

Environmental Report

Abridged version

2013



HOKKAIDO
UNIVERSITY

Opening up the Future of Hokkaido University via the Power of Individuals and the Strength of the Establishment as a Whole

In June 2013, Professor Keizo Yamaguchi (the President of Hokkaido University (HU)) and Professor Yasuhiro Yamanaka (the Director of the Center for Sustainability Science) informally discussed a number of themes, including the nature of sustainability at HU and the challenges that lie ahead in this regard. They talked about thoughts and ideas they wished to convey to students and researchers at the university.



Brainstorming to solve real problems

Yamanaka: When you became HU President, you laid out three principles: diversity, the convergence of all efforts with individuality, and tolerance. The term *tolerance* here stood out to me. Previously, the term *diversity* was often used to describe the need to allow different values in the consideration of sustainability. Does the use of the word *tolerance* represent a step forward from this line of thinking?

Yamaguchi: Universities try to respect free thinking among individual researchers; this is what diversity's about. On the other hand, we also have to display individuality in our role as the entity known as HU, which involves the strength of the establishment as a whole. However, these concepts are diametrically opposed, so a spirit of tolerance for their coexistence is needed.

Yamanaka: We were all looking in the same direction toward growth in the 20th century, weren't we?

Yamaguchi: Well, the development of science has transformed our society, but the myth that science keeps helping society to improve no longer holds. I think this is where the need for sustainability was first introduced. To solve real problems, we need to

stay at the forefront of learning, but society can't improve if we do what we believe is good for it only on an individual basis.

Yamanaka: Whenever I explain the term *sustainability*, I say it's a way of continuing to live. I say that just eradicating nuisances to stay alive is simply survival, while sustainability involves developing advantages on top of this.

Yamaguchi: It involves the fusion of science and the humanities as a factor, doesn't it?

Yamanaka: Yes. We're in a period where there are no right or wrong answers, so we should present options for people to choose from.

Yamaguchi: Right. Now's the time to brainstorm, isn't it?

Yamanaka: Yes. Some things need to be decided by universities, but members of the general public should also consider and choose options. We should present choices together with researchers in science and technology as well as in social sciences, and then build a consensus. I think this kind of learning is what we need today.

Yamaguchi: Human history shows that cultures have grown on foundations of free thinking, but

Keizo Yamaguchi

President
Hokkaido University



Keizo Yamaguchi graduated from Kyoto University's Faculty of Science, earned a Master's Degree at Nagoya University's Graduate School of Science, and completed the Doctoral Program at Kyoto University's Graduate School of Science. He specializes in differential geometry. Before becoming the 18th President of the University in 2013, he assumed the posts of Advisor to the President of Hokkaido University in 1999 as well as the positions of Executive (in charge of education, student affairs and other matters) and Vice President of the University in 2011. In the same year, he also became the Executive Director of the Institute for the Advancement of Higher Education, the Director of the Admission Center, and the Director of the Front Office for Human Resource Education and Development.

Yasuhiro Yamanaka

Director
Center for Sustainability
Science



Yasuhiro Yamanaka graduated from the Graduate School of Science at the University of Tokyo. He received a doctorate for his research achievements on Marine Ecosystem-Biogeochemical Cycle Modeling at the University of Tokyo's Atmosphere and Ocean Research Institute (AORI). He became the leader of a Global COE (Center Of Excellence) Program in 2008, and has served as the Director of the Center for Sustainability Science since 2012.

we need to be conscious of how our activities relate to society rather than only having self-serving ideas. It's significant that people are particularly aware of this when they're young.

The Goal of Making Hokkaido University Even More Relevant and Helping it to Mesh with Society

Yamanaka: I think it's good for students and researchers to go off campus as a way of learning to lead efforts to solve Hokkaido's problems. What's your view on this?

Yamaguchi: Universities are no longer ivory towers. It's important to educate students in collaboration with society and engage in research based on social needs rather than just staying absorbed in research on campus.

Yamanaka: In line with the concept of sustainability, I think it's important to transcend generations because life is finite.

Yamaguchi: That's right. We're developing a curriculum with an eye on sustainability. I also plan to develop related programs on an undergraduate level.

Yamanaka: We're doing our best at the Center for Sustainability Science, too.

Yamaguchi: We need to encourage young people to think about how they can help.

Yamanaka: Future universities need to be flexible in opening up to outsiders too. In fact, the budget-saving review of government programs a few years ago was a turning point for me. It made me think about the real purpose of universities. Today, universities need to mesh with society.

Yamaguchi: HU has a unique initiative called CoSTEP, or the Communicators in Science and Technology Education Program. It helps people from the university and elsewhere learn how to communicate effectively in the fields of science and technology. In related developments, the way information is communicated today is changing. I believe we highlight HU's role in local communities as a university located in Hokkaido. We should make this known across Japan.

Learning valuable lessons from mistakes on campus: the value of creative ideas

Yamaguchi: Students tend to be bound by the uniquely Japanese idea that it's hard to start over again if you fail in something. How can we get rid of this way of thinking?

Yamanaka: The Center for Sustainability Science works on the principle of making plenty of mistakes to generate occasional successes.

Yamaguchi: I think it's important to make lots of small mistakes.

Yamanaka: Yes. Students should probably make mistakes. This is illustrated by the question of whether cherry blossoms are in full bloom or not. They're not if they haven't fallen yet. They're in full bloom only when the number of petals opening and the number falling are in equilibrium. In the same way, students are probably doing their best when there's this kind of turbulence. They can be forgiven for making mistakes, I guess. As a university, we should encourage them to do so.

Yamaguchi: That's right. We should tell them that the paths to their goals aren't always straight.

Yamanaka: We could even tell them they can still

earn credits if they make mistakes, or that they can't earn credits unless they make mistakes.

Yamaguchi: I wish we had such a system.

Yamanaka: It's just a thought I had. Japan's birthrate decline and population aging are among the most marked in the world, and this is particularly the case for Hokkaido. The successful implementation of related experiments in the region will help to reassure the rest of Japan and the world. Outside universities, people may have tough lives at the moment. However, we can still use creative thinking on campus, so I believe we have a chance to use our creativity to bring affluence in the future. I think we'll show our commitment to our students and build affluence together. That's the scenario I imagine.

Yamaguchi: I hope that's what happens. I'd like to hear lots of ideas on how Sapporo can thrive as a region. I'd like to find the true strength that unites diverse individuals. Of course, our students are from all over the country and have their own ambitions, so I'd also like to help them move toward their dreams.



Hokkaido University Environmental Policy

September 5, 2005

Policy Statement

Hokkaido University is a national university with a central role in Japan's academic research and human resource development (e.g., researcher capabilities), and supports the country's knowledge foundation for the 21st century. In this role, it is committed in all its activities to protecting the environment on local and global scales and to building a sustainable society.

Basic Principles

Hokkaido University shall establish an Environmental Management System to implement the goals of its Policy Statement, and shall set and achieve environmental objectives as outlined below in conjunction with university staff, students and everybody else on campus. The university shall also make efforts to ensure that ongoing environmentally friendly activities take root by publicizing them on campus and providing relevant information to the public.

1. Consideration for the global and local environment via education and research

HU shall foster the development of individuals with high degrees of specialization through the promotion of a wide variety of educational and research activities relating to global and local environments, and shall produce outstanding research achievements.

2. Social contribution via the provision of information on the environment

HU shall help to raise awareness of the need for environmental consideration in local communities and society as a whole through efforts to educate and to make people aware of environmental education and research program results.

3. Reduction of the university's environmental footprint

HU shall make efforts to reduce its environmental footprint via the promotion of energy and resource conservation, cyclical resource usage and green purchasing along with thorough implementation of chemical substance control and other measures.

Simultaneous Studies on Rivers and Forests

Futoshi Nakamura

Professor, Research Faculty of Agriculture

Rivers cannot be understood through observation alone

In Japan, river and forest researchers used to only observe their respective targets. In contrast, Professor Futoshi Nakamura of the Research Faculty of Agriculture, worked on a project to investigate ecosystem connections in the US state of Oregon under the Japan Society for the Promotion of Science's Postdoctoral Fellowship for Research Abroad program when he was a lecturer. He examined the connections between rivers and forests for two years there, and has also explored rivers and forests in Japan.

All of Japan's 109 Class A rivers are managed by the central government, and national statistical data have conventionally been used to accurately assess the situation of biodiversity in the country. However, Prof. Nakamura saw an additional need to map current biodiversity conditions and related assessment results, and to this end developed maps providing information needed to make judgments on the value of ecosystems. Areas that encompass rare species habitats are often considered important, but those where ordinary species live are also significant. Prof. Nakamura's mapping is considered to have facilitated decisions on areas to be conserved in order to protect as many species as possible with limited budget resources.

Not just either/or choices

Prof. Nakamura also conducted a survey on the Kushiro Wetland — the largest wetland in Japan — and the surrounding region to observe catchment areas as a whole. Since the Ramsar Convention came into force in 1980, the approximately 20,000-ha area of the wetland itself has been protected. However, agriculture and forestry activities in an upstream area covering approximately 250,000 ha have resulted in increased pollutant loads on the wetland. Usually, wetlands evolve into forests over thousands of years, but natural change is occurring six to seven times faster than normal in Kushiro due to anthropogenic factors. Measures to combat this are considered necessary.

Discussions on the natural environment and people's activities commonly include either/or choices. An example of this is seen with the stalemate that has stalled talks between individuals who advocate keep-

ing an existing dam and others supporting its removal. However, the option of improving the dam could also be considered. Production and ecosystem conservation are not necessarily diametrically opposed. In Hyogo Prefecture, farmers grow rice without using agricultural chemicals so that stalks are conserved, and the rice is sold under the Stork Rice brand. This rice is highly popular among school children and parents for use in school lunches.



Living by our own yardsticks

Prof. Nakamura believes that science should not determine value, and that one of the roles of scientists is to highlight the variety of values that can be considered.

Japan has a declining birthrate and an aging population. Although population shrinkage is seen as problematic, Prof. Nakamura is level-headed about the issue. He believes we should change our values because abandoned farmland can be restored to wetland and provide habitats for red-crowned cranes, although there are downsides to such a value change because salaries may not rise as they did during the nation's period of rapid economic growth. He is rather more concerned that the sight of children playing in rivers has now become so rare. An increasing number of Japanese people have never experienced the joy of playing in rivers or other outdoor places. Prof. Nakamura expects students to develop the ability to think for themselves by gaining a wide range of hands-on learning experiences and to live by their own yardsticks. He also wants young researchers to experience other countries rather than staying exclusively at the university, believing that HU should continue to be an institution where previous students wish to return.



A talk on connections between rivers and forests with JICA trainees (from Africa, Central America and other developing countries) on a long-term training program in Hokkaido



Field survey at a wetland restoration site in the US state of Florida

1. Research for a brighter future

Research that provides solutions to environmental and energy problems is the greatest contribution universities can make to society. Hokkaido University undertakes nationally and internationally high-profile research in a variety of fields in this regard.

Turning Biomass into Resources Using Activated Charcoal

Atsushi Fukuoka

Professor and Director, Catalysis Research Center

Production of bioethanol from waste left after sugarcane juice extraction

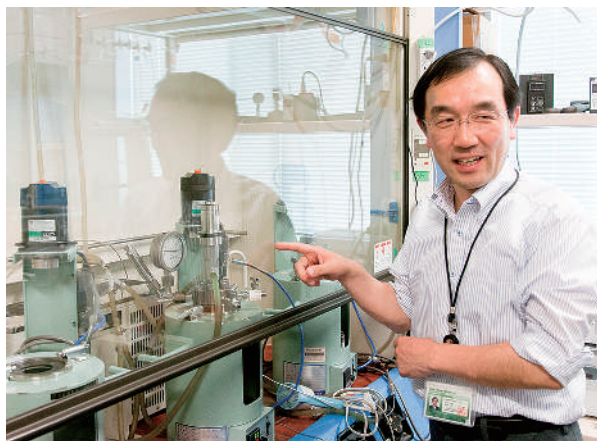
Based on the view that resource-poor Japan's existing resources should be used more effectively, Professor and Catalysis Research Center Director Atsushi Fukuoka succeeded in saccharifying biomass with high efficiency using readily available activated charcoal as a catalyst. The term *biomass* refers to renewable, biologically derived organic materials other than fossil resources, but plant biomass (e.g., Chinese silver grass, rice straw) was used in his experiment. As a result of trial and error with different materials, Prof. Fukuoka managed to efficiently produce glucose and xylitol from sugarcane bagasse (waste left after juice extraction). Glucose is a raw material used in the production of bioethanol and biodegradable plastics, and xylitol is effective in preventing cavities.

As opposed to the acid catalysts used in conventional research on biomass degradation, Prof. Fukuoka succeeded in using alkaline-treated activated carbon — a method that previously seemed unfeasible.

Efforts to produce a catalyst superior to enzymes

Catalysts and natural enzymes facilitate chemical reactions. However, the latter have the drawbacks of high expense and the need for accurate temperature and pH settings. With catalysts, not all expected reactions take place; only 90% or so materialize. However, as these substances are man-made, they can be used under various conditions such as environments with heating and acid conditions. They are also affordable and can be used repeatedly. Based on these benefits, Prof. Fukuoka seeks to produce a catalyst superior to enzymes and is enthusiastic about trying new approaches.

Catalysts make a substantive yet unrecognized contribution to chemistry, but are particularly interesting



to researchers because a small change to a catalyst dramatically alters chemical reactions, which can in turn benefit society. A student from Prof. Fukuoka's laboratory devotes himself to research in the field, saying, "I realized at an early stage that I'm not great at organic chemistry, but I may be able to apply my efforts to solve global environmental issues in the world of catalysts, where organic chemistry, inorganic chemistry and physical chemistry come together."

The importance of novelty for research

As research must be original in order to be significant, Prof. Fukuoka always asks his students what is new in their work. He says individuals who are well suited to research can talk about science theoretically and consider abstract concepts as concrete. For example, students with an aptitude for research understand the connection between environmental issues and charging for plastic bags at supermarkets. They do not believe that shale gas and methane hydrate are silver-bullet solutions to fuel shortages simply because stocks of them will last as long as 100 years. Although these energy resources are expected to replace petroleum, they cannot be used as raw materials for plastics because chemical transformation does not occur readily with them other than via combustion. Individuals who can consider both their own generation and future generations are needed as researchers.



Student-based Identification and Resolution of Problems at Hokkaido University

Sustainable Campus Contest

Campus improvement based on students' perspectives and ideas

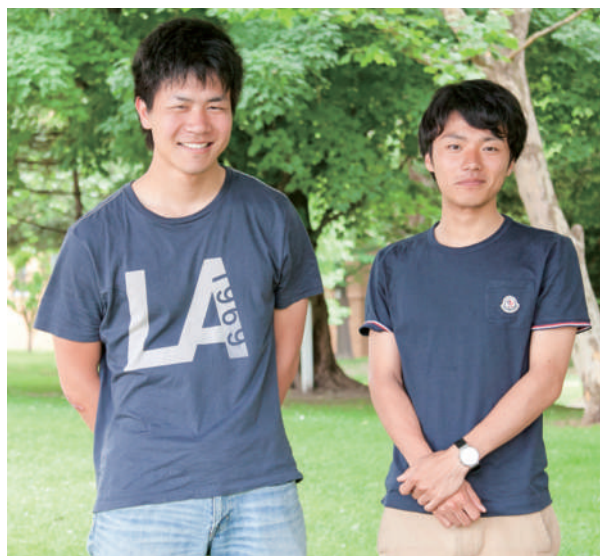
The Sustainable Campus Contest, which has been held annually since 2010, is a Sustainability Weeks event hosted by students and organized by the Student Council for Sustainable Development (SCSD; a student organization). (For more information on the Sustainability Weeks and SCSD, see p. 37 and p. 13, respectively.)

As explained by SCSD representative Mr. Yusuke Matsuo and Mr. Yoshiyuki Inoue, the contest provides HU students with opportunities to raise issues they feel affect HU based on their research or daily lives and to present solutions. If the judges deem their ideas feasible and effective, HU will finance their implementation by the students who suggest them. An example of a successful proposal was the establishment of a poster management committee to improve the usage of bulletin boards that students could use freely in joint-use buildings, and HU supports related activities.

Limited number of entries in 2012

The 2012 Sustainable Campus Contest presentation themes were: 1. The Connected Vehicle Project: This initiative involved experimental on-campus usage of clean-energy-powered bicycle taxis (known as Velotaxis) and electric low-carbon carts (LCCs) to support the examination of roles for forms of transportation other than buses and cars on campus; 2. TFT-Hokkaido: Table for Two, or TFT, is a system under which restaurants in developed countries serve healthy meals and donate the equivalent of 20 yen for each one to support healthy school lunches for children in developing countries; and 3. Creation of a Communication Center at Hokkaido University: This project is intended to support the creation of a community center on the HU campus as a forum for networking among HU students, staff and local residents.

Only three entries were made in 2012 (significantly less than the eight proposals received in 2010), and



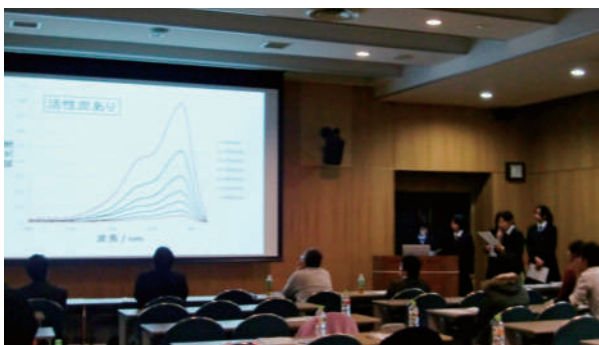
SCSD representative Yusuke Matsuo (left) and Yoshiyuki Inoue (right)

there was room for improvement in terms of presentation content and contest publicity. On the positive side, however, university students from Tokyo and Osaka as well as local high school students came to observe the contest, and individuals from outside HU also participated.

Pre-event planned for 2013

To further promote the event and support the resolution of problems facing HU, SCSD is preparing for the next contest. As a new pre-event, plans are under way to operate a Talk Café as a platform for informal discussion of everyday problems.

SCSD members look forward to welcoming a significant number of participants from the campus and elsewhere. The organizers hope people will see HU's problems as affecting the whole of the JR Sapporo Station North Exit district where the university is located rather than only the university itself, and that HU students and individuals from outside the campus will engage in fruitful exchanges of opinions.



Sustainable Campus Contest 2012



2. Pivotal roles for strong-willed students

Hokkaido University works to enrich its undergraduate and graduate programs with the goal of enhancing students' awareness of the environmental sustainability concept. Related initiatives by students voluntarily engaging in environmental activities have recently taken on a higher profile.

Having Students Tackle Environmental Issues as a Way of Building their Abilities

Exercise in Local Science, Faculty of Letters

Problem resolution training based on consideration of crow-related issues and other difficulties

Many people think that only science courses offer the study of subjects related to environmental issue resolution. However, Hokkaido University's Faculty of Letters offers a unique specialized subject called Exercise in Local Science in the first semester of the second academic year. Graduate School of Letters Assistant Professor Shirow Tatsuzawa and five other faculty members teach the subject to about 30 students, including some from other faculties.

The course consists of 14 to 15 classes, with the first half designed to equip students with basic survey-related techniques. These include methods of accessing literature/maps and critically viewing resources and statistical data using binoculars, digital cameras and other tools. Annual field excursions to Shizunai, Akan, Shiretoko and other places are also part of the course. The latter half highlights examples of common environmental issues. Problems with the local crow population have been highlighted since 2009 after an on-campus attack by a crow resulted in a head injury. Students choose themes (such as on-campus crow distribution and HU student awareness of crows), consider possible solutions and summarize them in presentation files.

Students also improve the techniques they learn from classes on the Outdoor Survey Method Training course in the first semester of the third academic year, and demonstrate their mastery of these methods in a bachelor's thesis during the fourth academic year.

No correct answers

One of the objectives of the Exercise in Local Science course is to help students realize there are no correct answers. People often fall into the habit of thinking in dichotomy before graduating from high school be-

cause they always look for "right" answers. However, environmental problems generally have more than one solution. To ensure students realize this, the course attaches importance to 1) processing one's own opinions and information, and 2) listening to other opinions in the field.

Another objective of the course is to encourage students to consider HU's issues as problems that also affect local communities.

Crow-related issues and waste problems are ideal topics in this regard. In off-campus fieldwork, students engage in various activities such as quantifying animal populations and talking with locals, business people and government officials. As a lack of social experience on the part of students often causes them to make mistakes, Assistant Prof. Tatsuzawa provides them with opportunities to display the ability for independent judgment and encourages their growth as local problem solvers, believing it is important that students learn from their mistakes rather than avoiding making them in the first place. He also says students should develop the ability to think for themselves and question common wisdom.

Hokkaido University — a place where students can follow their true passions

Assistant Prof. Tatsuzawa specializes in the ecology of wild animals, and says Hokkaido University is probably the only Japanese university where research on ecology is performed in the Faculty of Letters. This may be due in part to Hokkaido University's traditional placement of special emphasis on practical learning, research diversity and research independence. Tatsuzawa previously engaged in research on sika deer on Yakushima Island and in Nara Park. He received a proposal to engage in collaborative research from a group of scientists in Siberia while considering reindeer in this study, and today also engages in research on the ecological management of reindeer and wolves in conjunction with ethnic minorities in the northern region. Believing that only Japan forces students to follow either humanities or science courses, he encourages his students to carefully consider what they want to do on campus without the constraints of such a boundary.

Assistant Prof. Tatsuzawa hopes that students will develop the character and ability to follow their true passions beyond the walls that separate faculties from other faculties, universities from other universities, and HU from society.



Assistant Professor Shirow Tatsuzawa



Crow observation on campus

Contribution to Africa beyond National Boundaries and Fields of Specialization

Hokkaido University Research Network with African Countries (HURNAC)

Mayumi Ishizuka

Professor, Graduate School of Veterinary Medicine

Networks for the study of African issues

The Graduate School of Veterinary Medicine runs a research project on environmental pollution in conjunction with African countries. The initiative was selected as a Japan Society for the Promotion of Science (JSPS)* Core-to-Core Program, and international research exchanges and symposia have helped to expand related networks. The project was launched after Graduate School of Veterinary Medicine Professor and toxicology expert Mayumi Ishizuka visited Zambia. During the visit, locals sought advice from her in relation to environmental pollution whose causes were unknown. Rapid resource development and urbanization have brought environmental chemical pollution to African countries, and issues such as the use of agricultural chemicals and the dumping of electronic waste exacerbate the problem. Despite this situation, there is insufficient information to accurately assess the current state of environmental pollution and take effective measures. Against this backdrop, the network was established to implement collaborative work involving researchers from a variety of different fields. The inaugural symposium held in 2007 was attended by only five countries, but now attracts more than 50 individuals from a dozen or so countries each time.

*The Japan Society for the Promotion of Science (JSPS) is an independent administrative institution carrying out programs based on four concepts: 1. support for research through Grants-in-Aid for Scientific Research programs; 2. promotion for the development of the next generation of researchers through Research Fellowships for Young Scientists; 3. international scholarly collaboration; and 4. support for university reform.

Efforts to promote research by involving local residents

Based on a belief that research activities should involve local researchers, Prof. Ishizuka and other project participants work with their counterparts at the University of Zambia — an institution with ties to Hokkaido University. Researchers from advanced countries sometimes treat nations in which they conduct research simply as places for sample collection, and fail to return their research achievements to benefit these

countries. Local residents view such cases as “sad research.” Against this backdrop, the Graduate School of Veterinary Medicine invites young researchers in Ghana, Egypt, Ethiopia and other countries to HU to study environmental pollution issues.



The organization of presentations highlighting research results and information exchanges is actively pursued. The Recent Advances in Research on Environmental Toxicology symposium attended by young researchers from Africa was held at the Graduate School on February 28, 2013, closely followed on March 1 by a Hokkaido University Research Network with African Countries (HURNAC)-hosted lecture meeting entitled *People in Africa and their Environment — Contribution to Africa from Hokkaido*. While the morning session was conducted in English, lectures were delivered in Japanese in the afternoon session to encourage the participation of non-researchers too.

Africa’s multiple problems

Many undergraduate and graduate students are interested in conducting field surveys, but cannot visit African countries easily due to the distance and cost involved (in contrast to Asian countries) as well as issues with security and sanitation. Nevertheless, Prof. Ishizuka makes every effort to encourage students in this regard based on her desire to further build the fledgling research network already in place and broaden the scope of research in order to contribute to African development.

She emphasizes that Africa’s multiple problems require students to adopt a broad perspective when considering issues such as environmental pollution. Field studies in Africa require the ability to communicate in English, but Prof. Ishizuka believes that having the desire to make one’s ideas understood is more important.



Collection of cattle urine and blood for a survey on environmental pollutants (Zambia)



Survey on environmental pollution in lakes and marshes based on observation of fish and birds (Ethiopia)

3. Connections with the world and new pinnacles of achievement

Hokkaido University has established networks at home and abroad to address global warming and other issues that require worldwide collaboration, and seeks to work with and learn from other universities. To these ends, it actively hosts symposia and other events on related topics.

International Exchanges Involving Non-Researchers

Overseas inspection tour by Office for a Sustainable Campus staff

Consideration of campuses in Amsterdam and Cambridge

Dr. Maki Komatsu (a coordinator at the Office for a Sustainable Campus) and Mr. Yoji Tanaka (a Unit Chief at the Sustainable Campus Promotion Division of the Facilities Department) visited VU University Amsterdam in the Netherlands from February 7 to March 19, 2013. To investigate the actual situation of industry-academia-government collaboration and other matters, they met with Dr. João Romão from the Department of Spatial Economics (part of the Faculty of Economics and Business Administration), who used to conduct research at Hokkaido University, and others. They also visited the University of Cambridge and Oxford Brookes University in the UK from March 4 to 6 to investigate the roles of environmental offices and other matters.

Does the principle of all faculties being equal really guarantee equality?

Dr. Komatsu and Mr. Tanaka learned a number of things on their visit to the university in Amsterdam. In this city (the capital of the Netherlands), the municipal government and the private sector engage in close collaboration for favorable time management and quality. However, there is room for improvement in the university's participation in this collaboration. The institution plans to build a new campus with a long-term perspective as a foundation for industry-academia-government collaboration.

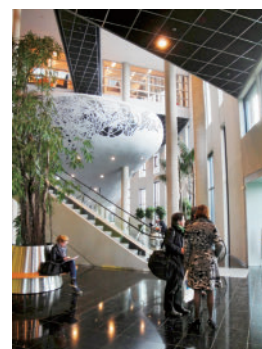
The two visitors found that the University of Cambridge promotes energy conservation through competition by inviting its undergraduate schools to submit energy-saving project ideas, and that the central

government allocates a budget for the initiative.

Due in part to encouragement by the EU and the respective countries' central governments, these universities have positioned industry-academia-government collaboration and energy consumption reduction as part of a campus-wide strategy. With a long-term perspective, they strive to create compact campuses based on space sharing by limiting the number of buildings, and also save energy based on competition among undergraduate schools rather than focusing on the pursuit of equality. Hokkaido University can learn a lot from these approaches.

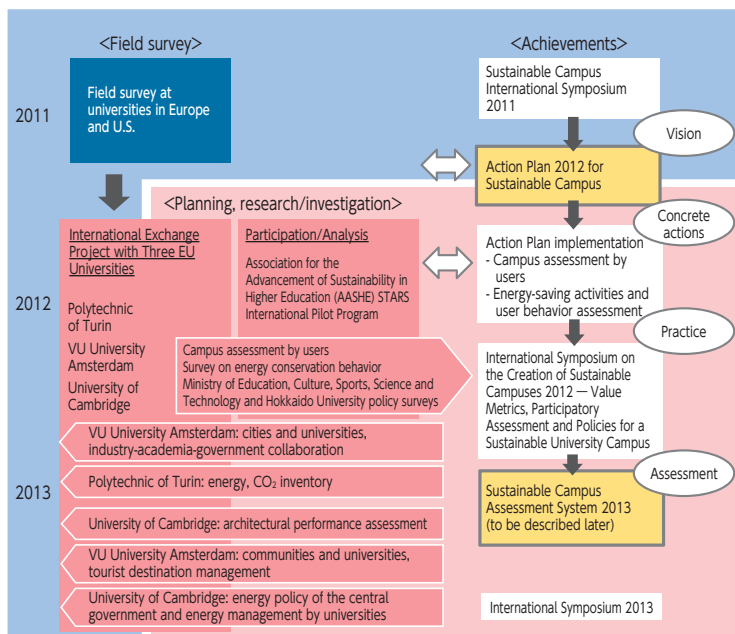
Ongoing investigation and research after the visit

Research on comparison of the industry-academia-government collaboration frameworks at Hokkaido University and VU University Amsterdam is still in progress. Between 600 and 900 researchers at the universities will be asked to fill in a questionnaire on industry-academia-government collaboration to support the identification of elements necessary for an ideal framework. A look at these elements and the results of evaluation under the Sustainable Campus Assessment System 2013 (see p. 13) is expected to provide insights that will contribute to the future development of such collaboration.



Inside VU University Amsterdam

Office for a Sustainable Campus Action Framework for International Networking



The Hokkaido University Office for a Sustainable Campus promotes events and research activities based on the framework shown in the figure on the left. In December 2011, Hokkaido University entered into an agreement with three EU universities (Polytechnic of Turin (Italy), University of Cambridge (UK) and VU University Amsterdam (Netherlands)) to conduct collaborative research in order to support the development of strategies for building sustainable campuses and related assessment systems. Based on this agreement, the projects described below are under way.

- **University campus assessment**
Supervising institutions: Polytechnic of Turin and Hokkaido University
Investigation of existing assessment systems and assessment indicators; setting of assessment criteria for cross-comparison of reform methods and sustainability strategies
- **User involvement in living campus**
Supervising institutions: VU University Amsterdam and Hokkaido University
Examination of campus blueprints for the future through user assessment:
Campus users gathered and submitted the results of campus assessment based on the viewpoints of academic characteristics, creativity, sustainability and regional qualities, and proposed strategies for the future.

Developing a Sustainable Campus

At the 2008 G8 University Summit, the Sapporo Sustainability Declaration was adopted, stating the determination of universities to “be the driving force behind the development of a sustainable society”. Currently, universities are being asked to contribute to efforts toward sustainability through research and education while acting as role models for a sustainable society by promoting the use of their campuses as living laboratories.

In order to construct this model, Hokkaido University established the Office for a Sustainable Campus in November 2010, which serves as the institution’s core organization promoting campus sustainability. In March 2011, Hokkaido University became a pioneer university in Japan to formulate Action Plan 2012 for a Sustainable Campus. We set a long-term goal of reducing carbon dioxide emissions by 35% from 2005 levels by the year 2030 and agreed to set second-phase medium-term goals by the year 2015.

In July 2011, we launched an Environmental Impact Reduction Promoter system to put people in charge of implementing the action plan. We completed the Sustainable Campus assessment 2013, thus establishing a structure to check on the efforts and continuously make revisions in order to fully implement a sustainable campus.

Office for a Sustainable Campus

The office’s three divisions cooperate to carry out the following tasks and maintain an environmentally friendly campus.

Division of Campus Assessment

- 1) Develop plans to achieve campus sustainability
 - Formulate action plans for campus sustainability to be implemented in conjunction with the Medium-term Goals, the Medium-term Plan and the Campus Master Plan.
- 2) Implement Campus Sustainability Assessments
 - Identify specific indicators to assess progress toward campus sustainability and build a comprehensive environmental evaluation system taking the university’s characteristics into consideration. Publish assessment results on the campus and elsewhere.
- 3) Devise Participatory Projects
 - Develop projects throughout the school in which both students and faculty can participate.
 - Disseminate information regarding the above activities and results and expand the scope to a campus neighborhood or regional environmental management program.
- 4) Establish Domestic and International Networks
 - Cooperate with international campus sustainability networks.
 - Collaborate with local communities in making effective use of the university’s various resources.

Division for Reduction of Environmental Impacts

- 1) Develop Plans for Environmental Impact Reduction
 - Develop plans for the achievement of CO₂ emission

reduction goals.

- Establish energy conservation design guidelines.
- 2) Promote Energy Conservation Measures
 - Promote energy consumption monitoring and database compilation.
 - Promote energy conservation measures in relation to facility development and management.
 - Develop energy conservation technologies that make the most of campus characteristics.
 - 3) Apply Intellectual Property to Campus Environments
 - Study the feasibility of environmental impact reduction technologies using campuses as laboratories.

Environmental Preservation Center

- Create a system for separating and collecting waste and recyclable resources.
- Put together information on campus waste and develop a system for integrated waste management.



Energy conservation patrol carried out in the winter

Policy	Area	Plan	Main Details	
1 Eco-friendly Activities through Education and Research	11 Education	1.1.1	Education for Sustainability <ul style="list-style-type: none"> • Provide university-wide courses and graduate courses focusing on sustainability. • Provide guidance on sustainability to first year students and create necessary brochures. • Promote activities for constructing a sustainable campus, such as Sustainability Week. 	
		1.1.2	Student Activities for Sustainability <ul style="list-style-type: none"> • Provide incentives for students to organize sustainability activities. • Provide information about sustainability-related publications and activities held both at the university and elsewhere. • Create websites and social network pages to disseminate information. • Develop an environment where students can work together with Office for a Sustainable Campus. 	
	12 Research	1.2.1	Promote the campus as a study field for research on Environmental Impact Reduction <ul style="list-style-type: none"> • Create research data about environmental impact reduction within the university. • Create specific research topics about environmental impact reduction using the campus as a study field. • Support public research applications for sustainability and environmental impact reduction. 	
2 Social Contribution through Dissemination of Information about Environmental Issues	21 Informing the Public Both Inside and Outside the University	2.1.1	Publicizing information about activities and achievements in environmental impact reduction <ul style="list-style-type: none"> • Publicize information about Hokkaido University's activities and achievements in environmental impact reduction. • Disseminate information about the university's activities in environmental impact reduction through environmental reports, websites, events, information centers, social networks, etc. 	
		2.1.2	Development of various strategies for education <ul style="list-style-type: none"> • Promote educational activities to faculty and students through visualization of environmental impact. • Create a university environmental information website. • Reach out to the public regarding ideas and projects for environmental impact reduction. 	
	22 Working Together with Local Communities	2.2.1	Working together with local communities on sustainability issues <ul style="list-style-type: none"> • Hold lectures in which citizens can participate. • Provide sustainability education to local elementary, junior high and high school students. • Through effective use of university resources, foster cooperation and collaboration between faculty, students, and the local community. 	
		2.2.2	Working together with the government on sustainability issues <ul style="list-style-type: none"> • Through cooperation and collaboration with the government, implement joint events and exchange information about sustainability. • Consider plans to set up a working group with the local government aimed at reducing environmental impact around campus (transportation planning, energy conservation planning, open space planning, etc.) 	
		2.2.3	Working together with private companies on sustainability issues <ul style="list-style-type: none"> • Consider measures to promote a sustainable campus through university collaboration with private companies. • Contribute to reduction of society's carbon dioxide emissions through environmental impact reduction technologies. 	
	23 Establishing Domestic and International Networks	2.3.1	Establishing domestic networks <ul style="list-style-type: none"> • Strengthen cooperation and exchange of information regarding sustainable campuses. • Implement joint research on sustainable campuses with other domestic universities. 	
		2.3.2	Establishing international networks <ul style="list-style-type: none"> • Participate in international pilot projects operated by associations for sustainability at North American institutes of higher education. • Implement joint research with EU3 Universities. Hold symposiums together with Seoul National University. • Participate in international conferences and symposiums on sustainable campuses. Plan and hold international conferences at Hokkaido University. • Join associations for sustainability at North American institutes of higher education as well as international sustainable campus networks. 	
3 Environmental Impact Reduction in University Management	31 Ecosystem	3.1.1	Ecosystem conservation on our campus <ul style="list-style-type: none"> • Study how to create and utilize databases based on ecological surveys. • Review guidelines for development activities and ecological preservation. • Formulate policies on maintenance management and conservation of green spaces. • Create guidelines for utilizing campus green spaces. • Formulate guidelines for maintenance management of the Sakushukotoni River, which is the backbone of the water system. • Examine plans for creation of a tree belt around the periphery of the campus and an elm grove. 	
		32 Northern Forest Project	3.2.1	Promote northern forest project <ul style="list-style-type: none"> • Advance carbon dioxide fixation capabilities through adequate management of experimental forest cleaning and thinning, reforestation, and silviculture. • Study forest certification, create carbon credits, and operate carbon offsets. • Establish events, business trips and mechanisms to offset campus carbon dioxide emissions. • Study methods for cooperation and collaboration with local government, forestry cooperatives, and local communities.
	33 Energy Saving Measures in Buildings		3.3.1	Thorough planning for energy efficient designs <ul style="list-style-type: none"> • Thorough implementation of energy saving designs in new construction and renovations. • Improve the level of energy saving designs by using CASBEE, etc. • Consider performance-based contract criteria allowing retro commissioning. • Introduce a system capable of measuring building units' energy consumption in real time. • Verify the effect of energy saving methods in new construction and renovations.
			3.3.2	Installing energy efficient appliances <ul style="list-style-type: none"> • Replace boilers, air-conditioning equipment, and lighting equipment with highly efficient equipment. • Implement energy saving measures in existing facilities and install individual electricity meters. • Introduce a system capable of controlling the power required for air-conditioning, natural gas consumption, and demand. • Adopt energy saving technologies to reduce the consumption of fuel on training ships.
		3.3.3	Offering incentives <ul style="list-style-type: none"> • Consider measures that give incentives to initiatives for reducing energy consumption. • Study the possibility of implementing ESCO projects that assess energy conservation. 	
	34 Energy	3.4.1	Reduction of energy consumption <ul style="list-style-type: none"> • Reduce per-unit (total floor area) energy consumption by at least 1% per year. 	
		3.4.2	Development of renewable energy <ul style="list-style-type: none"> • Study the adoption of renewable energy sources such as solar power, geothermal heat, wind power and biomass energy. • Study the adoption of renewable energy in small-scale facilities. 	
	35 3R Measures	3.5.1	Thorough implementation of the 3Rs within the university <ul style="list-style-type: none"> • Unify the classifications for waste separation. • Reduce the total amount of annual waste by 30% (relative to FY 2008). Reduce year-on-year paper procurement by 1%. • Safely dispose of hazardous waste such as laboratory waste. Publicize and disseminate information regarding the amount of waste collected and the amount of resources recovered. 	
		3.5.2	Cyclic use of organic waste <ul style="list-style-type: none"> • Study structural improvements and the utilization of technology for reusing organic resources. 	
		3.5.3	Hazardous waste management <ul style="list-style-type: none"> • Educate the entire university about the proper disposal of toxic substances and adequate storage of hazardous materials. • Thorough registration and use of the chemical substances management system. 	
	36 Water	3.6.1	Water management <ul style="list-style-type: none"> • Reduce campus water use (well water and tap water) by at least 1% year-on-year. • Appeal to campus cafeteria operators for effective wastewater management 	
		3.6.2	Stormwater management <ul style="list-style-type: none"> • Thoroughly manage sewage water quality using the legal sewage water quality test. • Adequately manage stormwater drainage by ensuring permeability of the pavement surface and ground. 	
	37 Food	3.7.1	Low-impact food purchasing <ul style="list-style-type: none"> • Appeal for preferential purchasing of sustainable foodstuffs and beverages. • Appeal for implementation of a system that gives incentives for the use of sustainable menus. 	
		3.7.2	Low-impact dining services <ul style="list-style-type: none"> • Appeal for the provision of napkins made from recycled material and reusable dining utensils for takeout orders. 	
	38 Transportation Planning	3.8.1	Vehicle restrictions <ul style="list-style-type: none"> • Consider complete vehicle restriction measures, including commuter vehicles. • Consider how to reconstruct the delivery system on campus with the environment in mind. • Embodiment of the campus flow plan recommended in the Campus Master Plan 2006 	
3.8.2		Improvement of faculty transportation methods <ul style="list-style-type: none"> • Consider measures to discourage commuting by private car or driving with a single occupant, and promote commuting by public transportation or bicycle. • Promote the use of video conferencing in order to limit the use of airplanes for business trips. 		
3.8.3		Improvement of bicycle transportation infrastructure <ul style="list-style-type: none"> • Formulate rules for handling abandoned bicycles and bicycle parking regulations on campus. • Consider measures to reduce the risk of traffic accidents caused by bicycle traffic. • Establish bicycle lanes with pedestrians in mind. Ensure bicycle parking locations and parking areas with ample capacity. 		
39 Space saving	3.9.1	Thorough implementation of space saving <ul style="list-style-type: none"> • Promote the use of databases to reduce superfluous buildings and spaces as well as to utilize open spaces. • Consider mechanisms for rewarding faculties that make efforts toward space-saving. 		
310 Purchasing	3.10.1	Promotion of green purchasing <ul style="list-style-type: none"> • Promote green purchasing and contracts based on the Green Contract Law. • Consider purchasing electricity with minimal carbon dioxide emission factors. • Consider the purchase or rental of environmentally friendly vehicles for use as campus buses or official vehicles. 		

Environmental Impact Reduction Promoter System

One Environmental Impact Reduction Promoter is assigned from each faculty along with at least one assistant. As of July 11, 2011, there are officially 33 promoters and 33 assistants. The Environmental Impact Reduction Promoter Meeting was established to facilitate an exchange of opinions and information between the Environmental Impact Reduction Promoters and the Office for a Sustainable Campus. The first meeting was held on October 11, 2011.

Environmental Impact Reduction Promoters' Tasks

- Tasks involving coordination with the Office for a Sustainable Campus and individual faculties as well as understanding the current situation in each faculty in relation to the promotion of environmental impact reduction measures.
- Assessing energy conservation in each faculty, conducting energy conservation campaigns, reducing waste and promoting recycling.
- Drafting plans to reduce environmental impact through coordination with the Office for a Sustainable Campus and individual faculties.
- Establishing and operating a system for raising awareness of faculties' environmental impact reduction and energy conservation activities.

Action Plan 2012 for a Sustainable Campus

Hokkaido University's second-phase medium-term goals promote maintaining an advanced and environmentally-friendly campus that supports world-class education and research. To this end, we formulated the Basic Plan for an Eco-campus and the Action Plan for an Eco-campus, which set forth the goals of promoting maintenance of existing facilities and constructing a comprehensive environmental



Environmental Impact Reduction Promoter Meeting (May 28, 2012)

Environmental Impact Reduction Measures

- Promote energy-saving measures
- Effective publication of environmental laws.
- Northern Forest Project
- Thorough implementation of the 3 Rs on campus.
- Effective publication inside the university and elsewhere.
- Development of new methods

performance evaluation system that covers the entire campus.

The Office for a Sustainable Campus' Expert Committee on Environmental Consideration, Steering Committee, and Executive Office for Campus and Environmental Planning studied these matters, drawing from the Environmental Impact Reduction Measures (see above). We formulated the action plan based on an expert conference in which four American universities participated (Portland State University, University of Oregon, Stanford University, and the University of California, Berkeley), as well as experience from participating in the ISCN* and the AASHE2011 annual conference, and a study by three European universities (Munich University of Technology, Swiss Federal Institute of Technology Zurich, Polytechnic of Turin). The Action Plan not only calls for sustainability of university activities, but also presents measures that should be put into practice in order to construct a sustainable society.

* International Sustainable Campus Network

Sustainable Campus Assessment System 2013

There are university sustainability assessment systems such as STARS, which is operated primarily by AASHE*¹, UNImetrics, which is being jointly developed by Polytechnic of Turin, University of Cambridge, VU University Amsterdam, and Hokkaido University, and AUA, which was constructed by Hokkaido University Office of International Affairs. We drew from the above and included our own original assessment criteria, thus completing Hokkaido University's assessment system.

The Sustainable Campus Assessment System 2013 is comprised of four categories: I Management, II Education and Research, III Environment, and IV Local Community. Each category consists of different fields and sections. The assessment results form the basis for criteria in university management policy decisions and are a necessary part of the sustainability evaluation criteria for general overall activities at the university.

*¹ Association for the Advancement of Sustainability in Higher Education

Sustainable Campus Assessment System 2013 (Summary)

Category: I Management

Field	Section	Assessment Criteria
I-1 Policy and overall plan	I-1-1 Education and research	Is there an overall plan and policy for education and research on sustainability?
	I-1-2 Campus	Is there a Campus Master Plan with reference to sustainability? Does the master plan contain policies and schemes to construct a sustainable energy system? Etc.
I-2 Organization to consider sustainability	I-2-1 Dedicated staff	Is there a sustainability office and a coordinator?
	I-2-2 Activities	Are faculty and staff being educated about sustainability? Are appropriate evaluations being made for faculties' and students' activities? Etc.
	I-2-3 Mechanisms to support policy decisions	Is there a permanent committee that makes policy decisions related to the university's sustainability? Is there a system to evaluate the progress of the overall plan? Etc.
I-3 Financial resource management	I-3-1 Long-term planning	Is there an operation policy and secure funds for long-term development of a sustainable campus with regards to education and research funds, university administrative costs, and overall university resources?
	I-3-2 Securing budgets and acquiring funds	Has sustainability been specifically set as a budgetary expense? Are national and private budgets as well as international funds being acquired? Etc.
	I-3-3 Operations	Are investments being made in relation to the environment and sustainability? Are impact assessments for these investments being made? Is there a fund allocation system in place for sustainability research? Etc.
I-4 Asset management	I-4-1 Community utilization of university assets	Is the community utilizing the university's facilities? Are historical assets being preserved? Are there environmental projects carried out in conjunction with the local community?
	I-4-2 Servicing of university assets	Are public-private partnerships and fixed-term leases being utilized to maintain the university's environment?
I-5 Facility management		Is there an integrated understanding of facilities' current condition and actual use? Is there an implementation plan and maintenance plan for new facilities? Etc.
I-6 Network to enhance sustainability		Has the university created a sustainability network with overseas universities, research institutes, and communities? Is there awareness of movements on the global stage?
I-7 Personnel training	I-7-1 Faculty evaluation	Is there a mechanism for evaluating researchers' dedication to administrative affairs related to the university's sustainability? Etc.
	I-7-2 Recruiting talent	Is there a system with a flexible means for recruiting talent with competency in sustainability?
I-8 Procurement and contracts	I-8-1 Procurement	Is green purchasing being employed for office equipment? Are contracts being completed based on the contract patterns prescribed in the Green Contract Law?
	I-8-2 Contracts	Are environmentally conscious contractors being used? Are local contractors being actively used? Etc.

Category: II Education and Research

Field	Section	Assessment Criteria
II-1 Education	II-1-1 Curriculum	Are there educational programs related to sustainability? Has the university individually defined "sustainability" and developed a specific curriculum including educational programs, internships, and lectures to which this definition applies? Etc.
	II-1-2 Sustainability Literacy	Is sustainability orientation for new students and environmental education for current students being carried out?
II-2 Research	II-2-1 Sustainability research	Is the topic of sustainability being researched at the bachelor's, master's, and doctoral degree level?
	II-2-2 Living lab	Is the campus being used for sustainability research? Is the university providing incentives for this type of research? Etc.
	II-2-3 Practical community research	Is interdisciplinary research on sustainability being conducted together with the local community? Is the university providing incentives for this type of research? Etc.
II-3 Students	II-3-1 Encouraging and supporting student activities	Is the university supporting students' activities related to sustainability? Does the university encourage off-campus internships (related to the environment and sustainability)? Etc.
	II-3-2 Student participation in university management	Are mechanisms being created for student participation in overall university's sustainability planning and campus-wide activities?

Category: III Environment

Field	Section	Assessment Criteria
III-1 Ecosystem		Is there a database in which flora and fauna characteristics and distribution on campus are recorded? Are there ecosystem conservation plans? Etc.
III-2 Land	III-2-1 Green space and forest land	Are there green space and forest land maintenance management plans? Is there an organization to execute these plans? Are the plans' state of implementation and results fully understood? Etc.
	III-2-2 Other open space	Is a campus plan being considered, including evaluation of the ratio of open space excluding green space and forest land? Etc.
III-3 Public Space		Are there guidelines to build public spaces inspired by intellectual creativity with humanity and culture in mind? Are these plans being carried out? Etc.
III-4 Landscape		Does the university aim to have a suitable campus that preserves the current design and does everything possible to avoid rebuilding? Does the university aim to have a campus that takes its surroundings into consideration?
III-5 Waste		Is the total amount of waste being reduced from 2005 levels? Are the 3 Rs implemented on campus? Are hazardous materials adequately disposed of?
III-6 Energy and resources	III-6-1 Energy management	Is energy consumption being reduced from 2005 levels? Are cogeneration and heat waste recovery being implemented? Etc.
	III-6-2 Greenhouse gases	Are greenhouse gas emissions being reduced compared to the previous year? Have initiatives been implemented to promote the absorption of greenhouse gases? Etc.
	III-6-3 Renewable energy	Are renewable energies being used? Has a plan been developed to conduct feasibility studies on the expanded use of renewable energies? Etc.
	III-6-4 Other resources	Is tap water consumption being reduced relative to 2005 levels? Is a food mileage improvement policy being practiced in the cafeterias? Etc.
III-7 Basic Equipment		Is there an overall plan with an integrated infrastructure design for roads, energy, water supply and sewage network, electricity, and communications? Etc.
III-8 Facilities	III-8-1 Environmental performance	Are there criteria for energy-saving designs? Have the building areas that meet these criteria been identified? Has seismic index information been used in facility maintenance plans? Etc.
	III-8-2 Indoor environment	Is there a management plan for temperature, humidity, and carbon dioxide concentration? Has an implementation system been created? Is the state of implementation and progress well understood?
III-9 Transportation	III-9-1 Flow planning	Has an implementation plan been formulated with a circulation design that controls the amount of vehicle, pedestrian, and bicycle traffic? Has this plan's implementation system been created? Etc.
	III-9-2 Pedestrians and cycling	Are there circulation plans and implementation plans for bicycle and pedestrian traffic? Has wintertime traffic been accounted for? Etc.
	III-9-3 Connecting with the local community	Is an implementation plan being formulated with a circulation design that connects to the campus' surrounding transportation network? Has an implementation system been created for this plan? Etc.
III-10 Use of historical assets on campus		Is the state of conservation of historical buildings being evaluated? Is a plan for their use being formulated? Has this plan's implementation system been created? Etc.
III-11 Disaster prevention locations		Are there plans to use the campus' open spaces as evacuation sites? Have evacuation routes been identified and publicized on campus? Etc.

Category: IV Local Community

Field	Section	Assessment Criteria
IV-1 Collaboration between industry, academia, and government		Has an industry-academia-government collaboration office been established? Is intellectual property used to contribute to industry? Is there an industry-academia-government collaboration coordinator? Etc.
IV-2 Community service	IV-2-1 System	Is there a community collaboration contact center and coordinator? Has a place been created for ongoing consultation with the local government and companies?
	IV-2-2 Activities	Are details of community collaboration activities and research such as seminars and conferences open to the public? Have documents of the results been published for the general public? Etc.
IV-3 Dissemination of Information		Has information regarding the university's sustainability activities been collected and disseminated to the general public? Etc.

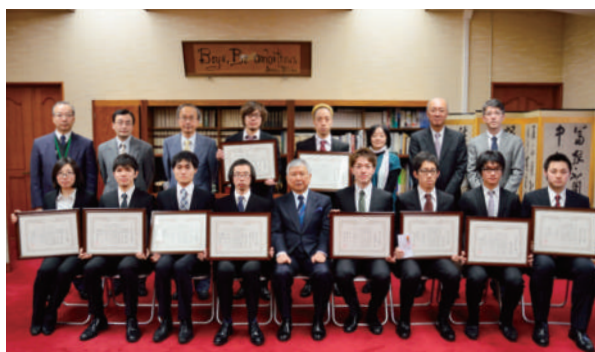
TOPICS

〈Research Results and Evaluation – Awards Report〉

■ Graduate School of Environmental Science awarded the Northern Energy-saving Award

Associate professor Tatsufumi Okino of the Graduate School of Environmental Science and Graduate School of Environmental Science student Takeshi Watanabe have been working on an environmental impact reduction project entitled *Improving Equipment Management that Employs a Visualization System in the Graduate School of Science and Energy-saving through Communication between Members*. The project uses a visualization system to remove redundant equipment and replace it with the use of high-potential energy-saving equipment, as well as constantly exploring new policies for energy conservation through communication with members. Furthermore, these policies can be used outside the research institute through dissemination of information, leading to energy saving.

The results were recognized, and the Graduate School of Environmental Science was awarded the Hokkaido Bureau of Economy, Trade and Industry's 2012 Northern Energy Saving Award (for



companies, etc. recognized by the Hokkaido Bureau of Economy, Trade and Industry as leaders in development, effective use or popularization of energy) in the "effective use category". This prize recognizes exemplary organizations and individuals who have achieved remarkable results in development, effective use, and popularization of energy in Hokkaido.

Hokkaido University presents the "Hokkaido University Elm Award" to individuals and groups that are recognized for remarkable achievement in extracurricular activities, community activities, self-improvement and student leadership. Watanabe received the 2012 Hokkaido University Elm Award.

■ Faculty of Fisheries Sciences Training Ship Oshiomaru awarded Japan Meteorological Agency Director-General Award

The Faculty of Fisheries Sciences' training ship, Oshiomaru, received the 2012 Japan Meteorological Agency Director-General Award in recognition of its long-term contribution to the Meteorological Agency by collaborating on sea surface temperature observation reports. After receiving the award, Oshiomaru Captain Yoshihiko Kamei happily proclaimed, "Although our area

of observation was restricted to the waters around Hokkaido, they were conducted under severe winter conditions and we are overjoyed to receive this award. It is a great encouragement to our crew. We would like to continue to contribute to the local community through our observations".



Constructed: September 28, 1992 / GT: 179 tons / Length: 39.39m / Crew capacity: 33 / Annual number of days at sea: 170 / Voyage waters: Around Hokkaido

TOPICS <Collaboration, Contribution, and Communication in the Local Community>

■ “Hokkaido University Environmental Education Lecture” held at Sapporo Moiwa High School

In the 2006 academic year, Hokkaido University began giving Hokkaido University Environmental Education Lectures to freshmen at Sapporo Moiwa High School. This initiative originally began as a Japan Science and Technology Agency Science Partnership Program (SPP) and aims to give students a sense of future career paths through science- and environment-related lectures.

In the 2012 academic year, approximately 50 research departments, including the School of Science, School of Agriculture, and Graduate School of Engineering, provided

a total of 31 lectures based on the two main themes of “Science of Life and the Environment” and “Science of Human Lifestyle and the Environment”. Two groups of student representatives who took the lectures gave presentations about the course at Hokkaido University’s “Sustainable Campus Contest”.



■ Developing Specialists Who Can Engage in Radioactivity Countermeasures

In the wake of the accident at Tokyo Electric Power Company’s Fukushima Daiichi Nuclear Power Station, the Ministry of Education began the Initiative for Human Resource Development in Nuclear Energy in the 2011 academic year, seeking to “develop international human resources capable of responding to various environmental radioactivity issues in cooperation with the agency”. The initiative is being carried out in cooperation with universities, research institutes, and local governments across the country.

In the 2012 academic year, lectures on environmental

radioactivity were given in three levels: beginner, intermediate, and advanced. There were also international seminars, environmental radioactivity experiments, Fukushima decontamination training, and tours of related facilities. All programs received more applicants than expected and positive feedback from participants on questionnaires following completion.



■ Public Lectures and Symposiums on the Environment in the 2012 Academic Year

- Graduate School of Environmental Science
Public lectures on *Chemistry that Supports the Environment* (total of 6 lectures)
 - *Environmental Cleanup and Energy Transformation through Photocatalyzed Reaction*
 - *Chemistry and the Burdens on Oceans and Lakes*
 - *Fairytale Environmental Chemistry*
 - *Atmospheric Chemistry of Ozone and Aerosols*
 - *Catalytic Purification of Air and Water*
 - *Reagent for Determining the Concentration of Metal Ions*
- Graduate School of Public Policy
Public Lectures on *Sustainable Low-carbon Societies* (total of 14 lectures)
- Graduate School of Public Policy
Environmental Policy Seminar: *Towards a Sustainable Hokkaido, Japan, and World — Renewable Energy and a Green Economy*
- Human Resource Development in Nuclear Energy: *Environmental Radioactivity / Public Lectures*
 - *Food Safety and Radioactivity Inspections / Regulations*
 - *Two years after the Nuclear Accident: The Situation in Iitate Village*

- Graduate School of Engineering Public Lectures
Waste Studies Special Lecture — Creating a Recycling-orientated Society (total of 15 lectures)
- Public Symposiums Jointly Hosted by Research Faculty of Agriculture
Safe and Secure Society Created through Agriculture and Food Science — Science and Technology, the Foundation of Human Survival
- Clock Tower Salon Hosted by Research Faculty of Agriculture
 - *Guardian Angel of Earth and Sky*
 - *The Revival of a Polluted Earth?*
 - *The Encounter of Nature and Food*
- Slavic Research Center Public Lectures
Who Will Protect the Nature and Environment of Eurasia? (total of 7 lectures)
- Hokkaido University Museum *Parataxonomist Lectures*

* A parataxonomist is a person who is capable of correctly identifying and sorting scientific specimens or samples. They play an important role in environmental studies and education.



TOPICS

〈Effective Use of Energy and Resources〉

■ Summer Power-saving in 2012 Academic Year (Period: July 2 — September 28)

1) Measures and Targets

Due to the tight supply-and-demand situation of electricity following the Great East Japan Earthquake, the national government requested that Hokkaido Electric Power Company's consumers meet power-saving reduction targets during the summer. Hokkaido University decided to take a proactive approach to this request, as it was already engaged in energy conservation activities with promotion of Environmental Impact Reduction in University Management stipulated in the university's environmental policy.

On the Sapporo campus, a target of 18,500kW was set for maximum electricity use during the July to September period. Excluding the university hospital, this value represents an 8% reduction from 2010's maximum electricity usage levels during the summer period and is over 7% greater than the reduction from 2010 levels requested by the national government.

Similarly, the Hakodate campus' target maximum was set at 530kW. This value represents a 10% reduction from 2010's maximum electricity usage levels during the summer period.

2) Methods

On the Sapporo campus, the environmental impact visualization model project, carried out in three departments during the 2011-2012 academic year, publicized data of energy consumption reduction through energy conservation activities.

As part of the 2011-2012 environmental impact reduction pilot project, electricity meters were installed and electricity use for each department on the entire Sapporo campus and Hakodate campus was publicized on the university website as a means of implementing electricity use visualization. Only Sapporo campus data is publicized externally.

If it is determined that maximum electricity use targets

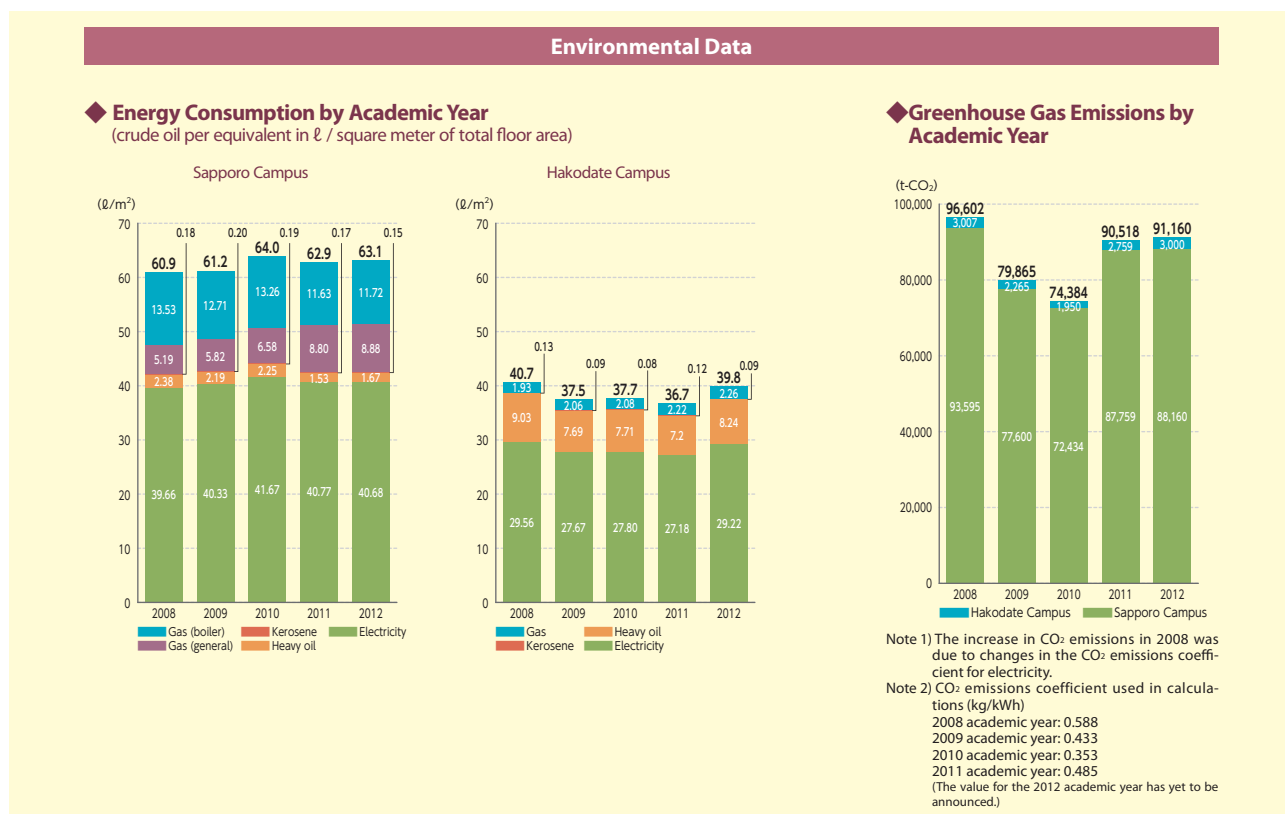
have been exceeded taking into account temperature and humidity, there is a system in place where the Office for a Sustainable Campus will send a warning e-mail to the responsible faculty's Environmental Impact Reduction Promoter to check if pre-determined power-saving measures are being observed and conduct energy-saving patrols when necessary.

In the 2012 academic year, after reflecting on university electricity demand analysis and questionnaire results from the 2011 academic year, we made requests for thorough power-saving from the use of air conditioning, lighting equipment, and office automation equipment.

3) Results and Evaluation

The university was not able to meet all power saving targets, but despite the target maximum being exceeded on some days, the Sapporo campus was able to achieve a 9.4% reduction at all general facilities other than the university hospital. At the Hakodate campus, there was construction work during the 2010 summer period, which caused closure of a number of facilities, making comparison criteria for maximum electricity use very low, and targets were determined to be unrealistic.

Most departments reduced their electricity use (kWh) from the levels in the 2010 academic year, and it was concluded that power-saving behavior is already well established. However, there were also departments where power-saving activities were limited due to the increased use of electricity in operating new functions, equipment, and facilities, as well as the use of temperature-sensitive experimental equipment. Energy conservation measures will need to be put in place for experimental equipment in the future.



TOPICS

〈Sustainable Campus Facilities and Environment〉

■ Energy-saving Design at the Graduate School of Veterinary Medicine Teaching Hospital

In March 2013, Hokkaido University Graduate School of Veterinary Medicine's Teaching Hospital was established. The hospital's fundamental policy is based on three principles: *fostering scientifically reliable veterinarians, contributing as a hub for regional veterinary medicine in Hokkaido, and researching, developing, and substantiating leading edge veterinary medicine.* It strives to be a medical center that shares functionality and comfort in order to

provide high quality veterinary medicine. The facility makes use of an energy-saving design to help control CO₂ emissions.



Hokkaido University Graduate School of Veterinary Medicine Teaching Hospital

Total floor area: Approximately 3,000m²

Structure and scale: Reinforced concrete, basement and three floors

Floor configuration:

- 3F: Mechanical room and electrical room
- 2F: Operating rooms (5 rooms), ICU, medical training room, conference room, etc.
- 1F: Internal medicine and surgical diagnosis rooms (12 rooms), treatment room, radiotherapy room MRI, CT, X-ray (2 rooms), echocardiography rooms (3 rooms), etc.

Main Points of Facility Equipment

- Built as a center of excellence for veterinary sciences and as a highly advanced veterinary hub.
- Built a parking lot and outpatient entrance on the east side, and a staff entrance on the south side (pre-existing hospital side).
- The diagnosis and examination departments were constructed on the first floor, allowing for smooth procession from registration to diagnosis and examination.
- On the second floor, a medical office was established in the operating department and the veterinarian, animal, and surgical instrument flow lines were divided.
- The use of highly insulated construction and geothermal heat contributes to CO₂ reduction throughout the entire building.
- The exterior walls were constructed with tiles to minimize the loss of heat through large openings.

Energy-saving Design

- 1) Highly insulated construction
 - Use of exterior thermal insulated roofing (rigid

polyurethane foam t200), inside insulation in the external walls (spray-on urethane foam t75), and vacuum-insulated glass.

- 2) Limited Solar Radiation
 - Installation of eaves around the large window openings that protect against solar radiation.
 - Use of plants around the base of the building to limit reflected heat from the sun.
- 3) Utilizing Natural Energy
 - Use of a courtyard and high side light to allow natural light to enter the building.
 - Natural ventilation system with built-in sashes that ventilate even during the night when outside temperatures are low.
 - The first floor waiting room area is designated as an animal zone and the second floor lounge area as a human zone to prevent odors.
- 4) Utilizing Geothermal Heat
 - By incorporating a buried earth tube, external air is brought in through an underground pit, making effective use of geothermal heat.

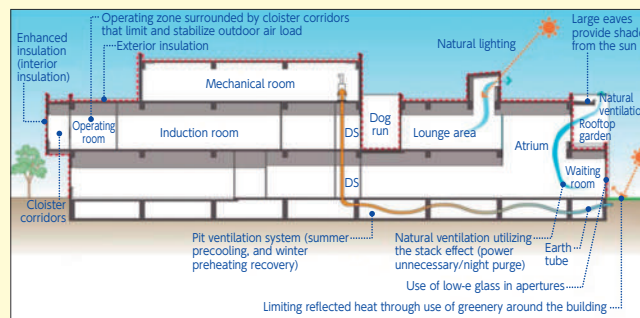


Diagram of energy-saving design

■ Improving the Campus Master Plan and Traffic Environment

Hokkaido University set out a basic policy for facility maintenance in the Campus Master Plan 2006 in order to realize its vision for the future in the 21st century. In this plan, traffic environment maintenance around the Sapporo campus is recognized as an unavoidable challenge in realizing a sustainable campus. A Master Plan Realization Task Force was established within the Facility and Environmental Planning Office. This task force studied traffic environment improvements and related public space maintenance issues.

In January 2012, a Survey on Sapporo Campus Traffic was

conducted, which identified a number of issues. The importance of ensuring traffic lines for and separating pedestrian, bicycle, and automobile traffic modes as well as securing linked public space was recognized. In response, concrete deliberations are underway in regards to maintenance around Clark Memorial Student Center and Kita 18-jo. However, the Sapporo campus has a population of over 20,000 people with a wide variety of views, so there is a possibility that the situation will not improve with regulations alone. A soft approach, such as teaching manners, must also be considered.

Effective Use of Historical Buildings

Hokkaido University was originally founded in 1876 as Sapporo Agricultural College, and possesses many historical buildings. Although these are valuable cultural assets, Hokkaido University has not taken adequate care of the facilities, and the methods of preservation and use have been questioned.

In the 2006 academic year, we began to study the preservation of historical buildings, and in 2010 established a division called the Historical Asset Usage Task Force inside the executive Office for Campus and Environmental Planning. In April 2012, we formulated

Evaluation Methods for Effective Use of Historical Buildings, and we are currently making evaluations while striving to implement methods to better preserve and utilize these buildings. It should be noted that the university has been commissioned by the Ministry of Education's University Facility Management Program to formulate these evaluation methods.



Furukawa Hall

Campus Ecological Environment Survey and Flora and Fauna Map

1) Hokkaido University Campus Ecological Environment Survey

The Hokkaido University is one of the leading universities in Japan in terms of the flora and fauna that inhabit its campuses. This breeding environment plays an important role in ensuring biodiversity in Sapporo City. In regards to the natural environment, the philosophy of a "sustainable campus" was used in the 2007 Campus Master Plan, calling for the creation of a preservation area and environment. However, collection and management of centralized information and comprehensive studies on the creation of preservation areas for plants and animals were not carried out.

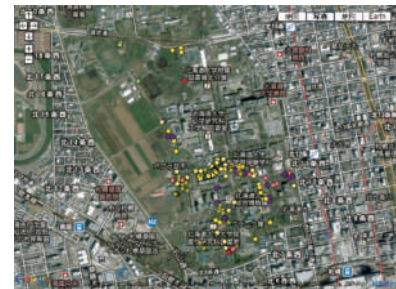
Therefore, a study was conducted in 2009 on the areas on campus with high natural quality that are targets for preservation indexes and to be the object of programs. In 2012, a study on the following topics was carried out in the Elm Forest, the east and west parts of the Department of Agriculture, and the area around the School of Science.

- Distribution of flora and plants of interest, distribution of foreign plants (conducted in spring, early summer, and summer)
- Understanding insect fauna, in cooperation with the university museum (collection of insects in

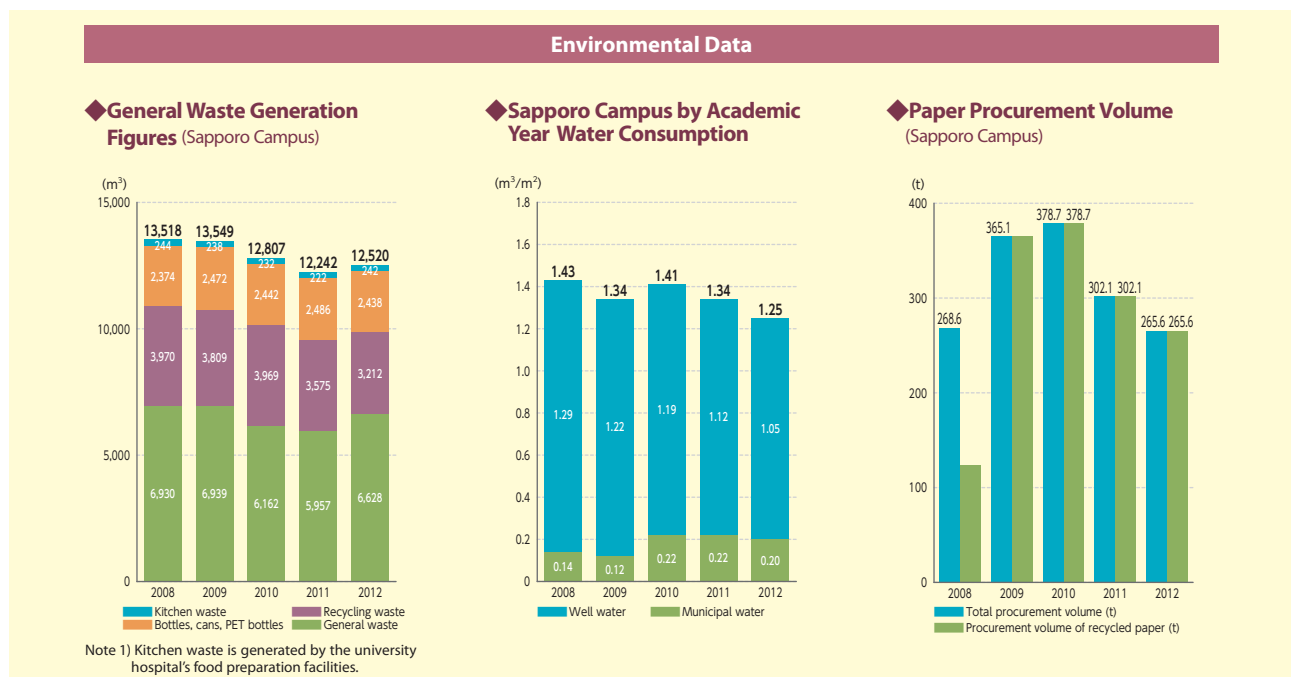
- approximately two locations, identification, and sorting)
- Other animals, etc. (recorded when observed during field study)

2) Sapporo Campus Flora and Fauna Map

The database of accumulated information was constructed in a format that conforms to Darwin Core in order to ensure versatility. In addition, we have organized the positional data and compiled GIS data to allow use in safety management of flora and fauna on campus, publishing on the web, and use in research. The Sapporo Campus Flora and Fauna Map is available on the university's Facilities Department website and includes topics such as introductions to plant and animal characteristics and important areas.



<http://www.facility.hokudai.ac.jp/contents/map/map.html>



Sustainability Weeks 2012 October 6 - 21, 2012



The Hokkaido University Sustainability Weeks (SW) 2012 event was held on the theme of *A Future Society Offering Peace of Mind for All*, with the launch of the official SW logo providing even greater impetus in the organization of this sixth annual gathering. With focus on the event's role as an open global platform for exchanges, the Sustainability Weeks provided excellent opportunities for the discussion of sustainable society. Researchers assembled from around the world with the results of their latest research and activity reports to consider, along with students and local residents, what constitutes the security necessary to protect all life on earth.

DATA

- Number of events: 36 (including 6 pre-events and 13 post-events)
- Number of entries for the Sustainability Research Poster Contest: 78 teams (90 people: 11 undergraduate students, 29 master's program students, 50 doctoral program students; 11 undergraduate/graduate schools)
- Number of events jointly planned with partner institutions: 3 (6 institutions) (Finland: University of Oulu, University of Lapland; Nepal: Tribhuvan University; Korea: Korea University, Seoul National University; China: Beijing Normal University)
- Number of participants from partner institutions: 39 (16 institutions in 9 countries) (In addition to the institutions above: US: University of Oklahoma; Italy: Polytechnic University of Turin; Indonesia: University of Palangkaraya, Gadjah Mada University, Bogor Agricultural University; Canada: University of Alberta; China: Zhejiang University; Finland: University of Helsinki; Nigeria: University of Nigeria, Ebonyi State University)
- Total number of attendees: 5,843 (including 602 from overseas)
- Number of archive views: 15,438 (as of November 30, 2012)
- Number of website visitors: 31,021 (April 1 – November 30, 2012)
- Number of likes on Facebook: 2,330 (as of November 30, 2012)

Events Details

[Model] Models for a Sustainable Society (3 events in total)

● International Symposium 2012 Indigenous Cultural Heritage and Tourism - Potential in Hokkaido (October 13 - 14)

This symposium highlighted sustainable relationships between indigenous cultural heritage and local communities. To highlight the issues involved, examples from around the world of cultural heritage management involving collaboration with local residents were introduced.



● International Symposium on Creation of Sustainable Campuses 2012 (October 29)

This symposium featured reports on action plans and the status of local collaboration among other topics by researchers from the Polytechnic University of Turin, the University of Cambridge and VU University Amsterdam.

[Network] Expanding a Cooperative Network (5 events in total)

● Joint Finnish-Japanese Symposium - Environmental Changes in Northern Regions (September 10 - 14)

This symposium featured discussions on how global warming affects the environment in northern regions and provided opportunities for exchanges with representatives of Oulu University, Lapland University and the University of Helsinki.

[Quality] Quality of Life (10 events in total)

● Stand Up Take Action in Hokudai (October 17)

This event held at Hokkaido University as part of a global campaign for poverty eradication featured presentations by researchers and others engaging in international cooperation activities.

[Nature] Harmony with Nature (3 events in total)

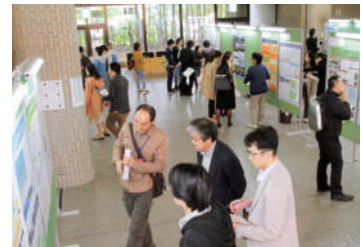
● Striving for the Revitalization of Agriculture in France (November 30)

Co-hosted by the Soci t  Franco-Japonaise and the Alliance Fran aise de Sapporo, this event featuring a lecture by a professor from the National Museum of Natural History in France provided a forum for learning with the theme of agricultural revitalization.

[Future] Learning for the Future (9 events in total)

● 4th Hokkaido University Sustainability Research Poster Contest (October 13 - 21)

A total of 78 teams of graduate and undergraduate students made poster-based and oral presentations on their current research from the viewpoint of contribution to the realization of a sustainable society.



Sustainability Weeks 2013 (numerous planned events)

Core weeks: October 26 (Sat.) - November 10 (Sun.), 2013

*Events and dates are subject to change.

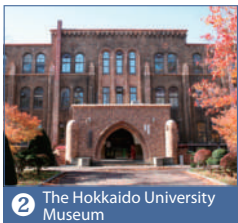
Oct. 26 (Sat.)	Event to mark the Sustainability Weeks 2013 - GiFT2013 (Hokkaido University)	Nov. 5 (Tue.) - 7 (Thu.)	Sustainability Research Poster Contest (Hokkaido University)
Oct. 29 (Tue.)	Sapporo Clock Tower Salon: Q&A with Members of the Research Faculty of Agriculture (Research Faculty of Agriculture)	Nov. 6 (Wed.)	International Symposium on the creation of Sustainable Campuses 2013 (Office for a Sustainable Campus)
Oct. 31 (Thu.) - Nov. 4 (Mon.)	Clark Theater 2013 (Hokkaido University Theater Project)	Nov. 9 (Sat.)	Symposium on Alien Species (student-planned event; Research Group of Regional Sciences at the Graduate School of Letters)
		Nov. 9 (Sat.) - 10 (Sun.)	3rd International Seminar Series on Environmental Radioactivity (Office of Human Resource Development Project for Environmental Radioactivity)
Nov. 4 (Mon.)	International Symposium: Performative Films (Center for Applied Ethics and Philosophy (CAEP), Faculty of Letters)	Nov. 10 (Sun.)	4th Sustainable Campus Contest (SCSD)

Hokkaido University Overview of the Sapporo Campus

HU has campuses in the Hokkaido cities of Sapporo and Hakodate. Covering an area of around 1.77 million square meters, the Sapporo site is one of the nation's largest urban campuses. HU has engaged in a variety of initiatives using the campus as a living laboratory as part of its efforts to create a sustainable society. Here, an overview of the Sapporo Campus and its notable facilities are shown.



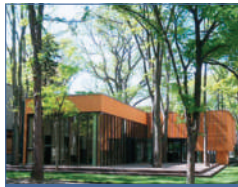
1 Poplar Avenue



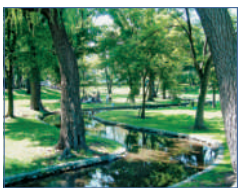
2 The Hokkaido University Museum



3 Biogas Plant



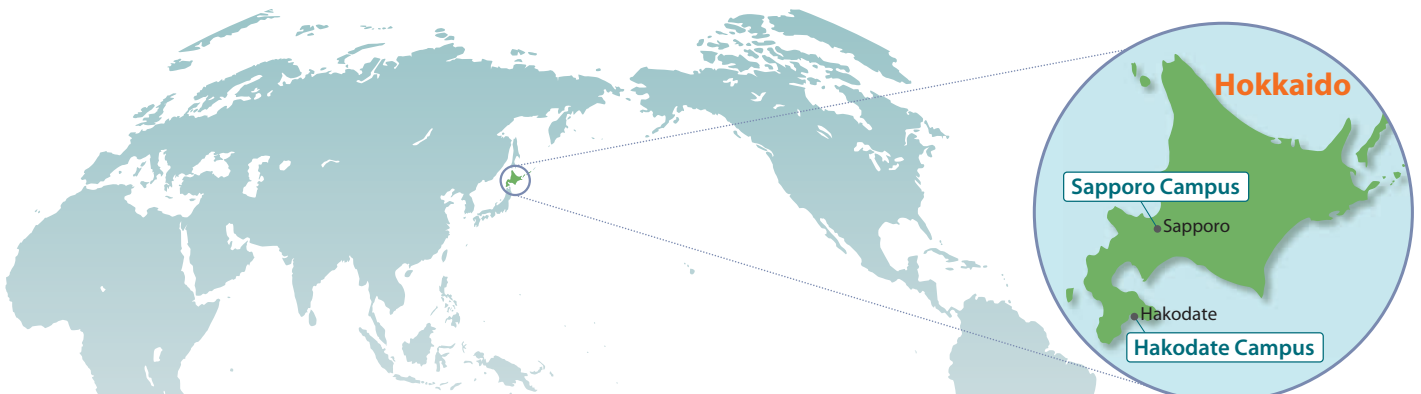
4 Hokkaido University Information Center



5 Sakushukotoni River



6 Site of Old Village





HOKKAIDO
UNIVERSITY

Office for a Sustainable Campus

Kita 8, Nishi 5, Kita-ku, Sapporo, Hokkaido 060-0808 Japan

Tel.: +81-(0)11-706-3660

Fax: +81-(0)11-706-4884

osc@osc.hokudai.ac.jp

website: <http://www.osc.hokudai.ac.jp/>



■ Sapporo Campus

Kita 8, Nishi 5, Kita-ku, Sapporo, 060-0808

Lands: 1,776,249m²

Buildings: 732,003m²

■ Hakodate Campus

3-1-1, Minato-cho, Hakodate, 041-8611

Lands: 105,149m²

Buildings: 38,943m²

■ Number of Staff (Data as of May 1, 2012)

● Number of Staff **3,878**

● Number of Students **18,161**

Number of the students breakdown:

Undergraduate Courses **11,661**

Institutes and Centers **50**

Graduate Courses **6,450**



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