

International Spring School on Environmental Studies 2018

GSGES Kyoto University, Optional Laboratory Visit

1 Global Environmental Policy [Prof. Usami]

In the laboratory of Global Environmental Policy, we explore normative and positive questions surrounding environmental problems and policies on local, national, regional, and global scales. On one hand, foundational topics are studied in the perspectives of legal and political philosophy. One group of these topics concerns the issue of global justice, in which it is asked, for instance, 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 intergenerational justice, which relates to the question of what are grounds for the obligation that the present generation might bear to future people. On the other hand, we also make empirical researches on models of policy process, policy transfer, implementation, compliance by businesses, and governance for sustainability, by using concepts, theories, and methods in policy analysis, political science, and law and society.

2 Global Ecological Economics [Assoc. Prof. Mori]

Global Ecological Economics have two basic disciplines: (1) to clarify underlying economic, social and institutional factors that causes degradation of the environment and quality of life locally, nationally, regionally and globally, (2) to find out what kind of policy instruments, policy integration, financial and institutional arrangements are required to transform economic and industrial structure to advance sustainable development in the long term. In considering measures to counter the traditional economic challenges including poverty and depression, we need to take into account global environmental issues and the limits of global resources. This means that it is very important to clarify who should be responsible for promoting the development process and what kind of rule should be applied to this process in order to attain the quality of life needed for human society. We are just beginning to try to achieve a sustainable society which can assure the common global interest of citizens beyond the interest of nation states and enterprises. What is the sustainable society and what the world economic system which conserves the global environment and also realizes both intergenerational equity and North-South equity? If there is such a society, how can it be realized? Once it is realized, what kind of quality of life and what kind of lifestyle can we expect? These challenges are difficult to solve, but we are trying to do so, based on interdisciplinary research, including economics.

3 Environmental Education [Assoc. Prof. Singer]

Our research field is built on three pillars: (1) education for sustainable development (2) community resilience studies and (3) material cycles and low carbon systems and society. We aim to reduce the gap between knowledge and practice through pro-active, field-level, community-based education, research and project implementation.

Education for sustainable development (ESD) empowers individuals and communities to create a more sustainable future. Our activities include development of approaches for formal, non-formal and informal sustainability education as well as efforts to promote campus sustainability. Community resilience studies focus on migration and displacement induced by development, disasters and climate change, with special emphasis on dynamics of social networks and inclusion of multiple stakeholders to enhance well-being while preserving a community's natural resource base.

From conducting research, internships and projects collaboratively with universities, non-government organizations, international organizations, bilateral and multilateral development agencies and regional bodies, faculty and students develop unique community-based approaches for education, environmental management, communication and sustainable development.

4 Environmentally-friendly Industries for Sustainable Development [Prof. Fujii]

Japan has overcome severe environmental pollutions in 1960's and 70's, and became one of the most environmentally-advanced countries in the world. During this process, we accumulated vast amounts of knowledge, tools, and experiences for practically solving environmental problems such as environmental technologies, legal systems, and environmental policies. On the other hand, most developing countries in the Asia region are still suffering from serious environmental problems, and our experience has not been fully utilized. This is mainly due to the lack of international education systems for transferring environmental technologies and practical training for solving real environmental problems. Industries should be environmentally friendly in order to create sustainable development of global civilization. Environmentally friendly industries should promote resources recycling, energy saving, and avoid the use of hazardous substances. In this laboratory, through various research projects, we will foster environmental leaders who have the ability to solve environmental problems in the world. Preservation and management of water environment, promotion of resources recycling, and development of energy saving industries are studied by using many kinds of tools, such as water quality analysis, micro-pollutant analysis, water and micro-pollutant treatment technologies, land use data analysis from satellite images.

5 Environmental Infrastructure Engineering [Prof. Katsumi]

The environmental sustainability of the subsurface should be maintained for a long period of time since it is crucial for life and society. This laboratory mainly focuses on the study of recycling technologies of various wastes as geo-materials, on remediation technologies for contaminated lands, and on proper containment and management of hazardous materials.

The main research topics are 1) Recovery from huge disasters, 2) Proper Waste Disposal, 3) Conservation of the Geoenvironment, 4) Environmental impact of recycled materials.

6 Environmental Biotechnology [Prof. Miyashita]

Photosynthesis is the most important reaction that supplies huge chemical energy into the Earth's ecosystem. Algae and phototrophic bacteria in aquatic environments as well as land plants in terrestrial environments carry out the reaction and play a key role as primary producers in each ecosystem.

We are interested in the biodiversity of phototrophic microorganisms, especially in the cyanobacteria and microalgae those are key phototrophs for forming and preserving aquatic ecosystems, and their photosynthetic mechanisms. Targeting to those organisms we work on broad range studies in their ecological distribution, biodiversity, genome, molecular mechanism of photosynthesis, evolution, genetic engineering and so on. Based on these studies, we also aim to develop an environmentally-friendly technologies for the production of low materials using those phototrophs.

7 Environmentally-Friendly Energy Conversion [Prof. Abe]

Our society is facing on the environmental and energy resource problems. Effective utilization of energy resources is the feasible method to solve the these problems. We are performing the fundamental research of electrochemical energy conversion devices such as fuel cells and rechargeable batteries. In particular, we focus on the "interface" at which the electrochemical reactions proceed and try to clarify the fundamental concept to enhance the rate and the reversibility of the interfacial reaction.

8 Regional Planning [Assoc. Prof. Saizen]

The Research Group of Regional Planning (RGRP) was established to explore the sustainable rural development of target regions (especially in Japanese rural areas or developing countries) by taking full advantage of existing regional resources, such as human, natural, historical resources and so on. Most of the RGRP members consist of Lab. of Regional Planning (LRP) members and RGRP meetings are officially approved as the several classes for master and doctor course students of LRP under Global Studies of Global Environmental Studies (GSGES), Kyoto University.

The main purpose of RGRP is i) to find out the solutions of global/regional environmental problems through the appropriate evaluation and effective utilization of regional resources and ii) to propose concrete plans for them based on the academic evidences. The current target areas (April, 2015) are China, India, Indonesia, Japan, Laos, Mongolia, Philippines, and Vietnam. Each of the RGRP members is conducting interdisciplinary activities covering the both humanities and sciences.

9 Ecosystem Production & Dynamics [Prof. Osawa]

Dry matter production, plant community dynamics, and plant ecological and physiological functions that produce observed ecosystem patterns in forests and other major ecosystems have been investigated based primarily on two perspectives. First is the study of structural dynamics and its mechanisms of forest ecosystems. Tree-ring analysis, mathematical models, and ecological field work are used in combination. Carbon dynamics and carbon accumulation of boreal forests are being estimated in addition to their patterns in the past in northwestern Canada, Finland, Estonia, and Japan. Boreal forests are ecosystems where the effects of global warming are likely to appear early. Second is the research that analyzes internal structure of stem wood. It examines relationships between size and distribution of water-conducting vessels and leaf opening, shoot extension, or growth rate of trees using the methods of ecological wood anatomy, as well as stable isotopes and tree eco-physiological techniques. Trees in tropical regions, Thailand and Malaysia, are being examined along with those in temperate climates.