

# Kyoto University

Graduate School of Global Environmental Studies

京都大学大学院●地球環境学堂・地球環境学舎・三才学林

## GUIDEBOOK 2019

ガイドブック 2019

Think Globally, Act Locally





The Graduate School of Global Environmental Studies (GSGES) was established in April 2002 to address the urgent environmental problems of the 21st century. Our primary objective is to help establish global environmental sustainability as a new field of academic study, bringing together ethics, science and technology, and humanities and social sciences. Through our educational and research programs, we seek to foster a new generation of professional practitioners.

Helping us realize this goal is a multidisciplinary and international faculty from fields that include science and engineering, agriculture, law, economics and humanities. The graduate school seeks to 1) achieve in-depth discussion and collaboration among faculty members, 2) train high level researchers and practitioners who can find comprehensive solutions to environmental problems, and 3) support education and research through a variety of innovative frameworks and programs.

Our ground-breaking research initiatives include multidisciplinary projects working with various local governments in Japan as well as extended international academic collaboration with universities and researchers in such countries as Vietnam, China, Thailand, Indonesia, Malaysia, Fiji and France.

Our educational program trains outstanding professionals and leaders in environmental management. Core lectures are conducted in English and all students in the master's program are required to participate in one week of fieldwork, held in the summer, as well as a three month internship program.

Two new projects -the "Environmental Innovator Program (EIP) -Cultivating Environmental Leaders across the ASEAN Region-" and "Japan Gateway: Kyoto University Top Global Program (JGP) Environmental Studies" were launched in 2015, for realizing internationalization of education and research and establishing international double/joint degree programs.

The 561 master's program graduates and 179 doctoral program graduates who are actively working in society today represent the results of our efforts to date. We are proud to have educated a large number of talented students who are now playing an active role in universities, research institutions, government offices, private enterprises and NPOs throughout Japan and overseas. GSGES welcomes inquisitive, hard-working and global-minded individuals ready to take part in leading the way to a sustainable future.

**Dean, Graduate School of Global Environmental Studies**  
**Shinya FUNAKAWA**

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# Introduction

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## Overview and Objectives

### Objectives and features of the Graduate School of Global Environmental Studies

Many serious global environmental problems are posing challenges for humanity in the 21st century. Abundance and convenience are desired by those people living in developed countries but mass production, mass consumption and mass waste have resulted in climate change, ozone layer depletion, water pollution, ground water and soil contamination, and waste-related problems. Since developing countries with rapid population growth are following the same path as developed countries, this will impose new stresses on the planet. The exploitative systems of primary industries such as agriculture, fisheries and mining undermine the growth of developing countries that primarily depend on these industries, and the least-developed countries still must eradicate poverty in order to provide a basic standard of living for their people. Yet there has also been progress, with some countries seeking to achieve sustainable and equitable development in line with the development goals conceived by the United Nations, and many OECD countries, including Japan, now strongly supporting conservation and the recycling of resources.

Global environmental problems include many complex issues on every scale, from global to local. We must tackle these problems in two ways — first, by applying research and academic skills in order to gain a greater understanding of the problems involved, and second, by seeking to solve these problems. The first approach requires the training of highly skilled researchers who can apply scientific principles and an appreciation of complexity to the study of global environmental studies. The second requires the training of high-level practitioners who can address problems by implementing sustainable and practical approaches.

Fostering top-notch researchers and practitioners requires innovative educational and research programs focusing on the global environment and drawing on a wide range of disciplines. By incorporating teaching derived from many disciplines in the natural and social sciences, the evolving and innovative field of global environmental studies can offer academic study combined with practical experience in various domestic and overseas organizations.

The Graduate School of Global Environmental Studies is organized flexibly so as to meet the varied needs of both research and education. Some of its unique organizational features are shown on the following pages.

## Educational, research and support organizations

Global environmental studies are at an early stage of formation. Research activity needs dynamic development with strategic views combining foresight and flexible interdisciplinary integration. Educational programs require sound, systematic teaching of a broad spectrum of global environmental topics with a view to social relevance and profundity. Research and educational activities, therefore, require different conditions. In order to meet these conditions, the Graduate School includes a research body, the Hall of Global Environmental Research, and an educational body, the School of Global Environmental Studies. Further, a supporting organization for education and research, the Grove of Universal Learning, provides wider perspectives to both researchers and students with different disciplinary backgrounds so that they can develop their research and talents cooperatively.

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## Collaboration with other graduate schools, institutes and research centers of Kyoto University and other organizations

The Graduate School of Global Environmental Studies collaborates with many other graduate schools, institutes and research centers of Kyoto University to conduct interdisciplinary study and education that link other academic fields with global environmental studies. In order to facilitate such support, the Graduate School has invited professors from other faculties of the university as collaborating professors. They not only teach and conduct research at their home institutions, but also, at the request of students of the Graduate School, they provide lectures and guide research and thesis-writing for master's and doctoral degrees. The Graduate School also invites visiting professors and lecturers from institutions within Japan and abroad to speak on current topics. The educational programs emphasize formal instruction as well as collaboration with domestic and international NPOs and NGOs to give students opportunities for internship study and field experience in various sectors.

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## Carrying out university-wide research projects

In order to open up new areas of research in global environmental studies that are substantially different from those of the traditional sciences, it is necessary for professors of the Graduate School to promote university-wide research projects with the intensive collaboration of researchers from different areas. The Graduate School promotes and actively participates in these research projects.



# Hall of Global Environmental Research (Research Body)

This organization includes three types of faculty: permanent professors, professors on double appointments, and collaborating professors. Double-appointment professors teach and conduct research both at their home schools, institutes or the various research centers of Kyoto University, and at the Graduate School. They hold professorships at two institutions within Kyoto University for a limited term. Collaborating professors are professors who teach and conduct their research not only at the institution within Kyoto University to which they have been appointed, but also at the Graduate School. These three types of faculty, together with visiting professors, explore global environmental issues and develop advanced technologies related to global environmental problems. Predicated on the desire to achieve global benefits, ecological conservation and recycling of natural resources, the Hall of Global Environmental Research is composed of three research groups, the departments of Global Ecology, Technology and Ecology, and Natural Resources.

## SCHOOL OF GLOBAL ENVIRONMENTAL STUDIES

- Global Environmental Studies
- Environmental Management

## HALL OF GLOBAL ENVIRONMENTAL RESEARCH

### Department of Global Ecology

- Global Environmental Policy
- Environmental Economics
- Global Ecological Economics
- Sustainable Rural Development
- Environmental Health Sciences
- Socio-Cultural Symbiosis
- Environmental Marketing Management
- Ontology of Environment and Technology
- Environmental Education

### Department of Technology and Ecology

- Environmentally-friendly Industries for Sustainable Development
- Environmental Infrastructure Engineering
- Global Environmental Architecture
- Biodiversity Conservation
- Landscape Ecology and Planning
- Environmentally-Friendly Energy Conversion

### Department of Natural Resources

- Regional Planning
- Urban Infrastructure Engineering
- Atmospheric Chemistry
- Ecosystem Production and Dynamics
- Terrestrial Ecosystems Management
- Aquatic Environmental Biology

# Department of Global Ecology

In the global society of the 21st century, human socio-economic activities and the natural environment are increasingly interdependent, and international relationships to support the advancement of science and technology, economic development and environmental preservation are strengthening.

With these trends in mind, the Department of Global Ecology seeks to promote scientific contributions by (1) studying the framework of human and environmental symbiosis, (2) integrating existing natural and social science disciplines into the new discipline of global ecology, (3) developing policies and techniques aimed at serving common global interests that transcend national and international economic interests, and (4) conducting studies which can contribute to governance that can enlarge management capabilities for the global environment.

Global Environmental Policy / Environmental Economics / Global Ecological Economics / Sustainable Rural Development /  
Environmental Health Sciences / Socio-Cultural Symbiosis /  
Environmental Marketing Management / Ontology of Environment and Technology /  
Environmental Education

## Global Environmental Policy

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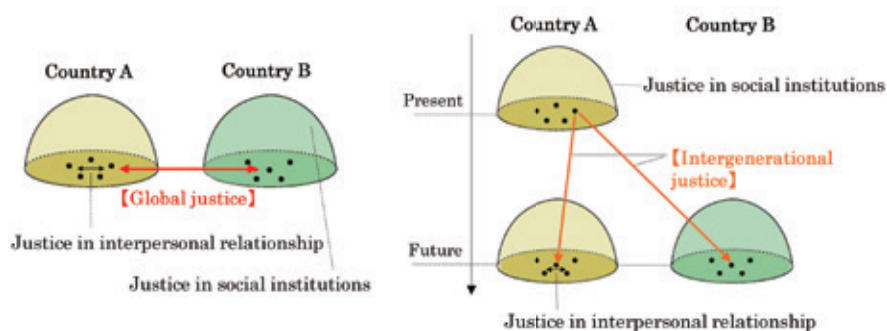
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In the laboratory of Global Environmental Policy, we explore normative and positive questions concerning environmental problems and policies on local, national, regional, and global scales. On one hand, foundational topics are studied from the perspectives of legal and political philosophy. One group of these topics concerns issues in global justice, one of which is the question of what principle should be adopted in distributing the benefits and burdens of climate change policy among individuals or states across the world. Another group has to do with issues

in intergenerational justice, notably the question of what are grounds for the obligation that the present generation might have toward future people.

On the other hand, we also conduct empirical research on international environmental law, environmental policy and its processes at national and local levels, and conservation-related activities by NGOs, businesses, and citizens. We explore these topics by using both qualitative case study methods and quantitative statistical techniques.



Global and intergenerational justice



# Environmental Economics

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The purpose of this laboratory is to analyze climate change policies and energy policies from economics perspectives. In order to do so, we request all the applicants for this laboratory to study environmental economics as its theoretical foundation. Based on this, we focus on the following three research topics:

### [1] Economic analysis of climate change policies and their policy designs

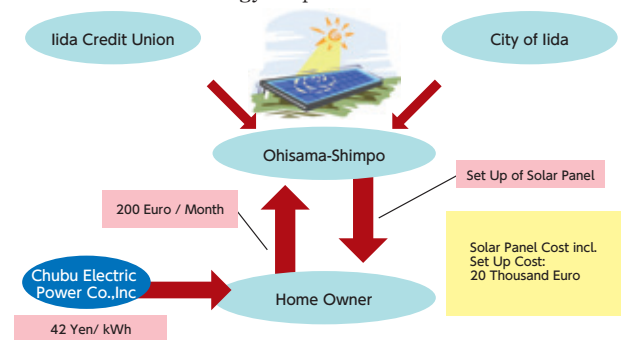
We focus mainly on climate change policies among various environmental issues. As a role of social science, design of social institutions and policy instruments is one of the most important tasks. Environmental policy instruments (environmental taxes, emissions trading systems, subsidies, etc.) are main target of our research.

### [2] Renewable energies and electricity market liberalization

Renewable energy policies play a crucial role in the climate change policies. On the other hand, research of the future power systems that make the large-scale renewable energy generation and grid integration possible is also important. This laboratory promotes a research project that supports transition of power systems from the centralized one to more distributed one, by increasing renewable energies in the liberalized electricity market environment.

### [3] Renewable energies and regional rehabilitation

Unlike the fossil fuels and nuclear energies, renewables are the universally distributed energy resources for any regions. We are tackling the issue of how to link renewable energy development with the regional rehabilitation. Collaborating with municipalities, we are currently engaged in "regional added value analysis" and research on appropriate forms of business entities like "Stadtweke" or energy cooperatives.



Regional business model for promoting solar power in the City of Iida, Nagano Prefecture

# Global Ecological Economics

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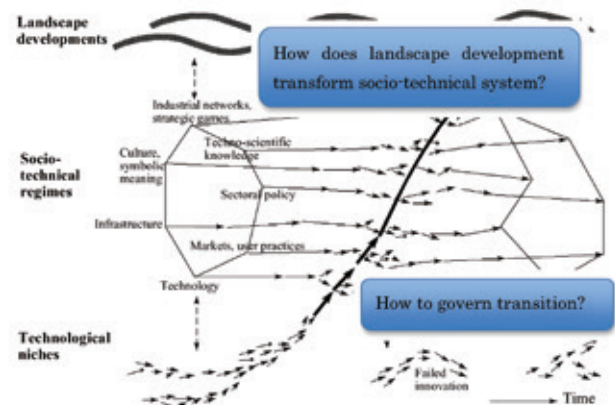
The 30 years of developments in environmental economics and policy studies proves it indispensable for socio-economic system to move toward the sustainable pathway, not to mention to technological and policy innovation and diffusion. In reality, however, socio-economic system, especially infrastructure is deeply embedded into the society, caught in a technological and institutional lock-in. Studies on strategic planning and reflective learning are required that enable niche innovations with sustainable technology to be a part of the regime, compete with the incumbent regime actors, and then dominate in the regime.

Against this background, we Global Ecological Economics have made economic analysis of **sustainability transition**, with special attention to, but not limited to:

- Economics of transition to sustainable energy, transport, agriculture and city
- Policies, institutions and financial mechanisms that advances sustainability transition
- International and domestic barriers that block sustainability transition

Students have taken their preferred cases in Japan, Asia, Europe, and America to make in-depth analyses.

The Global Ecological Economics is also joining in the Research Unit for Development of Global Sustainability of Kyoto University.



Multi-level perspective on sustainability transition

Source: Author compiled based on Geels, FW. Technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case-study, *Research Policy* 31 (2002) 1257-1274.



# Sustainable Rural Development

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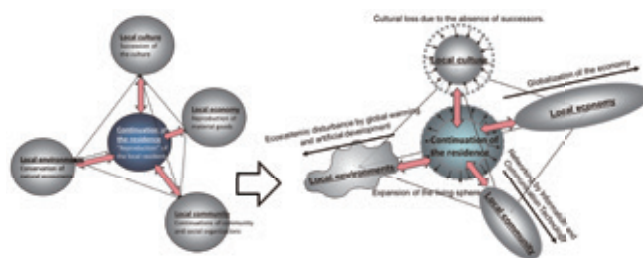
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Rural sustainability (RS) was traditionally maintained by preserving harmony within a geographically limited frame. This type of harmony was maintained by five components, as shown in the figure on the right. Because all of these components are associated with regional characteristics, rural sustainability also involves characteristics that are unique to each region.

In recent years, however, the declining and aging population, economic globalization, climate change and excessive human-induced development have brought about changes in those five components. As a result, rural regions are now facing various challenges and this, in turn, is significantly impairing rural sustainability.

Working from a rural planning perspective, the Laboratory of Sustainable Rural Development is designing and evaluating measures and policies in an attempt to offer solutions to these challenges and to rebuild region-specific rural sustainability that can extend into the future. Our research concerns cover a wide range of topics including regional resource management by way of knowledge management, restoration of social capital (SC) and regional revitalization, symbiosis between residential environments and wildlife, regional development through regional informatization, the establishment of resident-led community

planning theory, and proposals on how to carry out regional realignment and social infrastructure development in a society with a declining population.



Components of Rural Sustainability and their Changes.

# Environmental Health Sciences

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Industrialization urbanization and globalization have brought new environmental challenges. To assess the health risks associated with these environmental problems, the following components are essential:

- Sufficient information on various environmental hazards
- Accurate and precise exposure assessment
- Quantitative evaluation of exposure-response relationship
- Elucidating mechanisms by which environmental hazards cause health effects

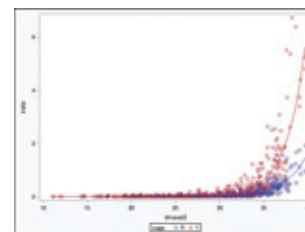
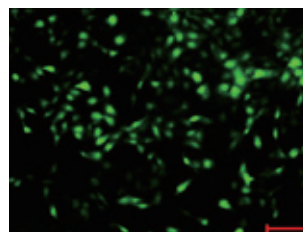
The goals of our division are to establish the methods for comprehensive evaluation of health risks of environmental factor and to prevent adverse health effects on the basis of mechanisms by which environmental hazards cause and to promote health in human populations.

Outline of study (Experimental studies)

- 1) To elucidate health effects of air pollutants and the underlying mechanisms
- 2) To identify responsible factors and the components of air pollutants that contribute to health effects
- 3) To elucidate health effects of environmental chemicals and the underlying mechanisms
- 4) To reduce health effects of environmental pollutants using technology of medical engineering

Outline of study (Epidemiological studies)

- 1) To elucidate health effects of air pollutants for human population
- 2) To evaluate health effects of climate change
- 3) To assess future health impacts of environmental policy
- 4) To develop exposure assessment model of environmental pollutants



(left) Oxidative stress in airway epithelial cells exposed to environmental pollutants (right) Scatter plot of ambulance dispatches due to heatstroke and apparent temperature

Our laboratory is also a part of the Department of Environmental Engineering, Graduate School of Engineering, Kyoto University, and is located at Katsura Campus, where students in the Graduate School of Engineering are working together.

# Socio-Cultural Symbiosis

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This laboratory will help students to gain an understanding of environmental problems and their causes and examine public policies designed to solve these problems from the viewpoints of political science and cultural anthropology.

Humankind has hitherto been able to flexibly adapt to an ever-changing environment. However, a dramatic increase in both the productivity and consumption of human societies since the beginning of the modern era has imposed a tremendous load on the environment and resulted in disasters that humans lack the capacity to deal with. For example, as global capitalism expands and effective ways to protect the environment are being sought, what kind of changes have hunter and gatherers and commercial nomads, who have led their nomadic life while utilizing natural and human resources, been exposed to, and what risks have they faced? In order to consider complex environmental problems, we examine how various communities have adapted to environmental changes and have maintained their lifestyles over time from a cultural anthropology perspective.

Regarding environmental problems in developed countries, political as well as economic factors play a crucial role. Environmental policies are formulated based not only on differences in public attitudes to environmental issues but also on a range of political factors such as whether or not a country has environmentally-conscious political parties, how active

environmental movements are, the degree of political influence agricultural lobby groups have, and the ranking of environmental ministries and agencies. We examine the political background of environmental problems from a political science perspective and environmental policies from the viewpoint of policy studies.



Camping Site of a Nomadic Community called Kalbeliya (Rajasthan, India, Sep. 2011)

# Environmental Marketing Management

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To achieve a more sustainable society beyond “negative externality” problems, all members of society must internalize the value of harmonizing with the environment. Can enterprises cover the costs with the returns from their pro-environmental activities? Is there a high probability that they can gain the support of consumers? We are addressing the following themes mainly on the Japanese market:

- Corporate market strategy based on pro-environmental activities: differentiation strategy, defensive strategy, and brand strategy beyond CSR
- Environmental communication between corporation

and consumer: environmental labels, environment management system certification, and environmental risk communication

- Consumers’ perceptions and behavior in relation to environmental issues: consumer segmentation, analysis of consumer behavior
- Pro-environmental agriculture: activities and management, market analysis, and consumer behavior
- Food risk communication: theories, analysis of consumers’ risk perception and risk-averse behavior, and evaluation of food safety policies



Pro-environmental agricultural practices: the fish cradle project in Shiga prefecture, Japan



A model of consumer behavior in selecting pro-environmental products

# Ontology of Environment and Technology

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The aim of this laboratory is to explore (or to unfold) the implications for a non-metaphysical onto-logy (knowledge of the being) of our physical environment.

What we shall try is :

- to focus on the implications of cultural theories about the concept of nature examining European philosophy from the past three centuries (from Descartes, Hobbes, Spinoza, Rousseau, and Kant to von Uexküll, Heidegger, and Deleuze & Guattari) ;
- to understand the modernist mode of *forgetting* "in-the-world-ness" as part of Heidegger's reasoning, in order to overcome the subject object duality in view of a non-objectifying anthropocentric "knowledge" ;
- to analyse culture as the operation of mechanisms and *technologies* (ref. M. Foucault) of mediation to occupy the gap between matter and life, social and individual, the environment and human activities.

Our postmodern-biotechnological age, full of intelligent machines and cyborgs, is also an age of natural and enviromental crises. It is an urgent matter to investigate the natural environment so as to abandon unreservedly anthropocentrism in the life sciences, and to deconstruct a humanized image of nature.



## Environmental Education

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Research and educational activities in this study area are broadly subsumed under three themes: 1. Education for Sustainable Development 2. community resilience and 3. material cycles and low carbon systems. Through conducting research, internships and collaborative educational initiatives, faculty and students develop unique community-based approaches that raise awareness and transform behavior to achieve equitable and sustainable development.

Education for Sustainable Development (ESD) promotes diverse learning approaches in schools and communities to foster the competencies needed for a more sustainable future. Our activities include climate change, place-based and sustainability education; campus sustainability efforts; and education on the

Sustainable Development Goals (SDGs).

Community resilience studies focus on migration and displacement induced by development, disasters and climate change. We also engage in research on disaster risk reduction and post-disaster reconstruction, climate change adaptation and community-based resource management, aiming to improve community engagement, livelihoods and well-being.

Finally, we focus on material cycles and low carbon system approaches, with emphasis on municipal solid waste (MSW) including food loss and plastic waste, disaster waste, and energy saving awareness and behavior. Research and education are carried out in Kyoto and other local communities, on campus, and in developing nations in the Asia Pacific region.



Campus sustainability campaign



Presentations by students



Focus group community discussions



# Department of Technology and Ecology

A delicate balance between nature and humanity has emerged as part of the global system through the interaction between nature and human culture. Human culture, as well as human life, cannot be maintained without sustaining such a balance. In order to position global environmental studies as a fundamental science relating to the topic of human existence, we try to integrate environmentally friendly technologies across disciplines and develop technologies and technological criteria appropriate for an environmentally balanced civilization.

Environmentally-friendly Industries for Sustainable Development / Environmental Infrastructure Engineering /  
Global Environmental Architecture / Biodiversity Conservation / Landscape Ecology and Planning /  
Environmentally-Friendly Energy Conversion

## Environmentally-friendly Industries for Sustainable Development

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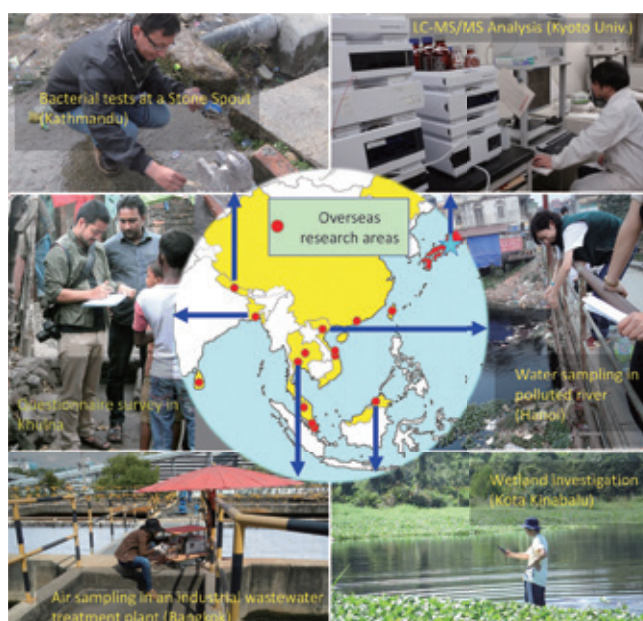
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Japan overcame severe problems with environmental pollution in the 1960s and 70s and became one of the world's most environmentally advanced countries. During this process, Japan accumulated vast amounts of knowledge, skills and experience in the practical solution of environmental problems. This includes environmental technologies, legal systems and environmental policies. On the other hand, most developing countries in Asia are still suffering from serious environmental problems and our experience has not yet been fully utilized by these countries. This is mainly due to the lack of international education systems suitable for transferring environmental technologies and the lack of practical training in solving real environmental problems in Japan. Industries should be environmentally friendly in order to achieve the sustainable development of a global civilization. Such industries should promote resource recycling and energy saving, and avoid the use of hazardous substances.

By means of the various research projects carried out in this laboratory, we foster environmental leaders who will have the ability to solve environmental problems anywhere in the world. Conservation and management of aquatic environments, the promotion of resource recycling, the development of energy-saving industries, and the improvement of environmental sanitation in developing countries are all topics being studied using many kinds of tools, such as water quality analysis, micro-pollutant analysis, water and micro-pollutant treatment technologies, and land use data analyses based on satellite images.



Examples of surveys and experiments



# Environmental Infrastructure Engineering

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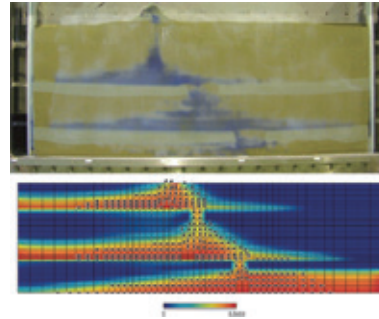
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The Environmental Infrastructure Engineering group deals with construction and management of sustainable and environmentally-friendly infrastructures, and mainly focuses on the preservation and restoration of the geo-environment. With particular attention to the promotion of a recycling-based society, we make emphasis on the study of: 1) strategies and technologies for the appropriate reuse and disposal of waste materials, including contaminated soils, excavated rocks, and disaster debris, 2) the design, management, and post-closure applications of coastal and inland waste disposal landfill sites, with a particular interest on the performance of liner and cover systems and, 3) the development and assessment of remediation techniques for ground contamination, mainly focused on the behavior of heavy metals and non-aqueous phase liquids (NAPLs) in soils. We perform both practical (on a laboratory setting) as well as theoretical work (using numerical models), and closely collaborate with national and private institutions that are responsible for the preservation of the geo-environment.

As members of a society that aims for a sustainable development, we hope that our work will help improve the frameworks and technologies that will allow us to safeguard the infrastructure and social systems for future generations, even under the straining effects of climate change.



Spread of a Non-Aqueous Phase Liquid in the ground



Site investigation at a waste landfill site

# Global Environmental Architecture

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The research explores “sustainable human environment in modern societies” based on local culture and natural settings. Learning from sustainable urban and rural settings, seeks to understand the global environmental order in all forms. The findings and experiences are realized into planning and design, and implementation of practical applications for societies.

## Locally-based building technology

We create the environmental / social design for practical applications in order to restructure / sustain the living environment in modern contexts.



Architectural project aiming at achieving environmental harmony



Reconstruction management of vernacular architecture and

## Locally-based human settlement

We explore the knowledge and methods for preferred human environment by the field surveys in eco-friendly rural villages and old historic quarters.



Field surveys of living environments in urban and rural areas



Field surveys of environmental adaptation in disaster-prone areas

# Biodiversity Conservation

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Stable global environment is based on ecosystem that comprises a large number of biological species, abiotic environment and their complicated mutual interaction. Among them, biodiversity conservation is one of the essential points to keep the environment. "Biodiversity" denotes variation at

the species level, the genetic level and the ecosystem level. We are interested in biodiversity of plant and animal species and contribute into training personnel who work to promote the conservation in domestic and/or international organizations and administrations.



Field research work in Kazakhstan



Project of ex-situ conservation of an endangered plants conducted at Takahama, Fukui Prefecture (Photo: "Foster parents" at primary school)

# Landscape Ecology and Planning

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The goals of our laboratory can be summarized as:

- 1) Protecting natural areas, including endangered wildlife habitats.
- 2) Restoring degraded natural habitats.
- 3) Planning and managing sustainable landscapes.

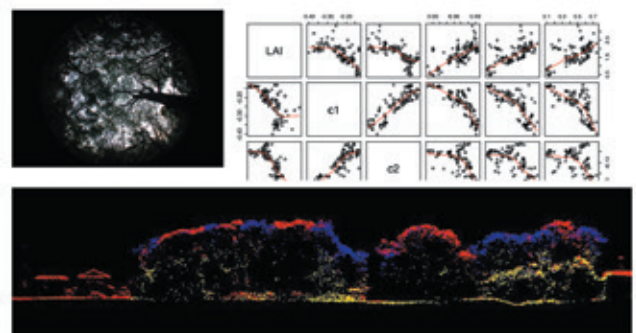
The scope of our research covers a variety of areas, ranging from small gardens and urban parks to rural and mountain areas, and also includes regions undergoing desertification. We deal with the landscape ecology of both heavily populated areas as well as relatively unpopulated natural areas in order to propose better

solutions to land use conflicts between man and nature.

Recognizing that we cannot stand apart from nature, and that ecological sustainability may not be achieved without corresponding cultural sustainability, our current areas of concern include landscape planning, design and management that takes wildlife habitats into consideration, and the development of suitable methods for ecological mitigation carried out as part of the environmental assessment process.



Cultural landscape: an important aspect of landscape planning



Ecological monitoring by remote sensing

# Environmentally-Friendly Energy Conversion

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Our society faces many environmental and energy resource problems. Effective utilization of energy resources is the most feasible method to solve these problems. In this laboratory we conduct the fundamental research on electrochemical energy conversion devices such as fuel cells and rechargeable batteries. In particular we focus on the "interface" at which the electrochemical reactions proceed and investigate fundamental concepts for enhancing the rate and reversibility of the interfacial reaction. The main themes of our laboratory research are 1), 2), and 3) as shown below.

## 1) Lithium-ion batteries

Fundamental research on the "electrode/electrolyte interface" and "ion transfer in electrodes" to elicit performance of lithium-ion batteries.

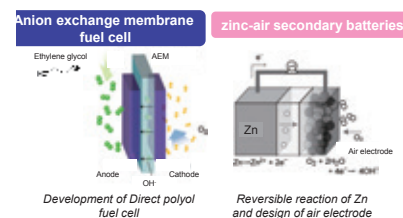
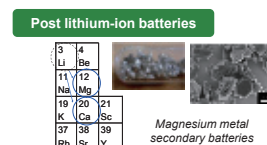
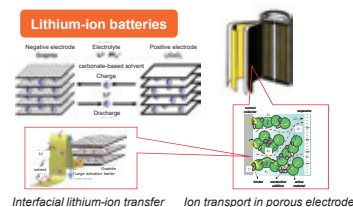
## 2) Post lithium-ion batteries

Fundamental research and material search of magnesium metal secondary batteries, sodium-ion batteries, and aqueous lithium-ion batteries as next-generation rechargeable batteries beyond lithium-ion batteries.

## 3) Fuel cells and metal-air rechargeable batteries

Fundamental research and material search of anion exchange membrane fuel cells and zinc-air secondary batteries. In anion exchange membrane fuel cells, the reduction reaction oxygen supplied from air is used as the positive electrode reaction and

the oxidation reaction of polyol is used as the negative electrode reaction. In zinc-air secondary batteries, the reduction and evolution reaction oxygen supplied from air is used as the positive electrode reaction and the dissolution and deposition reaction of zinc metal is used as the negative electrode reaction.





# Department of Natural Resources

The Department of Natural Resources considers the global ecosystem to be a complex composed of nature and human society and seeks to avoid environmental destruction by conducting dynamic analyses of resource circulation on both a global scale and within regional ecosystems. Our research and educational approaches are, therefore, built on both global and regional perspectives, based on the idea that natural resource management must conform with a well-designed human lifestyle on a local scale that, in turn, contributes to the conservation of the larger ecosystem and ultimately that of the global environment. Topics that receive particular attention include the environment-friendly utilization of organic resources, technologies for low-impact material conversion and recycling, and the proper management of land and water resources. Field-based studies of geospheres, biospheres, coastal zones and watersheds also play a key role in identifying resource circulation issues in such regional units and suggesting solutions for sustainable development and environmental conservation that can be carried out on both a local and a global scale.

Regional Planning / Urban Infrastructure Engineering / Atmospheric Chemistry /  
Ecosystem Production and Dynamics / Terrestrial Ecosystems Management / Aquatic Environmental Biology /

## Regional Planning

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Our laboratory explores well-balanced regional developments among urban and rural areas through an appropriate evaluation and utilization of natural and social resources and tackles potential issues associated with implementation of regional planning by GIS/RS field survey. Current topics are follows.

### ■ Understanding of Regional Environments by GIS/RS

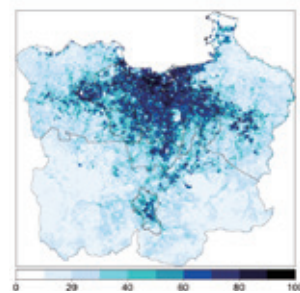
For the implementation of appropriate regional planning for managing environments, land use/cover is monitored and modelled by GIS/RS:

Monitoring of urban expansion (Indonesia); Evaluation of resilience for climate changes (India, Philippines); Spatial accuracy analysis of land cover classification; Spatial data mining of local statistical data.

### ■ Exploring sustainable developments based on field work

Natural or social resource issues associated with the management of regional environments are explored by field work or questionnaire survey:

Land use analysis and forest resource management (Vietnam); Evaluation of social impacts of environmental conservation agriculture (Philippines); Research on connectivity of hills, humans and oceans toward sustainable development (Watersheds, Japan).



Urban monitoring in Jakarta Metropolitan area in Indonesia



Interview survey for ethnic minority in Vietnam.



# Urban Infrastructure Engineering

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Practices to reduce environmental impact in addition to safety and security technologies are necessary to sustain sustainable human activities as a lifeline. It is important to develop "Holistic Engineering" integrating Design, Construction, Operation and Maintenance technologies. In order to achieve such a task, the laboratory aims to develop green technologies in conjunction with existing advanced technologies to secure urban infrastructures in terms of disaster-free and long life.

## Transport and Energy Infrastructures

- Application of High Performance Materials to Bridge Structures
- NDE, Monitoring, Structural Integrity Evaluation and Life Prediction of Aging Steel Structures
- Development of Floating SUPG

## Water and Disaster Prevention Infrastructures

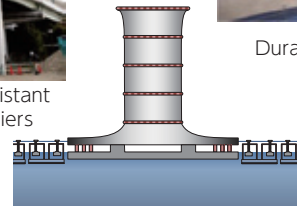
- Development of Accurate and Universal Movable Bed Model
- Multi Agent Model for Evacuation Planning
- Development of Flood Risk/Largest-Class Flood Disaster Estimation Method



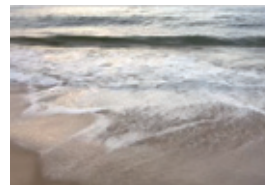
Earthquake-Resistant Steel Bridge Piers



Durable FRP Bridges



Floating SUPG



Sediment Transport Simulation



Risk Assessment on Water-related Disaster

# Atmospheric Chemistry

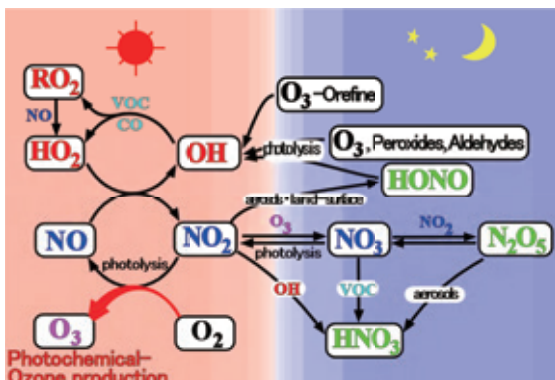
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We investigate atmospheric chemistry, mainly focusing on the issue of photochemical ozone formation. Despite the apparent downward trends for both NO<sub>x</sub> and VOCs (precursors of photochemical oxidants) detected in mega-cities in many advanced countries, including Japan, photochemical oxidants have still increased in recent years.

We are trying to determine the cause of this upward trend.

We are developing ultrasensitive and highly precise instruments to measure reactive trace species such as HO<sub>x</sub> radicals and NO<sub>x</sub> and we are using these instruments to obtain information about possible sources of air pollutants, such as vehicles.

Our final goal is to integrate the knowledge obtained from our observations and considerations in order to provide a sound scientific basis for the improvement of air quality.



Mechanism of oxidant formation



Research activities

# Ecosystem Production and Dynamics

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We investigate dry matter production, plant community dynamics and plant ecological and physiological functions that produce the various ecosystem patterns observed in forests and other major ecosystems, based primarily on two perspectives.

First, we study structural dynamics and its mechanisms in forest ecosystems. This involves tree-ring analysis, mathematical models and ecological measurements being used in combination. Carbon dynamics and carbon accumulation in boreal forests are being studied in Canada, Finland, Estonia, Russia and Japan along with their past patterns. Boreal forests are the ecosystems where the effects of global warming are likely to appear first.

The second research approach focuses on analyzing the internal structure of stem wood. From the perspective of ecological wood anatomy and using both stable isotopes and tree eco-physiological techniques, it examines the relationships between the size and distribution of water-conducting vessels and leaf opening, shoot extension and the growth rate of trees. Trees in tropical regions, such as Thailand and Malaysia, are being examined along with those found in temperate climates.



Fig.1



Fig.2

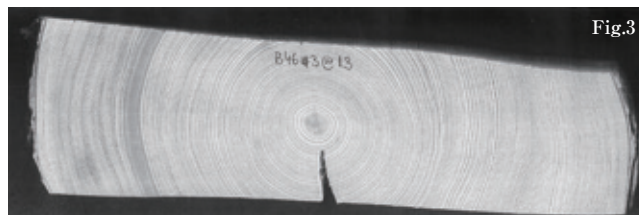


Fig.3

Fig. 1: Litter traps installed in a pine forest site in northwestern Canada

Fig. 2: A tropical seasonal forest with deciduous trees in the dry season

Fig. 3: A tree-ring sample used for estimating tree growth and past stand structure

# Terrestrial Ecosystems Management

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Our continued existence depends heavily upon terrestrial ecosystems that include air, water, soils, plants and animals. We also influence the functioning of terrestrial ecosystems and act as one of the components. The recent increase in human activities adversely affects ecosystems and the environment at both the local and global levels, in the form of desertification, water and soil pollution and land degradation.

Our laboratory is engaged in a broad range of studies on terrestrial ecosystems management. The study topics include soil characterization, fertility mechanisms and maintenance, the utilization and conservation of soil resources, the mechanism of soil degradation and its remediation, and the reappraisal of indigenous agro-ecosystems management techniques in the humid and semi-arid tropics. We also study holistic approaches to rural development and ecosystems management that can be used to enhance human welfare and security in Japan, Asia and Africa.



Clear-cutting of tropical lowland forest in Indonesia



Honeycomb used as a non-timber forest product (Cameroon)

# Aquatic Environmental Biology

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We examine the ecology and ecological production systems of aquatic biological resources from various points of view. In particular, we investigate integrated coastal zone management, based on an understanding of the ecological relationship between terrestrial and coastal areas, including productivity and biodiversity, which are strongly affected by human activities.

## ■Connectivity of hills, humans and oceans

We examine the ecological links between forest, river, human and coastal ecosystems, and the impacts of human activities on coastal biological production systems. These concepts are then used to identify suitable methods for aquatic zone management in order to achieve future sustainable development.

## ■Ecology of aquatic organisms

We study production systems of aquatic biological resources, focusing on energy flow from nutrition and primary production through to macrobenthos and fish, emphasizing the life history, survival, growth, movement and feeding characteristics of key species.

## ■Management of aquatic biological resources

We examine management approaches that focus on resources produced by specific aquatic environments in local areas. We develop appropriate methods to manage resources, restore environments and enhance stocks.



Set net operation at Tai, Maizuru, Kyoto



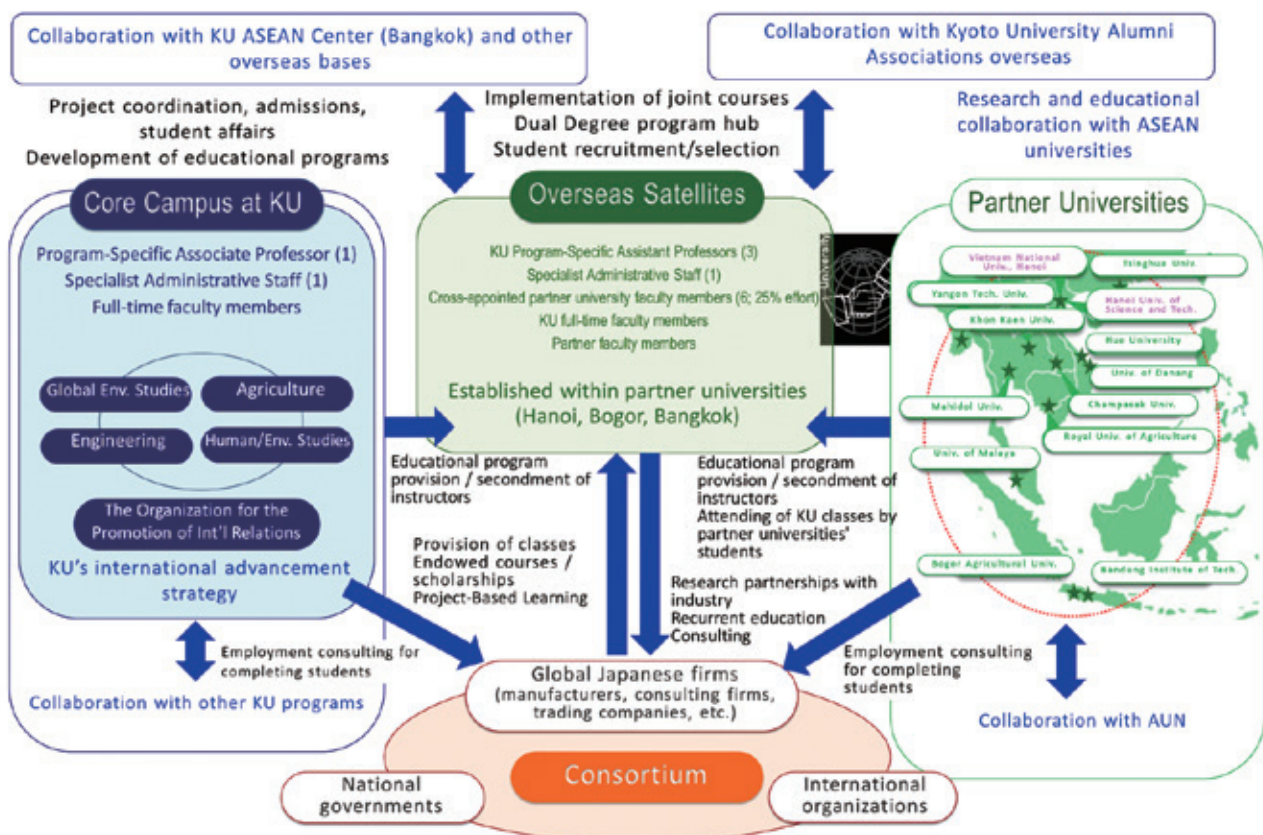
# Environmental Innovator Program EIP – Cultivating Environmental Leaders across ASEAN Region –

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Rapid economic growth in the ASEAN region has created serious environmental and social problems, ranging from water degradation and improper waste management, to traffic congestion and deforestation.

The *Environmental Innovator Program – Cultivating Environmental Leaders across ASEAN Region* is a new program at GSGES, which strengthens research and educational capacity through intensive intellectual exchanges with 11 partner universities in the ASEAN region. It aims to cultivate environmental innovators who will take on leadership roles with a deep understanding of Asian cultures and advanced communication skills to tackle global environmental challenges.

One of the major components of this program are two newly launched double-degree programs with Mahidol University (Thailand) and Bogor Agricultural University (Indonesia). Students enrolled in these programs will research Global Environmental Studies at GSGES (earning a master's degree in Global Environmental Studies) with a multi-disciplinary perspective, and will also study a specific discipline at a partner university, such as environmental engineering or agriculture, for their second master's degree. The EIP program provides a unique opportunity to study not only a specific discipline but also multi-disciplinary environmental studies at the same time.





# JGP Top Global University Project “Japan Gateway: Kyoto University Top Global Program” Environmental Studies

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A program, “Japan Gateway: Kyoto University Top Global Program, JGP in short”) has been organizing to conduct international joint education and double degrees with world-class partner universities prominent in research areas such as Mathematics and Chemistry that Kyoto University has significantly international competitiveness. In the area of environmental studies, Graduate School of Global Environmental Studies of Kyoto University plays a central part to prepare the way to implement interdisciplinary and practical researches to conduce towards the environmental problems, both in global and local scales. To fulfill this goal, Graduate School of Global Environmental Studies is collaborating with Graduate School of Agriculture of Kyoto University to facilitate an international joint education and double degree program. Through the global education and research work, the program is set out to encourage young researchers to obtain skills and knowledge in environmental studies so that they can be able to work on the world stage in near future.

## 1) International double degree program

The program has been conducting a double degree program with Gadjah Mada University, Bogor Agricultural University (Indonesia), Kasetsart University, Mahidol University (Thailand) so far. A double master degree program with other university is planned to be implemented in the future.

## 2) International joint education program

The program provides various international education programs. A short study abroad program, named “International Spring School / Autumn School for Environmental Studies” aimed to understand the environment in Japan and learn the skills and knowledge of analysis through the field work, laboratory work and lectures was carried out for 3 years. In total 67 selected students (applicants: 214) from various universities in the world have joined and learned environmental studies under the multicultural atmosphere of Kyoto since 2016. In addition, JGP has providing opportunities for internships and research program in overseas universities for students, and receiving students from partners’ universities to conduct international collaborative research. In this way, our program promote/foster internationalization, and develop environmental studies with interdisciplinary researches in multi-culture condition.

## 3) International research and study abroad fair

The program is also joining events on “Study Abroad Fair” and “International Symposium in Environmental Studies” in various countries in the world, i.e. Vietnam, Thailand, Tanzania etc., to promote international collaborative education and research. In addition, international collaborative studies/field work/researches have been conducted in various places.



# Introducing the Faculty

## Project for the Reconstruction of Vernacular Architecture and Its Significance for Contemporary Society

Professor Hirohide **KOBAYASHI**  
Environmental Design, Regional Architecture



### Vernacular Architecture in Modern Society

Even in remote villages, the spread of the market economy and accompanying shifts in values have already become part of daily life, and the local culture and customs unique to a region are gradually dying out. In particular, vernacular architecture—the highly indigenous traditional housing cultivated by the natural features of a region—is quickly being replaced with buildings incorporating large amounts of new materials such as concrete blocks, galvanized iron sheets, and cement slates. Field surveys that have been conducted so far across Asia, the South Pacific, and West Africa also reveal that in many cases residents have not been constructing their own traditional buildings since the 1970s and 1980s. For such architectural techniques to be passed down through the generations, there needs to be collaborative efforts among the local community to construct housing without outside help. There is, therefore, a risk that such techniques of vernacular architecture will be lost as highly skilled community residents grow older without the opportunity to transfer their knowledge with the next generation. Moreover, given that architectural spaces reflect not only architectural techniques, but also the daily lifestyles of the village community and its cohabitation with nature, the loss of vernacular architecture will also have an impact on the potential of many traditional customs and rites to be kept alive into the following generations. The diverse abundance of vernacular architecture is gradually slipping away and will be difficult to revive once it is lost completely.

Conducting surveys in the villages and listening to what individuals have to say, we find that many are conscious of the necessity and importance of traditional housing. However, a number of factors hinder the construction of such housing, such as restrictions on the use of resources due to forest conservation policies, the decline in useful resources around villages, reluctance to provide construction labor resources in financially struggling village communities, or strong preferences for modern housing using new building materials. At the same time, when my survey research brings me to a central figure in the village community who is concerned about this situation—and when we engage in repeated

discussions—this concern comes together as a consensus among the local people, and it is possible to establish a project for reconstructing vernacular architecture. So far, we have cooperated with and supported initiatives in Vietnam (2008 and 2018), Fiji (2011), Thailand (2013), and Vanuatu (2017), tackling various hurdles along the way.

### Sustainability of Vernacular Architecture

Based on my experience with reconstruction projects, it is possible to summarize the factors that contribute to the construction and maintenance of vernacular architecture into three elements: local materials, traditional techniques, and collaborative labor. These elements are mutually linked in the sense that knowledge and techniques are passed down through interaction between the generations in the village communities, and such skills are adopted to use forest resources effectively and rationally, allowing the village community to enjoy the substantial gifts of the forest. Moreover, looking at each element as a regional resource, local materials are part of the local natural environment (physical resources), traditional techniques are part of the local culture (intellectual resources), and community cooperation is part of the local society (human resources), such that as a whole such architecture is a product of the local environment itself. This demonstrates how the creation and sustainability of vernacular architecture relies on the preservation of the regional environment. Investigating vernacular architecture means investigating not only buildings, but also communities, natural environments, and even the culture of the area. The distinctive character of such vernacular architecture can be seen as not so much the antiquated product of a bygone era, but as an essential element for creating balanced regional environments in the future from the point of view of regional identity and coexistence with nature in our extremely globalized modern society. In that sense, projects to reconstruct vernacular architecture provide significant insights into not only the community residents in and around the project, but also our daily lives and housing in the modern day.



# Striving for Sustainable Development Utilizing Regional Resources

Professor Izuru SAIZEN  
Regional Planning



## Farming villages weakened in the process of economic development

I engage in research on the development of regional areas and farming villages inside and outside of Japan with a central focus on field surveys and analysis using geographic information systems. In Japan, the depopulation and aging population of farming villages has been a clear issue for several decades. Given the extremely severe and complex background, it is still difficult to find an effective solution. No doubt very few people during Japan's period of high economic growth predicted that rural communities would lose their vitality. Efforts should probably have been made at the time to devise measures in preparation for the future. Meanwhile, in many of the agricultural villages in the developing countries of Southeast Asia, the benefits of the economic development of the country as a whole have seen improvements in living standards and levels of happiness, as reflected by the contented smiles on many children's faces. However, such rapid development is also in some ways vividly reminiscent of Japan's high economic growth, and we therefore need to carefully consider initiatives toward the future. As the economy develops, the concept of a monetary economy begins to encroach on agricultural communities as well. While livelihood in the farming villages in such countries was typically based on a system of self-sufficiency, farmers begin to use the fields, in which they previously used for cultivating food for themselves, for growing cash crops and eventually begin to intensively farm a certain crop in order to increase their profits. While this raises the potential for making monetary profit, it also increases their vulnerability to changes in the market value of the crop and to natural disasters. Some may wreak catastrophic and irreparable damages

in just a short period of time. And as the populations in farming villages increase, demand arises for new industry. However, as in many developing countries, urban industry is driving the economy so that the rising population lies increasing deindustrialization of the farming villages.

## Revisiting what is always there

One method of ensuring sustainable economic development in such regions is to effectively utilize the local resources available in an area. "Regional resources" refers to those resources that have been cultivated throughout the long history of the region, which are highly compatible with the natural environment and climate of that area, and which have supported the lifestyles of the local residents over the years. However, there are many regional resources that are gradually being lost in the shadow of economic development. These include, for example, festivals unique to a certain community, traditional crop cultivation, and slash-and-burn agriculture. These traditions and practices each have the potential to contribute to the community in the form of ecological tourism, securing crops for self-sufficiency, or the sustainable use of forests. By reconsidering regional resources, it is possible to boost the underlying vitality of an area. Developing countries are also entitled to enjoy economic progress and prosperity. At the same time, it is essential to ensure that they pursue suitable and sustainable development in line with the stages of development. I aim to develop achievable measures through discussions with local people.



# Introducing the Faculty

## Clarifying the connections among human health, environment, and society

Associate Professor **Kayo UEDA**  
Environmental Health Sciences



We have been experiencing a transition of environmental health risks over the past half-century. In the past time, the main concerns were whether the high level of industrial pollutants from the local source may have caused diseases or exacerbated pre-existing ill conditions in a short time period, which made people infer the association between its association. Currently, we are aware that these environmental health risks should be addressed in a global scale, as represented by heat-related mortality under climate change and respiratory/cardiometabolic diseases morbidity attributable to transboundary air pollutants. The emerging environmental health problems also include the health effects of low levels of chemicals on allergic diseases, concerns of health effects of maternal exposure to environmental pollutants on fetal and neonatal development. Further, various individual- or community-level factors, such as socioeconomic status and medical progress, modify the health effects of environmental pollutants.

Our laboratory tries to disentangle the health effects of environmental pollutants using epidemiological and experimental approaches. Of those, I have been involved with epidemiological studies which focus the distribution and determinant of health and diseases in "population" while experimental approaches use cells, animals, and sometimes human to elucidate health effects of environmental pollutants and underlying mechanisms.

One of my specific research goals is to identify who are more at risk from environmental pollutants. We can consider susceptible populations who are likely to have more serious responses to a certain level of exposure to pollutants, and vulnerable populations who are likely to be exposed to higher levels of environmental pollutants more often than others. Susceptibility is generally related

to physiological variation. For example, it is considered that children are more susceptible than adult because they are still under the development and the defense system is immature. Vulnerability is related to people's behavior and social factors. In the study examining the association of hot temperature and heat-related illnesses in Japan, we focused on age as a factor that could modify the effect of temperature on health. The age-stratified analysis revealed that the middle-aged males had higher risks of heat-related illnesses than other age groups. This was an unexpected finding because we hypothesized the elderly, with deteriorated physiological function due to aging process, was more susceptible to exposure to high temperature during summer. From this observation, it is speculated that the middle-aged people tend to work outdoor longer hours than the elderly while the elderly stay indoors where air conditioning is available and avoid going outside. Especially, Japanese people have been more aware of heat-related illnesses from preventing heatstroke campaigns focusing on the elderly after the hot summer in 2010. This result is just a piece of evidence that indirectly suggest how much individual behavior and social status modify environmental health risks. But this gives us an insight about the connections among individual, society, and environment.

# Conveying the Significance and Safety of Using Recycled Water in Agriculture

Associate Professor Akira YOSHINO  
Agricultural Economics

Master's students at the School of Global Environmental Studies take part in a long-term internship lasting at least three months as a compulsory part of the curriculum. Over the three years since 2015, each year one student from the field of Environmental Marketing Management has pursued his or her internship by participating in an initiative in Itoman City in Okinawa to investigate the potential use of recycled water in farming.

The recycled water has been developed through efforts led by Professor Hiroaki Tanaka's laboratory at the Kyoto University Graduate School of Engineering. By applying ultrafiltration and UV disinfection to treated waste water, they have created a low-cost supply of safe water suitable for direct use—even to irrigate crops of vegetables sold for raw consumption. In Itoman City in Okinawa, where use of the recycled water is being tested, there are high hopes for its use due to the chronic water shortage that farming in the area has suffered over the years. This approach is also environmentally-friendly as it reduces the amount of treated waste water released into rivers.

Yet, regardless of how safe the water may be, the local government heading up the project and farmers were concerned about the possibility that consumers could be reluctant to purchase vegetables grown with recycled water, given that such water comes from sewage. This is why they reached out to our laboratory. Risk communication for food products has been one of the focuses of our research since the scandal that arose surrounding BSE—or mad cow disease, as it is commonly known.

In order to be able to communicate risk to consumers and the general public it is necessary to start by listening openly to people's interpretations and concerns regarding the message put out by those developing the products. Chiharu Miwa—the first student to pursue her internship at this project in Okinawa—drew on the knowledge of chemistry that she had acquired as an undergraduate to create a pamphlet and website explaining the significance and safety of recycled water, while also carrying out a survey to listen to what consumers had to say. The results revealed that the majority of consumers were not completely against the idea but had a vague feeling of concern. Such concern focused on the possibility of toxic chemicals that may have been overlooked and the risk of unanticipated accidents, rather than the risk of food poisoning. This result came as a shock to those involved in the development of the water, as they had taken great

pains to ensure that E. coli bacteria and viruses had been eradicated.

Serika Yuto, the student who went to Okinawa the following academic year, took part in a test run selling vegetables grown using recycled water with the cooperation of farmers, and created and starred in a video explaining recycled water. Alongside these activities, she conducted a survey and skillfully applied advanced statistical analysis to the results in order to estimate to what extent the actual sale of vegetables cultivated in Okinawa Prefecture would be affected if recycled water was used in cultivation. This revealed that as long as explanations regarding recycled water are provided, the impact on vegetable sales is not significant enough to merit concern.

This, however, left the question of how to ensure that the message gets across. The third student to participate in the internship, Minori Oda, who specialized in education as an undergraduate, set out to tackle this question. In addition to publishing articles in the local newsletter, she also set up a recycled water tank and hydroponics kit in the lobby of the Itoman City Hall, testing out ways of encouraging people to want to find out more regarding recycled water. Displaying such items was highly effective, with just under 90% of local people becoming aware of the existence of recycled water, and just under 40% being drawn to the explanation on recycled water.

As a result of such survey and research activities, the recycled water project in Itoman City is being developed for commercial purposes. As our role draws to an end, it seems fair to suggest this internship and other such opportunities are distinctive of the School of Global Environmental Studies in the way that they allow students from various backgrounds across both the sciences and humanities to cooperate with and learn from researchers from other fields as well as government and industry representatives, and to draw on their own knowledge and ability in their respective specialist fields to contribute to a certain project and, in doing so, pursue their own research.





# Introducing the Laboratories

## Research Laboratory Profile: Professor Makoto USAMI

Global Environmental Policy, Department of Global Ecology

### —What kind of research do you do, Professor Usami?

I do research on legal philosophy in connection with environmental issues. I approach environmental problems and policies from the perspective of justice, with a particular interest in expanding the applicable scope of this ideal. People of the same era share straightforward rules of justice, such as the principle that items borrowed should be returned. But what about those of different generations? Given that future people will be adversely impacted by the environmental degradation we cause today, we can conceive an obligation for the current generation to act with consideration for future generations. On the other hand, what is the reason for obliging the current government to use its citizens' money on policies for the benefit of people in the distant future long after we ourselves have departed, such as 500 or 1,000 years from now? One of my research interests is to explore environmental problems and policies from the viewpoint of intergenerational justice. I am also interested in the issue of apportionment beyond national borders. For example, the tensions between developed and developing countries over the reduction of CO<sub>2</sub> emissions show that climate change is a question of global justice. Climate justice, which is the subject of much research in the international academic community in recent years, thus encompasses the dual facets of intergenerational justice and global justice.

### —How do you run your laboratory?

Currently there are seven Doctoral students, 11 Master's students, and four research students in my laboratory. I have six international students from China, two from Indonesia, one from South Korea, one from Switzerland, and one from Bangladesh. We use a mixture of English and Japanese in our seminars. The large number of international students is a feature of the School of Global Environmental Studies, and I think that engaging in discussions and interactions with these students offers great stimulation to our Japanese students, too. There are three pillars to research supervision in my laboratory: (1) individual consultations of approximately one hour each, held periodically; (2) seminars, held on an ad hoc basis; (3) joint seminars with other research laboratories in the social sciences, held bi-annually. (2) and (3) involve presentations and discussions among graduate students of many different disciplines and specializations, enabling



my students to gain feedback from a variety of angles and delve deeper into their own research.

### —Tell us about your graduate students' research.

My current students are engaged in an extremely diverse range of research projects, including psychological exploration of motivations for citizens to purchase green products, inquiry into indigenous people's attitudes toward the commodification of genetic resource in Indonesia, econometrical analysis of the development of solar panel technology in South Korea, case study of climate change adaptation projects in Africa, legal research on international treaties on radioactive waste, and theoretical analysis of climate justice.

### — (Question to Ms. Cita Ekanijati an international student from Indonesia who presented at Professor Usami's laboratory research reporting session on January 26, 2016) Tell us what motivated you to study in Professor Usami's laboratory and about the School of Global Environmental Studies.

Cita: I study environmental policy under Professor Usami. Both the Professor and the other graduate students provide valuable comments to support my research, and the laboratory also has many books and other materials. In Indonesia, it is not common for students to learn directly from a professor. The access to direct, attentive professorial supervision is one of the great attractions of the School of Global Environmental Studies. The School also has systems that provide students with financial support for projects, internships and participation in international conferences. I hope to become a university faculty member when I return to Indonesia.

### —Interviewer's Postscript

Environmental problems have been recognized as global-level challenges for many years now, but these problems are broad-ranging not only in spatial terms but in temporal terms as well. To what extent can we share common rules and ethics in relation to such multi-dimensional problems? The basis for addressing the question of responsibility beyond generations may already exist within Asian societies, but the design of actual institutions for this purpose is still a work in progress. Furthermore, achieving global consensus on how to deal with environmental problems requires not only the reconciliation of different value outlooks but also the striking of political and economic bargains. Professor Usami has an open, global laboratory that reflects precisely these challenges. (Ayako IWATANI)

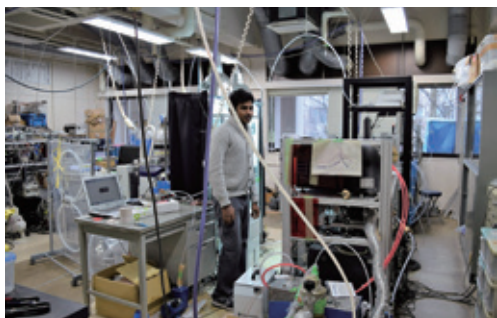


## Research Laboratory Profile: Professor Yoshizumi KAJII

Atmospheric Chemistry, Department of Natural Resources

### —What kind of research do you do, Professor Kajii?

I specialize in atmospheric chemistry. My research involves detecting and evaluating atmospheric substances and shedding light on the mechanisms of atmospheric pollution. In the 1970s, atmospheric pollution became a serious social problem in Japan as well. Photochemical smog is caused by substances known as oxidants, which are formed when nitrogen oxides (NO<sub>x</sub>) found in gas emissions react with volatile organic compounds (VOCs) in the atmosphere. Japan achieved a reduction in oxidants in the 1980s, as a result of factors such as the impact of the Air Pollution Control Act and combined public and private sector efforts to keep the air clean. Since the 1990s, however, oxidants have been increasing once more, and identifying the cause of this increase has become an urgent priority. Oxidant concentrations tend to be higher in spring and lower in summer, meaning that the ongoing increase cannot be attributed simply to long range transport of pollutants such as PM<sub>2.5</sub> from China. There is thus a need to detect both oxidants and the VOCs from which PM<sub>2.5</sub> particles and oxidants are formed, but it is extremely difficult to identify them given that there are between 500 and 2000 different types of VOC. We have focused our attention on substances known as OH radicals. When they react with VOCs in the atmosphere, OH radicals form stable H<sub>2</sub>O molecules and dissipate. Measuring the speed of such dissipation yields data corresponding to the overall volume of atmospheric VOCs. In our research lab, we have a hand-made device that uses laser technique to create OH radicals artificially and causes them to react with compounds in the atmosphere. Working in partnership with the National Institute for Environmental Studies and other universities, we use this device to measure atmospheric compounds in order to gain our understanding of the chemistry in the air.



### —How do you run your laboratory?

My laboratory currently has two Program-Specific Researchers, one Master's student, and one Doctoral student in the Graduate School of Human and Environmental Studies, and five Master's students in the Graduate School of Global Environmental Studies. Each morning at 9:30, Program-Specific Researchers and the Doctoral students gather with my Assistant Professor, Yosuke Sakamoto, for a brief meeting. Once a week, a seminar is held for undergraduate and graduate students, where we report on the progress of our research. Once every half-year, all graduate students make presentations



on their research. We also hold journal meetings to review the latest academic journals, including a monthly joint journal meeting with the laboratory of Professor Masahito Sugimoto (Aquatic Chemistry, Graduate School of Human and Environmental Studies). There is also a weekly workshop organized by the graduate students themselves, with study activities including thematic summary of books in the field of atmospheric chemistry.

### — (Question to the graduate students gathered in the laboratory) Tell us about your research.

Student A: I am studying in Professor Kajii's laboratory because I want to deepen my interest in atmospheric pollution.

Student B: I am interested in automobiles, and I do research on exhaust gases.

Student C: I am researching the mobility of substances in the environment.

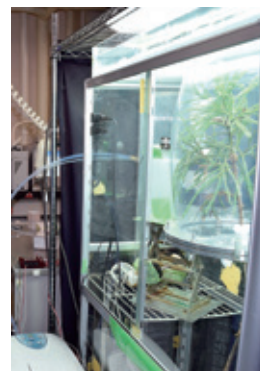
Student D: My motivation was the Kyoto Protocol. CO<sub>2</sub> is said to be the cause of global warming, but there may be other factors as well. That is what I am researching.

### —Tell us what the atmosphere in the laboratory is like.

"Free" might be the best word. We can choose our own research topics freely, and we are allowed to do our research in the manner in which we choose. I was even able to do research overseas, in Vietnam, when writing my Master's thesis. It was a great learning experience.

### —Interviewer's Postscript

I gained a sense of the "freedom" of Professor Kajii's laboratory even during my own brief visit there. Despite my status as a complete stranger to his academic field, Professor Kajii took the time to explain his research to me carefully and coherently. The innovative, cutting-edge content of his research seemed to strike a great contrast with the hand-made device fitted with a profusion of pipes and the adjacent case full of plants used in the measurement of VOCs. In Professor Kajii's lab, today is another day in the ongoing search for solutions to environmental problems through the power of science. (Ayako IWATANI)



# School of Global Environmental Studies (Educational Body)

The School of Global Environmental Studies is composed of the “Doctoral Program in Global Environmental Studies,” designed to foster outstanding researchers responsible for further development of the new field of global environmental studies, and the “Master’s Program in Environmental Management” and “Doctoral Program in Environmental Management,” both designed to train outstanding practitioners capable of addressing environmental issues from the local to the global level. The educational goals of these programs are shown in the following table.

## Doctoral Program in Global Environmental Studies

This program fosters researchers capable of working at the international level by tackling global and local environmental issues using innovative approaches and methodologies drawn from various fundamental academic fields.

## Master’s Program in Environmental Management

This program trains internationally-minded practitioners

with the knowledge and practical skills required to tackle environmental problems from the local to the global level. This program also fosters researchers capable of working at the international level by addressing global and local environmental issues using approaches and methodologies drawn from various fundamental academic fields.

## Doctoral Program in Environmental Management

This program fosters practitioners with advanced management expertise and the extensive knowledge and skills required to address environmental issues from the local to the global level. This will enable them to make a practical contribution when working in international settings.

Students participating in any of the above programs may enroll in both compulsory and elective courses offered in English, in keeping with the Graduate School’s aim to train professionals capable of working in an international setting. Students seeking to further their interdisciplinary knowledge base are also able to take credited lecture courses from other schools in Kyoto University.

## Doctoral Program in Global Environmental Studies

This program accepts students who have obtained a master’s degree or the equivalent in various fields. The program encompasses the Department of Global Ecology, the Department of Technology and Ecology, and the Department of Natural Resources of the Hall of Global Environmental Research, as well as Sansai Gakurin. Students’ specialized study themes are selected from a vast range of themes related to global environmental studies, based on prior study and approaches available in the humanities and social sciences as well as in the areas of natural science, agriculture and engineering. After receiving a doctoral degree, students may work at universities or environment-related government/private-sector research organizations.

### 1 Curriculum structure

In order to develop outstanding researchers, course guidance is provided, as needed, on subjects offered under the Master’s Program in Environmental Management, focusing primarily on lectures and seminars.

An academic supervisor and a sub-supervisor are assigned to each student upon entry into the university, and the student receives interdisciplinary guidance.

### 2 Progress towards the degree

First year: Academic supervisor selected; research plan drafted, reviewed and presented; preliminary thesis report written; and enrollment in exercises

and seminars.

Second year: Enrollment in exercises and seminars.

Third year: Second thesis report written; enrollment in exercises and seminars; submission, review and defense of a doctoral thesis; Doctoral Degree in Global Environmental Studies awarded to student.

The standard time taken to complete the program is three years. However, exceptional students may be able to complete the degree in less time.

### 3 Admission information

Applicants will be graded according to the sum total of their marks for English ability (evaluated on the basis of TOEFL iBT (preferred), TOEFL PBT, TOEIC SP or IELTS test scores) and interview performance (specialized knowledge of the applicant’s chosen study area and presentation of a research plan).

## Master's Program in Environmental Management

In order to gain the skills needed to become outstanding environmental management professionals or environmental researchers, students are required to participate in a lengthy internship study. Based on practical experience gained outside of the university, students gain professional skills that will enable them to write an innovative master's thesis. After completing the master's degree, students may continue on to the doctoral program in order to obtain advanced professional and academic research skills or may choose to work for national or local government organizations, international organizations, environment-related departments of industries, environment-related industries, or environment-related NGOs, among others.

### 1 Curriculum

The core requirements of the Master's Program in Environmental Management are courses in the theoretical foundations of global environmental studies (Global Environmental Policy and Economics, Global Environmental Engineering, Management of Global Resources and Ecosystems, Environmental Ethics and Environmental Education). The student studies environmental management fundamentals and theories, and attends seminars corresponding to the student's area of interest. After that, the student completes an internship and then submits a master's thesis.

Students also attend environmental management seminars, which include special lectures by invited lecturers, fieldwork, experiments and practical study, and a literature review, all of which serve to instill in the student the fundamental knowledge and skills needed for environmental research or practice at the international level.

### 2 Internship

An internship is a compulsory part of the curriculum of the Master's Program in Environmental Management. Individual education based on practical experience outside the classroom enables students to acquire competence in addressing global environmental issues. The Graduate School of Global Environmental Studies has arrangements with a wide range of domestic and international environmental research institutions and organizations that currently serve as hosts for internship training. Previously, students have been placed as interns at governmental research institutes, private research organizations, foreign universities, and international organizations such as the United Nations and international NGOs.

Two kinds of internship are available for students: Long-term internships, which require students to spend at least three months at one site in order to train and cultivate practical skills, and short-term internships of one to two

months for students whose research objectives are best achieved through brief practical experience. (For short-term internships, the submission of preliminary thesis work is required.)

### 3 Progress towards the degree

First Year: Course work, drafting of internship study plan, internship.

Second Year: Submission and review of master's thesis for the Master's Degree in Global Environmental Studies.

### 4 Admission information

Applicants will be graded according to the sum total of their marks for English ability (evaluated on the basis of TOEFL iBT (preferred), TOEFL PBT, TOEIC SP, or IELTS test scores), general knowledge of the global environment, basic knowledge of the applicant's choice of study area and interviews (to assess specialized knowledge gained over the course of the undergraduate program, the study plan, and the applicant's suitability for the master's program).

### 5 Double Master's Degree Program

This program seeks to train/foster specialists who will have in-depth knowledge of global and regional environments and the practical skills necessary to solve environmental problems, and who are instilled with an international perspective. Students who successfully complete approved course work overseas at the partner university will gain transfer credit and earn two master's degrees in two different fields for three years.

Partner universities:

Mahidol University, Thailand (Environmental and Water Resources Engineering, Faculty of Engineering)

Bogor Agricultural University, Indonesia (Master Program in Regional Planning and Master Program in Landscape Architecture)

Graduate School at Shenzhen, Tsinghua University, China



## Doctoral Program in Environmental Management

This program aims to train professionals capable of functioning in an international setting by equipping them with the comprehensive knowledge and skills needed for resolving conflicts and managing global environmental issues. Internship study (domestic or overseas) and the preparation of a doctoral thesis help students develop the skills required for environment-related work after graduation. Graduates of the doctoral program are expected to find employment in national or local government, international organizations, environment-related departments of industries, environment-related industries, environmental NGOs, universities, or government/private-sector research organizations with an environmental focus, among others.

### 1 Curriculum

In order to cultivate outstanding environmental management practitioners and researchers, course guidance is provided, as needed, on subjects offered under the Master's Program in Environmental Management, focusing primarily on lectures and seminars. The student also completes an internship program lasting approximately six months, and then submits a doctoral thesis.

An academic supervisor and sub-supervisor are assigned to each student upon entry into the university, and the student receives interdisciplinary and practical guidance.

### 2 Internship

An internship is a compulsory part of the curriculum of the Doctoral Program in Environmental Management. Individual education based on practical experience outside the classroom enables students to acquire competence in addressing global environmental issues.

The Graduate School of Global Environmental Studies has arrangements with a wide range of domestic and international environmental research institutions and organizations that currently serve as hosts for internship training. Previously, students have undertaken internships with governmental research institutes, private research organizations, foreign universities, and international organizations such as the United Nations and international NGOs. Doctoral students must spend at least five months training and cultivating practical skills at their internship sites. After returning to the Graduate School, students prepare their doctoral theses by drawing upon their experiences outside the classroom.

### 3 Progress towards the degree

First year: Academic supervisor selected; research plan drafted, reviewed and presented; preliminary thesis report written; preparation of an internship

plan, and enrollment in exercises and seminars.

Second year: Internship

Third year: Second thesis report written; enrollment in exercises and seminars; submission, review and defense of a doctoral thesis.

Doctoral Degree in Global Environmental Studies awarded to student.

The standard time taken to complete the program is three years. However, exceptional students may be able to complete the degree in less time.

### 4 Admission information

Applicants will be graded according to the sum total of their marks for English ability (evaluated on the basis of TOEFL iBT (preferred), TOEFL PBT, TOEIC SP, or IELTS test scores) and interview performance (to assess relevant research skills and specialized knowledge gained over the course of master's study or practical achievement in relation to environmental management, as well as their research plan for the doctoral program).

\*Note for applicants from overseas

In keeping with the international focus of this Graduate School, we warmly welcome applications from overseas students to all our programs. International applicants to the Master's Program in Environmental Management should note, however, that some of the credited electives offered by the school may be taught only in Japanese. Applicants are strongly advised to consult with their intended academic supervisor for further information on what classes are available. International applicants should also note that while proficiency in Japanese is not a requirement for the Master's Program in Environmental Management, a degree of Japanese speaking, listening comprehension and reading ability may enrich their social and academic interactions during their study at the Graduate School.

# GSGES Course Tree

## Graduate School of Global Environmental Studies (Environmental Management, Global Environmental Studies)

### Goal

Secure the current and future health and sustainability of the global environment by fostering (1) practitioners with an ability to improve, sustain, and manage the environment, (2) researchers who establish sustainability as the basis of an integrated, interdisciplinary field, and (3) Internationally effective professionals who address the environmental challenges confronting the 21<sup>st</sup> century.

Cultivate professional practitioners and researchers who pursue field-based research with a sincere commitment to contribute to the environment and environmental sustainability.



### Admission



### Admission

### Admission

### Prospective Students

We seek a diverse body of students with different backgrounds and perspectives: Future researchers from all academic fields with a keen interest in global environmental problems and their solutions and future and current practitioners with a passionate enthusiasm for environmental management and a sincere commitment to acquiring and implementing knowledge and practical skills.

# Voices from Students

## VOICE 1

**Hideaki Anazawa**  
Master's Program, Resource Recycling Science



The School of Global Environmental Studies allows students to develop a broad range of knowledge on the environment, unrestricted by the boundaries between the arts and sciences, and to study the environment in relation to various fields, such as engineering, science, economics, education, and law—all starting from the fundamentals. This made it a very easy learning environment for me as someone who did not graduate from a faculty specializing in environmental studies. The school brings together students from a number of countries, each with a different background, culture, religion, and individual character. As we exchanged opinions and engaged in discussions as part of our day-to-day studies, listened to presentations during various lectures, participated in group work, pursued field work, and engaged in other such opportunities, each day brought fresh ideas that we would not have come up with alone.

Another advantage of the school is the fact that participating in an internship is a compulsory part of the curriculum. The internships, which provide experiences that are not possible simply through graduate school studies, are a chance to develop your own research, gain experience in the field, and build a foundation of knowledge, while at the same time offering the opportunity to learn about the current state of society and the world as well as to take a very close look at yourself, as if they were

a training ground for preparing to go out into the real world of work.

The School of Global Environmental Studies offers double degree programs, which allow students to acquire master's degrees in two countries. I became interested in such programs and took part in the double degree program with Mahidol University, Thailand. Here at the Graduate School of Global Environmental Studies, I was able to study a broad range of elements in the field of environmental studies, acquiring a considerable amount of knowledge. I then went to Mahidol University in Thailand where I pursued the study of engineering in greater detail, allowing me to hone my knowledge in that field. My travels in these two countries gave me the opportunity to develop a deeper understanding of both the current state of the global environment and the differences between the cultures of each country.

I believe that by providing such learning opportunities the School of Global Environmental Studies fulfills the graduate school's aim of "educating researchers capable of pursuing key roles on the global stage," as it offers a great environment for students to develop their skills to become leading international figures in environmental studies in an increasingly globalized society.

## VOICE 2

**Sharda KC**  
Doctoral Program in Global Environmental Studies  
Terrestrial Ecosystems Management



My name is Sharda KC. I am a Doctoral Program student in the Laboratory of Terrestrial Ecosystems Management at the Graduate School of Global Environmental Studies (GSGES). After graduating from GSGES, I decided to continue studying there toward my Doctorate. The knowledge acquired during my Master's course was a major factor in my decision to proceed further along the research path. I initially chose this graduate school because the teaching is delivered in English and also because I was aware that GSGES incorporates scientific and socio-economic aspects, at both the local through global levels, in the study process. So, it teaches how global environmental issues can be addressed through the use of locally available natural resources. The course is designed to foster the development of researchers with the capacity to tackle both global and local environmental issues in pursuit of global sustainability. Field-based studies play a key role in identifying resource circulation issues and suggesting solutions for sustainable development and environmental conservation.

The GSGES provides multidisciplinary courses in that it incorporates science, engineering, agriculture, economics, and the humanities. Each student can select subjects in which he or she is particularly interested and acquire deeper knowledge in those fields. The group discussions, occasional lectures by visiting professors, and weekly lab seminars help to broaden knowledge in different subjects. And, comments from professors and fellow lab members in the seminars are of ongoing assistance in developing research themes and the skills required to attain

our objectives.

Another great feature of GSGES is the internship program. This enables us to put the knowledge gained through teaching and to practical use in everyday situations. Internship study during my Master's program played an important role in determining my research topic and broadening my experience with a view to further research. The program also provides opportunities to deepen the practical knowledge that we need for our research work and to expand our potential after graduation. Since my research work relates to agricultural activities based on an experimental framework, I lived in the house of farmer in a rural village in Nepal and carried out experimental work. Though I am a Nepali citizen, I did not have any experience of living in a rural area of the country and working with a farmer. Through that internship, I came to realize how hard life can be when there are limited resources and facilities. I also developed skills in project management and engaging with local communities that could be helpful in my professional career.

At GSGES, there are many international students of different nationalities, cultures, and faiths, both at the school and in the laboratory. I rarely felt lonely living in a foreign country. It was an opportunity for us to share our cultures and religious beliefs with other students. I believe that GSGES is the ideal institution for those who want to acquire learning and practical experience in respect of various environmental issues, which is the key to becoming an international researcher.

## VOICE 3

**Shahar Lilia Griffin**  
Master's Program, Socio-Cultural Symbiosis



Studying in a different country could be quite challenging, but a well-known phrase says: "The magic happens when you step outside of your comfort zone".

When I came to know about the master program of Environmental Management in the GSGES, I knew I found the best program for me. I was attracted by the practical aspect of these studies, and the ultimate goal of the graduate school: to qualify future experts that would have positive impact on the health and sustainability of the global environment.

In the GSGES we study various courses regarding global environmental issues and sustainability in different fields: economics, engineering, and education along with other fields. Apart from studying in the classroom, we all also went out to the field, and saw in our own eyes what are we studying about. This combination of theoretical learning along with practical learning is productive, especially when dealing with environmental management. One thing I liked especially is meeting the local people when we went to the field. Hearing about the practices and rural culture of Japan was fascinating and authentic, as well as directly related to issues we have learned in class.

The professors in the GSGES are very helpful and welcome intelligent debates and personal consultations. The fact that our professors have both perspectives - the local and the global - and the fact that the fields of their research diverse greatly, gives us, the students, multiple perspectives to our own research. I think that our joint seminars and the comments I have received from the professors really improved

my research.

Although studying and researching interesting topics is very fulfilling, it is very demanding as well: being a master student requires my classmates and me to study hard, spending much of our time in deepening our understanding in environmental related topics, and especially have a high self-discipline when conducting our research. In the time of our internships, we were operating independently in the field, and it was our obligation to make our best out of this experience.

Since the GSGES is quite a small graduate school compared to other Kyoto University graduate schools, there is a good sense of community, which makes it a nice place to work in. One more integral feature of the school is its international community: the students, and some of the teachers, come from different backgrounds and cultures, which makes the time together very enriching and educating. In that sense, it does not matter where you are from, since everybody contributes to the discussion of global environmental issues.

Indeed, challenges are not easy, but they always provide us benefits when overcoming them. Studying global environmental studies in a multicultural environment is looking one step ahead, as we aim to apply theoretical as well as practical solutions for the future society.



# Voices from Graduate Students



Graduated from Master's Program  
(2017)

**Tomohiro AOKI**

Community-Reactivating Cooperator  
Squad (Minabe Town Hall)

I entered the School of Global Environmental Studies with the idea of "I want to create a system that draws out the appeal of rural areas and increases their vitality!"

In the Laboratory of Sustainable Rural Development, I learned methods for community building, and at the same time I was able to directly go to local communities in Japan and abroad and experience real community-building sites where specialized know-how was being applied. In particular, through the school's internship program, I stayed in a rural area and felt firsthand the conditions in the community from the perspective of its residents. Increasing the vitality of the local community requires that "industry (companies), academia (research institutes), government (national and local governments), and the people (local residents)" come together as one and work cooperatively, and I learned that the function of "intermediaries" is vital in order to coordinate that cooperation among them.

Since graduating from the school, I have been working as a member of the Community-Reactivating Cooperator Squad of Minabe, a town located in the Hidaka District of Wakayama Prefecture, building a model for a system that is based on cooperation among each constituent of the "industry-academia-government-people" partnership and that will lead to boosting the local community's vitality. I am proactively going to the site of community activities, interacting with the people from the town hall and from the community, and as I build trust with both sides, I am starting to fulfill that "intermediary" function between "government and people." Furthermore, along with regular consultations and interaction with people from research institutes at the School of Global Environmental Studies and elsewhere, I am starting to make progress on strengthening "academia-people" cooperation by carrying out activities aimed at getting advice from the perspective of experts. Step by step, I am getting closer to my objective of creating a "system to increase the vitality of the local community."

I believe the internship system that provided a firsthand feel for the atmosphere at the site and the group discussions that permitted debates which transcended the frameworks of "field, nationality, and teacher/student" have been extremely useful in allowing me to smoothly implement these types of community activities. The School of Global Environmental Studies is appealing in as much as you have the opportunity to interact with so many enthusiastic teachers and fellow classmates from Japan and abroad, and it is possible to gain broad-based, systematic knowledge and to take on the challenge of every sort of research field in Japan and abroad, which opens up limitless possibilities for your own future.



Graduated from Master's Program  
(2009)

**Takumi MIYAZAKI**

Bank of Tokyo-Mitsubishi UFJ  
(temporarily transferred from Osaka Gas)

Since graduating from the School of Global Environmental Studies, I have been working for a gas company, handling the development of energy infrastructures such as domestic and foreign resources, as well as power plants. I have had the good fortune to have opportunities like being posted to our subsidiary in the UK and being temporarily transferred to a financial institution; and while it is hard work, I feel like I am pursuing a fulfilling career.

The two years I spent at the School of Global Environmental Studies unquestionably built my foundation. My interactions with international students at the school and the internship system that allowed me to work in a research laboratory at a British university gave me the opportunity to turn my attention to the world. Also, within the numerous unique programs, by studying hard together with my classmates who had diverse values and backgrounds, it made me realize how narrow my own perspective was. I feel that it has enabled me to persistently work to discover solutions when I have been placed in various environments.

Even now, I ask myself daily whether I am really embodying the ideals of the School of Global Environment, but the stimulation I received from my classmates as well as senior and junior fellow students who live earnestly without turning their back on their own beliefs still energizes me today. Global environmental issues are extremely difficult problems, but if you are thinking that you want to contribute to the solutions through your work, then by all means, I hope you will consider enrolling in the School of Global Environmental Studies.



Graduated from Master's Program  
(2017)

**IM SOPHANAVY**

Cambodia-Japan Cooperation Center  
Phnom Penh, Cambodia

Life in Japan, as well as in my graduate school (GSGES) provides me many new experiences, and knowledges. I am impressed by GSGES program because of sharing opportunity, field trip, and internship program.

Students are allowed to share their knowledge and understanding through group discussions, presentations, and assignments. I have learned a lot from different kinds of presentations, such as presentation in graduate school, joint laboratory, and my own laboratory. In addition, my research topic was improved by the comments of professors and participants.

I am not only provided theoretical base, but also practical based program. Field trip to Tango is memorable experience to me to collect ocean creatures and to identify their ages; in addition, I have learned how to distinguish soil types and measure tree dimensions.

Internship is another interesting activity. I could build good networks with internship hosting institution, and I learned about the reality of working with Cambodian government institution. Besides assisting administrative staff to organize seminars and workshops, I took internship opportunity to do field survey to collect data for my thesis. To collect data, I have prepared questionnaire to interview community. Internship is a good opportunity to reach targeted community and access to data for my research topic.

GSGES has provided me a good opportunity to learn, improve, and share knowledge through presentations, field trips, and an internship. I am now working as a coordinator in Cambodia-Japan Cooperation Center (CJCC) in Phnom Penh Cambodia.



Graduated from Master's Program  
(2012) and Doctoral Program (2016)

**Mai KOBAYASHI**

Researcher, Research Institute for  
Humanity and Nature

Having lived overseas for a long time, I wanted to study environmental issues in the Japanese context and under the guidance of teachers who emphasize practice. I did not want to live in Tokyo, and I looked forward to studying at a graduate school with an open environment like Sansai Gakurin (Grove of Universal Learning). During my Master's Program at the school, I spent many days struggling to improve my rusty writing skills while working on my compulsory subjects. I had many opportunities in class and through joint projects to interact with my fellow classmates, and that generated a strong sense of camaraderie. It was also a time when I had the luxury of meeting lots of people from different cultural areas and learning a great deal from each individual's awareness of issues, different perceptions, and dreams. As environmental issues become more serious with each passing year, the very fact that this is a cross-sectoral experiment with no predetermined answers to certain questions—such as what the issue is, how the threat should be understood, or how solutions should be shared—tested our communication skills as we tried to understand one another. I often had the feeling that the school's students, who came together with an eye to diversity and a sense of a need for integration, possessed a new type of imagination that was a bit different from the teachers as well, who have produced exceptional results in the context of the traditional academic framework. This urgent new field requires an appropriate, flexible imagination. I moved on to the Doctoral Program, and since graduating, I have been working as a project researcher at the Research Institute for Humanity and Nature, where I was fortunate enough to work as an intern during my Master's Program. There, I have continued my research on organic agriculture policy in Bhutan—a field that I was able to enter thanks to my work at the school—as well as on the future of sustainable food.

Sansai Gakurin was established in 2002 to promote and support the activities of the new Graduate School of Global Environmental Studies (GSGES) at Kyoto University by facilitating the exchange of ideas across relevant disciplines, both inside and outside the university. “Sansai” refers to the traditional East Asian triad of heaven, earth and humanity that embraces the phenomenal world. “Gakurin” means a “grove of scholars.” The 2001 mission statement of Kyoto University promulgated its intention to pursue harmonious coexistence within the human and ecological community on this planet.

## **1) Activities designed to integrate all academic disciplines related to global environmental studies and coordinate the outreach activities of GSGES**

In order to develop a Global Environmental Studies Directory at Kyoto University, we devise and host regular events, including the Kyoto University Global Environmental Forum, the Hannari Kyoto Shimadai-juku, and the Global Environmental Studies Konwakai. The Kyoto University Global Environmental Forum brings together researchers from inside and outside the university to provide the general public with an insight into the research conducted by the GSGES. First held in April 2008 and generally held three times a year, the forum has been held thirty-two times as of October 2018. The Hannari Kyoto Shimadai-juku, which is held at the Shimadai Gallery in a traditional Kyoto townhouse, includes public lectures that connect the research pursued at the university with everyday life. It was launched in November 2004 and has been held forty times as of March 2018. Meanwhile, the Global Environmental Studies Konwakai is an informal gathering for GSGES faculty members to present and discuss their research. The first Konwakai was held at the time of the GSGES’ establishment in April 2002 and as many as 116 have taken place as of July 2018.

In addition to these events, we also participate in university-wide international seminars and forums related to global environmental studies and collaborate with a variety of events and activities held in Kyoto with the aim of expression related to humankind and the environment.

## **2) Activities designed to promote research**

We provide medium- and long-term support aimed at ensuring that the research of the GSGES is unified toward promoting “global interests”—interests that are above and beyond the gains and losses of human society—and toward the development of civilization across the globe.

The mainstay of these activities is the regular publication of the SANSAI Newsletter, which reports the research and educational activities of the GSGES. The first issue of the SANSAI Newsletter was launched in October 2012, and August 2018 saw the publication of the 22nd issue.

## **3) Activities designed to support education**

We are currently providing support for international education programs provided at Kyoto University and the GSGES. The vibrant activity in international education and research collaboration at the GSGES is presented at the symposiums, seminars, and other such events held several times each year. The following table shows the locations, participant numbers, and other such information on the main symposiums.

### Main International Symposiums held by the GSGES

Date	Location	Collaborating university	No. of participants (universities/countries)
March 5, 2009	Kyoto, Japan	–	155 (11/3)
March 10, 2010	Hanoi, Vietnam	Hanoi University of Science and Technology	85 (11/3)
March 11, 2011	Hue, Vietnam	Hue University of Agriculture and Forestry	150 (11/5)
December 11, 2011	Shenzhen, China	Tsinghua University	97 (5/3)
March 7-8, 2013	Kyoto, Japan	–	141 (15/10)
September 15, 2013	Hoi An, Vietnam	Hue University of Agriculture and Forestry	99 (13/5)
March 25, 2014	Kyoto, Japan	–	141 (10/7)
September 29, 2014	Can Tho, Vietnam	Hanoi University of Science and Technology	90 (14/6)
July 27, 2015	Da Nang, Vietnam	University of Danang	134 (12/5)
December 11-12, 2015	Kyoto, Japan	–	152 (25/16)
November 13-14, 2016	Bangkok, Thailand	Mahidol University	185 (30/14)
October 30-31, 2017	Hanoi, Vietnam	Hanoi University of Science and Technology	285 (42/15)
November 30 - December 1, 2018	Bogor, Indonesia	Bogor Agricultural University	195 (19/9)

主催：京都大学大学院地球環境学堂

「第31回 京都大学地球環境フォーラム」

ムラのつながり、ムラの未来

住環境が薄り、高齢化が進む農村地域では、持続性が危惧される集落（ムラ）がますます増加しています。この状況に締結するために期待されるのがムラをより強く「つながり」です。近年、近隣のムラから都市、果ては海外まで、ムラをとりまくつながりには大きな変化が生まれています。農村計画学、社会ネットワーク科学、社会心理学の3つの視点から、ムラのつながりの今と未来について考えたいと思います。

プログラム

13:00 受付開始  
開会式挨拶

◆13:30～13:40  
講演

◆13:40～14:20 「農村のつながりの実質：農業はつながりにかかっている？」  
尾澤 健一郎（京都大学大学院地球環境学堂 助教）

◆14:20～15:00 「創造農村をいかにして作るか」  
金光 淳（京都産業大学経営学部 准教授）

◆15:00～15:10 休憩

◆15:10～15:50 「農業コミュニティにおける社会関係資本：社会心理学からの検討」  
内田 由紀子（京都大学こころの未来研究センター 准教授）

閉会式挨拶

◆15:50～16:40  
閉会の挨拶

◆16:40～16:45

2018年6月2日（土） 13:30～16:45  
会場：京都大学理学部セミナーハウス  
参加無料、先着100名まで（定員が満員の場合は、当日受付で追加）

申込用紙は、事前に Web でダウンロード  
アクセス（住所）第31回地球環境フォーラム 会場、所収（電話）075-753-9187にてお問い合わせ  
<京都大学地球環境フォーラム事務局、地球環境学堂>  
Web サイトの URL <http://www.gesg.kyoto-u.ac.jp/terms/forum31/>  
Tel: 075-753-5630 Fax: 075-753-9187

wondershare



Poster for the 31st Kyoto University Global Environmental Forum and a presentation at the forum (June 2, 2018)





Flyer for the 40th Hannari Kyoto Shimadai-juku and a presentation at the event (March 27, 2018)



Participants at the symposium in Bogor, Indonesia (December 1, 2018)



The SANSAI Newsletter Issue No. 22 (Published September 1, 2018)

# Recent Collaborating Institutions for Internship Study

## Private enterprise

- Aoi Consultants Co., Ltd
- Earthship Academy
- Environmental Control Center Co., Ltd.
- HACHIOH Co., Ltd.
- KANSO CO.,LTD.
- LAGO Co.,Ltd
- LINK Co.,LTD.
- LIXIL Corporation
- Miyama Power HD
- Miyama Smart Energy
- OKUMURA CORPORATION
- PricewaterhouseCoopers Aarata LLC
- Research Institute for Natural Capital Co.,Ltd
- REVO INTERNATIONAL INC.
- SANKI ENGINEERING CO.,LTD.
- TOYO CONSTRUCTION CO.,LTD.
- YAMADA FARM

## country/the local government

- Kashiwa City
- Katsuragi Town (Wakayama Prefecture)
- Kyoto City
- Kyoto Prefectural Board of Education
- KYOTOFU DISASTER VOLUNTEER CENTER
- Lake Biwa Environmental Research Institute
- Ministry of the Environment
- Okinawa Prefectural Government
- Tsushima City

## NPO/NGO

- Certified NPO Organization FURUSATOKAIKI CENTER
- chokomaka
- CITYNET Yokohama
- FUJISAN CLUB
- Green Grass NPO
- Institute for Sustainable Energy Policies (ISEP)
- Japan Association of Drainage and Environment
- Japan Center for a Sustainable Environment and Society (JACSES)
- KIKO Network
- LEAF - Learning and Ecological Activities Foundation for Children
- NPO SHINRINGAKKOU MORINKO
- Satoyama Net AYABE
- Social Design Center Awaji

## Various corporation / research organizations

- AEON Environmental Foundation
- Center for Environmental Remote Sensing, Chiba University
- Central Research Institute of Electric Power Industry
- Graduate School of Horticulture, Chiba Univ.

- Institute for Global Environmental Strategies (IGES)
- JAPAN ENVIRONMENTAL SANITATION CENTER
- Japan Fisheries Research and Education Agency
- KYOTO CITY GREENERY ASSOCIATION
- Nara National Research Institute for Cultural Properties
- National Agriculture and Food Research Organization (NARO)
- National Institute for Environmental Studies
- National Institute of Advanced Industrial Science and Technology (AIST)
- Nippon Intemation Cooperation for Community Development (NICCO)
- Northwest Pacific Region Environmental Cooperation Center (NPEC)
- Public Works Research Institute
- Remote Sensing Technology Center of Japan
- Renewable Energy Institute
- Research Institute for Humanity and Nature
- Sailors for the Sea
- The Japan International Research Center for Agricultural Sciences (JIRCAS)
- The Japanese Association for Conservation of Architectural Monuments
- United Nations University Institute for the Advanced Study of Sustainability Operating Unit Ishikawa/Kanazawa (UNU-IAS OUIK)

## international organization /overseas

- Bogor Agricultural University
- Caen University
- Center for International Forestry Research (CIFOR)
- Charles Sturt University
- Chiang Mai University
- Chiang Mai University, Regional Center for Social Science and Sustainable Development
- Chulalongkorn University
- Conservation International
- Cooperative Research and Education Center for Environmental Technology Kyoto University-Tsinghua University
- Cumbria Action for Sustainability
- Danang University of Technology (DUT)
- Economic Research Institute for ASEAN and East Asia (ERIA)
- Energy Research Institute, Chulalongkorn Univetsity, Thailand
- European University at St. Petersburg
- Faculty of Engineering - Andalas University
- Hanoi University of Science and Technology
- Hue College of Sciences
- Hue University
- Hue University of Agriculture and Forestry
- IFFSTAR
- IFSTTAR Nantes
- Indonesia Joint Crediting Mechanism Secretariat (JCM)
- Institute for Food and Resource Economics, Bonn University
- International Water Management Institute (IWMI)
- IRSTA, Bordeaux research center
- Jomo Kenyatta University of Agriculture and Technology
- Kazakh National Agrarian University
- Lille University of Science and Technology
- Lille University
- Lilongwe University of Agriculture & Natural Resources
- Myanmar Engineering Society
- National Parks Board
- National Science and Technology Center for Disaster Reducion
- National Taiwan University
- National Taiwan University Building & Planning Foundation
- National University of Life and Environmental. Sciences of Ukraine
- PlanEnergi
- PT Gagas Dianamiga Aksenta
- Qingdao Product Quality Supervision and Testing research Center
- Renewable Energy Management Bureau, Philippine Department of Energy (REMB)
- Resilience Development Initiative
- Sokoine University of Agriculture
- Tarlac State University
- The Gobi Institut
- The NGO Forum on Cambodia
- The University of Da Nang
- The University of Philippine-Dilliman
- UNESCO Bangkok
- UNESCO Ivory coast
- UNICEF in Myanmar
- United Nations Environment Programme International Environmental Technology Centre
- Universite de Lorraine
- University College Cork
- University of California San Diego
- University of Hawaii at Manoa
- University of Jambi
- University of Science and Technology at Lille 1
- University of South Australia
- University of the Philippines Los Baños
- University of the South Pacific
- University of Zambia
- Xiamen University
- Xinjiang Ecology and Geography Institute (XIEG) , Chinese Academy of Sciences

# After Graduation

## Master's Program in Environmental Management

### Private Sector

- IHI Corporation
- ALMEC CORPORATION
- EXEDY Corporation
- EX Research Institute Ltd.
- NTT DATA Corporation
- OBAYASHI CORPORATION
- OKUMURA CORPORATION
- Kubota Corporation
- Kumagai Gumi Co., Ltd.
- CTI Engineering International Co., Ltd.
- Japan Bank for International Cooperation, JBIC
- SANYU CO., LTD.
- Sanyu Consultants Inc.
- GLION Co., Ltd.
- TSP CO., LTD.
- DeNA Co., Ltd.
- DENSO CORPORATION
- DENTSU INC.
- TOYOTA INDUSTRIES CORPORATION
- Nihon Suido Consultants Co., Ltd.
- Development Bank of Japan Inc.
- Nomura Research Institute, Ltd.
- FORWARD CO., LTD.
- HAKUHODO CONSULTING INC.
- Business Consultants, Inc.
- Hitachi, Ltd.
- Hitachi Solutions, Ltd.
- Fujitsu General Limited
- Funai Soken Holdings Inc.
- The Boston Consulting Group
- Sumitomo Mitsui Banking Corporation
- Montbell Co., Ltd.
- Roland Berger Holding GmbH
- Works Applications Co., Ltd.
- Accenture Japan Ltd
- Esri Japan Corporation.
- Ishizaka Inc.
- IDEA Consultants, Inc.
- EF-ON INC.
- NTC INTERNATIONAL CO., LTD.
- Kajima Corporation
- KEYENCE SOFTWARE CORPORATION
- KISOJIBAN
- Kyoto University
- KYOWA HAKKO BIO CO. LTD.
- Coca-Cola Bottlers Japan Inc.
- KOKUSAI KOGYO Co., Ltd.
- INPEX CORPORATION
- JX Nippon Mining & Metals Corporation
- Shizen Energy Inc.
- SHIMIZU CORPORATION
- Showa Shell Sekiyu K.K.
- Sumitomo Forestry Co., Ltd.
- Swing Corporation
- SEKISUI CHEMICAL CO.,LTD.
- National Federation of Agricultural Cooperative Associations
- Soft Bank Corp.
- DAIKEN CORPORATION
- CHUBU Electric Power Co., Inc.
- Chiyoda Corporation
- TSUKISHIMA KIKAI CO., LTD.
- Central Japan Railway Company
- Tokio Marine & Nichido Fire Insurance Co., Ltd.
- TOKYO GAS Co., Ltd.
- Tokyo Electric Power Company Holdings, Inc.
- TOHO GAS CO., LTD.
- Toyo Engineering Corporation
- TODA CORPORATION
- NIPPON TELEGRAPH AND TELEPHONE WEST CORPORATION
- West Japan Railway Company
- JGC CORPORATION
- Nippon Koei Co., Ltd.
- NIPPON SYSTEMWARE CO., LTD.
- NIPPON TELENET CORPORATION
- NEC Corporation
- Norinchukin Bank
- PACIFIC CONSULTANTS CO., LTD.
- Panasonic Corporation
- Haneda Airport Service CO., LTD.
- Value Frontier Co., Ltd.
- PIAPIA COMMUNITY SUPPORT G K.
- Hitachi Zosen Corporation
- The Procter & Gamble Company of Japan Limited
- McKinsey & Company
- Marubeni Corporation
- Mizuho Information & Research Institute, Inc.
- MITSUI & Co., Ltd.
- MITSUBISHI MOTORS CORPORATION
- Mitsubishi Corporation
- Yahoo Japan Corporation
- Janssen Pharmaceutical K.K.
- Rakuten, Inc.
- Rinnai Corporation
- YUGENGAISHA AZUSAKOUMUTEN



## Corporate Organization

- KYODO NEWS
- Gotoh Educational Corporation
- Japan Science & Technology Agency (JST)
- National Institute for Environmental Studies
- New Energy and Industrial Technology Development Organization (NEDO)
- Research Institute for Humanity and Nature
- Japan International Cooperation Agency (JICA)
- Japan Foundation
- Japan Railway Construction, Transport and Technology Agency
- Japan External Trade Organization (JETRO)
- National Institute of Technology and Evaluation

## Ministry/Local Government

- Ministry of the Environment
- Ministry of Economy, Trade and Industry
- Nuclear Regulation Authority
- Shiga Prefecture
- Tsushima City
- Nagoya City
- Ministry of Agriculture, Forestry and Fisheries
- Forestry Agency
- Kyoto City

## Overseas

- Faculty of Social and Politics
- Hue University of Sciences
- King Mongkut's Institute of Technology Ladkrabang
- Land titling office
- Ministry of Housing and Public Works
- Semarang State University
- State ministry for national Development planning
- Ti Rayon Soleil
- Wildlife Conservation Society
- School of Urban Rail Translation
- Universiti Sains Malaysia
- Hanoi University of Science and Technology
- Institut Teknologi BANDUNG
- RenEnergy

## Ph.D Program

- KYOTO UNIVERSITY
- OKAYAMA UNIVERSITY

## Doctoral Program

- Amami Wildlife Center
- Institute of Noto Satoumi Education and Studies
- Research Institute for Natural Capital Co., Ltd
- E-konzal
- OBAYASHI CORPORATION
- TOSHIBA CORPORATION
- HASEKO Corporation
- Royal University of Agriculture
- Kyushu University
- Kyoto University
- Ministry of the Environment Government of Japan
- National Institute for Environmental Studies
- National Research and Development Agency Public Works Research Institute
- United Nations Development Programme
- United Nations University- IAS
- Sumitomo Forestry
- Sumitomo Riko Company Limited
- Research Institute for Humanity and Nature
- The University of Tokyo
- Chinese Academy of Fishery Sciences
- Japan International Cooperation Agency (JICA)
- Institute for Global Environmental Strategies
- Japan Society for the Promotion of Science
- NIPPON TELENET CORPORATION KICK Smart Life Laboratories
- Bangladesh Agricultural University
- Mahidol University
- The University of Melbourne
- Bandung Institute of Technology
- Bogor Agricultural University
- Hanoi University of Natural resource and environment
- Hanoi University of Science and Technology
- Hue University
- Hue University of Sciences
- Institut Teknologi BANDUNG
- King Mongkuts Institute of Technology Ladkrabang
- Kyoto University
- MINISTRY OF PUBLIC WORKS AND HOUSHING
- School of Urban Rail Translation
- Thuyloi University
- University of Danang
- Willis Japan Holdings K.K.

# List of Academic Staff

## Department of Global Ecology

### Global Environmental Policy

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Professor Toru MOROTOMI

### Global Ecological Economics

Associate Professor Akihisa MORI

### Sustainable Rural Development

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### Environmental Health Sciences

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Associate Professor Kayo UEDA

Assistant Professor Akiko HONDA

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### Environmental Marketing Management

Associate Professor Akira YOSHINO

### Ontology of Environment and Technology

Professor Junji SATO

### Environmental Education

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Associate Professor Misuzu ASARI

Lecturer Roger C. BAARS

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### Environmentally-friendly Industries for Sustainable Development

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Associate Professor Shuhei TANAKA

Assistant Professor Hidenori HARADA

### Environmental Infrastructure Engineering

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Associate Professor Atsushi TAKAI

### Global Environmental Architecture

Professor Hirohide KOBAYASHI

Assistant Professor Chiho OCHIAI

### Biodiversity Conservation

Professor Hiroaki SETOGUCHI

Associate Professor Kanto NISHIKAWA

Assistant Professor Shota SAKAGUCHI

### Landscape Ecology and Planning

Professor Shozo SHIBATA

Associate Professor Katsue FUKAMACHI

Assistant Professor Ryo HIGASHIGUCHI

### Environmentally-Friendly Energy Conversion

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Associate Professor Kohei MIYAZAKI

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### Regional Planning

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### Urban Infrastructure Engineering

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Assistant Professor Tomohiro TANAKA

### Atmospheric Chemistry

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Assistant Professor Yosuke SAKAMOTO

### Ecosystem Production and Dynamics

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Associate Professor Naoki OKADA

Assistant Professor Masako DANNOURA

### Terrestrial Ecosystems Management

Professor Shinya FUNAKAWA

Associate Professor Hitoshi SHINJO

### Aquatic Environmental Biology

Professor Yoh YAMASHITA

Assistant Professor Keita SUZUKI

## Project

### Environmental Innovator Program (EIP) -Cultivating Environmental Leaders across ASEAN Region-

Project Associate Professor Suwanna Kitpati BOONTANON

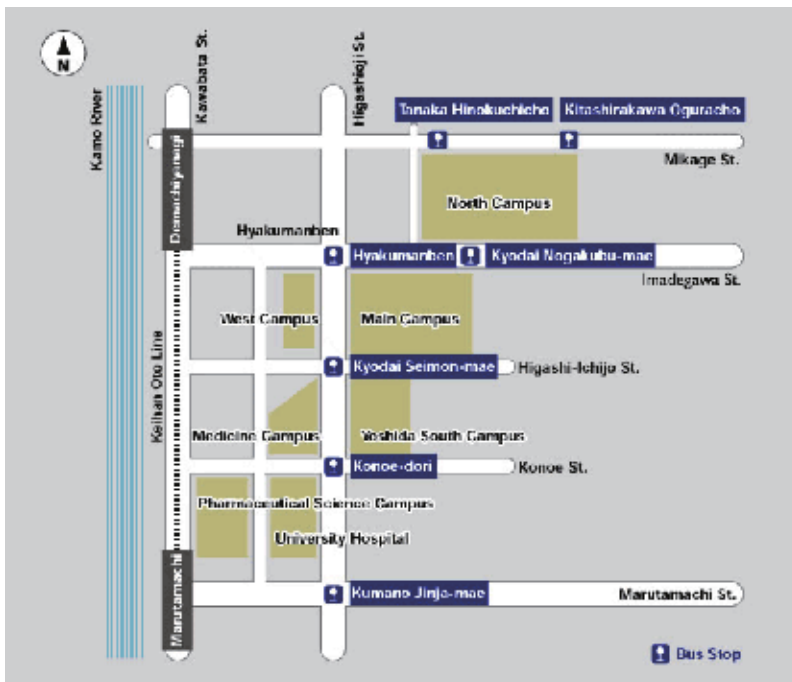
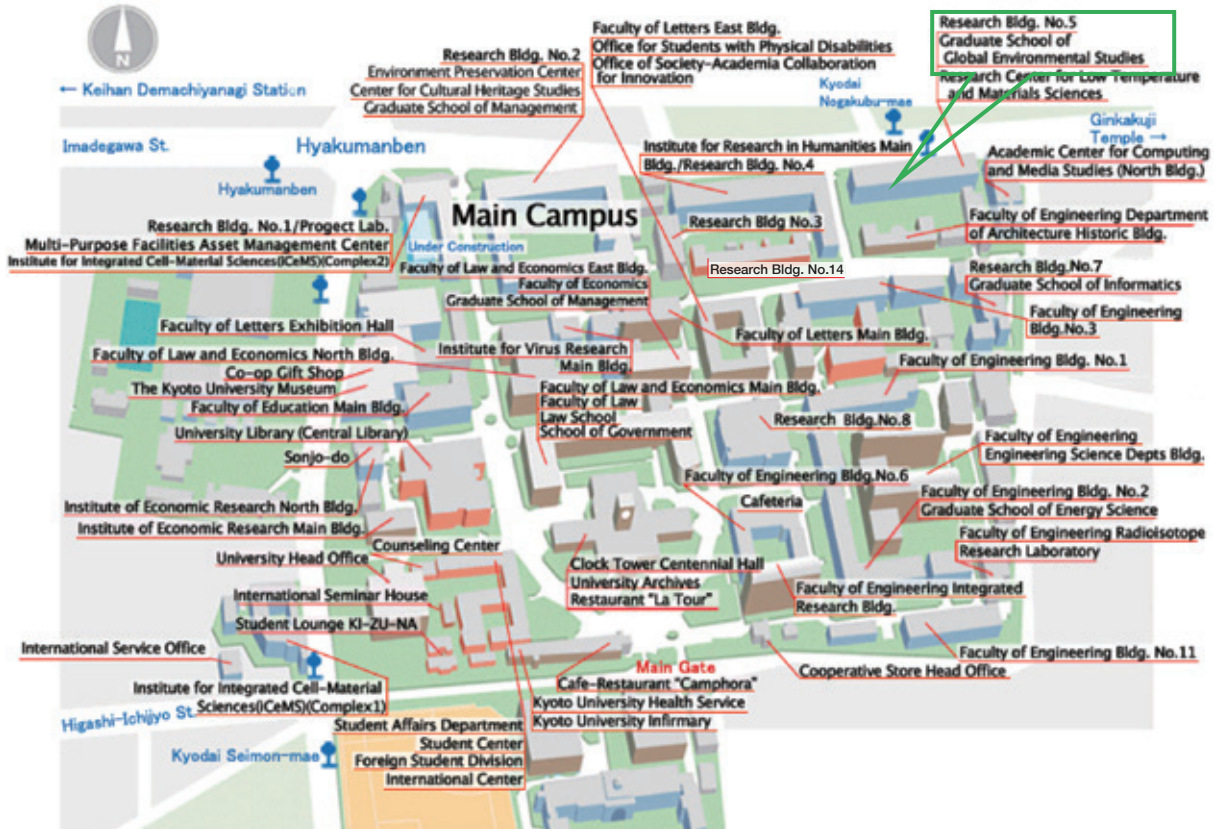
Project Assistant Professor Wen LIU

### Top Global University Project "Japan Gateway: Kyoto University Top Global Program" (JGP) Environmental Studies

Project Assistant Professor Yuki OKAMOTO

## Graduate School of Global Environmental Studies (GSGES) Location Map

<Yoshida main campus>





Graduate School of Global Environmental Studies  
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