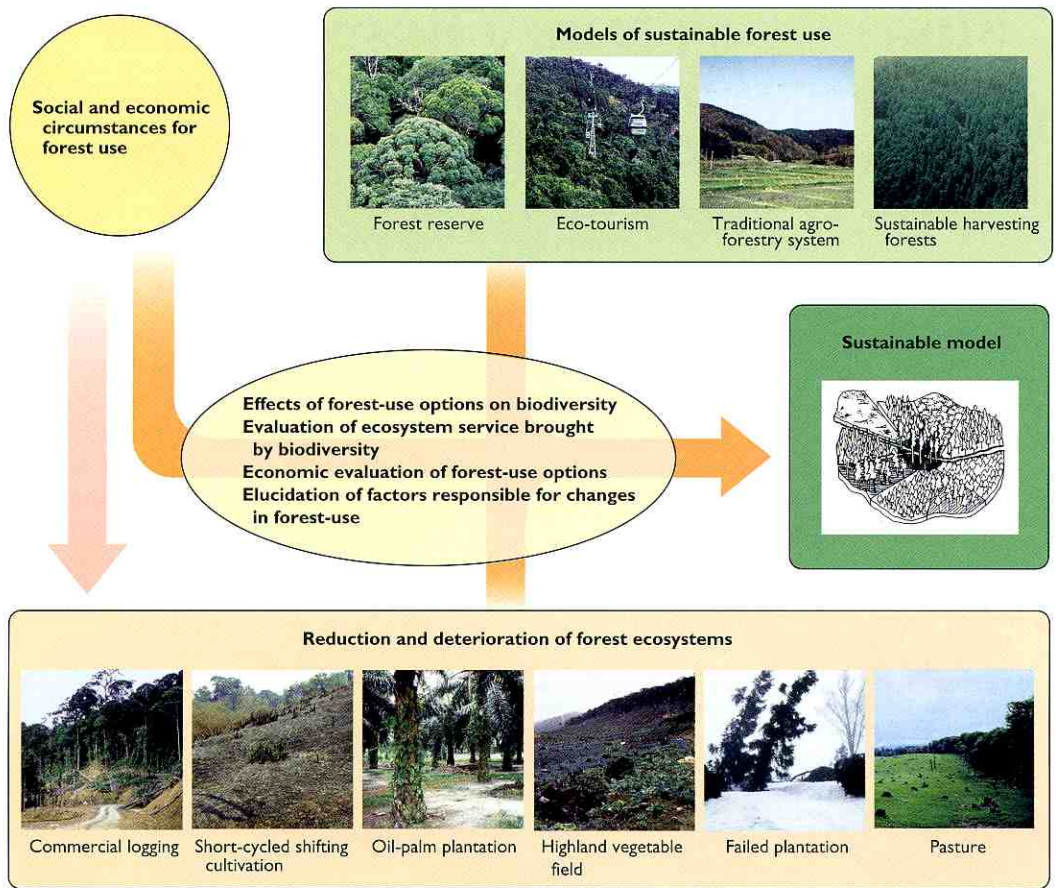


Figure 1 Assessment of forest utilization options for sustainability and biodiversity

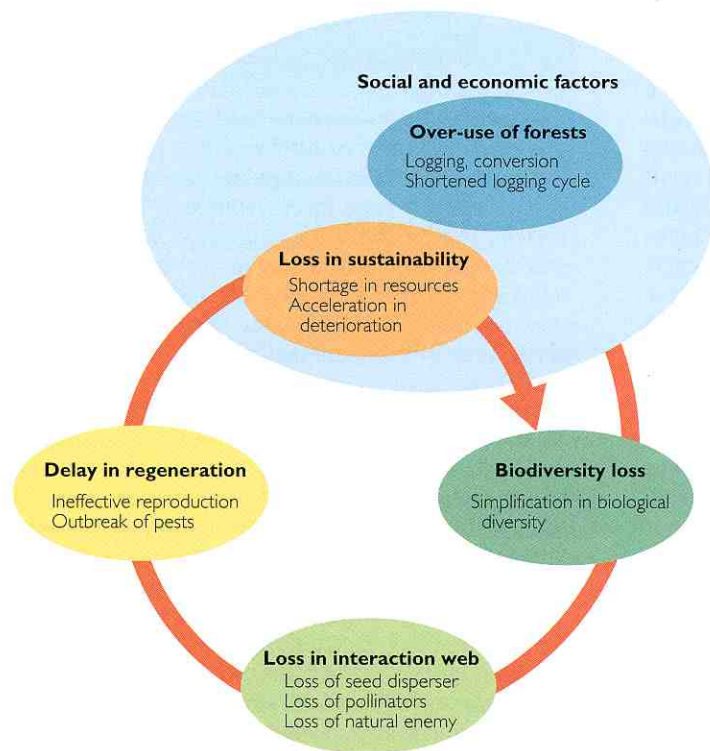


Figure 2 Acceleration of biodiversity loss

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

Based on an interdisciplinary partnership, this project aims to develop a methodology for revealing interactions between human activities and nature in a watershed. Focusing on the characteristic spatial scales of the watershed, we develop and test a methodology for watershed diagnosis and consensus-building through field work in the Lake Biwa-Yodo River watershed. This methodology will help the residents and administration to conduct watershed management, and to elucidate possible future scenarios of the watershed.

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Background and the Aim of the Project: Why Watershed?

A watershed, or river basin is a spatial unit for water and material cyclings that is topologically easy to recognize. Since old times, humans have been developing an inherent regional culture depending upon the uniqueness of each watershed that is diverse in climate, culture and history. Today, human activities in each watershed cause not only its own regional environmental problem but also global environmental problems through the climatic and oceanic processes and global economy that cross watershed spatial scale. Thus, revealing inherent environmental problems in each watershed is an important basis to understand global environmental problems.

“Hierarchical Watershed Management” Concept

On this background, this project aims to develop a methodology for watershed diagnosis and consensus building indispensable for the watershed management. A watershed is usually 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 therein. Usually, administrative districts are also hierarchically structured in parallel with this natural hierarchical structure, causing the people who live in the different hierarchy (or spatial scale), to experience their lives differently, thus have different interests and opinions. Therefore, in the process of building consensus over 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.

To overcome the difficulty arising from the watershed nested structure, we proposed “hierarchical watershed management” concept considering the spatial scales, as a model watershed management system. The main objective of our project is to test the effectiveness of this idea through research and practice in the “Lake Biwa-Yodo River watershed” in Japan, i.e., 1) testing the possibility of adaptive management by stakeholders with our aid of monitoring and developing diagnosis indicators at each scale, 2) developing a methodology for sharing what the main subject is on watershed management between scales.

Research Site: 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 the Lake Biwa, the largest lake in Japan, whose catchment area roughly coincides with the Shiga prefecture and has large farm area. (2) The “Yodo River watershed” (the downstream part to the Osaka Bay), contains city areas like Kyoto and Osaka (Figure 1). The Lake Biwa is one of the most ancient lakes in the world, supplies water to 14 million people in the Kansai district but is an ecosystem influenced by land-use change of its coastline, eutrophication and invasion of exotic species.

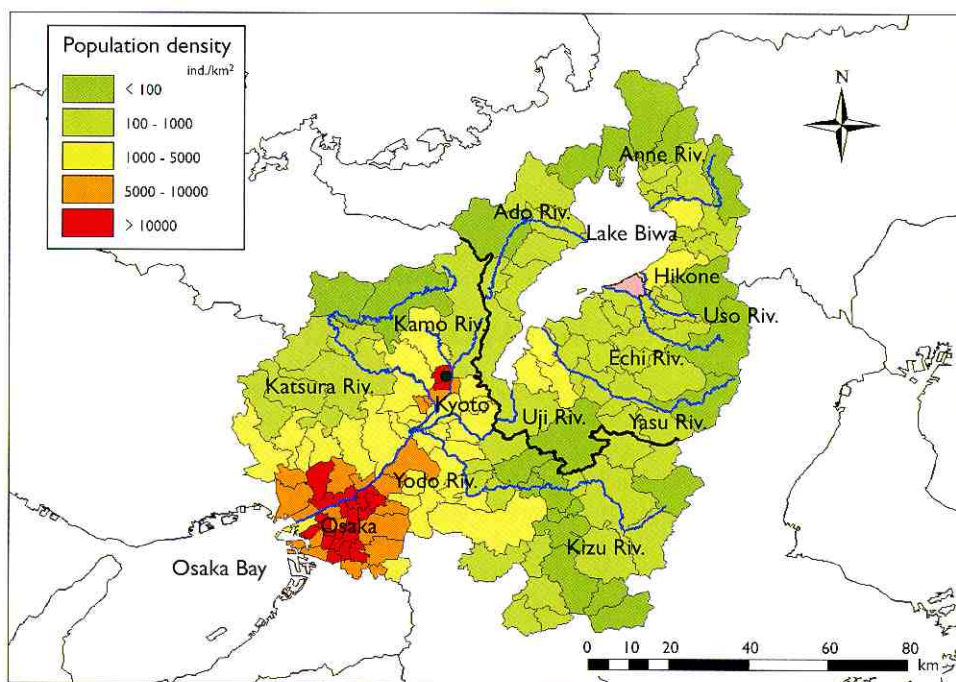


Figure 1 The Lake Biwa-Yodo River watershed

It consists of the Lake Biwa watershed (the upstream part) and the Yodo River watershed (the downstream part). Only the main stream of each river system is indicated. Our principal research field, Inae district (pink) in Hikone city lies in the Lake Biwa watershed, and RIHN (black dot) in Kyoto in the Yodo River watershed. The population density is based on the data of 2003 year.

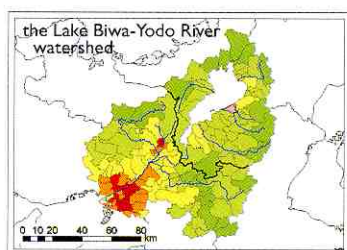
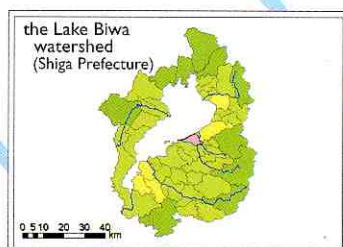


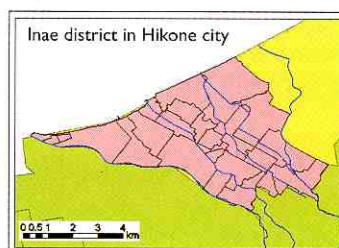
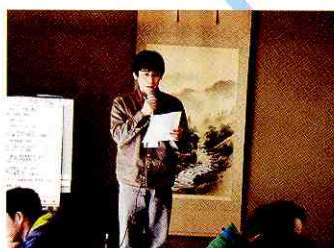
Figure 2 Research activities at the three scales

Our research activities 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 these research activities in the three scales, modeling and GIS are used for bridging the scales seeking for a watershed management methodology.



Measurement of the agricultural drainage effect on water quality by the material cycling group

Workshop on making regional environmental vision by social and cultural system group



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

Methods: Building Interdisciplinary Partnership

With the assistance of the residents and administration in the watershed, we promote our research activities as to water environmental management at the three spatial scales in the Lake Biwa watershed (Figure 2). We focus our research activities on the relationship between water quality of the Lake Biwa and the load of agricultural drainage. With an interdisciplinary part-

nership of four working groups; "material cycling", "social and cultural system", "ecosystem", and "watershed information and modeling", we seek for a way which enables both the reduction of environmental load to the Lake Biwa and the conservation of regional environment.

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.

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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 selec-

tively 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.

Research Content

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.

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 will start ecosystem monitoring surveys, keeping in mind global warming anticipated for the future. Also surveyed will be the routes

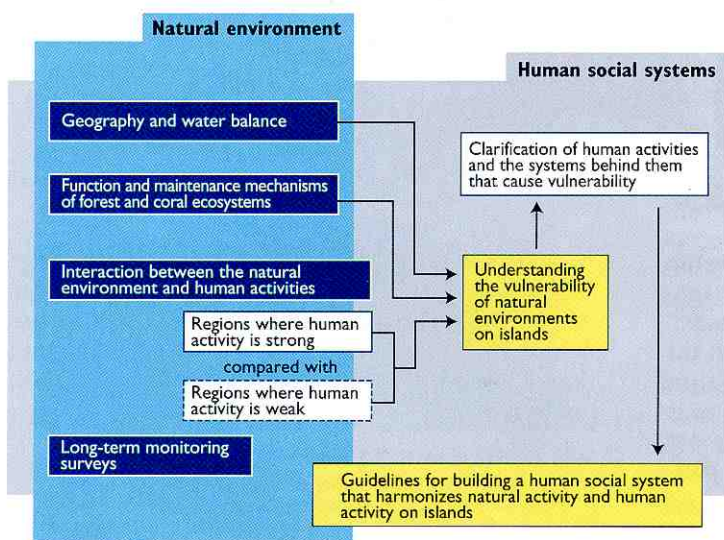


Figure 1 Framework of the project

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.

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.



Figure 3 Evaluation of water balance on Iriomote Island

Figure 2 Iriomote Island (Shirahama-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



Figure 4 Clarification of forest functions and maintenance mechanisms



Figure 5 Evaluation of industries that form the foundation of life

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.

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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, lake sediment cores. The water circulation system in the basin: water resources and demands will be also studied, in order to interpret properly the documents and the proxies. Interviews with local people and field observations will help determine how much water is required for agriculture and the pastoral lifestyles, and the transport of water from rainwater, to glaciers, rivers, ground water, and evapo-transpiration. This would enable us to understand what are the 'development' and the 'sustainability,' which are considered most crucial in facing the "global environmental problems."

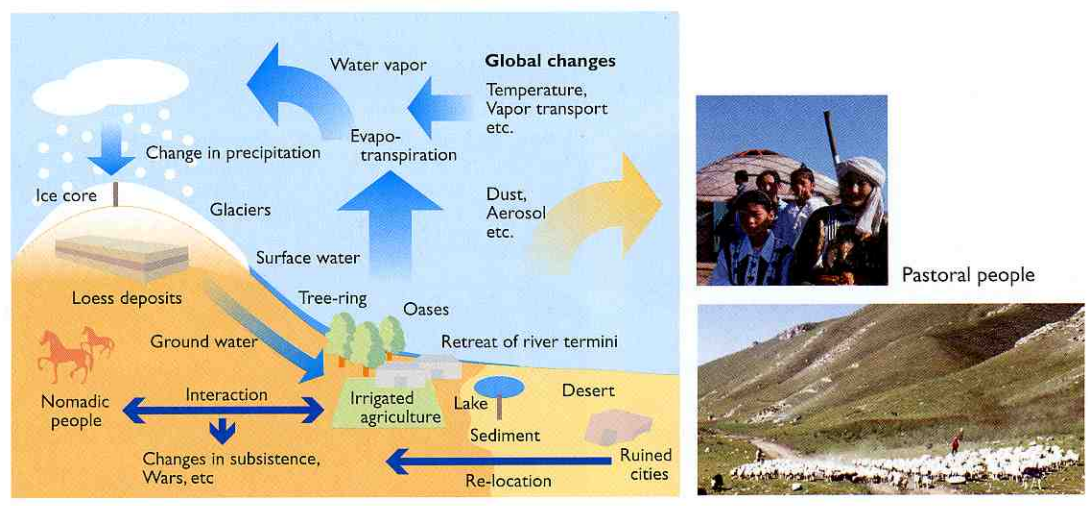
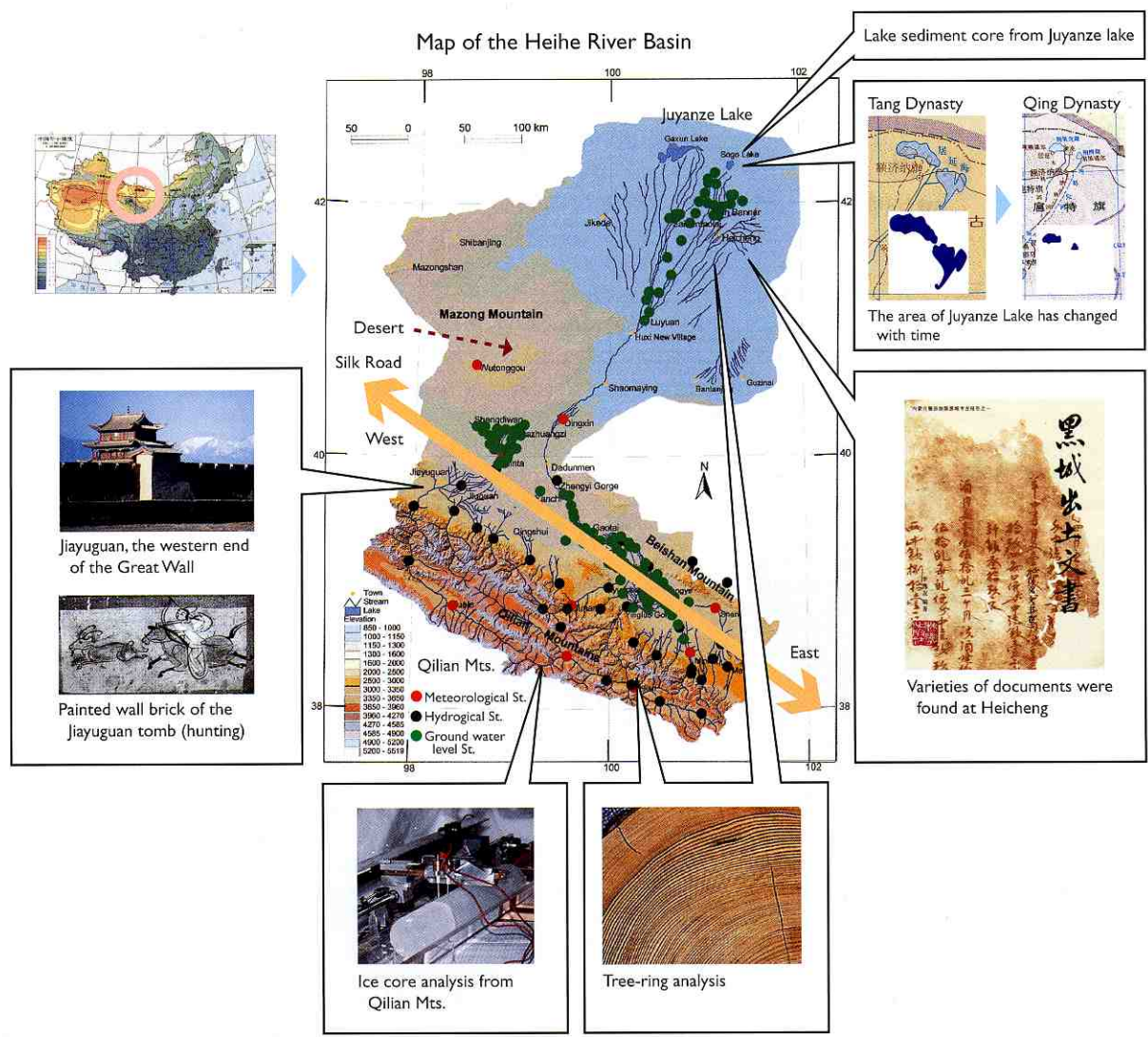
Present Issue

In the Heihe Basin, the river water has been used for irrigation quite intensively these days, and the river discharge has decreased significantly downstream. As a result, the Juyanze Lake at the terminus of the river has dried up, and the ground water level has decreased drastically, which has damaged the ecosystem near the river end, and caused serious problems for, in particular, the pastoral people living there. Thus, the water shortage has recently become a big issue in this region. This has caused the local people to move and change the traditional life style urgently. The impact of human activities (e.g. overuse of agricultural water or over pasturage) and/or climate change (e.g. global warming) could have caused the water shortage, but the precise

reasons are still undetermined. It is very important to elucidate the causes, and to maintain the water resources adequately in the region. For future capability, however, it is more important to address the basic questions: who possesses the water and why it is to be used by people.

Regarding the History

The research field, the Heihe Basin, is located at an intersection of two ancient major trade roads: the famous Silk Road connecting the East and the West, and the nomadic route along the Heihe River, extending north to south from the Mongolian Plateau with the richest grassland down to Yunnan through the Tibetan Plateau. The water shortage of today could have taken place intermittently in the history of the last 2000 years, while farming activities and nomadic activities were in conflict with each other at sometime, and they could have been in harmony in the other days. In which era was with the 'development,' and in which era was with the 'sustainability' The construction of the perspective of the history of the interaction between people and nature in the region, would contribute to give clues to human beings at present, who face serious so called global environment problems, regarding how to live in harmony with the surrounding nature, and to potentially create a new concept of the manner of living for future capability.



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.

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Human and Nature in Transition

Extending from Yunnan in southwestern China to Laos and Thailand, the region is climatologically characterized by distinct wet/dry seasonality. In diverse ecological environments, ranging from the wetland and valleys to hills and mountains, a number of ethnic groups inhabit with various historical and cultural traditions (Figure 1). Since the post-war period, revolutionary change in political regimes, Indo-China and Viet Nam Wars, and growing market economy that have swept this region, have made people's lives uneasy and perturbed physically, culturally and socially.

To clarify these dynamic and transformational processes that have occurred within the region during the past several decades, it may therefore be crucial to examine people's interaction with the surrounding environment as a complex whole, taking environmental, human ecological, socio-economic and cultural factors into account.

From Human Body to Material Culture in Eco-Historical Perspective

In line with eco-sensitive factors such as subsistence complex, nutrition and health, and resource management that may clearly manifest human-environmental relations, several study topics are chosen; transitional aspects of nutrition and health, external impacts upon ethno-history of the people, transformation of perception and decision-making in subsistence due to short-term and long-term climatic changes, materialistic and institutional changes caused by environmental perturbation and market economy. These

topics are further implemented through research activities by five groups, as follows.

These are ①Agro-Forestry Group: to investigate dynamic aspects of ecology, economy, culture and society in agro-forestry communities of northern Laos, ②Wetland-Plain Group: to investigate dynamic aspects of ecology, economy, and life structure in communities in wetland and riparian habitats of central and southern Laos, ③Human Ecology Group; to investigate population, epidemics, nutrition and their transitional aspects in communities of northern, central and southern Laos, ④China Yunnan Group: Historical Ecology Sub-group that investigates the regional eco-history using historical documents and inscription, Historical Forestry Sub-group that conducts research on the regional history of forest products use, Chinese Yunnan University Sub-group that investigates the regional eco-history based on ethnographic studies of the minorities, all in Yunnan Province, China, and ⑤ Material Culture and Information Group that aims to reconstruct the regional eco-history from changes of technology and tools associated with subsistence activities.

Towards Integration

In 2004 and after, our research specifically takes the following four approaches into account for data acquisition;

- a. An encyclopedic accumulation of knowledge and information for selected plant and animal resources in order to evaluate proximal methods for the integration as the regional eco-history,
- b. Interdisciplinary joint research in selected field sites in northern and central Laos,



Figure 1 Study areas

- c. A preliminary study for a compilation of environment-related events and phenomena of the region as the eco-chronicle, using historical documents and field data, and
 - d. Database preparation on material culture and information collected by Japanese researchers since 1950s, and synthesis of data and information collected by five groups as the eco-historical archives.
- Through combining four approaches (from **a.** to **d.**), we may challenge to construct the regional eco-history in tropical monsoon Asia.

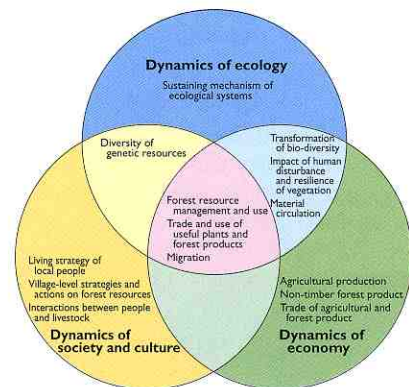


Figure 2 Research themes of Agro-Forestry Group
Agro-forestry group aims to analyse dynamic interactions of ecology, economy, society and culture among people who depend their lives mainly on forest and agricultural resources. We seek to construct the regional eco-history through the integrative studies of these interactions.

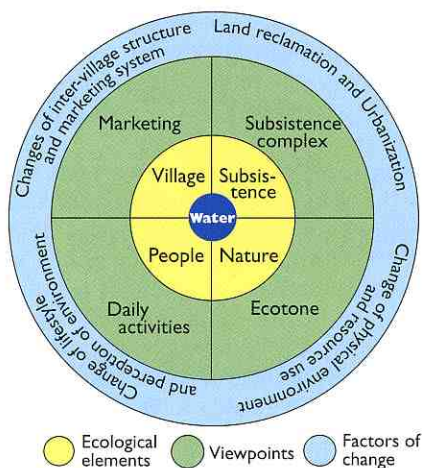


Figure 3 A research framework of the Wetland-Plain Group
The wetlands in tropical monsoon Asia are characterized by the seasonal predominance of inundating ecotone where major subsistence activities are undertaken. People living in these wetlands are not in isolated and self-sustained conditions, but their communities are inter-linked each other through market economy and commodity distribution networks. This group aims to explore present-day changes occurred in the environment, subsistence and the community, taking the environmental perception and daily practices of the people into account.

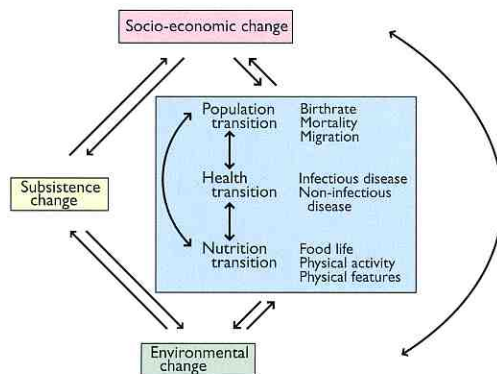


Figure 4 Human Ecology Transition
Dynamic relations among nutrition, health and population can be understood within a framework of transitional interactions between population and nature. Given the physical body as the core, and subsistence, social-economic systems, and environment as the external domains, dynamic interactions between the core and external domains, and among three external domains becomes the key for the research analysis.

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

It is even said that if the wars of the last century were fought over oil, the wars of this century will be fought over water. This project attempts to develop global perspectives for such water resources issues by integrating field investigations at various observational sites all over the world, by predicting natural water cycles and human water use in the future, and by establishing guidelines for sustainability development from a viewpoint of water resources issues.

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World Water Resources Issues

A population increase, expected mainly in developing countries, necessitates increases in water demand for human life, food production, and industry, resulting



Figure 1 **Total Runoff Integrating Pathways (TRIP)** Section in South America; The whole land on the Earth is covered with 0.5 degree longitude and latitude meshes and flow direction from each mesh is given. TRIP is coupled with land surface hydrological models and used to estimate the global potential water resources

in more intense use of water resources in the world. Not only for developing countries but for Japan and other developed countries, where population increase is not expected, water resources issues will be serious because water resources can be 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.

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 from waste are transferred by diffusion of underground water. Thus, water cycles are related to global environmental problems in various cross-cutting ways.

What are the Problems?

Although much information about water issues is now available, some of the information seems groundless and often emotional. Thus, one of the problems about water issues is that scientifically reliable information and groundless prejudice are distributed with confusion. Another problem is such that only a little

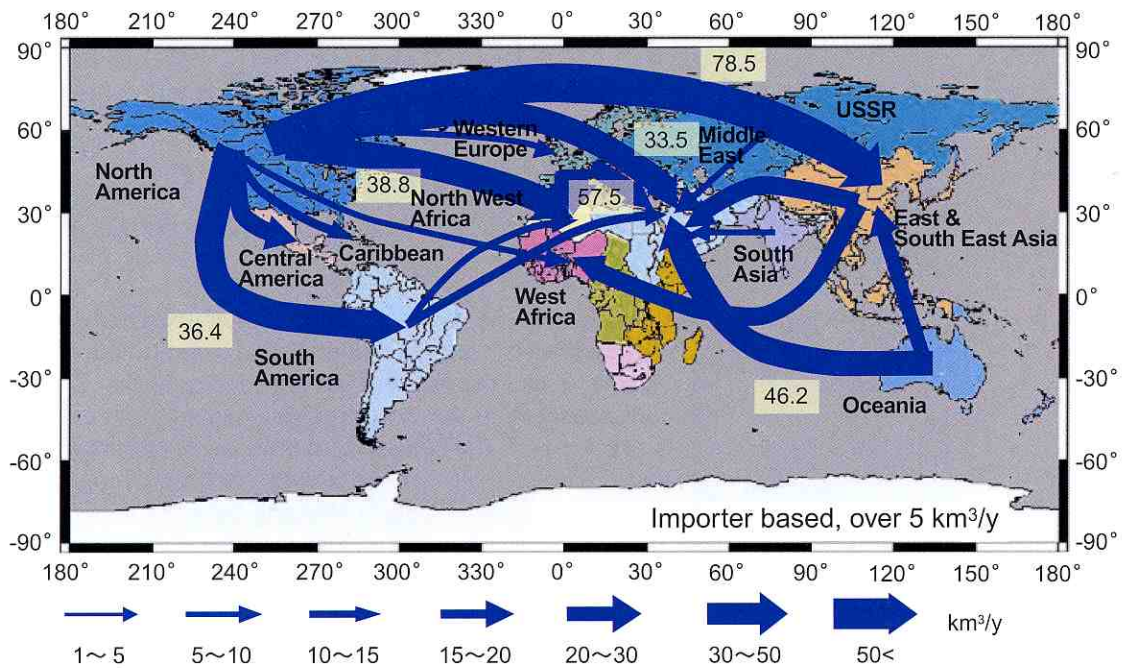


Figure 2 International virtual water trade (km³/ year) in 2000:
 Estimated based on statistics of grain (wheat, rice, barley, and corn) trade. The arrows indicate how much virtual water is transported among regions through grain trade

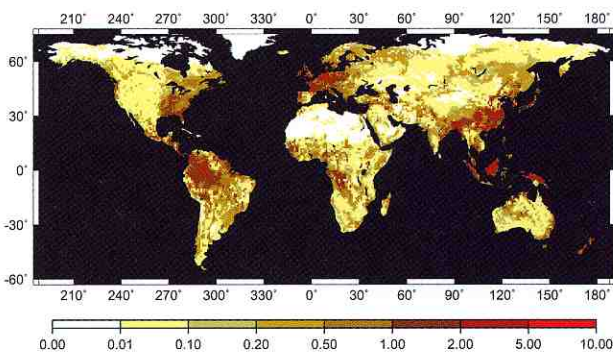


Figure 3 Nitrate-Nitrogen Leaching (tN/km²/yr)
 Global estimated distribution of nitrate leaching. Much leaching in Europe and east and southeast Asia is mainly due to fertilizer. Its increase in near future is anticipated

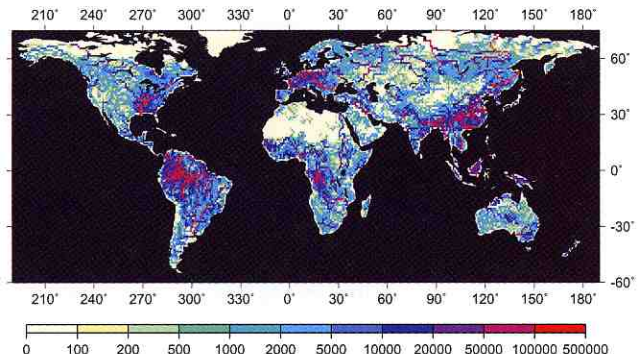


Figure 4 Nitrate-Nitrogen Discharge (tN/yr)
 With a global river model TRIP, the estimated leaching amount is converted into the concentration in the world major rivers. The estimates of concentration will be of use for the evaluation of negative impact on oceans and fisheries as well as for the evaluation of the impact on water resources

information is dispatched by Asian countries including Japan; most information is actually dispatched by the United States and European countries. In fact, regional characteristics should be well considered for water issues in each region, because both natural water cycles and water use 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 regard to the uniqueness of the Asian monsoon climate and farming culture of paddy.

World Water Issues as Global Environmental Sciences

This project aims at clarifying the true nature of world water issues and presenting perspectives of water management in the future. The project attempts to develop a scientific basis for proposing a policy and helping policy making. Such an attempt will enable to

people avoid some serious problems anticipated in the future.

As a result of this project, the following products will be expected: prediction of the water resources demand in Asia, report of Asian fresh water resources for the Millennium Assessment of the United Nations, and the IPCC AR4 and settlement of regional water issues in Asia.

Part of the major results of this project so far is introduced here. We have successfully quantify the global virtual water trade of these several decades. The global virtual water trade, mainly arising from the import and export of crops and foods, of recent days becomes almost double compared with that of thirty years ago. Japan (virtually) depends nearly the same amount of water withdrawn domestically on foreign countries. It may necessitates the modification of the framework of global water resources assessment.

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

People's value judgment system on the 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. In this project, a tool named Interactive Device between Environments and Artifacts (IDEA) will be developed for exchanging the information between people and specialists. Methodology mediated with IDEA will be proposed to identify the environmental elements affecting the environmental consciousness formation.

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Perception of the Environment

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 the "environmental consciousness." People use or modify their environment based on their environmental consciousness. Each individual's environmental consciousness is influenced not only by human-sociological factors, but also by the changes in environmental qualities. The project will concentrate on exploring the changes in the environmental consciousness induced by the modification of the environment.

Why Do We Focus on the Environmental Elements?

In order to understand the present situation of the environment and to predict its future it is necessary to grasp the environmental quality as quantitative evaluation of environmental elements. Clarifying the relationship between the environmental quality and people's environmental consciousness is an important task for wise-use and conservation of natural environment. When an environment is considerably modified, an environmental assessment with public involvement is necessary. To make the public involvement substantive, people must be informed of the present situation of the environment concerned and on the predicted environmental impacts. Such information must be presented in a way that people can easily understand to reconsider their lifestyle.

Specialists and Non-Specialists

Environmental specialists have conventionally done the environmental education using the translation from the scientific terminology to ordinary language. Is such one-way connection between people and specialists appropriate for people to create the future environment and their lives? Specialists should not only concern with how to convey their scientific information to the people but also with how people would understand the information and express their desired future environment in non-scientific expressions. On the other hand, non-specialist people must self-consciously evaluate the environment by exchanging the information with specialists. However, there has been no attempts to develop a framework that supports the active information exchange between specialists and non-specialists.

In this project, the framework will be considered from the conceptual point of view to develop a methodology for identifying a set of environmental elements, which affect the people's environmental consciousness. The schematic diagram of the relationship between people and specialist focused in this project is shown in Figure 1.

Framework of the Project

In the project, the relationship between changing value judgments and environmental quality will be analyzed in a forest-lake ecosystem. The methodology to be developed requires several functions: (1) quantitative prediction of changes in environmental elements

caused by virtual environmental modifications, such as logging, and dairy farming, (2) informing appropriately the environmental changes to people and (3) analysis of the relationship between changes in the people's value judgment and in the environmental elements (Figure 2). IDEA will be developed as a main tool that provides all the functions above.

Using a response-prediction model in IDEA, changes in environmental elements based on the virtual modifications in a watershed (Figure 3) are quanti-

tatively estimated. Predicted environmental changes are transformed into plain words by the transformation module. Changes in the people's environmental consciousness are detected by questionnaire surveys. Survey data are analyzed with IDEA and to be reflected in new questionnaires. Through bilateral information exchanges between people and specialists, substantial knowledge about the relationship between environmental consciousness and environmental elements will be gained from IDEA.

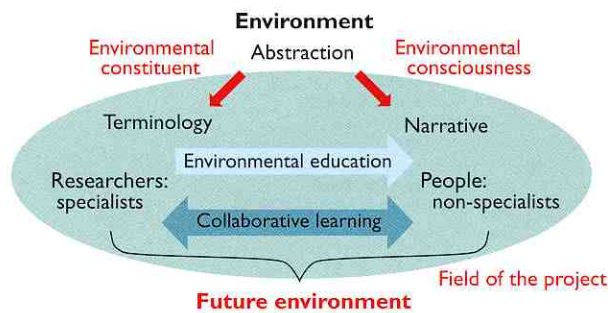


Figure 1 Specialists abstract environments with terminology, while people perceive and express environments using everyday expressions. In the conventional environmental education, the flow of information about the environment was only from specialists to the people in one-way translation of academic information into plain words. However, the collaborative relationship between them with bilateral exchange of information is necessary to create the people's desired future environment. In this project, a methodology for the bilateral information exchange will be developed.

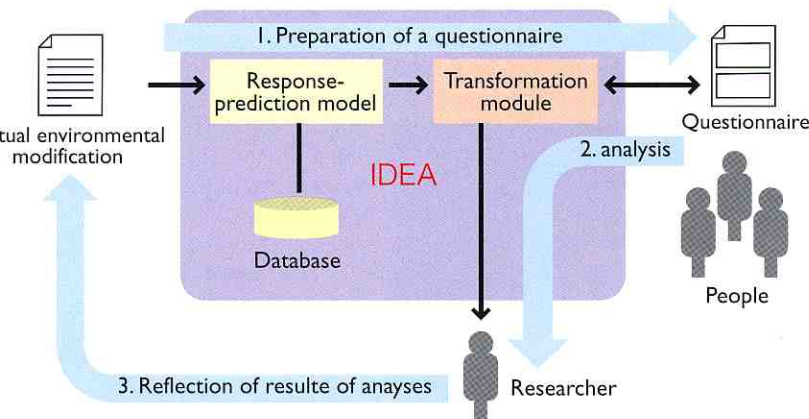


Figure 2 Response-prediction model predicts the changes in the environmental elements when a virtual environmental modification is applied to the environment concerned. Transformation module translates the predicted changes into plain words that are used in the questionnaire to people. Data derived from the questionnaire survey are analyzed, and some of the results will be fed back to the new set of questionnaire. From the relation between changes in the environmental elements and change in the people's evaluation on the environment, a set of environmental elements affecting the people's environmental valuation will be identified. Repeated questionnaire survey with increasingly focused questions will untangle the complexities of the interactions among environmental elements and the formation of people's consciousness.



Steam in winter



Swamp forest extending downstream of Dorokawa River

Figure 3 Main study site is a Lake Shumarinai watershed in the northern part of Hokkaido Island, Japan

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.

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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.

Purposes

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 contributing 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.

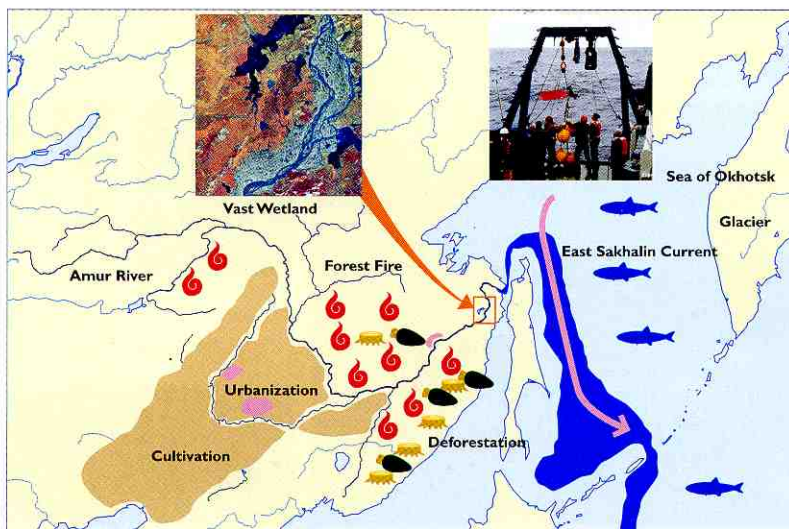


Figure Study area

Human activities in Amur River basin and flowing out of the river water into Okhotsk sea and North Pacific Ocean

Human Impacts on Subsurface Environments

How do human beings develop and sustain urban areas where population is increasing and concentrating rapidly? We will address scenarios of future development by reconstructing changes in urban environments, and evaluating the effects of humanity and climate changes. Subsurface environmental indexes will be used for evaluating environments of (a) water, (b) heat, and (c) material, which are necessity for human beings such as food, energy and health.

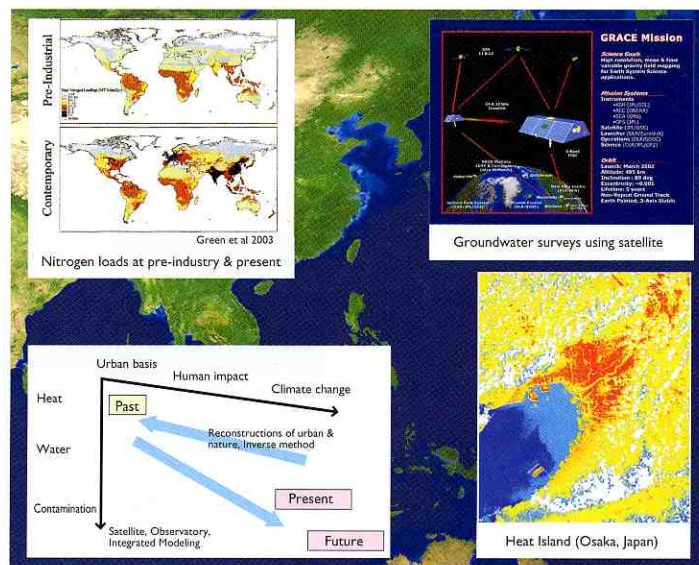
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Securing water resources and clearing contaminated water caused by human activities in urban areas are global environmental issues in the 21st century. Heat island phenomena created by human activities are also a big environmental problem in addition 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.



We will evaluate urban environments using various subsurface environmental indexes.

Evolution of Cultivated Plants and Man-made Habitat

Humans have domesticated various plants to yield 'cultivated plants.' Yet, we do not know exactly when, where and how cultivated plants were domesticated. This project aims at revealing the time, place and the way of domestication, using the technique of 'DNA archaeology.' Interestingly, the original cultivated plants that were grown in the continental region tend to be annual or seed propagators, while those in the insular or ocean regions are perennial or vegetative propagators. Differential propagating systems of cultivated plants, as well as human activity seemingly play important roles in the characterization of man-made habitat. This project also deals with the evolution of man-made habitats in relation to the domestication of cultivated plants.

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Most of the staple crops that came to be cultivated in temperate and continental regions are annuals and are seed propagated, while those of equatorial and island regions are perennials and vegetatively propagated.

The different systems of propagation reflect inherent qualities of the plants domesticated, and this as well as human activity has been important for domestication and the creation of man-made habitats. In order to understand the biological and cultural aspects of agriculture, we will investigate the evolution and domestication of cultivated plants in relation to natural and man-made habitats.

High resolution analysis of the course of domestication is performed based on DNA analyses of excavated plant and animal remains.

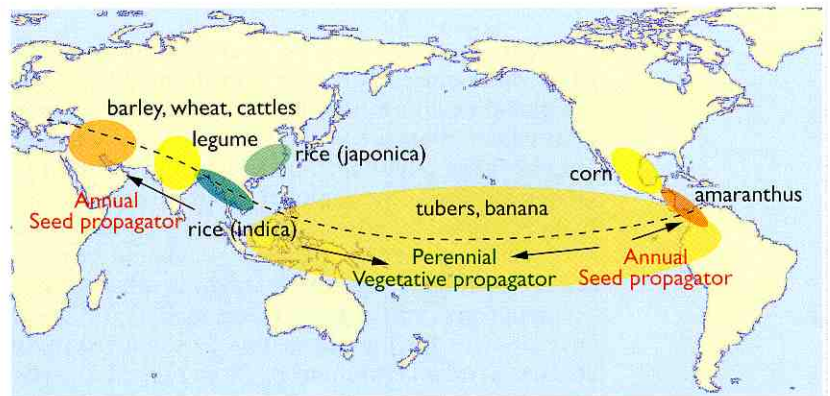


Figure 1 Map showing the homeland area of various cultivated plants

Vegetation of early habitats is deduced based on the pollen grains or phytolith (silica body) excavated from ancient soil. Also, high resolution dating is performed using AMS and varved sediments.

The Project will seek ways of sustainable development of man-made habitat that have been maintained under different environments by human cultures that have cultivated different plants.



Figure 2 Pollen grain (by KITAGAWA, Junko)



Figure 3 Phytolith (by UDATSU, Tetsuro)

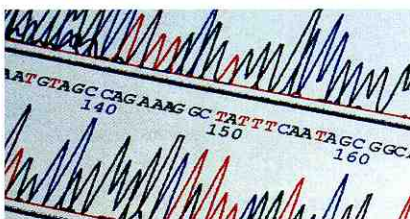


Figure 4 DNA sequence of the excavated plant remains



Figure 5 In situ conservation site of wild rice at Vientiane, Laos

URL:<http://chikyu.ac.jp/sato-pro/>

An Attempt to Reconstruct the Environmental Condition of Ancient Civilization with Special Reference to Indus Civilization

From ancient times human beings have intensively cultivated habitable spaces that have a sustainable food supply, sometimes utilizing the natural environment and sometimes fighting against the natural environment. Thus human beings constructed ancient civilization. Research on the rise and fall of ancient civilization is meaningful for understanding the relationship between human beings and nature. In this project we will study the Indus civilization. How did the Indus civilization rise? Why did the Indus civilization decline? We will seek the answers to these questions in order to reconstruct the environmental conditions of the Indus civilization.

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The primary characteristic of this project is to adopt a linguistic methodology. The four great civilizations; i.e., Egyptian, Mesopotamian, Chinese (Yellow river) and Indus contain the ancient scripts; namely the hieroglyph, cuneiform, Chinese and Indus script. The decipherment of Indus script has not been successful yet while the other three scripts have been deciphered. Thus we will try to decipher the Indus script. Furthermore, comparative linguistic studies in the India subcontinent have not been fully explored, especially of Munda and Burushaski. Moreover, the results of comparative linguistics should reflect the results from studies of the unearthed properties of archaeological excavations in given areas. The collaborative work between linguistics and archaeology has been a recent trend since Renfrew

wrote the book titled Archaeology and Language in 1987.

Apart from linguistic methodology, we have two approaches towards ancient civilization. One is research on excavated cultural properties; i.e., Indus seals, Indus cities, water supply system and so on. The other is research on transmitted cultural properties; i.e., oral tradition, written ancient literature, ethnic cultures and so on. For the former, archaeology and related academic fields play a crucial role for our project. And for the latter, Indology, anthropology and related academic fields assume an important role for our project. Our project should be done by scholars from the Humanities with the assistance of natural scientists working on DNA, the origin of cultivated plants, palaeoclimate, the glacier core and so on.

Figure 1 Map of Indus civilization (from the internet site of "an invitation to the Indus civilization")



Figure 2 Indus scripts from the Dholavira excavation site in India ©ASI



Figure 3 Fortified Enclosure at Balathal, India

Historical Research into Eurasian Cultures of Daily Life as the Emergent System from Interaction between Human Beings and Nature

Each regional culture in Eurasia has emerged from the diverse and profound interactions between itself and others, since prehistoric times. This project makes various historical analyses of these based on the history of human life in Eurasia, and clarifies pluralistic interactions from which each of them emerged. Through this clarification we will finally come to illuminate the interactions as core lines between human beings and human beings with nature, from which each Eurasian culture's daily life emerged historically. And then we will acquire a basic view point to project future must-do relationship lines between human beings and nature from.

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Why have the modern environmental problems occurred? This project is aimed at uncovering the connections between these problems and the daily life of cultures who dwell in Eurasia, based on historical consideration of these.

We will present Eurasia as one vast cultural and historical field in which various peoples and cultures have existed and have been interacting since prehistoric times, rather than as a mere expanse of Europe and Asia. Now with accumulations of many years of historical, archaeological, philological, etc. studies we are arriving at a new stage of being able to understand this in much greater intricacy.

Human daily life goes on along a dynamic line balanced between pluralistic or polyphonic interactions of humans, natural things, natural conditions, and man's

body, which is never exactly as humans want it to be. 'Culture' is the system that arises from the lines which have themselves, emerged from a long series of progressions of human daily life and from various crossings of these.

Therefore this culture-system is the emergent system, never the resultant system, and never the mechanical system, being the same as life itself. But now we are leading a way of life along lines that function as a mechanism supported by enormous artificial things as our modernization increasingly expands across the whole world.

We will look for the routes that lead to these modern problems through historical research into past and current styles of relating between human beings and nature, an in-depth, broad and detailed study of the way of life in Eurasian cultures.

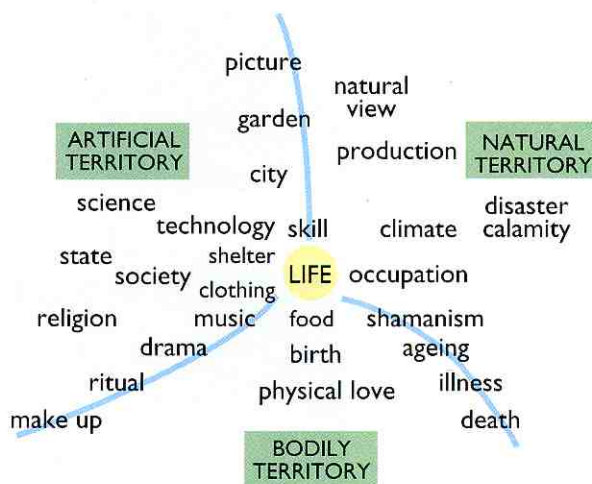


Figure Theme chart

Reconstructing the Concept of Symbiosis: A Historical Approach to the Cases in the Far Eastern Archipelago and Surrounding Areas

This project is aimed at understanding symbiosis among organisms, not as a fixed relationship but as a dynamic one which has arisen and vanished ceaselessly, and making an eco-historical description of the relationships between humans and nature which have been occurred in the Japanese Islands and their surrounding areas for a million years. The results of both studies are to be taken into philosophical consideration in order to create a new paradigmatic concept of coexistence with nature.

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

CORE MEMBERS ■ **ABE, Hiroshi** — RIHN

ANKEI, Yuji — Faculty of International Studies, Yamaguchi Prefectural University

MURAKAMI, Noriaki — Graduate School of Science, Kyoto University

OKITSU, Susumu — Faculty of Horticulture, Chiba University

SHIMIZU, Isamu — Center for Ecological Research, Kyoto University

TANAKA, Hiroyuki — Primate Research Institute, Kyoto University

TSUJI, Sei-ichiro — Graduate School of Frontier Sciences, Tokyo University

UCHIYAMA, Junzo — RIHN

YAHARA, Tetsukazu — Graduate School of Science, Kyushu University

YAMAGUCHI, Hirofumi — Graduate School of Agriculture and Biological Science, Osaka Prefecture University

It is often argued that the present global environmental problems are consequent upon the loss of “symbiotic” relation between humans and nature, and therefore it is the restoration of symbiosis that can solve those problems. But this opinion is questionable: Has there ever existed an ideal symbiosis between humans and nature all through our history? What on earth does “symbiosis” mean?

The Far Eastern Archipelago (Sakhalin Island, Japanese Islands, Ryukyu Islands and Formosa), facing the Eurasian Continent on the west, has accepted a numerous number of organisms from the Continent over the ages in which the climate has changed globally, so that unique flora and fauna have been formed. In particular, for the last ten thousand years, both the environment and immigrants have changed radically because of developing human activities. In this project, we undertake an investigation into symbiotic relations among organisms under the global environmental changes by elucidating the history of partnership between angiosperm and other organisms (e.g. pollination, seed dispersal, mycorrhiza) in the Japanese Islands and their surrounding areas. Furthermore, we intend to describe the relationships between humans and nature dia-

chronically in terms of environmental archaeology and ethnosciences, and propose a desirable relationship between them through the philosophical examination.

For this purpose, we are going to develop a new system of software which is easy to overlook the region from several viewpoints (e.g. palaeogeography, palaeoclimatology, molecular biogeography, and relationships between plants and animals), by integrating existing results of various sciences into a database and GIS system. And we try to reveal the origin of immigrants by interdisciplinary synthesis of diverse proxy, including high resolution analysis of archaeological remains.

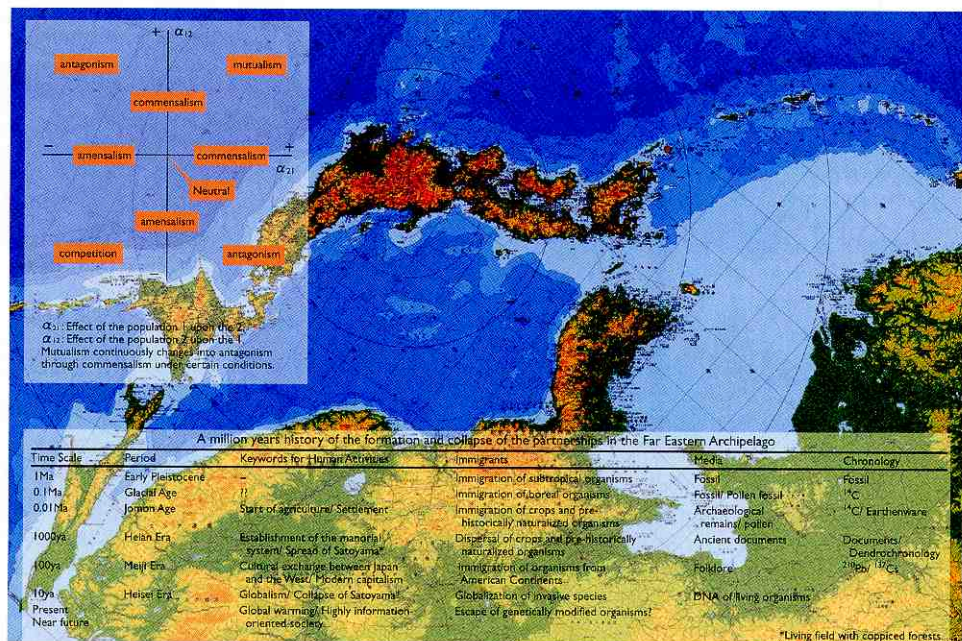


Figure The Far Eastern Archipelago along Eurasian Continent

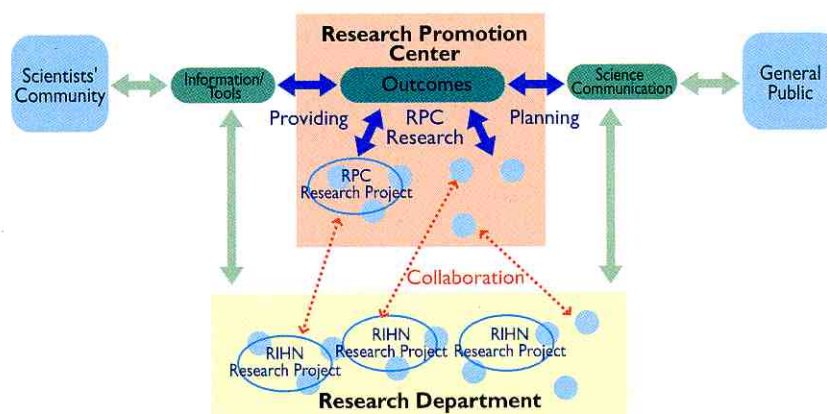
The Far Eastern Archipelago connecting with the east end of the Eurasian Continent: Organisms immigrated into the archipelago through 3 paths until modern times: Primorsky—Sakhalin; Korean Peninsula—Tsushima; Formosa—Ryukyu Islands. Copyright under Toyama Prefecture (H6 No.76).

Activities of the 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.

From this year, 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 Liaison 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, the 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 environment studies."



The RIHN Forum

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

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

To do research from the perspective of the "global environment studies," what will be needed? First we shall have a clear idea about the conceptual framework of the "global environment 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 environment studies," and will constitute materials necessary for communicating the RIHN's research activities to the public.

Research Staff Profiles

(in alphabetical order)

ABE, Hiroshi

- Assistant Professor, Project 5-3FS
- 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 a new approach to the environmental issues in Southeast Asia, focusing on historical relations between wildlife and indigenous populations.

FUJITA, Wataru

- Research Fellow, Project 2-2
- Background: political ecology, anthropology, area study (Southeast Asia)



I aim to consider the relationship between forest and human societies in Southeast Asia, focusing on the interaction among various kinds of people in modern nation state system.

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.

HANNAN, Md. Abdul

- Visiting Professor, from April 1, 2004 through March 31, 2005, Project 3-2
- Research fellow, Center for Natural Resource Studies, Bangladesh



I conduct research in the field of bee biology, pollination ecology, insect sociality, and conservation biology. Recently, my prime interest is to know the relationships between flowering plants and bees, and throughout this research I hope to bring benefits for human beings and merits in nature conservation.

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
- 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.

**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.

**IMAMURA,
Akio**

- Associate Professor, Project 5-3FS
- Background: ecology and plants



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.

**KATO,
Yuzo**

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



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

**INOUE,
Mitsuyuki**

- Research Fellow, Project 4-1
- Background: chinese cultural history



I have studied the daily life of Chinese intellectuals by means of their diaries, essays, paintings and calligraphies. Here, I will figure out the relationship between humanity and nature using various documentary records.

**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 a clue. I like to enjoy creating my own earth environmental study in this laboratory of RIHN, groping about uniting multi-disciplines.

**INOUE,
Takashi**

- Visiting Professor
- 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. So, I have been challenging on describing the rises and the falls of civilizations in a new point of view and a new way. I hope I could use these experiences in my studies.

**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.

**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.

**KINOSHITA,
Tetsuya**

- Professor, Project 4-3FS
- 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.

**MOMOKI,
Akiko**

- Associate Professor, Research Promotion Center in charge of information and communication
- Background: biology, ethnology (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.

**KUBOTA,
Jumpei**

- Associate Professor, Project 4-1
- 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.

**MURATA,
Fumie**

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



I have been studying about mechanism 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.

**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.

**NAKANO,
Takanori**

- Professor, Project 3-1
- 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.

**MATSUOKA,
Masayuki**

- Research Fellow
- 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.

**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.

**MIYAKE,
Takayuki**

- Research Fellow
- Background: environmental chemistry



I wish to figure out the signals of changes of human activities and natural environment by ice core analysis with my background (environmental chemistry).

**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.

**NARITA,
Hideki**

- Associate Professor, Projects 2-3 and 4-1
- Background: physics of snow and ice, polar glaciology



Many records of past human activities have been hidden in ice core of middle latitude region. I analyze the core under high time-resolution and investigate the analytical results while connecting with the human activities.

**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.

**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.

**SAITO,
Kiyooki**

- 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.

**NONAKA,
Kenichi**

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



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 diversity people's life as well as characteristics.

**SATO,
Yo-ichiro**

- Professor, Project 2-5FS
- 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 intend to start a research project entitled: Evolution of cultivated plants and man-made habitat.

**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.

**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.

**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 linguistic methodology.

**SUGIMOTO,
Takashige**

- Visiting Professor, Professor of Ocean Research Institute in Tokai University
- Speciality: Coastal Oceanography and Fisheries Environmental Oceanography



Management system of river water is reconsidered from the view point of coastal oceanography. Nutrient fluxes from the Yodo River into inner Osaka Bay, formation processes of red tide and anoxic water mass are investigated under P3-1.

**TAKAHASHI,
Atsuhiko**

- 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, 2-4FS 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.

**UCHIYAMA,
Junzo**

- Associate Professor, Project 5-3FS
- 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, Project 1-1
- 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.

**WADA,
Eitaro**

- Professor, Project 3-1
- Background: biogeochemistry, isotope ecology



During the past 10 years, I have been working in several multidisciplinary projects concerning IGBP-MEXT, biodiversity and JSPS-Research for the future program. On the bases of these experiences, I will promote the project "Lake Biwa-Yodo River Watershed".

**WANG,
Genxu**

- Visiting Professor from April 1 through December 15, 2004, Project 4-1
- Background: Water resources and hydrology, eco-hydrology, LUCC and environment



I have been studying water resources development and its impacts on environment, hydrological processes in the northwest China. I am interested in eco-hydrology and LUCC issues at river-basin scale. At RIHN, I am cooperating the research project 4-1 on some hydrological problems in Heihe River basin.

**WATANABE,
Tsugiohiro**

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



I am interested in wisdom of agriculture, especially wise use of land and water. 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.

**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 on a global scale. 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 5-3FS and 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 Far-eastern Archipelago, and relationships between humans and nature, by interdisciplinary approach.

**ZHENG,
Yuejun**

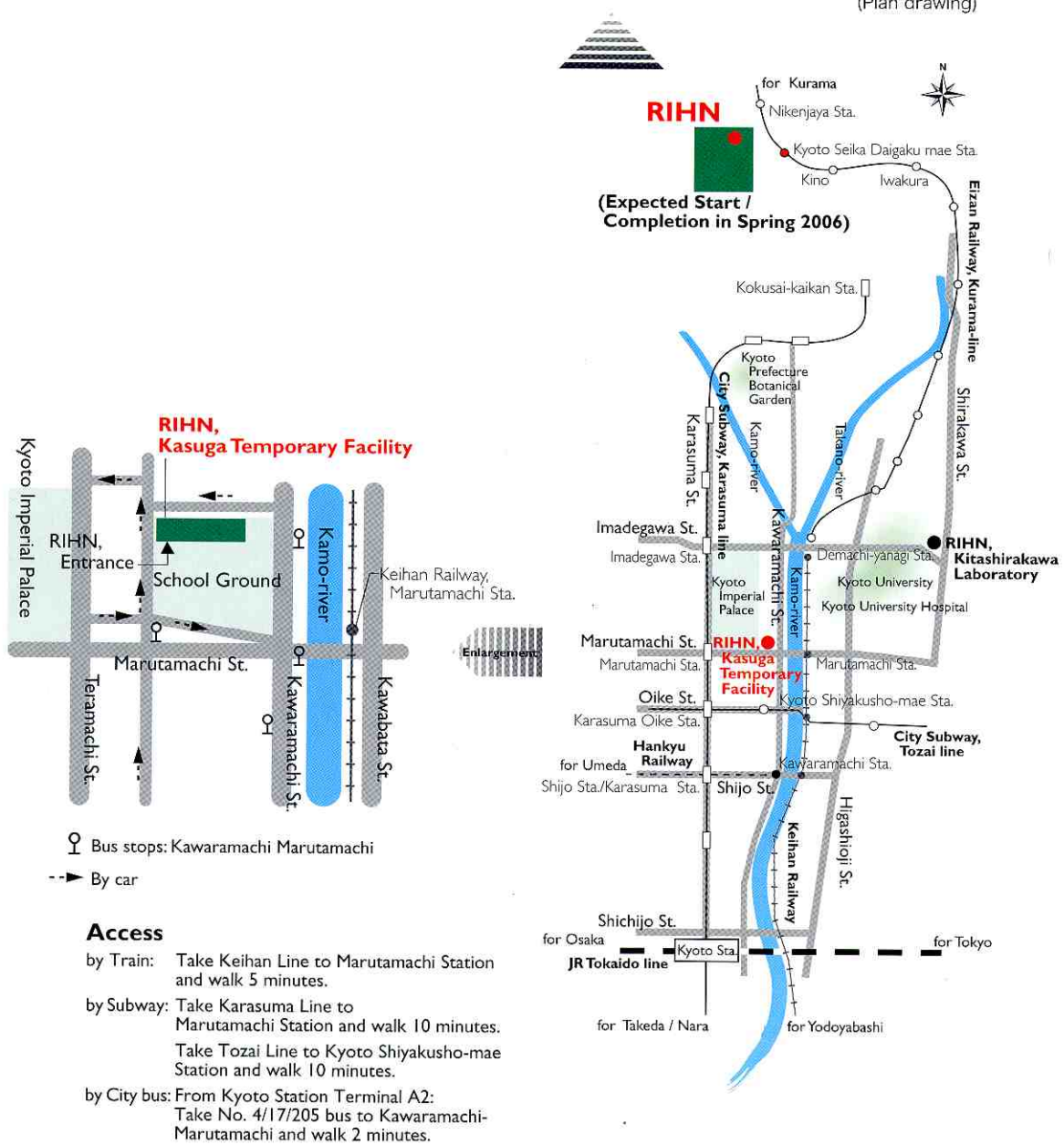
- Associate Professor, Project 5-2
- Background: environmental statistics, environmental economics, social survey



My research interests are in analyzing the mutual connection between human actions and environmental changes in temporal and spatial scales based on the survey data. Especially, I am exploring the essence of environmental consciousness, which strongly influences people's life style, from the view point of data science to develop the framework of harmonious society.



(Plan drawing)





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