Creating Strategies for Global Sustainability

Integrated Research System for Sustainability Science (IR3S)

2006

IR3S

Integrated Research System for Sustainability Science

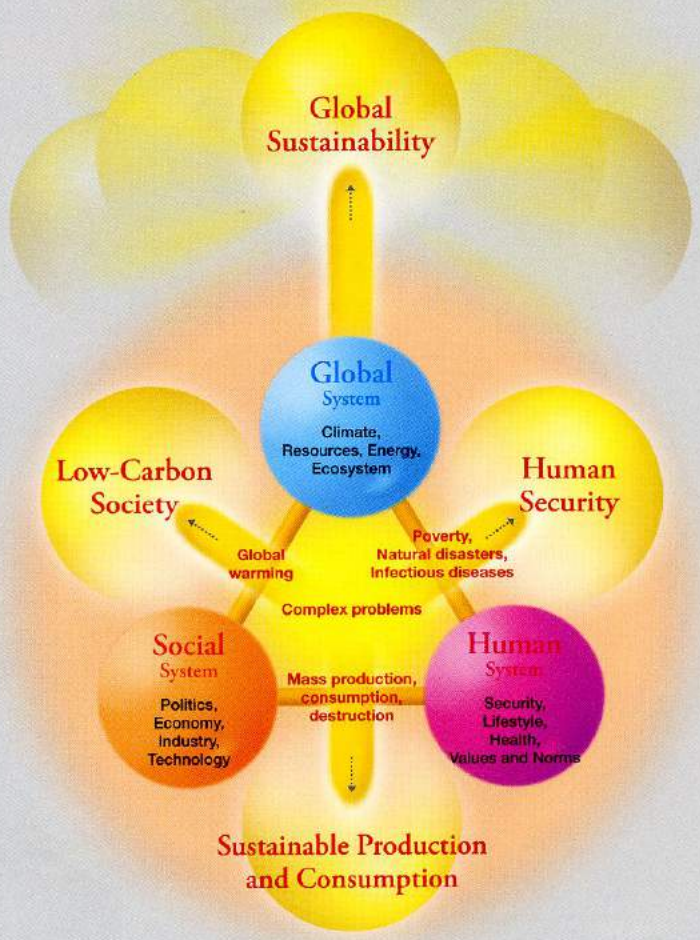
What is sustainability science?

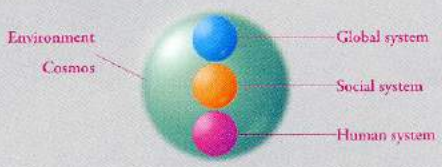
Sustainability is a key concept in any discussion of science, technology and economics in the 21st century, the Century of the Environment. Sustainability science is a new, transdisciplinary field that seeks to address the urgent problems we face in this century by developing visions and strategies to create a sustainable global society.

Rebuilding and repairing global, social and human systems

Research in sustainability science examines three kinds of system: global, social, and human. All three systems, and the interactions among them, are crucial to the coexistence of human beings and the environment. The current global sustainability crisis has much to do with the breakdown of these systems and their linkages.

The global system comprises the energy, natural resources, and ecosystems that support human life on this planet; the social system consists of the political, economic, industrial and technological structures created by society; and the human system is the sum total of factors affecting the survival of individual human beings, including lifestyles, health, safety, and values. Global warming is a salient example of a problem that stems from the interaction of the global and social systems, while one issue linking the social and human systems is how to construct a resource-circulating society, i.e. one capable of sustainable production and consumption. Development of a global crisis management system represents a challenge involving the human and global systems. A particular concern of sustainability science is to identify the mechanisms that threaten these systems and their interconnections. IR3S sees as its ultimate objective the development of visions and policies for rebuilding the global, social and human systems and repairing the links between them.





What is IR3S?

**IR3S is a research network founded with the aim of serving as a global research and educational platform for sustainability scientists.
Administered by the University of Tokyo, it consists of five participating universities — Kyoto University, Osaka University, Hokkaido University, Ibaraki University, and the University of Tokyo — and four cooperating institutions — Toyo University, the National Institute for Environmental Studies, Tohoku University, and Chiba University.**

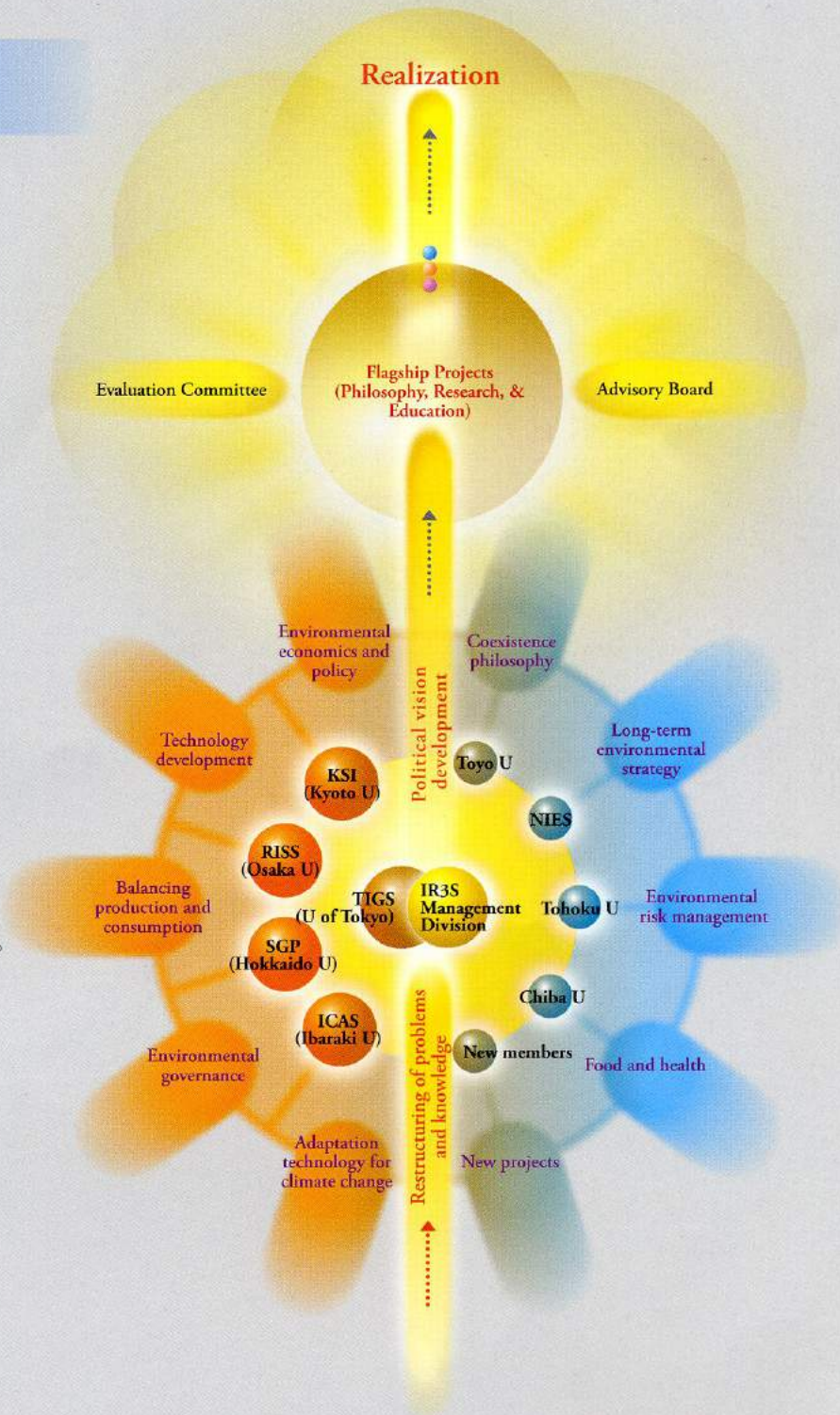
Joint research by a close alliance of universities and institutes

Sustainability science by definition embraces a broad range of phenomena and principles. The goal of IR3S is to help develop and expand sustainability science as an academic discipline, beginning with collaborative efforts by nine Japanese institutions with demonstrated potential for research and education in this field. Emblematic of these joint efforts are the flagship projects of IR3S in the three categories of Philosophy, Research and Education. The Research category comprises the following three flagship projects.

◉Flagship project ①
〈**Sustainable measures to mitigate and adapt to global warming**〉
The University of Tokyo, project leader; Ibaraki University, co-leader

◉Flagship project ②
〈**Building a resource-circulating society in Asia**〉
Osaka University, project leader; Hokkaido University, co-leader

◉Flagship project ③
〈**Global sustainability — conception and development**〉
Kyoto University, project leader



Initiatives by participating universities and research institutions

The University of Tokyo

Transdisciplinary Initiative for Global Sustainability (TIGS)

Structuring issues and knowledge to build global sustainability strategies

TIGS pursues an issue-driven approach to the complex and broad-ranging problems of the global environment so as to obtain an overview of these problems, their structure and their interrelationships. Equally important is the structuring of knowledge and problems to overcome the limitations of conventional discipline-oriented research by initiating transdisciplinary efforts to find comprehensive and practical solutions to these problems. In light of Asia's critical role in global sustainability, TIGS will utilize the Asia-based network of IR3S in its research on sustainability.

Building a center of active intellect

Akimasa Sumi [Executive Director, TIGS]

The realities confronting academia today demand an integration of knowledge, particularly of science, technology and the humanities. However, we must be aware that the scholarship now required is not something isolated from existing individual disciplines. Rather, it is an effort to develop the framework necessary to reorganize the current store of knowledge more effectively and systematically. This effort can be sustained only if the organization, management, and motivation to tackle new problems are in place.

Researchers in any field tend to attack the problems that they think they are the most likely to solve. Now, however, we face problems that we must solve, like it or not. TIGS aims to pursue intellectual initiatives at the university level that break new ground on this front.

Kyoto University

Kyoto Sustainability Initiative (KSI)

Socio-economic reorganization and technological strategies

KSI is engaged in developing sustainability science on the basis of an original perspective recognizing the dynamic mutual interactions and interdependence of the environment, the economy, and technology. As the global environment degrades, technological innovations must be accelerated to preserve the environment. The existing socio-economic system must also be reorganized so as to encourage these technological innovations and incorporate them as smoothly as possible. KSI aims at proposing the best, most cost-effective and attainable technological strategies to secure the sustainability of society for our common future.

The "Kyoto model" of sustainability science

Takamitsu Sawa [Director, KSI]

Kyoto University has the potential to be one of the "centers of excellence" in the field of sustainability science, possessing ample human resources to carry out research in such fields as the environment, energy, disaster prevention, green chemistry, regional studies, and environmental economics. Kyoto University believes it has a responsibility to explore strategies to attain technological development as well as social reform that will preserve the global environment and realize a sustainable society. In the next academic year Kyoto University will inaugurate a masters course in sustainability science at its Graduate School of Global Environmental Studies, offering a diverse and comprehensive curriculum of courses taught by members of KSI. Through these research and education initiatives, we intend to offer what we call a "Kyoto model" of sustainability science.

Osaka University

Research Institute for Sustainability Science (RISS)

Designing a closed-loop economy with eco-industrial technology

RISS aims at designing a closed-loop economy through the development and application of eco-industrial technology. Its projects include

❶ designing visions and strategies to achieve a society that minimizes the environmental burden through the circulation of resources;

❷ designing urban and regional systems that prioritize the use of eco-technology and industrial ecology; and

❸ designing low-impact and high-efficiency production technology.

"Where there's a will, there's a way"

Masao Toyota [Director, RISS]

RISS is committed to the realization of a secure and resilient society that ensures human fulfillment and development in harmony with the natural environment. To this end we are engaged in transdisciplinary efforts to design a sustainable-resource economy through eco-innovation in science and technology. Our goal can be summed up as "contributing to society through the creation, cultivation, and dissemination of knowledge."

A primary objective is to devise sustainable socio-technical systems and provide scenarios and roadmaps for their realization. RISS plans to achieve this ambitious goal by integrating disciplines, utilizing Osaka University's extensive knowledge base and its considerable strengths in eco-technological design, and advancing our understanding of sustainability.

Hokkkaido University

Sustainability Governance Project (SGP)

Global governance and a sustainable bio-production zone

SGP addresses four basic themes — two in research and two in education. Its research themes are

❶ creating a Northern Biomass Production Zone Simulator, and

❷ developing proposals for sustainability governance.

Its educational themes are

❶ creating a sustainability science international education system, and

❷ establishing a Japan node office for the Global Land Project (GLP) with the aim of building an international research and education network.

Toward a philosophy of governance

Mitsuru Osaki [Director, SGP]

In ancient India, people faced the same threat of environmental catastrophe as we do today. The great king Ashoka thereupon decreed that every person should plant and care for five trees: one each for medicinal use, fruit, firewood, housing materials, and flowers. This "panchavati" (grove of five trees) policy was nothing less than an early instance of environmental preservation or "sustainability governance." Inspired by concepts found in the *Bhagavad Gita*, the Indian philosopher and activist Satish Kumar today speaks of a "new trinity" of soil, soul and society to connect humanity more directly to the natural world. Philosophically speaking, sustainability science may owe much to the attempts of the ancient Indians to grapple with humanity's ultimate challenge: how to live in harmony with our environment.

Ibaraki University

Institute for Global Change Adaptation Science (ICAS)

Adapting to climate change in Asia and the Pacific

ICAS focuses primarily on global warming and climate change. There are two approaches to addressing these problems: prevention of warming through reduction of greenhouse gas emissions on the one hand, and adaptation to a warming environment on the other. Given the profound effects of climate change on the Asia-Pacific region, the development of frameworks, policies and measures for adaptation is a critical issue for the region's sustainability. ICAS will study adaptation in a range of fields such as disaster prevention, societal safety and security, agriculture, and urban environments and lifestyles.

Living with global warming

Nobuo Mimura [Director, ICAS]

Small island countries in the South Pacific are threatened by rising sea levels and climate change and variability. People in developing countries in Asia and the Pacific face significant threats from climate change, even though they do not contribute much to global warming. When we consider countermeasures against global warming, we usually mean reduction of greenhouse gas emissions through energy conservation and other preventive measures. But what is an appropriate response for people in the aforementioned countries? The answer lies in the phrase "living with global warming" — in other words, adaptation. Though it may sound passive, adaptation in the broad sense means securing the conditions for survival — including safety, security, food and water — that are the basis for sustainable development. "Living with global warming" is a concept compatible with sustainability science that can be shared by all countries in the world, whether developed or developing.

Toyo University

Utilizing the wisdom of East Asia, pioneer in coexistence and sustainability

Toyo University proposes an "eco-philosophy" that addresses problems and tensions across the breadth of contemporary society, aiming for a harmonious coexistence not only between humanity and the environment, but also between present and future generations.

National Institute for Environmental Studies

Devising international strategies for global warming

NIES works toward the development of international strategies focused on global warming, the most prominent and pressing issue facing sustainability science.

Tohoku University

Focusing on human health

Tohoku University proposes a "regional sustainability science" in the area of health risk management, a critical component in the creation of a social system amenable to sustainable regional development.

Chiba University

Addressing food and health issues

A sustainable society requires the establishment of regional communities that ensure human health and fulfillment. Chiba University focuses on sustainability in the interrelationship of food sources, people, and the environment.

Education for a sustainable society

Training experts with a global perspective

The five participating universities of IR3S will jointly launch the Sustainability Science Education Program, a masters program for training professionals capable of working in the international arena to build a sustainable society. With English as the primary language of instruction, the program aims to produce graduates who fully grasp the diverse, global and transdisciplinary nature of sustainability issues and are equipped to work toward sustainability in practical societal contexts. The program also aims to develop methodologies and curricula for sustainability education that can provide a benchmark for similar programs at universities around the world.

By admitting students who wish to minor in sustainability science as well as those seeking a masters degree, the program will offer opportunities for students with different levels of interest in sustainability issues to acquire a solid grounding in the field. Participating universities will make credits transferable and plan to enable students in the program to obtain dual degrees. Remote lecturing will be utilized to overcome the physical distance between universities.

Intensive Program on Sustainability

As a prototype of the masters program, the five IR3S universities, in collaboration with the Asian Institute of Technology (AIT), Bangkok, Thailand, have already launched the Intensive Program on Sustainability to train the next generation of leaders in Asia by providing on-site learning opportunities in locales facing environmental problems. With the objective of fostering the practical, consensus-building knowhow demanded for international problem-solving efforts, this is an intensive short-term program with a flexible curriculum that can vary according to the needs of the time and place. The program is open not only to students at the five IR3S universities but to students and researchers at other institutions in Japan as well as cooperating universities in Asia, the Pacific, Europe and North America.

What is education for a sustainable society?

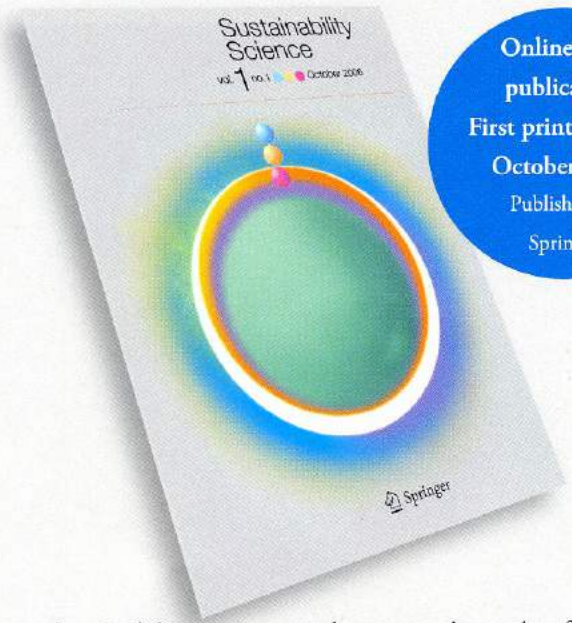
Takashi Mino
[Professor, Graduate School of Frontier Sciences, The University of Tokyo]

In the debate over how to ensure the sustainability of the global environment, we must avoid fixating on the oft-cited complexity and diversity of the problems at hand at the expense of seeking the essential truths of the matter. Nor will we get anywhere if we spend our time debating the terms of debate. The time is past for seeking narrow "solutions" to isolated environmental "problems"; the challenge for us is how to build a sustainable social system that is all-encompassing in outlook. We have left the era of trouble-shooting and entered one that demands the creation of a society built on a new set of values. The education required for this task is not one of schooling in discrete areas of knowledge but of training in the application of one's knowledge through hands-on experience. In other words, education now must foster a sensibility that leads to behavioral choices that support sustainability. The sustainability education program of IR3S aims to cultivate such a sensibility by offering students the opportunity to study concrete examples of sustainability in action and confront a diversity of values and perspectives.

Sustainability Science

The official journal of
the Integrated Research System for
Sustainability Science (IR3S)

Sustainability Science **is an international English-language journal that takes a transdisciplinary approach to the study of sustainability science.**



Online First publication
First printed issue: October 2006
Published by Springer

Sustainability Science not only presents the results of IR3S-related research, but solicits manuscripts on the latest work in the field from around the world. The editorial board is an international roster of leading scholars in sustainability science and the journal is published in print and online by Springer, a global publisher known for its work in science.

Sustainability Science particularly seeks to understand the interactions among global, social, and human systems. The journal features articles and reports that examine the linkages among these systems and propose solutions to the problems that threaten them. The journal also welcomes proposals for the development of policies in collaboration with industry and the public that lead to global sustainability. Relevant areas include environmental and human security, eco-friendly technology, closed-loop economy design, solutions to food-water-population issues, and comprehensive society-wide measures to conserve energy and mitigate global warming.

A description of the journal (Aims and Scope), editorial board list, and instructions for authors can be viewed on the following website:
http://www.springer.com
(search for "Sustainability Science")

Editorial Board

Organization and origins of IR3S

The Integrated Research System for Sustainability Science (IR3S) is composed of five participating universities, four cooperating institutions, and a Management Division under the directorship of Hiroshi Komiyama, president of the University of Tokyo. The Management Division coordinates the IR3S-related activities of the participating and cooperating institutions. It is responsible for overall planning and administration, including supervision of the collaborative flagship projects carried out by these institutions, as well as forming a corporate sustainability consortium and engaging in outreach to society at large.

A four-year plan to establish a research and education base

IR3S was created in 2005 when the University of Tokyo received funding from the Special Coordination Funds for Promoting Science and Technology of Japan's Ministry of Education, Culture, Sports, Science and Technology (MEXT) for the purpose of forming a sustainability science research network. The University of Tokyo solicited proposals from interested universities and research institutions in Japan and, through a process of rigorous evaluation by an International Review Panel, selected the current roster of participating and cooperating institutions. Following a symposium aimed at more clearly defining sustainability concepts and issues, IR3S formally launched a four-year program of research and educational activities in 2006.

Integrated Research System for Sustainability Science (IR3S)
The University of Tokyo
7-3-1 Hongo, Bunkyo-ku, Tokyo 113-0033, Japan
[Fax]—+81-3-5841-1545
[E-mail]—info_ir3s@.u-tokyo.ac.jp
[Website]— http://www.ir3s.u-tokyo.ac.jp/

IR3S
Integrated Research System for Sustainability Science

"Creating Strategies for Global Sustainability"

Edited and published by
the Integrated Research System for Sustainability Science
Publication date: July 31, 2006
Designed by Kohei Sugiura, Atsushi Sato,
and Kaoru Shimada
Printed by Sanshusha Co., Ltd.

Supported by MEXT through Special Coordination Funds
for Promoting Science and Technology