



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 2023

ガイドブック 2023



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 have opportunities to participate in the fieldwork as well as a three month internship program. Two projects -the "Environmental Innovator Program (EIP) -Cultivating Environmental Leaders across the ASEAN Region-" and "Japan Gateway: Kyoto University Top Global Program (JGP) Environmental Studies" launched in 2015 promote internationalization of education and research and establishment of international double/joint degree programs.

The 786 master's program graduates and 240 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
KATSUMI Takeshi

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Introduction

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.

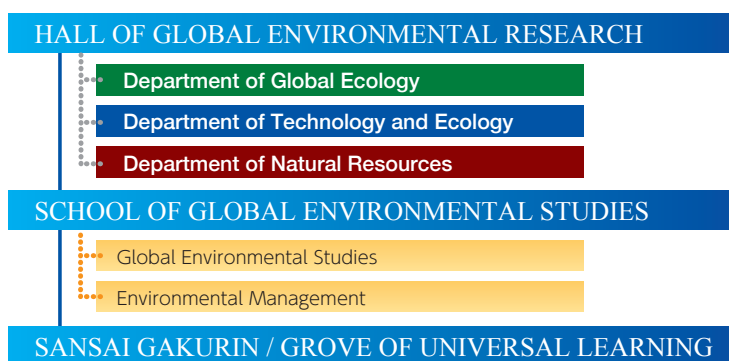
Fostering top-notch researchers and practitioners requires innovative educational and research programs focusing on the global environment and drawing on a wide range of disciplines. By incorporating teaching derived from many disciplines in the natural and social sciences, the evolving and innovative 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.



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.

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.

HALL OF GLOBAL ENVIRONMENTAL RESEARCH

Department of Global Ecology

- Global Environmental Policy
- Environmental Economics
- Global Ecological Economics
- Sustainable Rural Development
- Water Environment Conservation
- Historical Geography and Culture
- Environmental Marketing Management
- History of Art and Culture
- 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
- Elemental Materials Chemistry

Department of Natural Resources

- Regional Planning
- Urban Infrastructure Design
- Atmospheric Chemistry
- Terrestrial Microbiology and Systematics
- Terrestrial Ecosystems Management
- Integrated Environmental Studies
- Ecosystem Linkages and Human Society

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 /
Water Environment Conservation / Historical Geography and Culture /
Environmental Marketing Management / History of Art and Culture /
Environmental Education

Global Environmental Policy

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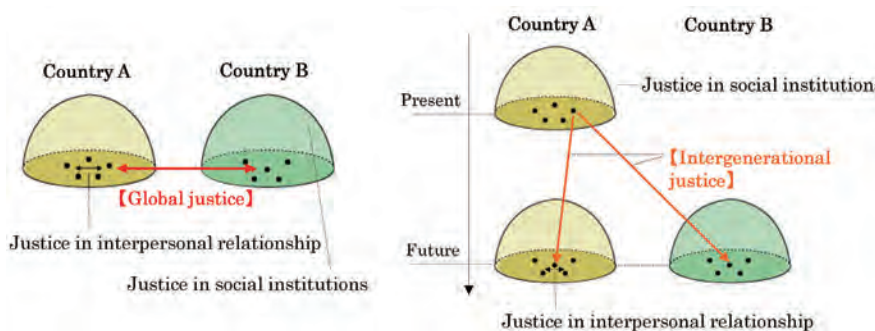
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In the laboratory of Global Environmental Policy, we explore normative and positive questions concerning environmental problems and policies on local, national, regional, and global scales. On one hand, foundational topics are studied from the perspectives 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 main cause of environmental issues is the economic activity of human beings. Therefore, it is critical to understand the principles of firms' and households' behavior when tackling the issues and proposing effective interventions. Our laboratory frames environmental issues from an economic perspective and considers how to design better policies.

[1] The Environment and Development

Is it possible to protect the environment while achieving economic development? This entails a fundamental inquiry that must be answered in order to attain sustainable development. Our laboratory addresses this topic by using field surveys and econometric analysis of micro-level data.



Field survey on cooking fuel use in Ghana

[2] Economics of Waste

Market goods are produced, consumed, and eventually disposed of into the environment. Economics mainly focuses on the production and consumption stages and pays less attention to the disposal stage. Can economic instruments help to reduce waste and promote recycling? To answer this question, painstaking data collection and sophisticated causal inference are indispensable.

[3] Valuing the Environment

The value of the environment is often omitted in the market economy. The question then arises if it even possible to evaluate the environment in monetary terms. Our laboratory employs stated preference and revealed preference approaches to tackle this conundrum.



Distribution of wind power CDM projects in China

Global Ecological Economics

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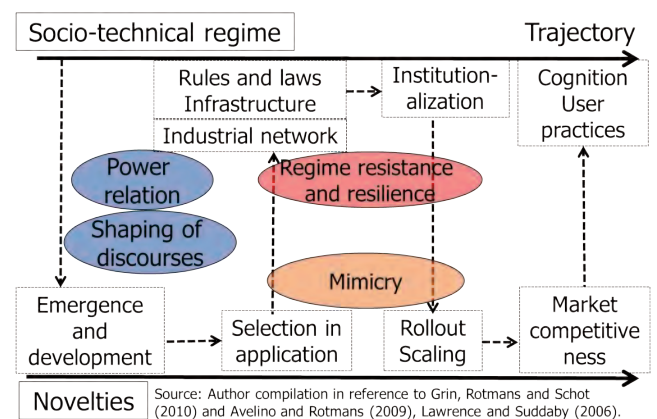
The 30 years of developments in environmental economics and policy studies proves it indispensable to step into the research on sustainability transition of a socio-economic-technical system, which goes beyond the analysis of individual policy instruments and technical measure. To achieve sustainability transition, however, we have to overcome mutually reinforcing physical, economic, and social constraints, or infrastructural and technological, institutional, and behavioral lock-ins.

Against this background, we Global Ecological Economics Group are making economic analysis of **sustainability transition**, taking cases of transitions toward sustainable energy, transport, agriculture and city around the world. We are exploring enabling factors and tipping points of the changes in the pathway from unsustainable toward sustainable one, by employing specific analytical frameworks in sustainability transitions research such as multi-level perspectives, and co-evolution between novelty and socio-technical regime for qualitative analysis, and econometric and simulation for quantitative analysis. We are paying attention to the role of divestment and green finance as well.

Global Ecological Economics Group is also making analysis of **China's Belt and Road**

Initiative from environmental, energy, and economic point of view, given its critical impacts on sustainability transitions in the Global South.

The Global Ecological Economics is also joining in the Research Unit for Development of Global Sustainability of Kyoto University (<http://iss.iae.kyoto-u.ac.jp/rudgsen/index.html>).



Co-evolution between Novelty and Regime

Sustainable Rural Development

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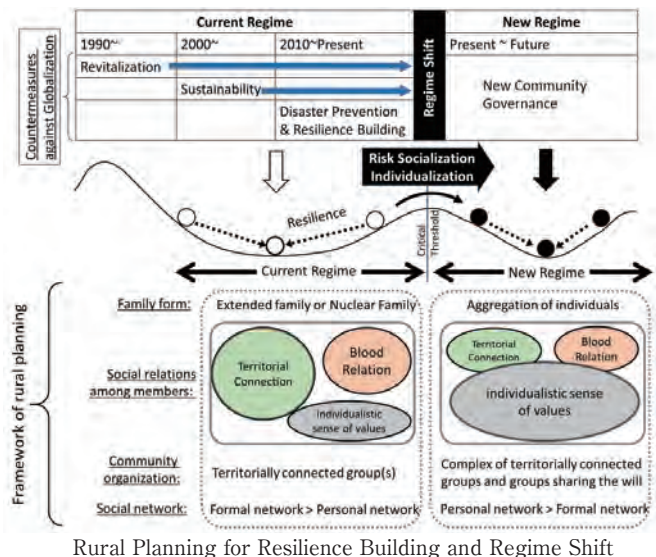
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Rural sustainability (RS) was traditionally maintained by preserving harmony within a geographically limited frame. This type of harmony was maintained by five components, as shown in the figure on the right. Because all of these components are associated 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.



Water Environment Conservation

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In order to create a healthy water environment and create a sustainable region at the same time, it is necessary to appropriately and efficiently treat hazardous substances contained in wastewater and waste generated by human activities in river basins. It is also necessary to build a sustainable water management system that integrates the economy, society, and environment to create added value by recovering resources and energy. There are also expectations for the construction of a recycling social system of the future that takes climate change into consideration in addition to the linkage of water, energy, and food, which are essential resources for human survival.

In this field, we will conduct field surveys to evaluate the current state of the water environment and clarify the pollution mechanisms, as well as develop new water treatment systems that create value from domestic and agricultural wastewater, which is a pollutant load. In carrying out research, we would like to emphasize collaboration with other fields such as agriculture, fisheries, and regional studies, as well as collaboration between industry, government, and academia, and place importance on both the deepening of the theory of water environment conservation as an academic field and its implementation in the region. Examples of specific research themes are as follows.

- 1) Research on current assessment of water pollution caused by trace harmful substances and technology for countermeasures
- 2) Research on technology for reducing greenhouse gas emissions from sewage treatment facilities

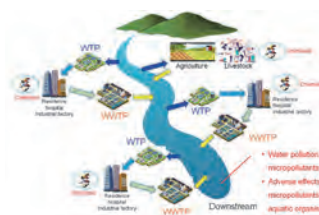


Fig.1 Water pollution by trace harmful substances

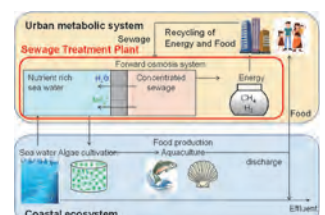


Fig.2 Recycling-oriented energy and food production system that integrates urban metabolic systems and coastal ecosystems

- 3) Research on building a recycling-oriented energy and food production system that integrates urban metabolic systems and coastal ecosystems
- 4) Research on a cascade-type hydroponics system that contributes to low-carbon greenhouse horticulture and resource recycling

This field is in collaboration with the Water Quality Engineering laboratory, Department of Environmental Engineering, Graduate School of Engineering, Kyoto University. We conduct research activities together with graduate students of the Graduate School of Engineering at the Katsura Campus, Kyoto University.

Historical Geography and Culture

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This laboratory will help students to understand the causes and structure of contemporary culture and socioenvironmental issues from the perspectives of history and geography. Students will learn the historical-geographical methods to deal with local problems and to find environmental values or potential attractions within the local spaces.

On the one hand, many people have come to abandon those traditional lifestyles and means of livelihood that had roots in local natural environment. On the other hand, they increasingly connect with others residing in distant places, including different countries. As this global transaction of items and people accelerates for each country to become interconnected, it appears that each region loses its individuality and culture and society get more



Field trip to the Hikone Castle to learn the academic characters of the early modern stone wall and its contemporary values

and more uniform. However, the cultural landscapes, exchanges, ideas, and social relationships, constructed through a long history of interactions between humans and nature, function strongly in local spaces. We have to learn the 'cross' regional structure as well as the the vertical spatial-social structure which include the local historical geography and culture to understand the contemporary culture and socioenvironmental issues essentially within the local spaces.

This laboratory will explore the local spatial-social structure analyzing the historical documents, old maps, cultural landscapes and heritages, and understand the perspectives and methods relating to contemporary issues.



At the Union Station in Los Angeles, you will see a large mural that depicts faces of residents expressing the city's diversity

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:

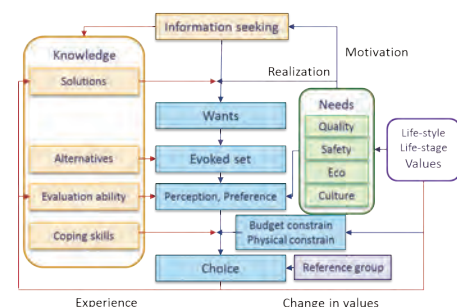
- Corporate market strategy based on pro-environmental activities: differentiation strategy, defensive strategy, and brand strategy beyond CSR
- Environmental communication between corporation



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

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



A model of consumer behavior in selecting pro-environmental products

History of Art and Culture

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The purpose of this research field is to gain a better understanding of the various aspects associated with the creation and reception of art works in a historical context, focusing on the modern era in Japan, and to attempt to clarify the historical significance of artworks and their relationship with the inner lives of individuals and society.

Our aims are:

- (1) To examine the relationship between the influence of tradition and other cultures on the process of creating works of art and plastic expression, for example, the problems of coexistence, fusion, and conflict between Western aesthetic values and Japanese aesthetic consciousness.
- (2) To clarify how art has attempted to express nature and society in the modern world, in terms of historical tradition and its

innovation.

- (3) To investigate how art has been accepted in the social environment.

In modern Japan, where the social and natural environment surrounding human beings has changed drastically, not only the works of art themselves but also the places where they are received have had to change as well. Each work of art inherits the tradition of art, and in the midst of changing times and changing trends in society, it sometimes acquires an unexpected and innovative expression, affecting both society and individuals. We believe that it is important to listen to the voices of the artworks and clarify their historical position and meaning in order to pass on their full value and significance to future generations.



《内国勸業博覧会美術館之図》三代歌川広重筆 明治10 (出典:「目でみる120年」東京国立博物館、1992)

Environmental Education

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Research and educational activities in this laboratory are broadly subsumed under three themes: 1. education and approaches for material cycles and sustainable community, 2. governance of energy and sustainability transitions, and 3. climate change and disaster preparedness.

One research focus of the lab is on material cycles and sustainable community system approaches, with emphasis on municipal solid waste (MSW) including food loss and plastic waste, disaster waste, and sustainability (toward SDGs) 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, Africa and other regions.

Research on the governance of energy and sustainability transitions focuses on examining how different governance

strategies like public policy, laws, industry rules and business models can accelerate the production and diffusion of clean technologies and the transition towards a sustainable society. The principal approach is to combine data-driven, empirical research with theoretical frameworks inspired by different fields such as public policy, sustainability transitions, innovation management, political science, economics and human geography.

The third research focus of the lab is on climate change adaptation as well as disaster preparedness and resilience. Work in this area includes projects on climate change education and adaptation, new approaches to sustainable lifestyles, social transformation, and behavior change, as well as disaster preparedness and resilience. Projects mainly focus on fieldwork in Japan, Europe, and the South Pacific (including Australia and NZ).



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 / Elemental Materials Chemistry

Environmentally-friendly Industries for Sustainable Development

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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.

In this laboratory, we conduct basic and applied research contributing to real-world environmental policies, and foster environmental leaders who will have the ability to solve environmental problems. Conservation and management of aquatic environments, improvement of water infrastructure, promotion of resource recycling, development of energy-saving industries, and analysis of solutions to water sanitation issues in Japan and abroad are all topics being studied using various tools, such as water quality analysis, micro-pollutant analysis, and water and micro-pollutant treatment technologies and mathematical modeling.



Field survey on water quality in Kathmandu



Analysis of micropollutants with a liquid chromatography mass spectrometer

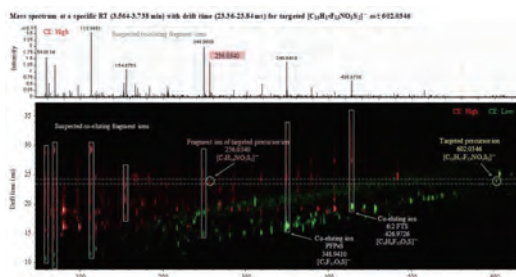


Fig. 5-6 The mass spectrum at a specific RT with drift time for targeted $[C_{10}H_{12}NO_5]^-$ ($w: 602.0346$) in a groundwater sample (GW)

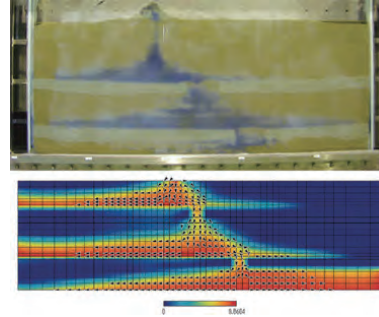
Identification of unknown micropollutants by ion mobility mass spectrometry

Environmental Infrastructure Engineering

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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 indigenous technology

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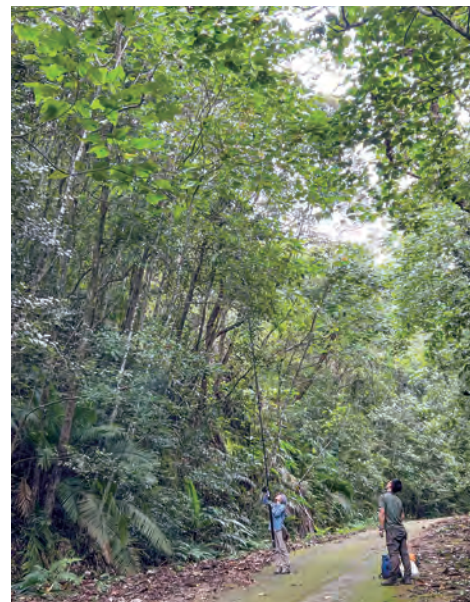
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Stable global environment is based on ecosystem that comprises a large number of biological species, abiotic environment and their complicated mutual interaction. Among them, biodiversity conservation is one of the essential points to keep the environment.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



Field survey of plants in Malaysia

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.

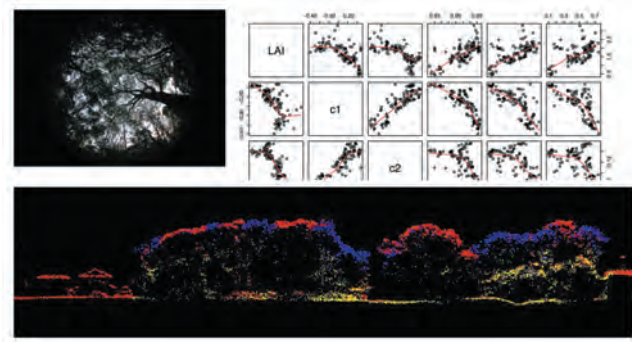
The scope of our research covers a variety of areas, ranging from small gardens and urban parks to rural and mountain areas, and also includes regions undergoing desertification. We deal with the landscape ecology of both heavily populated areas as well as relatively unpopulated natural areas in order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

Elemental Materials Chemistry

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Polymer materials have a wide range of applications today, from everyday objects to automobiles and aircraft, and in optical, electron, and other cutting edge devices. Still, only a handful of elements, such as carbon, hydrogen, and oxygen, are available to make up polymers. If we can understand the characteristics of many other elements and use them at will, we can expect not only to increase the functionality of existing materials but also to create novel properties and materials based on them. Also on the horizon is the possibility of designing materials from scratch—which will be truly momentous as new materials can only be made by chance now—discovering phenomena that cannot be explained by existing frameworks, and elucidating their principles. With this in mind, we set for ourselves the goal of discovering new "faces" of elements by using such tools as "element-blocks," the minimum unit of functionality composed of various elements, "inorganic polymers" and "organic-inorganic polymer hybrids," in which organic and inorganic components are dispersed at a scale of nanometers, and "composite materials," which arrange inorganic components within polymers according to a given program to have functions present themselves. We are also working to create materials with new functions thus developed to bring them to market.

Selected research topics

- New functionality created by stabilizing "instability"
- Development of a "periodic table of excited elements"
- "Biomimetics," a novel concept of designing bioceramics
- Establishment of a technique for designing luminescent chromism materials from scratch based on "complexes in the excited state"
- Establishment of a technique for designing "minuscule" near-infrared emitting dyes and development of tailor-made materials



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 Design / Atmospheric Chemistry /
Terrestrial Microbiology and Systematics / Terrestrial Ecosystems Management / Integrated Environmental Studies /
Ecosystem Linkages and Human Society

Regional Planning

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The Laboratory of Regional Planning (LRP) has been conducting studies on well-balanced regional developments in urban-rural areas, which are based on appropriate evaluation and utilization of regional resources. "Regional Resource" is a significant keyword in research activities associated with the LRP, and encompasses the human, cultural, historical, and natural resources that have existed in a particular region for a long time. Members of the LRP have been intending to solve social problems through intensive field surveys complemented by GIS and remote sensing technologies to maximize the utilization of "Regional Resources". In many cases, members of the LRP work with stakeholders (academically addressed as co-design and co-production); subsequently, they try to associate the results and findings of the study with responses of societal challenges. The current study topics are as follows:

Rural revitalization via a transdisciplinary approach (rural areas in Japan); land and regional resource management and regional resilience (Vietnam); rural studies for sustainable development (Indonesia, Philippines, India); historical institutionalism and its application to design regional planning (Morocco); cultural landscape evaluation and sustainable development (India); and spatial data mining of local statistical data for regional planning.



A seminar held by the LRP for sharing the results of the regional studies with researchers at the Hue University of Agriculture and Forestry, Vietnam



Regional resource management by working with local people (winter flooding paddy field)

Urban Infrastructure Design

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We study the urban and regional landscape, from nature to culture, by analyzing its spatial and temporal structure and transformation based on landscape analysis, design surveys, historical analysis, and community structure analysis. Furthermore, we explore how to design urban infrastructures that are in harmony with the cultural environment, and also study the goals and methodologies of urban and regional planning and design.

1) Landscape Analysis and Planning

We study hilly and mountainous landscapes, and landscapes with rivers and waterways that have formed a favorable environment and influenced the development of human culture. Specifically, we use GIS and CG systems to analyze topography, carry out site analysis, and examine view characteristics. Through this, we explore various normative landscape design methods and different ways of ensuring sustainable landscape management.

2) Landscape Conservation and Regeneration, Urban and Regional Design

We study the characteristics of urban and regional landscapes by focusing on their formation processes, relevant factors, and relationships with infrastructure. The specific targets are mainly cultural landscapes and infrastructures such as parks and green spaces. In addition, we study the possibilities of urban and regional design by evaluating the social structures that make up the landscape and examining the mechanisms of sustainability and transformation of landscape formation systems.

3) Roles of Social Networks in Cities and Regions

We study the formation and function of the social networks (the connections between people in a community), including during extraordinary times such as disasters. Using a variety of methods such as fieldwork and mathematical modeling, we explore the nature of social infrastructure and sustainable societies, taking social networks into account.



Urban public space renovation and its design study

Atmospheric Chemistry

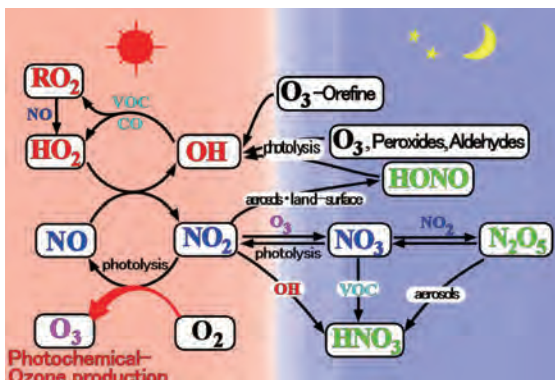
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We investigate atmospheric chemistry, mainly focusing on the issue of photochemical ozone formation. Despite the apparent downward trends for both NO_x and VOCs (precursors of photochemical oxidants) detected in mega-cities in many advanced countries, 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_x radicals and NO_x 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

Terrestrial Microbiology and Systematics

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Many microbes live in agricultural and forest ecosystems, and are interacting with plants and other organisms. Some of these microbes are parasitic to the plants bringing severe damages to the hosts, and some other microbes are mutualistic bringing benefits to the hosts. We are studying on these microbes and the nature of interactions between the microbes and their biotic and abiotic environments to develop new approaches for plant protection and its health. Our current interests are:

- Fungal systematics.
- Studies on physiology and ecology of plant pathogens and symbionts.
- Molecular analyses of the fungal specific characters in parasitism and symbiosis (hyphal development, spore morphogenesis, colonization and penetration on/to solid substrates).



Field research on mycoflora and plant diseases in Yunnan Province, P. R. China.



An exotic fungal symbiont (*Amanita muscaria*) in New Zealand and its mycorrhiza with an endemic beech tree (*Fuscospora solandri*).

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



Revitalization of resource recycling using underutilized resources including human waste (Malawi)

Integrated Environmental Studies

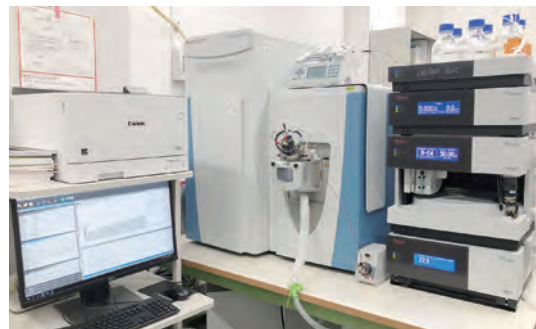
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The Laboratory of Integrated Environmental Studies was launched to facilitate interdisciplinary and integrative research activities in environmental studies. Given the multitude of specialized fields that the Graduate School of Global Environmental Studies (GSGES) encompasses, this research laboratory covers all aspects of global environmental studies and carries out research projects on specific topics in collaboration with other GSGES laboratories, thus promoting research work for the GSGES at large. Specific research topics include: solutions for sustainable regional

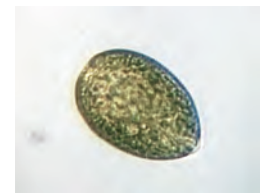
development and global environmental conservation by way of dynamic analyses of resource circulation on both a global scale and within regional ecosystems; the framework of human and environmental symbiosis; policies and techniques aimed at serving common global interests; and technologies and technological criteria appropriate for an environmentally balanced civilization. These individual research initiatives contribute to the promotion of studies at the Department of Natural Resources, Department of Global Ecology, and Department of Technology and Ecology.



International Negotiation on climate change (COP24, Poland)



Analysis of raphidophytes with a liquid chromatography mass spectrometry



Raphidophytes occurring in sources of drinking water

Ecosystem Linkages and Human Society

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This laboratory is a cooperative laboratory in the Field Science Education Research Center (FSERC) of Kyoto University. Based on the new concept of "the Connectivity of Hills, Humans, and Oceans (CoHHO)," the FSERC proposes an integrated academic field to clarify interactions among forest, river, human, and coastal ecosystems.

the life history, survival, growth, movement, and feeding characteristics of key species.

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 terrestrial and coastal productivity. These concepts are then used to identify suitable methods for ecosystem management in order to achieve future sustainable development.

Ecosystem ecology

We study interactions between living (biotic) and non-living (abiotic) components based on material cycling within an ecosystem and with external ecosystems.

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 connectivity between forest and river ecosystems (left), and the bounty of the forest (upper right) and coast (lower right).

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

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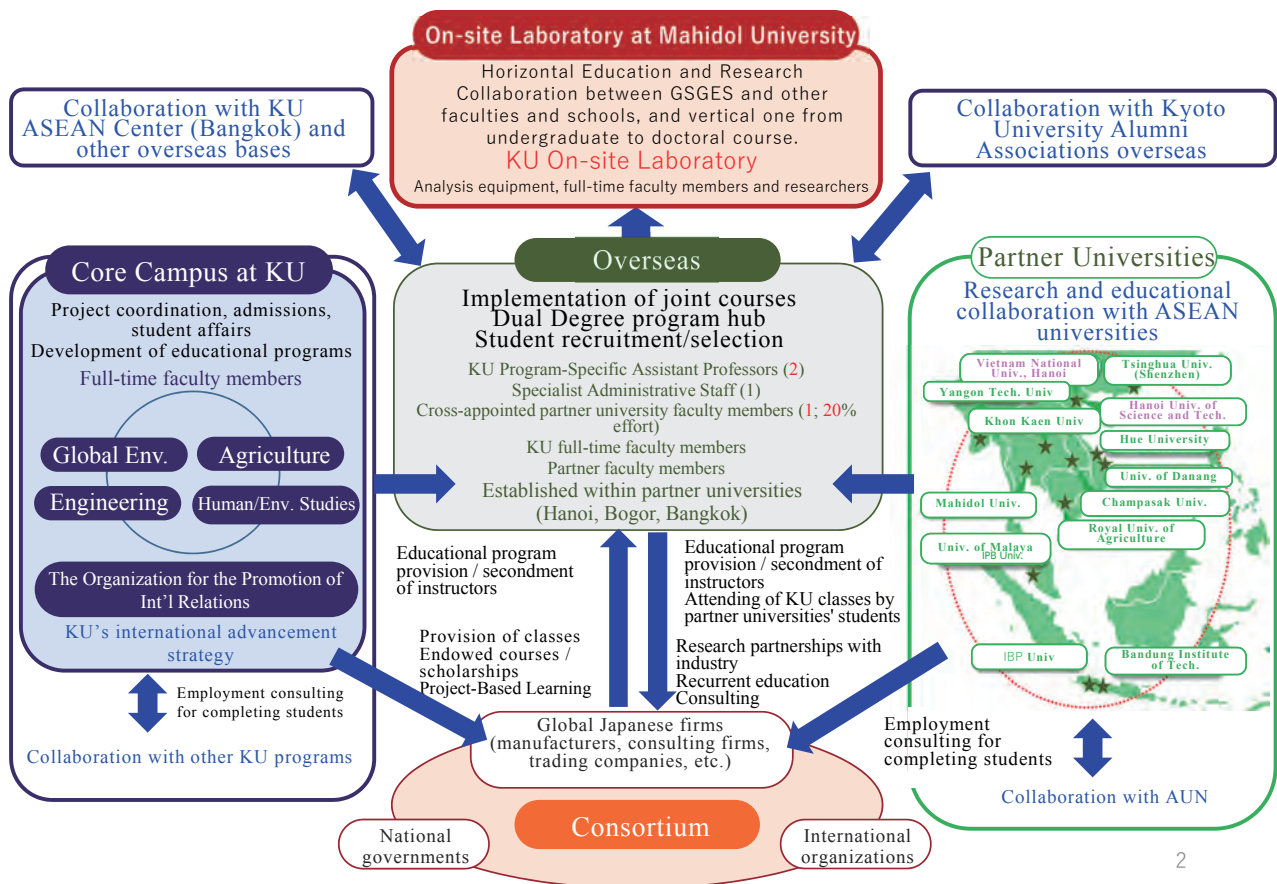
KAWAGUCHI Kohei, Program-Specific Assistant Professor

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 program at GSGES, which strengthen research and educational capacity through intensive intellectual exchanges with 11 partner universities in ASEAN region. It aims to cultivate environmental innovators who will take on a 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 three double-degree programs with Mahidol University (Thailand), IPB University (Indonesia), and Graduate School at Shenzhen, Tsinghua University (China). 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.

On-site Laboratory at Mahidol University was launched in 2019, for promoting collaboration on research and education as a program hub, especially aiming for horizontal education and research collaboration between GSGES and other faculties and schools, and vertical one from undergraduate to doctoral course.



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

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 IPB University (Indonesia), Mahidol University (Thailand), and Tsinghua University (China) so far. A double master degree program with Lille University (France) etc. are 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 Autumn School” 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 5 years. In total 103 selected students (applicants: 222) from various universities in the world have joined and learned environmental studies under the multicultural atmosphere of Kyoto from 2015 to 2019, although we weren't able to conduct the programs due to the spread of COVID-19 since 2020. 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.

<Images of JGP activities>

Spring School 2016

Water fowl observation @ Lake Biwa
Field monitoring Atmospheric Chemistry
Orientation @ GSGES
Learning waste water treatment system
Lecture @ Lake Biwa Museum
On-board training @ Maizuru Research station
Lecture @ Aso Volcano Museum
Soil observation in Lab. visit
Geothermal power plant
Casual presentation @ hotel
Fuji-ori experience in Kamiseya

Chemical experiment in Lab. visit
Group photo @ clock tower
Lecture @ Kyushu Okinawa Agricultural Research Center

Partner Universities in Oversea

Researcher exchange program
Joint degree program
Collaboration in Education
Collaboration in Research
Environmental Studies
Student exchange
Lecturer exchange
Double degree program
Graduate School of Global Environmental Studies
Graduate School of Agriculture
Kyoto University

American Universities
- University of California, San Diego (U.S.A.)

African Universities
- Sokoine University of Agriculture (Tanzania)
- Lilongwe University of Agriculture & Natural Resources

European Universities
- KU Leuven (Belgium)
- Université de Bretagne Occidentale (France)
- Université de Lille 1 (France)
- Université de Lorraine (France)
- University of Caen Normandy (France)
- University of Stirling (Scotland)
- University College Cork (Ireland)
- University of Naples Federico II (Italy)
- University of Modena and Reggio Emilia (Italy)
- Politecnico Di Torino (Italy)

Asian Universities
- Royal University of Agriculture (Cambodia)
- Tsinghua University at Shenzhen (China)
- Banaras Hindu University (India)
- Indonesia University (Indonesia)
- IPB University (Indonesia)
- Institut Teknologi Bandung (Indonesia)
- Gadjah Mada University (Indonesia)
- Brajajaya University (Indonesia)
- Kazakh National Agrarian University (Kazakhstan)
- Champrapak University (Laos)
- National University of Laos (Laos)
- Malaya University (Malaysia)
- Yezin Agricultural University (Myanmar)
- National Taiwan University (Taiwan)
- Chiang Mai University (Thailand)
- Kasetsart University (Thailand)
- Khon Kean University (Thailand)
- Mahidol University (Thailand)
- Ha Noi University of Science and Technology (Vietnam)
- Hue University (Vietnam)
- The University of Da Nang (Vietnam)

Oceanian Universities
- University of the South Pacific (Fiji)
- Macquarie University (Australia)

(Updated on November 30th 2016)

Spring School 2017

Satoyama observation @ Kamiseya
Lab. experiment in Atmospheric Chemistry
field study in Kabata, Shiga
DNA extraction in Marine Biology
Discussion in final seminar
Tea-ceremony experience in Kyoto
Atomic energy seminar
Field study in Forest Wakayama
Learning local confectionary company's challenges
Awarding ceremony of this program

Introducing the Faculty

Understanding fungal lives coevolved with plants

Professor **TANAKA Chihiro**
Terrestrial Microbiology and Systematics



Many microbes live in agricultural and forest ecosystems and interact with plants and other organisms. Some of these microbes are parasitic to the plants, bringing severe damage to the hosts, and some other microbes are mutualistic, bringing benefits to the hosts. We are studying these microbes and the nature of the interactions between the microbes and their biotic and abiotic environments to develop new approaches to plant protection and health.

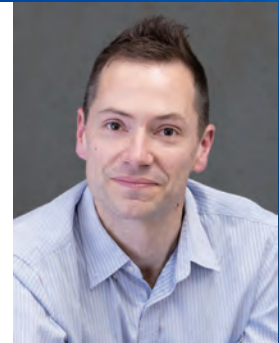
Among these microorganisms, my favorite ones to study are fungi. Fungi are considered to be one of the most “successful” taxonomic groups, with over 1.5 million species thought to exist on the Earth. Fungi play a central role in the global chemical cycle as decomposers of plant remains in current terrestrial ecosystems, but their ancestral forms are aquatic organisms comprised of a single or a few cells, attaching to organic substrates in water. It is thought that the reason such organisms became major players in the chemical cycle of terrestrial ecosystems is that fungal cells took on a filamentous form called hyphae and were able to penetrate solid organic substrates using the hyphal growth mechanism. Furthermore, this ability is thought to have led fungi to evolve into parasites of other multicellular organisms, especially plants. From these pathogens, a symbiotic relationship with host plants might have been selected. In particular, the emergence of mycorrhizal fungi, which invade plant roots and take photosynthetic sugars while the rest of fungal mycelium continue to grow through the soil, dissolving and absorbing inorganic salts and water instead of root hairs and sharing these with their plant hosts, has led to the adaptation of plants to terrestrial environments. The prosperity of plants on land has simultaneously led to the prosperity and diversification of fungi as decomposers, parasites, and symbionts of land plants; moreover, the fungi developed more complicated life systems. However, we do not know exactly how many species of fungi there are. Traditionally, isolation,

culturing or microscopic inspection was required for identification. The recent development of environmental DNA analysis methods has made it possible to reveal the diversity of microbiota, including fungi, without isolating them; however, it is still necessary to isolate and culture the fungal species that possess DNA information for close elucidation of their various properties.

Investigations of individual species using several ecological strategies and life systems will reveal the basic principles, diversity, and evolution of fungal lives. These studies will lead to knowledge of biorational applications for our lives. For example, the osmotic stress-response signaling system, which is evolutionarily conserved in filamentous fungi, has attracted attention as a target site for highly selective fungicides with low environmental impact. The mechanism of attachment and invasion of fungi to solid substrates has been of interest not only for plant protection but also for the fermentation industries and for residential hygiene.

Sustainability from the perspective of socio-technical systems

Associate Professor **TRENCHER Gregory**
Environmental Education



What is a socio-technical system and why is it important?

To build a sustainable society, there is an urgent need to develop and diffuse new technologies, energy sources, materials, and business practices. Although many of these exist already, most of the time these don't diffuse in society, or their diffusion is very slow. Why is this? To understand this, there is a need for a systemic perspective that views technologies as part of social systems. Such socio-technical systems are networks of different elements. These include social elements (e.g. policies, laws, rules, business models, infrastructure, funds), human elements (e.g. users, makers, companies) and material elements (e.g. supporting infrastructure and raw materials). Furthermore, this system concerns two sets of activities: production and use.

Like with most systems in the human and natural world, the goal of a particular socio-technical system is not self-destruction. Instead, the different parts in the system influence each other and evolve together in the goal or attaining stability, growth or continuity.

This systemic view of technologies as part of a broader socio-technical system in this way brings many hints for scholars and policymakers trying to understand how to speed up societal transitions towards sustainability. First, it tells us that if we want to accelerate the production and diffusion of sustainable technologies, we need to consider the other social, human and material elements that affect them. For example, if our goal is to accelerate the diffusion of fuel cell vehicles or renewable energy, then we need to implement strategies that help push all of these parts together towards our desired destination. Thus, the goal becomes not technology diffusion, but system transformation. Second, systems suffer from inertia and don't like to change. They can become locked-in to developing in a certain direction. This means that strong socio-technical systems built around established technologies (e.g. gasoline vehicles, nuclear or

thermal energy) will often resist efforts to transform them. Third, many researchers and policymakers like to focus on supporting the creation of new technologies and business models. But because social systems can often be locked-into to the pathway of producing and using unsustainable technologies, materials and practices, there is also a need to accelerate their gradual abolishment.

Research topics

From this perspective, the research of myself and students focus on understanding the forces that prevent transitions towards sustainability and strategies that can be used to accelerate the production and diffusion of technologies for decarbonization. We therefore take an interest in both technologies as much as social systems, and the creation of sustainable technologies as much as their destruction. We take inspiration from different social science fields of enquiry that include energy policy, sustainability transitions, human geography, political science and innovation management. My preferred approach is to use both theory and empirical cases. First, we create novel theoretical frameworks to help understand complex energy and socio-technical systems. For example, myself and students have studied the increasing use of passenger vehicles in Bangkok, the production and diffusion of fuel-cell vehicles and battery electric vehicles, and the financing of coal-fired power plants. We then apply these frameworks to case studies to learn about the process of technological change from a socio-technical perspective.

Introducing the Faculty

Co-education for Creating a Sustainable Society

Associate Professor **ASARI Misuzu**
Environmental Education



Time is ripe for a change

It was with a lofty ambition of solving global environmental problems that I matriculated at the Kyoto University Faculty of Engineering. Back then, just before the adoption of the Kyoto Protocol, Japan was experiencing what may be called the first boom of global environmental studies. My main research topic has been waste problems, and I have since been working on how different types of waste are generated and treated, as well as how we can promote 3R, namely, Reduce, Reuse, and Recycle.

As an undergraduate student, I launched a group called “Kyoto University Garbage Club” to kick off a campaign to make Kyoto University an “eco-campus,” which led me to become involved in a broad range of educational and awareness-raising activities. I now belong to the Environmental Education laboratory, and you could say that it all started with my activities as a student.

Looking back over the years, I must say that social interest in global environmental problems began to wane after peaking between 1990 and a little after 2000, when the issue often made headlines. Environmental education did continue to spread among schools over the past two decades, but not in a way that engages young generation’s interests, encourages their action, and eventually transforms society.

More recently, however, public interest in global environmental protection has reached unprecedented peaks that are orders of magnitude greater than ever before, and seemingly unstoppable movements are emerging. This is particularly true among younger generations, who seem motivated to act. It even feels that society as a whole is being awakened to the need to do something.

Potential of environment and sustainability education

Like other labs of the Graduate School of Global Environmental Studies, mine has a diverse student body with different nationalities, careers, beliefs, and aspirations. Nat-

urally, they come from different educational backgrounds. This is even more the case when it comes to environment and sustainability education, and we have to begin by developing a shared understanding of the realities and issues that each student has.

One thing in common among them, however, is their determination to bring about change, as well as their recognition of the importance of changing the awareness and behavior of individuals in pursuit of building a sustainable society. With this in mind, we are seeking action research by staying on-site as much as possible so that we can bring about and sustain change.

For instance, we collaborate with several elementary and junior high schools in Kyoto and develop a curriculum built around the SDGs and sustainability of communities. We then evaluate how students’ awareness and behavior change or conduct a behavior survey on the purchase and acquisition of plastics to understand consumer awareness and behavior so that we can make policy recommendations for measures to be taken. Furthermore, in a satoyama natural woodland area in northern Kyoto, whose sustainability is being threatened, we established an education hub on the SDGs, where we distribute educational programs both online and on-site and promote research, education, and social services in an integrated manner.

It is no exaggeration to say that we learn more from teachers and students from local schools and community residents than they do from us, which is why I think “co-education” is critical. Although we are witnessing this major wave of change, we cannot rest on our laurels but need to dramatically change our lifestyles and society if we wish to realize a sustainable society. I believe that co-education is the pillar of such change.

Exploring Hidden Properties in Order to Create New Elemental Materials

Professor TANAKA Kazuo
Elemental Materials Chemistry



Creation of new elemental materials

Organic and polymeric materials are widely used in our daily lives and are also found in many modern electronic devices. However, conventional materials consist of only a limited number of elements, such as carbon, hydrogen, oxygen and nitrogen. We think that advanced materials with superior properties could be obtained by employing elements which have not yet been used in conventional materials. Based on this idea, we aim to develop new optoelectronic materials, catalysts, and sensors with unique elemental functions. Furthermore, we expect that the results will also reveal new characteristics of the elements involved. The discovery of fundamental properties of elements and practical applications for these materials provide the motivation for our exploratory investigations.

Various types of elemental materials have been developed. For example, we recently found that some elemental complexes can exhibit intense emission activity in the solid state where conventional organic dyes commonly show poor luminescence. Moreover, by adding external stimuli, luminescent color changes could also be induced. Based on the results from mechanistic analyses, we showed that several different elements could potentially play a critical role in such unique optical behaviors. As a result of these stimuli-responsive and environment-sensitive solid-state luminescent properties, several chemical sensors and bio-probes have already been developed for a range of uses, such as for monitoring trace amounts of harmful chemicals and real-time sensing on skin surfaces. These technologies could all be used for creating advanced sensing systems.

By homogeneously mixing organic and inorganic components on a nanometer scale, organic-inorganic hybrid materials can be obtained. Owing to the high thermal stability of inorganic species, hybridization is regarded as one of the most promising strategies for reinforcing the durability of organic materials. Furthermore, by using cubic silica molecules as a scaffold, we can obtain designable hybrids. Based on preprogrammed designs, we can then

obtain stimuli-responsive hybrid materials, such as luminescent chromic hybrid rubbers for detecting distortion, electric conductive flexible hybrids which can monitor the degree of external forces, and thermally stable liquid crystals. In particular, hybrid gels have been used to detect dispersed nano-plastics in water, by means of luminescence color changes. The development of sensing materials such as these could be helpful in carrying out precise environmental assessments in the future.

Discovery of a new element periodic table

Ever since the establishment of the element periodic table by Mendeleev, 150 years ago, we have used this table to help estimate material properties. However, we have since found some curious element properties which do not correspond to any of these preliminary estimations. For example, after photo-excitation, some element complexes show individually different behaviors - even within the same element group. We are interested in the material properties of such elements in the excited state. By introducing another bond into the central element of elemental complexes, we can also form hypervalent states of the element. Recently, we have been able to obtain stable hypervalent complexes and have found that unique environmental sensitivity appears to originate from these extraordinary atomic valences. These new properties are promising platforms for designing the next generation of sensing technologies. By obtaining new insights such as these, we expect to be able to establish a "new element periodic table".

Introducing the Laboratories

Department of Technology and Ecology, Environmental Infrastructure Engineering

—What kind of research are you doing?

The research we do in our laboratory addresses several geoenvironmental issues. Among our goals is to predict the behavior of contaminants in the ground, develop effective and economical countermeasures for ground contamination, recycle by-products generated by construction projects and industrial operations, analyze the effects of rising ground temperature rises on geotechnical phenomena, and create efficient separation methods for disaster wastes.

We have been researching soil-bentonite mixture (SB) cutoff walls for contaminant containment for more than 20 years. Bentonite, a clayey soil, can swell when it comes into contact with water. Due to the swelling of the bentonite in SB, the pores in the SB are filled, resulting in SB cutoff walls with high barrier performance. To improve the reliability of SB cutoff walls, we have studied their soundness against earthquakes, solute transport, self-healing property, and so on.

Additionally, we are conducting extensive research on excavated soils and rocks containing geogenic contaminants. Subterranean construction generates large volumes of soils and rocks. While geogenic contaminants are in relatively low concentrations in the excavated materials, the leaching concentrations of the toxic elements can slightly exceed the environmental standard values. Therefore, excavated soils and rocks should be effectively utilized considering the risks to the surrounding environment. Understanding the risk of contamination requires evaluating the leaching behavior of geogenic contaminants in excavated soil and rocks. For about 15 years now, our laboratory has been researching the leaching behavior of excavated soils and rocks. Our investigations aim to clarify the long-term leaching behavior of excavated soils and rocks which has yet to be fully understood. We explore various scenarios or geotechnical parameters (e.g., pore structure, saturation) that affect the leaching behavior of the materials.

—How do you run your laboratory?

Our laboratory is in charge of education in the Faculty of Engineering and the Graduate School of Engineering for civil engineering. Our activities are conducted together without distinction between the GSGES and the Engineering course. As of April 2023, the laboratory has six doctoral students, eleven master's students, and four undergraduate students. Five of the master's students are in the GSGES. Once a month, we hold a seminar to discuss the progress of our research activities.

—Tell us about the research your graduate students are doing.

Research in geoenvironmental engineering involves many experimentations. Soil is different depending on geology and location, so our research is difficult to generalize. Students are required to solve problems independently. Students need to be able to work with their hands, solve problems through trial and error, and confirm their results through repeating the experiments. For example, in our research on disaster waste recovery, we investigate how to efficiently separate soils from mixed disaster wastes and utilize the soils for construction. This will help reduce the amount of waste, as well as rapid restoration after a disaster. The students

conducting this research were tasked to make their own experimental plans. They created simulated disaster waste by mixing wood and soil and conducted laboratory and on-site sieving tests. Their investigations showed that it is challenging to separate wood from the mixture if the mixture contains a large amount of fine-grained soil.

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

Students actively engage in research. Many students gather in the laboratory to conduct their experiments. Diversity is another important feature of our laboratory. The laboratory consists of Japanese and international students. Moreover, some doctoral students are working in Japanese construction companies while studying for their doctorate.

—What kind of areas do students move on to after they graduate from your laboratory?

Many students join the construction and infrastructure industry after graduation. Some become civil servants, while others continue with their research at universities or national research institutes. We are pleased to see them working to create a sustainable future using their expertise and experience in geoenvironmental engineering.



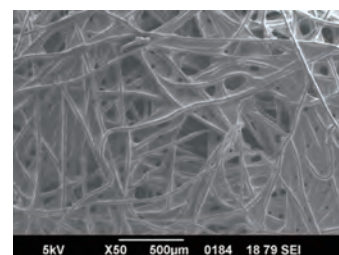
Pilot-scale sieving tests for waste separation



Leaching tests for excavated soils and rocks



Site visit at a waste landfill



Microscopic observation

Department of Natural Resources, Urban Infrastructure Design

—What kind of laboratory is it?

With “landscape” as a key word, this laboratory conducts exploration and practical research through an engineering approach on landscape and urban design and related planning methods for urban facilities and public spaces, encompassing urban planning. During the post-war high-growth period of the Showa era (1926-1989), the rapid development of cities and national land, such as the construction of highways, and the widespread use of concrete and steel gave birth to free forms. At the same time, however, the shape of cities changed in an uncontrolled manner, and a research field arose within the field of civil engineering to consider how to construct and design facilities to beautify urban landscapes like those in developed countries. In the JSCE (Japan Society of Civil Engineers), there are several fields of activity such as civil engineering planning, landscape and urban design, and civil engineering history. Among these, the field of landscape design is a fusion research area that integrates the fields of architecture and landscape architecture with urban planning. In our laboratory, we have expanded the scope of our research not only to urban facilities, but also to the landscaping of entire cities, including open spaces such as gardens and plazas, as well as buildings such as train stations. This is because, to make a city beautiful, it is necessary to synthesize the many objects of which it consists. It is also necessary to consider not only the value of beauty, but also the social structure and usage of the city so that people can lead vibrant social lives and engage in cultural and economic activities. If we do not take into account people's vitality, local communities, and management, cities will decline. In view of the many challenges we face such as global environmental issues, population decline and the aging society, natural disasters, and infectious disease problems, research into the state of Japanese cities is a task whose goals should be pursued quickly within the span of long-term urban development.

—What kind of research do you do?

Basically, we explore the spatial and temporal structure of landscapes and the objectives of design and design methodologies to create cultural and beautiful landscapes. For example, we conduct research on the design process, management, form, and color of urban facilities and public spaces; research on natural mountain and river landscapes and urban vistas; and research on original landscapes and

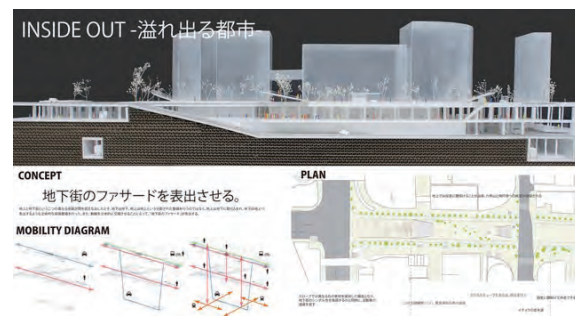
images expressed in literature. In particular, the mountainside and waterfront areas of Kyoto and its surrounding cities are a treasure trove of design, and we conduct topographical analysis and design surveys using graphic systems such as GIS (Geographic Information System) and CG (Computer Graphics) to carry out sophisticated research on spatial composition and design techniques. We are exploring spatial models, such as the maintenance of historical environments, from the historical background of their establishment, and attempting to reflect them in urban planning guidance and policy methods. We have also been studying the historical value of modern civil engineering heritage such as canals and streets. Furthermore, we have been conducting research on disaster and local community level issues by utilizing various methods such as social network analysis and fieldwork techniques.

—How is the laboratory run?

There are 25 people in the entire laboratory, including the concurrently employed engineering students. There is one professor, one associate professor, one assistant professor, one secretary, three doctoral students, 12 master's students, five undergraduate students (Civil, Environmental and Resources Engineering), and one special auditing student (from France). Student residence rooms are located on the Katsura Campus, and practical design and exercise work is conducted in the laboratory. Our faculty offices are located on the Yoshida Campus.

—What kind of research are your graduate students doing?

Some graduate students continue their undergraduate research and develop it further in the master's program, while others take on new challenges. In each case, we emphasize the importance of students' own initiative and will. Many of our graduates are active in public construction think tanks, consulting and design firms, general contractors, and as national and local public officials. They work in a public service capacity for the vitality of the nation and cities, and society also expects them to be immediately effective. Therefore, we believe that analytical thinking alone is not enough to benefit the world, and we are pursuing our research with the aim of finding social issues on our own and cultivating the creativity to come up with comprehensive solutions to them.



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 who are 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, as well as practitioners who have such academic quality.

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, as well as researchers with such practical capabilities. 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), TOEIC SP or IELTS test scores) and interview performance (specialized knowledge of the applicant’s chosen study area and presentation of a research plan).

MEXT special scholarship IEMP (International Environmental Management Program) Entrance Examination will be also implemented for international applicants.

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 structure

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 study

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 more than

one month for students whose research objectives are best achieved through brief practical experience. (For short-term internships, the submission of preliminary master's research report 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), TOEIC SP, or IELTS test scores), and interviews (to assess general knowledge in global environmental studies, basic knowledge in the intended study area, research and study plan for master's program, and capability for the master's program). MEXT special scholarship IEMP (International Environmental Management Program) Entrance Examination will be also implemented for international applicants.

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 (Graduate School of Engineering) IPB University, Indonesia (Graduate School of Agriculture)

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 structure

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 study

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), 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.

MEXT special scholarship IEMP (International Environmental Management Program) Entrance Examination will be also implemented for international applicants.

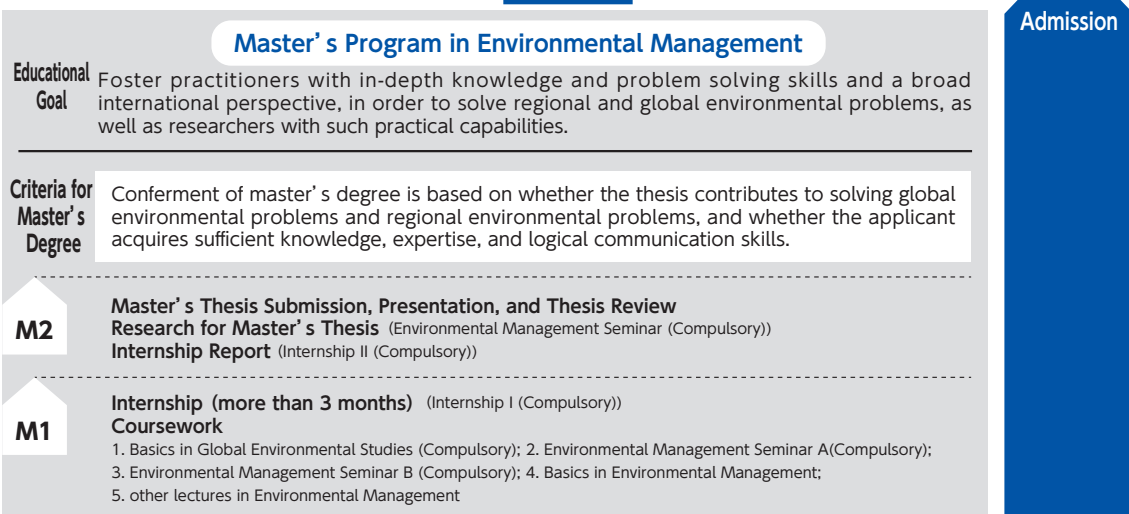
GSGES Course Tree

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 21st century.

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



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

Augusto Cesar Oyama
Master's Program in Environmental Management
Global Environmental Architecture

To the comrades who seek or are considering possibilities to be affected by the context of this island and by hopeful transoceanic experiences, reasons that led me to choose GSGES, I will say about this essay two certain subterranean affinities: first, that our reconstructed past, **at once individual and collective**, is not a refuge, but a source of reasons to fight; second, that perhaps all starts with the sentiment of belonging to the furthest things, being connected and held by forces (ideas, projects, dreams), imagining and undertaking actions tending to legitimize and materialize them.

About the first provocation, in the face of so many experiences made feasible from GSGES/Global Environmental Architecture laboratory – experiences that are particularly impossible to narrate due to the specific intensities – I think that accepting to occupy this place and be affected by it opens up a specific communication with ourselves. At Kyodai/GSGES, we can find friends with whom we share a sensibility and a similar way of asking questions. Being together like this, **frontiers of knowledge are diluted**.

My research, for example, seeks to illuminate and stress contexts of violations of land and housing rights in Brazil and Japan, using a particular reading key on disasters related to

large urban interventions. I was able to meet organizations and collectives from this island and from Latin America and Europe that emerged due to these complex realities. Such intense meetings were boosted by the programs, courses, and day-to-day life experienced especially (but not only) from this **common place**, Kyodai/GSGES.

About the second provocation, the small part that falls to me is to say what I think we often lose sight of: it is fundamental to situate our **social responsibility** in every place where we act; and this responsibility, this individual endeavor, but always with a collective signature, is what can drive dreams. Taking advantage of GSGES and the university's vibrant environment, as well as legitimizing our decisions, **systematizing the experience**, and communicating it, is in some way paving the way for our society projects and also for the next comrades. After all, the meaning of all this is to reverberate and exchange these multiple narratives.



VOICE 2

MORIOKA Tamaki
Doctoral Program in Global Environmental Studies
Environmentally-friendly Industries for Sustainable Development

I matriculated into a doctoral program at the Graduate School of Global Environmental Studies (GSGES) after completing my studies at Kyoto University's Faculty of Agriculture and my Master's Program at the Graduate School of Informatics. My career objective is to do something that concerns global environmental issues. Knowing that GSGES offers an opportunity to learn about multiple perspectives on environmental problems through research work, I enrolled at GSGES.

One of the appeals of researching at GSGES is that researchers are made aware of how their work is relevant to society. Through my research, I am fortunate to have many opportunities to discuss with persons from research institutions and private enterprises, although internship studies are not required for the Doctoral Program in Global Environmental Studies. Those experiences helped me form a habit of focusing on what I should elucidate in my research work to resolve environmental issues and to sustain and develop society and the economy simultaneously.

Another thing I love about studying here is that students and researchers from diverse backgrounds are welcomed.

Because the student body is so diverse, some with working experience and others with international backgrounds, with a nice blend of humanities and science students, students can avail themselves of comprehensive support so we can learn and study from scratch. I joined GSGES from its doctoral program to work on a research topic that was new to me. I think I have been able to further my studies steadily thanks to the casual atmosphere, which encourages me to enjoy small talk with my peers or seek counsel from my advisors. Furthermore, because everyone feels so comfortable speaking to or discussing with other students from different backgrounds, students can learn about new perspectives daily, be it values relevant to life or points of view for researchers, which then allows us to deepen our critical thinking from even more diversified perspectives.

I believe that GSGES opens its doors wide to applicants who are interested in global environmental issues and eager to learn and study with hands-on approaches.



Voices from Graduate Students



Graduated from Doctoral Program in
Global Environmental Studies (2019)

VAR Elif Berna

Research Fellow, Japan Center for
International Cooperation in Conservation,
Tokyo National Research Institute for Cultural
Properties

Living in Japan as a child has influenced me a lot to create my personal interest in Japanese culture, which has later transformed into a professional interest as I graduated from the university in Turkey. Thanks to the opportunity given by MEXT, I enrolled in GSGES in 2015 as a research student and started my doctoral education in the next year.

I should say that studying in a foreign country might be challenging at times and the life of a doctoral student is stressful in any way. That is why it is crucial to have a learning environment where you feel comfortable and free to express yourself. In that sense, I was very lucky that I belonged to GSGES, where students and professors make strong community ties with close relationships during good and bad times.

Various interdisciplinary lectures and internship opportunities are provided in GSGES, whereas they were not compulsory in my program. But, I took this opportunity to improve myself in global environmental issues, so I attended several courses where I met many professors and friends from different fields and/or countries. This interdisciplinary and multicultural working environment helped me to understand different cultures, perspectives, and expectations, which -in the end- enriched my own vision, too.

I believe this was a remarkable chance for me since I joined to Tokyo National Research Institute for Cultural Properties as a research fellow after my graduation and I work in a team consisting of architects, archeologists, engineers, and conservation scientists from Japan as well as abroad. I have been interacting with many people from different backgrounds and I believe my experience in GSGES is very helpful to manage this process smoothly.

Besides all those, one of my biggest learnings in GSGES, which changed my career perspective, is that our research activities should be conducted in the light of global standards, but blended in the local context; and should create social impact. I found it very meaningful and satisfying as a researcher, so that I try to conduct research activities that can contribute to society.

In short, my experience in GSGES was a memorable one. I hope yours would be much better!



Graduated from Master's Program (2017)

SHARDA KC

Research Institute for Quality Living Co., Ltd.

In 2014, I came to Japan for the first time with the aim of furthering my studies. After one year in Japan, I enrolled in the master's course at the Laboratory of Terrestrial Ecosystems Management in the Graduate School of Global Environmental Studies (GSGES) at Kyoto University. I chose the course because the lectures are conducted in English and it has a compulsory internship program. During the master's program, we had many opportunities in class to interact with our fellow classmates from different cultural backgrounds and countries. It was a great time to learn about different cultural values, individual perceptions, and dreams. I had to spend my days struggling to improve my writing skills and completing assignments and laboratory experiments. After graduating from the master's course, I entered the doctoral course in the same laboratory, where I joined an internship program. I experienced living in rural areas of Nepal and working together with farmers. Through that experience, I came to know how hard life is for

people living in rural areas and learned to cope with limited resources and facilities. I gained skills in time and project management through this field experience.

Altogether, I spent five years at Kyoto University, and I have great memories of my time there. The professors in my lab were very helpful and cooperative. I think that our joint seminars and the comments I received from the professors and my colleagues really improved my research. Ultimately, my dream and passion to complete a doctorate (Ph.D.) was fulfilled at GSGES. For my success in this achievement, I am very grateful to all the professors and staff of GSGES as well as my colleagues there, for their immense support and cooperation during this journey.

Recently, I have been working in a Japanese company in Chiba prefecture. It is a company dealing with food and hygiene inspection, where I belong to the physicochemical inspection group. I must say the laboratory skills, equipment handling, data analysis, etc. related to physical and chemical analysis that I learned from Kyoto University are applicable and helpful now in my professional career. I acquired skills in writing journal papers and conducting research, and together with experience of the internship program and lectures on other subjects. I hope that everything I gained will help to boost my professional skills in future.



Graduated from Master's Program (2017)

HARA Natsuko

Kokusai Kogyo Co., Ltd.

After embarking on my career, any time I have met with my friends from the Graduate School of Global Environmental Studies (GSGES) we have shared our experiences from our respective workplaces and discussed current events that catch our eye. When this happens, we unanimously agree that we can have such conversations only with GSGES alumni. I think this is because students at GSGES come from diverse backgrounds, take an interest in a variety of topics, and are inquisitive about social issues in general.

About half of my classmates were from abroad, coming from not just Asia, Europe, and North America but also the Caribbean, the islands of the South Pacific, and Africa. Sitting in classes and occasionally eating and going on trips together with students from around the world, I was able to deepen my knowledge about how my

values and culture differed from theirs as well as see the variety of national policies that exist. Also in our class were Japanese students who came from different undergraduate faculties, had working experience, or were raised outside of Japan. They all had unique perspectives on issues facing our world, many of which were beyond me, and I think we learned a lot from each other.

I am now an engineer at a private enterprise, involved in the construction of geospatial information infrastructures, a foundational aspect of nations. Such information is being used in wide-ranging fields, including disaster management and mitigation, ecosystem conservation, and energy planning. Buried under my work day in and day out, sometimes I find myself becoming short-sighted. At such times, I make it a rule to take a step back and see things that are related from a broader perspective, and think about the significance of what I am doing and our customers' needs. I must say, these attempts to approach things from multiple angles would not be possible for me to do without what I learned from GSGES.

If you are looking for a graduate school that will help you to develop your expertise further and provide new encounters and learning opportunities, I can safely say that GSGES is the place for you!

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 42 times as of October 2022. 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-two times as of March 2021. 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 123 have taken place as of September 2022.

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 January 2023 saw the publication of the 32nd 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	IPB University	195 (19/9)
November 26-28, 2019	Kyoto, Japan	—	269 (32/17)
November 30 - December 1, 2020	Zoom Online Symposium	Mahidol University	423 (60/13)
November 29-30, 2021	Zoom Online Symposium		338 (61/21)
November 24-25, 2022	Kyoto, Japan Zoom Online Symposium		354 (78/22)

第42回 京都大学地球環境フォーラム 主催：京都大学大学院地球環境学室

持続可能な社会を実現する 高分子化学の最前線

三大材料のひとつに数えられる高分子ポリマー（プラスチック）は、私たちの健康で豊かな生活を支えるなくてはならない物質です。一方、持続可能な社会を実現する上で、それらの製造、再利用、廃棄それぞれの過程において生じる環境負荷を削減・除去することが、重要な課題となっています。今回は、次世代を担うべき新たな高分子を生み出す「高分子化学者」の最先端の取り組みをご紹介します。化学の視点から「持続可能な高分子」のあり方について議論します。

プログラム
◆ 13:30～ 開場 総合司会：山口 敬太（京都大学大学院地球環境学室・准教授）

開会の挨拶
◆ 14:00～14:10 勝見 武（京都大学大学院地球環境学室・教授）

講演
◆ 14:10～14:40 光や刺激で分解・修復する持続型新材料の開発 廣藤 敬（京都大学大学院総合生命学館・教授）
◆ 14:40～15:10 植物由来機能性および分解性ビニルポリマーの開発 佐藤 浩太郎（東京工業大学物質理工学院・教授）
◆ 15:10～15:40 プラスチックを検出するための化学センサーの設計開発 田中 一生（京都大学大学院地球環境学室・教授）

総合討論
◆ 15:55～16:55 コーディネーター：伊藤 峻一郎（京都大学大学院地球環境学室・助教）

閉会の挨拶
◆ 16:55～17:00 吉野 章（京都大学大学院地球環境学室・准教授）

2022年10月15日（土）14:00～17:00（開場 13:30）
ハイブリッド開催
会場：京都大学 北部総合教育研究棟1階 益川ホール
（会場定員：100名）
オンライン：Zoomウェビナー
参加無料 申込締切：10/12（水）

参加をご希望の方は、申し込みフォーム（QRコードまたは下記URL）からお申し込み下さい。
お申し込み頂いたEメールアドレスに【10/14（金）】にZoomウェビナーへの参加方法をお送りします。
Web申し込みURL：https://forms.gle/pMGR7onAALQ9VAbA
京都大学地球環境学室事務局・地球環境学室
Tel：075-753-5530 メールアドレス：forumsanka@mail2.adm.kyoto-u.ac.jp
（注：講演者、講演内容は事前の予告なく変更することがございます）



The 42nd Kyoto University Global Environmental Forum

October 15, 2022

現代の環境科学の発展を促すことにより、
 世界環境のよみがえり、ならびに、力のある未来社会の発展を促すことにより、
 地域にひろがるための環境教育を推進する。この目的を達成するために、今回は「環境教育の発展」をテーマとして開催いたします。
 皆様のご参加を、心よりお待ちしております。

はななり京都 嶋臺塾

第42回 平成31年3月20日(水) 午後6時~8時

湖畔を巡りて

浜海から: 「琵琶湖岸の保全から再生へ」
 西野 麻知子氏 (びわこ成蹊スポーツ大学 教授)

学童から: 「琵琶湖岸への外来植物の侵入と
 在来植物への影響」
 田中 周平 (地球環境学童 准教授)

● 本学に在り、お問い合わせ先
 (本学以外、外部関係者の方)
 京都大学 環境学童 事務局
 電話: 075-753-9630

後援: 環境学童・ライオン
 協賛: 京都府環境局
 事務局: 075-753-9630

司会: 深町 加津枝 (地球環境学童 准教授)
 主催: 京都大学 地球環境学童・学童・三才学林
 協力: 嶋 台 (上京区)

The 42nd Hannari Kyoto Shimadai-juku



(January 21, 2019)



International Symposiums (November 24-25, 2022)

Sansai Newsletter No.31 01 September 2022

SANSAI Newsletter

Photo by Daisuke UGATA

Page	Content	Date
2	Special Interview: Kazuo Nishikawa, Field of Biodiversity Conservation at the Department of Technology and Ecology	Jul 11, 2022
5	The 1 st Global Sansai Gateway Knowledge	Jul 28, 2021
9	Kyoto University International Online Symposium 2021 on Education and Research in Global Environmental Studies in Asia - Fostering International Cooperation with COI/O-Framework	Mar. 28-30, 2021
11	The 2 nd Global Sansai Gateway Knowledge	Dec 1, 2021
12	The 41 st Global Environment Forum: Challenges to Climate Change from the Viewpoint of the Global Level and Solutions	Mar. 19, 2022
13	Annual Report to CO2ES Member	n.d.

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Sansai Newsletter No.31 01 September 2022

Sansai Interview
 Kanto Nishikawa, Field of Biodiversity Conservation at the Department of Technology and Ecology
 (Continued on July 11, 2022)

Dr. Kanto Nishikawa
 -Interviewer-

Q: I liked it. I was more attracted and interested in something like evolutionary ecology.
 A: When you came to us, you were a graduate student.
 Q: Well, the closest thing to evolution. Well, they were similar. I had a teacher named Masahiko Minami, who was teaching a lecture on the natural history of animals, and he studied zoogeography. At first, I wanted to study fish, but he suggested that I should study zoogeography, which involves a little more than fish. Well, he told me something very interesting to that, so I got started.
 Q: They say that the organisms that live in ancient and places like that are very important.
 A: That's right. I had never had such a viewpoint, so I was interested in it.

Q: There's talk in of those on any content in your research that you find enjoyable or rewarding.
 A: My research is taxonomy, which is a job to find new species, so it's fun to catch frogs and salamanders that no one knows or has ever seen. It's rewarding to have someone whose I find something that no one else knows.

Q: I know that you have been to various overseas countries, but is it more likely that you will find with new species overseas?
 A: There's right. Also, all those are a lot of species in tropical areas, and research has not progressed yet, so there are many opportunities.
 Q: What is your scientific approach other than your observations?
 A: Examining DNA is already a normal approach now. For example, tadpoles and frogs. Tadpoles metamorphose into frogs, but after all, tadpoles and frogs are not the same. Tadpoles are like that, but they are completely different, so there are other ways to study. Also, sometimes they are the same thing even though they have different names. When I look at the genes of such a frog, I can understand how closely you can make out. Also, I can understand the phylogenetic relationship, and I use PCR, which is now so vague. There's a way that to investigate the DNA sequence.
 Q: Investigating the DNA sequence, I think that there are cases where you come across a new species that is not recognized, but are there many opportunities like that?
 A: It's a matter of the zoogeography field that has already been recognized.
 Q: There are still many things that are not recognized, and in a recognized area, there are two or three.

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SANSAI Newsletter No.31 (Published September 1, 2022)

Recent Collaborating Institutions for Internship Study

Private Sector

- IDEA Consultants, Inc.
- Ecommit Corporation.
- KANSO CO.,LTD.
- E-konzal
- Tsukudafarm Co., Ltd
- Agelle Co., Ltd
- FP Corporation.
- Green Power Investment Corporation
- HACHIOH Co., Ltd.
- Picchio Wildlife Research Center.
- Lago
- OKUMURA CORPORATION.
- Shigenori Uoya Architects and Associates
- Nippon Expressway Research Institute Company Limited
- Nakanojo power Co.,Ltd.
- TOSOH Analysis and Research Center Co.,Ltd.
- Hyakumori Inc.
- Mitsubishi UFJ Research and Consulting Co., Ltd.
- Sanyo Chemical Industries, Ltd.
- Shimin Energy Chiba Limited Liability Company
- SHIZEN ENERGY Inc.
- Matsui Kensetsu K.K.
- UEYAKATO LANDSCAPE Co., LTD.
- TERUKAZU NII & VASANTI MENON, ARCHITECTS & ASSOCIATES
- Toko Geotech Co.,Ltd.
- Technical Research Institute, Naruo, Civil Construction Div.,Toyo Construction Co., Ltd.
- JAPAN NUS CO., LTD.
- Mikuniya Corporation.
- NIPPON STEEL CORPORATION.
- Hinodeya Institute for Ecolife co. ltd.
- FEAST NPO
- Green Infrastructure Research Institute
- Satoyama Design
- Renewable Energy Institute
- Research Institute of Innovative Technology for the Earth (RITE)
- Institute for Global Environmental Strategies
- THE NATURE CONSERVATION SOCIETY OF JAPAN
- Hamamatsu Cultural Foundation

- Kyoto Environmental Activities Association
- THE MORI MEMORIAL FOUNDATION.
- Satoyama-Gakkou Tokyo
- Koganecho Area Management Center Information
- Institute for Sustainable Energy Policies
- Kiko Network
- Wetlands International Japan
- INOW Kamikatsu
- Kamoshida farm
- Fridays For Future

Ministry/Local Government/Universities

- Saijo City
- Okinawa Prefectural Enterprise Bureau
- The National Gardens Association Kyoto Gyoen National Garden
- Kyoto city zoo
- Kyoto Botanical Gardens
- Lake Biwa Environmental Research Institute
- Maibara City, Shiga Prefecture
- Okinawa General Bureau
- Policy Research Institute, Ministry of Agriculture, Forestry and Fisheries
- National Institute for Environmental Studies
- Kyoto University
- Tropical Biosphere Research Center University of the Ryukyus
- Japan International Research Center for Agricultural Sciences (JIRCAS)
- National Agriculture and Food Research Organization
- Research Institute for Humanity and Nature
- Research Institute of Environment, Agriculture and Fisheries, Osaka Prefecture

Overseas

- Center for International Forestry Research
- Global Environmental Institute
- International Center for Tropical Agriculture Vietnam
- ASCEM B.V
- E Guard Environmental Services
- Greenspace Architect Co.Ltd

- PT BambooLab Architect
- Representative Office of Hoffmann-La Roche Ltd. In Vietnam
- Forest Department Sarawak
- National Institute of Aeronautics and Space of Indonesia
- National Institute of Health of Thailand, Department of Medical Sciences, Ministry of Public Health
- National Parks Board, Singapore
- Papua New Guinea Forest Authority
- Sarawak Biodiversity Centre
- Nanjing Environmental Monitoring Center
- Da Nang University of Science and Technology
- Hanoi University of Science and Technology
- Heidelberg University
- Hue University
- Hue University of Agriculture and Forestry
- IPB University
- Khon Kaen University
- Lille University of Science and Technology
- Mahidol University
- Ocean University of China
- PTG International Youth College
- Tongji University
- Tribhuvan University
- University of Applied Forest Sciences Rottenburg
- University of Caen, Normandy/ IFSTTAR
- University of California, San Diego
- University of Zambia
- Vietnam National University of Forestry
- Walailak University International College
- Zhejiang University
- Development Planning Agency at Sub-National Level Badan Perencanaan Pembangunan Daerah Sukabumi Regency
- Motu Economic and Public Policy Research
- Thailand Development Research Institute
- Wuppertal Institute

(The results from 2019 to 2021)

After Graduation

Master's Program in Environmental Management

Private Sector

- JAC Corporation
- KPMG Consulting Co., Ltd.
- Accenture Japan Ltd
- Almec Corporation
- IDEA Consultants, Inc.
- Willis Japan Holdings K.K.
- EF-ON INC.
- Omron Healthcare Co., Ltd.
- Organo Corporation
- Konami Holdings Corporation
- Sharp Corporation
- Simplex Inc.
- Deloitte Tohmatsu Consulting LLC
- Pacific Consultants Co., LTD.
- Panasonic Corporation
- Mizuho Information & Research Institute, Inc.
- Metawater Co., Ltd.
- Yanmar
- Itochu Plastics Inc.
- Rakuten Group, Inc.
- IHI Corporation
- Kantar JAPAN
- Kubota Corporation
- Jtekt Corporation
- Spicebox, inc.
- Forward Co.,LTD.
- Fujita Corporation.
- The Boston Consulting Group
- MAHLE Filter System Japan Corporation
- Recruit Holdings Co., Ltd.
- Roland Berger Holding GmbH
- Okumura Corporation
- Kumagai Gumi Co.,Ltd.
- Konoike Construction Co.,Ltd.
- Sumitomo Mitsui Financial Group, Inc.
- Sumitomo Mitsui Banking Corporation
- Obayashi Corporation
- Yomiko Advertising Inc.
- Nikken Sekkei Ltd.
- Hitachi, Ltd.
- Hakuho Inc.
- Fujitsu General Limited
- Nomura Research Institute, Ltd.
- Marubeni Corporation
- Kurita Water Industries Ltd.
- Kokusai Kogyo Co., Ltd.
- Hanwa Co., Ltd.
- Sumitomo Mitsui Trust Bank, Limited
- Sanki Engineering Co., Ltd.
- Mitsubishi UFJ Research and Consulting Co., Ltd.
- Mitsubishi Chemical Engineering Corporation
- Shizen Energy Inc.
- Kajima Corporation
- Mori Trust Co., Ltd.
- Shimizu Corporation
- Nippon Telegraph and Telephone West Corporation
- Daiei Kankyo Holdings
- Osaka Gas Co., Ltd.
- Dai Nippon Printing Co., Ltd.
- Daiwa Energy Co., Ltd.
- Daiwa Securities Co. Ltd.
- Nagase & Co., Ltd.
- Shimadzu System Solutions Co., Ltd.
- Tokyo Metro Co., Ltd.
- Tokyo Electric Power Company Holdings, Inc.
- Toho Gas Co., Ltd.
- Toyo Construction Co., Ltd.
- Nissan Mortor Corporation
- Nippon Systemware Co.,Ltd.
- Nippon Television Network Corporation
- Nippon Koei Co., Ltd.
- Yachiyo Engineering Co., Ltd.

Corporate Organization

- Urban Renaissance Agency
- Kyoritsu Women's Educational Institution
- Institute for Global Environmental Strategies
- National Institute of Technology and Evaluation
- Japan International Cooperation Agency(JICA)
- Japan Railway Construction, Transport and Technology Agency
- Kyodo News
- Research Institute for Humanities and Nature

Ministry/Local Government

- Ministry of Agriculture, Forestry and Fisheries
- Ministry of Land, Infrastructure, Transport And Tourism
- Ministry of the Environment
- Wakayama Prefecture
- Tokyo Metropolitan Government
- Shiga Prefectural Office
- Kyoto City
- Miyazaki Prefecture
- Kobe City
- Kanagawa Prefecture

Overseas

- Ministry of Public Works and Housing
- Water Resources Department, Guangzhou, China
- Hue University of Sciences
- King Mongkuts Institute of Technology Ladkrabang
- Semarang State University
- Chamber of Industry and Commerce

Ph.D Program

- Kyoto University
- University of Tokyo
- Nagoya University
- Cambridge University
- Chinese University of Hong Kong
- University of Queensland

Doctoral Program

- E KONZAL
- Research Institute for Natural Capital Co.,Ltd
- OBAYASHI CORPORATION
- Toshiba Corporation
- Toda Corporation
- Sumitomo Riko Company Limited
- Smart Life Research Institute
- Willis Japan Holdings K.K.
- Sumitomo Forestry
- Kyoto Environmental Activities Association
- Institute for Global Environmental Strategies
- National Agriculture and Food Research Organization (NARO)
- Research Institute for Humanities and Nature
- Japan International Cooperation Agency(JICA)
- Japan Society for the Promotion of Science
- Ministry of the Environment
- Kyoto University
- KONAN UNIVERSITY
- Osaka Prefecture University
- United Nations University Institute of Advanced Studies
- MINISTRY OF PUBLIC WORKS AND HOUSING
- United Nations Development Programme
- IPB University
- Sher-e-Bangla Agricultural University
- Bandung Institute of Technology
- Hue University of Sciences
- King Mongkuts Institute of Technology Ladkrabang

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Department of Global Ecology

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Professor USAMI Makoto

Environmental Economics

Professor TAKEUCHI Kenji

Global Ecological Economics

Associate Professor MORI Akihisa

Sustainable Rural Development

Professor HOSHINO Satoshi

Associate Professor ONITSUKA Kenichiro

Program-Specific Sianipar Corinthias

Assistant Professor Pamatang Morgana

Water Environment Conservation

Professor FUJIWARA Taku

Assistant Professor NOMURA Youhei

Historical Geography and Culture

Professor YAMAMURA Aki

Associate Professor TOKUNAGA Yu

Environmental Marketing Management

Associate Professor YOSHINO Akira

History of Art and Culture

Professor TAKASHINA Erika

Environmental Education

Associate Professor ASARI Misuzu

Associate Professor TRENCHER Gregory

Senior Lecturer BAARS Roger C.

Department of Technology and Ecology

Environmentally-friendly Industries for Sustainable Development

Professor ECHIGO Shinya

Associate Professor TANAKA Shuhei

Environmental Infrastructure Engineering

Professor KATSUMI Takeshi

Associate Professor TAKAI Atsushi

Assistant Professor KATO Tomohiro

Global Environmental Architecture

Professor KOBAYASHI Hirohide

Associate Professor OCHIAI Chiho

Assistant Professor SUGINAKA Mizuki

Biodiversity Conservation

Professor ICHIOKA Takao

Professor NISHIKAWA Kanto

Landscape Ecology and Planning

Professor SHIBATA Shozo

Associate Professor FUKAMACHI Katsue

Assistant Professor NUKINA Ryo

Elemental Materials Chemistry

Professor TANAKA Kazuo

Assistant Professor GON Masayuki

Assistant Professor ITO Shunichiro

Department of Natural Resources

Regional Planning

Professor SAIZEN Izuru

Associate Professor ASANO Satoshi

Urban Infrastructure Design

Professor KAWASAKI Masashi

Associate Professor YAMAGUCHI Keita

Assistant Professor KOTANI Hitomu

Atmospheric Chemistry

Professor KAJII Yoshizumi

Assistant Professor SAKAMOTO Yosuke

Terrestrial Microbiology and Systematics

Professor TANAKA Chihiro

Associate Professor YOSHIMI Akira

Assistant Professor TAKEUCHI Yuko

Terrestrial Ecosystems Management

Professor FUNAKAWA Shinya

Associate Professor SHINJO Hitoshi

Assistant Professor SHIBATA Makoto

Integrated Environmental Studies

Professor KATSUMI Takeshi

Assistant Professor TAKEMAE Yumiko

Assistant Professor TADA Yuto

Program-Specific Assistant Professor ISHIKAWA Raga

Ecosystem Linkages and Human Society

Professor TOKUCHI Naoko

Professor TATENO Ryunosuke

Assistant Professor SUZUKI Keita

Project

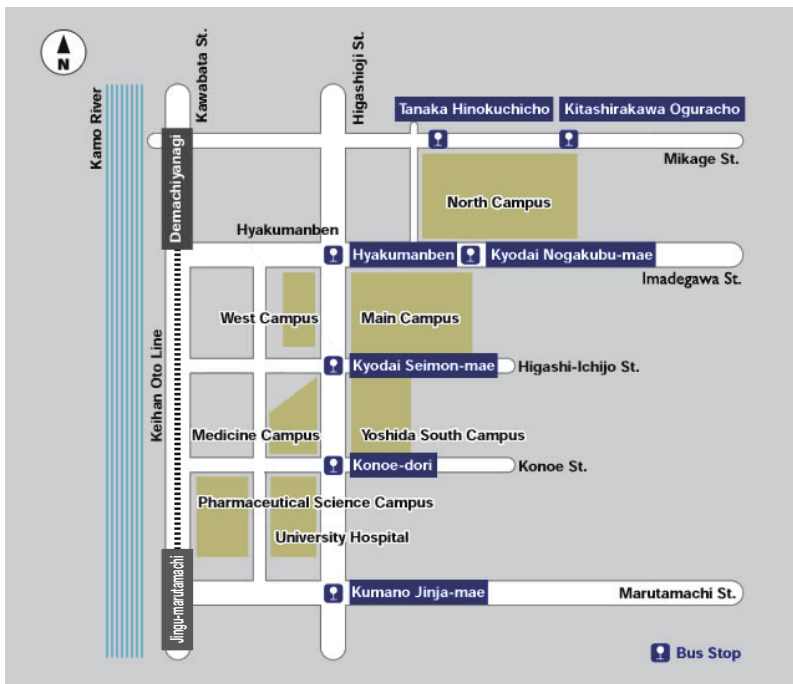
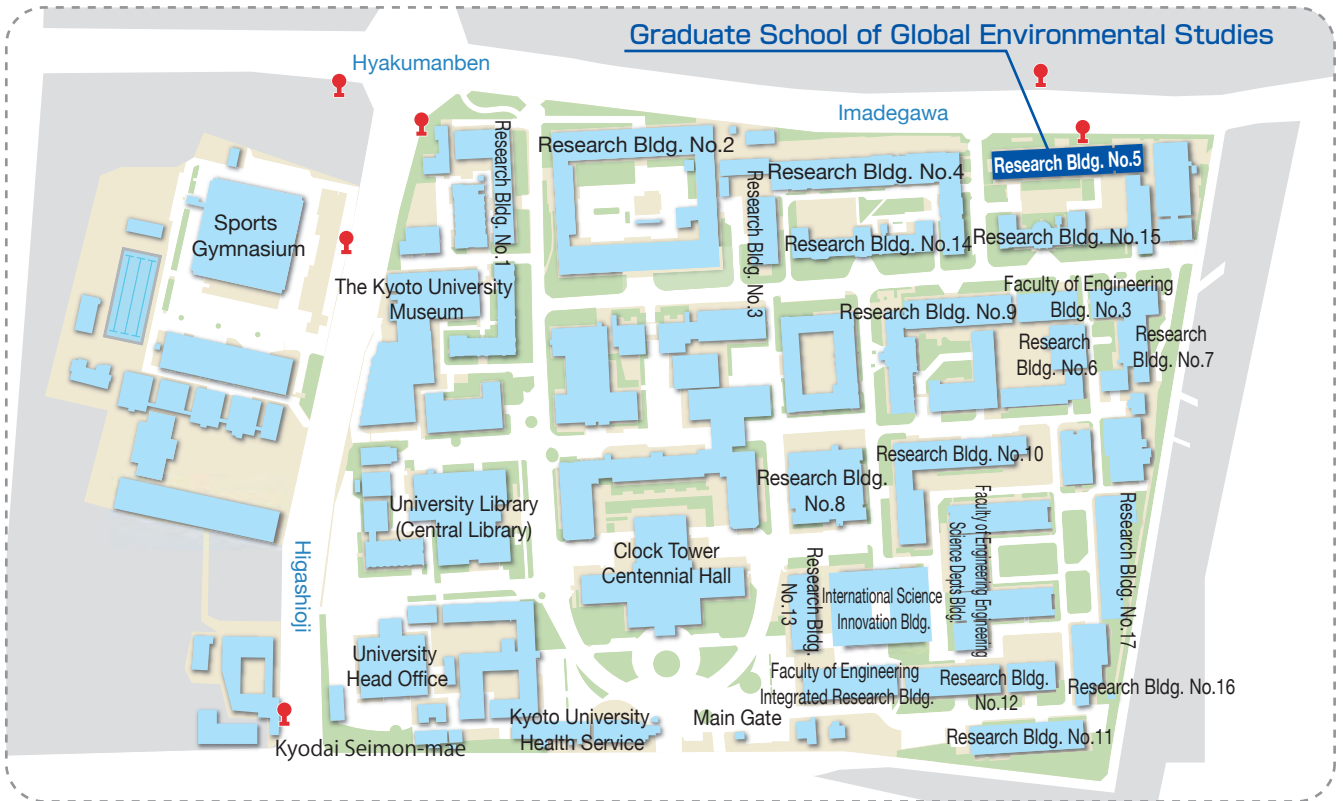
Environmental Innovator Program (EIP) -Cultivating Environmental Leaders across ASEAN Region-

Program-Specific Associate Professor BOONTANON Suwana Kitpati

Program-Specific Assistant Professor KAWAGUCHI Kohei

Location Map

Yoshida Main Campus



Graduate School of Global Environmental Studies
GUIDEBOOK 2023

地球環境学堂・地球環境学舎・三才学林 ガイドブック 2023

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