

## **1. Outline of the plan for establishing the COE**

In this Global COE program, on the basis of a large number of achievements made by the Yokohama National University including the 21<sup>st</sup> Century COE program and in collaboration with the National Institute for Environmental Studies (NIES), we hope to contribute to the proper control of ecological risks in the developing nations in Asia. Throughout Asia, ecosystems are being destroyed, and ecosystem services are being significantly degraded, as a result of population growth and economic development. Toward this goal, we aim to:

- 1) Analyze and present a vision of international risk management as well as its basic method and system incorporating an Asian perspective into the Millennium Ecosystem Assessment (MA) of the United Nations.
- 2) Investigate and analyze the ecosystem functions of forest vegetation, soil, and coastal regions of Asia. Present in detail a method for adaptive risk management, including the management of invasive species.
- 3) Develop and apply a concrete and practical method for risk management for ecosystem services in the developing nations of Asia. These services include control of pesticides, fertilizers, and other harmful substances, as well as the advanced usage of biomass, genetically modified products, and recycling of waste substances.
- 4) Organize an international network of researchers, municipalities, companies and citizens in order to connect “basic studies,” “application case studies,” and the “proposals of a new social system” based on a new policy idea.
- 5) Establish an international center for human resource development for young researchers (with training experience described below) on the basis of items 1) to 4) above.

The most common approach to environmental policy appears to differ between Europe and North America. There is a tendency for European policy makers to stress precaution, while Americans focus more on adaptive management. This controversy has in part arisen due to the immaturity of ecological risk analysis, which provides a platform for environmental policy. Specifically, the main reason for disagreement in the international arena is considered to be due to the absence of the following two perspectives: 1) the perspective of adaptive risk management, i.e., that adaptive *ex post facto* verification is necessary for the precautionary principle and that the adaptive management, when uncertainty is taken into account, inevitably becomes the precautionary adaptive management; and 2) the perspective of developing countries in Asia that the use of ecosystem services inevitably entails ecosystem risk and that policies will require both risks and use of services to co-occur. Natural resource management will likely involve voluntary agreements and customs in addition to legislation, regulatory requirements or other mandatory systems.

Therefore, in this plan, we aim to develop a vision and a basic procedure for adaptive risk management presented by the 21<sup>st</sup> Century COE so as to be able to establish a new basic approach in the international arena; to apply this approach to environmental risk management in various developing countries in Asia, capitalizing on the academic infrastructure information and network accumulated in our university; and to establish a center for human resource development that will produce world leaders in this field. We will accomplish these goals by applying to the entire curriculum the experiences we have accumulated in the first risk management course in Japan.

Education plan: We intend to cultivate students’ creativity to enable them to work independently in new domains. At the same time, we aim to 1) develop the ability to write the scenario based on an objective analysis and comprehension with a broad perspective; and 2) launch the International Education Curriculum for Environmental Risk Management (provisional name), with the goal of producing young researchers who can lead global environmental activities in the future. The curriculum will emphasize the ability to formulate a broad human network and to negotiate social activities at home and abroad.

Capitalizing on the experience of offering lectures, seminars and workshops on ten subjects in a curriculum that combines the natural science and human science in the 21<sup>st</sup> Century COE, as well as having planned an international workshop for youth, we intend to 1) launch a hands-on training program, which will send students overseas, so that they can cultivate experience in different academic fields, and 2) provide the various economic support system including public recruitment of the COE fellow (DC), dispatching researchers overseas and inviting them from abroad targeting the students in the doctor course.

Research plan: We intend to 1) develop an adaptive risk management method and put it into practical application; 2) develop a method to analyze risk trade-offs, in order to comparatively measure risks in different dimensions; 3) make an international comparison of environmental governance and the nature park management system, in which plural and diverse entities collaborate on environmental management; 4) construct, propose, and apply case studies for evaluation, forecast, and management of the ecosystem risks; 5) investigate and analyze the ecosystem functions in the forest vegetation, soil, and coastal regions of Asia; 6) propose evaluation and management methods regarding biodiversity and invasive species; 7) propose a technique for assessment of the impact of harmful substances such as fertilizers on the ecosystem, marine products, or water usage, and use these assessments as the basis for a suitable adaptive management method; 8) develop/apply techniques to sustain ecosystem services, including social systems that enable recycling and advanced usage of living resources/waste; and 9) construct/develop an infrastructure for knowledge and information for the environmental science and administration of ecosystem risk management, based on trust-based relationships with data providers all over the world.

Aiming to establish an international center for research and education mentioned above, we will:

- 1) Set up a) Theories and Methodology Group, b) Ecosystem Functioning Group, c) Ecosystem Services Group, and d) a team to foster internationally-minded human resources. The team described in d) will consist of the representatives of each group from a) to c), a Vice-President of the University in charge of education. These team members will cultivate a close relationship with each other, achieved through the regular steering committee meetings and plenary sessions comprising the Yokohama National University and the National Institute for Environmental Studies.
- 2) Undertake basic research, application and implementation of research results in a coordinated manner, through an international network consisting of the universities and research organizations in a cooperative agreement with our university. These institutions include Tsinghua University in China, Prince of Songkla University in Thailand, the University of Redlands in the US, the Institute for Global Environmental Strategies (IGES) in Japan, the United Nations University, the human network comprising the graduates of our university who remain actively involved in various pertinent activities in Asia, and the network comprising the government organizations, companies, and NPOs.
- 3) Establish an external evaluation committee in Japan and overseas, and seek opinions frequently for improvement.
- 4) Reinforce faculty membership in important fields such as agricultural management in Asia. Recruit tenure-track assistant professors and COE fellows (postdocs), both in Japan and abroad, on the subjects covered in this program.
- 5) Expand and bolster divisions related to international cooperation, such as the International House, the Foreign Student House, and programs to promote international exchange and cooperation.