Toward Sustainable Campus Areas

Environmental Report 2014

北海道大学
HOKKAIDO UNIVERSITY

Opening Discussion

Keizo Yamaguchi, President, Hokkaido University
Aya Sakai, Associate Professor, Faculty of Engineering
Noriko Arisaka, 3rd-year student, Faculty of Agriculture

Hokkaido University and its Distinctive Appeal

Associate Professor, Faculty of Engineering
Aya Sakai

Aya Sakai graduated from the Department of Architecture at Yokohama National University's College of Engineering, earned a Master's Degree in landscape architecture at Harvard University, served as a visiting researcher at Oxford University and the University of California, Los Angeles, and earned a PhD at the University of London. She worked at the East Japan Railway Company (JR East) and at Sasaki Associates, Inc. in Boston, and is a first-class registered architect. She assumed her present post in February 2007.

President, Hokkaido University
Keizo Yamaguchi

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 diff¬erential geometry. Before becoming the 18th President of Hokkaido University in 2013, he served as an Instructor, Lecturer and Associate Professor at the University's School of Science and assumed the posts of Professor at the Faculty in 1993 and Advisor to the President of Hokkaido University in 1999. He also became an Executive (in charge of education, student aff¬airs and other matters) and Vice President of the university in 2011. In the same year, he was additionally made 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.

3rd-year student, Faculty of Agriculture
Noriko Arisaka

Tokyo native Noriko Arisaka is a junior in the Department of Agrobiology and Bioresources at Hokkaido University's Faculty of Agriculture, and is a member of the Laboratory of Environmental Molecular Bioscience. She serves as the current representative of HOSUP (Hokkaido x Support) – a student organization assisting with the reconstruction of the tsunami-devastated Tohoku region. She also engages in organic vegetable farming in Sapporo's Okadama area as a member of the Hatake Kurabu (Field Club) farming team. Despite being a junior at the Faculty of Agriculture, Noriko's research at the laboratory is focused on the human brain.

The President of Hokkaido University (HU) engaged in a discussion with a female researcher and a female student in July 2014 in recognition of today's need for enhanced female presence in the workforce. The discussions transcended gender barriers and highlighted HU's appeal as well as providing a platform for the participants to express their thoughts on future directions for the university.

HU's American-style campus areas

Yamaguchi: I believe this is your first visit to the Executive Office. The portrait of Dr. William S. Clark you see here was donated by a descendant of his. Dr. Clark was in Sapporo for only a little more than half a year, but his presence had a great impact. Notable HU alumni like Inazo Nitobe and Kanzo Uchimura, who were members of Sapporo Agricultural College's second class, never actually met him.

Arisaka: These figures paved the way for us to be here today.

Sakai: Dr. Clark came from a university in America. You've been to a few American universities, haven't you, Dr. Yamaguchi?

Yamaguchi: I've been at HU for over 30 years since I came here after earning a doctorate at a Japanese university. The first American university I went to was Columbia University in New York City. That was in 1981 when the economy was bad, so New York was a dangerous place.

Sakai: When I went to New York in the late 1980s, I was told never to open a map on the street, so I made a tiny copy of a map and pasted it to my palm to look at and get around.

Yamaguchi: In those days, university instructors were lucky to be able to study abroad for two consecutive years. When I was at the University of California, Berkeley, in San Francisco, I saw people living in parks without worries – it was a very safe place.

Sakai: Things were so different in the east and west of the US that they were like different countries. How was the central region?

Yamaguchi: From 1990 I was in Minneapolis, where I experienced temperatures of −35°C for the first time.

Sakai: That's cold enough to make walking outside dangerous, isn't it? When I came to Hokkaido, I thought it was like the US.

Yamaguchi: In Japan, Sapporo is almost viewed as another country because it's not connected to the mainland and has

totally different vegetation. Houses here don't tend to have tiled roofs so it has an atmosphere similar to that of New England, which means Americans feel at home here.

Sakai: A professor from the UK even said that HU is like an American university.

Yamaguchi: The campus areas aren't typically Japanese, and are filled with tourists.

Sakai: When I come to the campus on weekends, it's almost like a park.

Yamaguchi: I was in the Department of Mathematics, which is on Poplar Avenue. I remember looking out of the window and being surprised to see so many tourists there. You don't see that much at universities.

Sakai: The question of whether campuses should be public or private is often discussed. On a scale of 0 to 100%, HU's campus areas are nearly 100% open, which I think is rare.

Yamaguchi: People can walk on campus late at night without worrying about safety, don't they?

Arisaka: Some people jog at night because it's safe even at 10 or 11 p.m.

Yamaguchi: Students visiting for Open Campus events often come to like HU and decide to take the entrance examination.

Sakai: Is there a balance of students from Hokkaido and elsewhere?

Arisaka: In my academic year, 49% are from Hokkaido and 51% are from other places.

Yamaguchi: The number of students from outside Hokkaido has increased since the university introduced a new entrance examination system. As of April this year, 60% of students were from outside Hokkaido. Universities in Tokyo also admit students from across the country, but 60% are from the local Kanto area even at the University of Tokyo. HU is different because it has students from all prefectures of Japan. Hokkaido's a popular place to live, and even elementary school students know Dr. Clark's famous quote: Boys, be ambitious.

From Japan to the world via HU

Yamaguchi: More than 70% of HU students live away from their parents.

Sakai: One of HU's strengths is its body of students from a wide range of backgrounds, isn't it?

Yamaguchi: People in Hokkaido welcome outsiders, which has a favorable effect. While I was studying in New York, I often saw people from varied racial and ethnic backgrounds reading newspapers in their own language on the subway, like Japanese, Chinese, Korean, Greek and Arabic. Living in a melting pot of races and ethnicities helped me to realize what democracy was all about. It's natural that people don't understand their neighbors because they look different and speak different languages. This highlights the need for communication.

Sakai: I also realized the importance of communication.

Yamaguchi: People should go abroad while they're young and impressionable. It's said that you can see everything on the Internet these days, but it's not the same as seeing things for yourself. Noriko, moving out of your parents' place has made a big difference, hasn't it?

Arisaka: Yes, it has. I have to cook and put out garbage on my own. I have to discipline myself.

Yamaguchi: HU launched Nitobe College last year. I think it's easier for students on this program to go abroad because they already live in Sapporo away from their parents.

Arisaka: Yes. I feel like being more active when I'm away from my parents' place.

Sakai: You've also been to the Tohoku region, haven't you?

Arisaka: Yes. If I lived with my parents, I don't think I'd be able to get away as much. We're planning to gather about 15 people for a visit to the Tohoku region this summer. Memories of the March 2011 disaster seem to be fading, so we believe providing opportunities to learn about the region's appeal is the best way to boost actual support for its reconstruction.

Yamaguchi: I hope you also learn about depopulation there rather than only about the disaster. Sapporo has the lion's share of Hokkaido's people and industry, and depopulation is a problem faced by the whole of Japan. I hope you'll be able to find issues that the rest of the country also shares.

Sakai: I've been involved in community development initiatives in Tokachi since last year. The region thrives on agriculture and hasn't suffered from any major natural disasters, but I wonder what communities there will be like in the next generation.

Arisaka: Is employment an issue there?

Yamaguchi: The problem is that there are no jobs, so young people flock to Sapporo.

Arisaka: Biei, Furano and other areas also have beautiful natural surroundings. I think young people would relocate there if these areas had prospering industries, but it might be difficult to sustain industrial activity there.

Sakai: We need initiatives to help these places keep attracting people.

Yamaguchi: We're considering the establishment of a structure to attract overseas students and researchers to HU in summer and to send Japanese students overseas. It might be difficult to attract people from other countries to Kyoto in summer because it's too hot and humid, mightn't it?

Sakai: We hosted a workshop for students from across Japan last year. A professor who attended said Hokkaido's cool climate increased his productivity. HU's campuses are ideal for summer school courses.

Yamaguchi: Sapporo has a population of about two million, which is rare for a city with so much snow.

Sakai: Efforts to use snow for cooling in summer are under way. I think the campuses can be used as living laboratories to see how the climate can be utilized.

Yamaguchi: Zebra crossings have to be repainted in spring because they're scraped off during snow removal work. In this kind of area, the campuses can be used as living laboratories in deciding how to manage snow removal and use big data.

Toward 2026 – the 150th anniversary of the university's foundation

Yamaguchi: I wrote about a future vision for the university as part of a reform strategy entitled Future Strategy for the 150th Anniversary of Hokkaido University. HU's four basic philosophies of education and research – Frontier Spirit, Global Perspectives, All-round Education and Practical Learning – are the foundations for the type of university we strive to be. Even though these concepts were set in the old days when the university was still Sapporo Agricultural College, they remain relevant to our objectives thanks to their modern significance. Frontier spirit is just as important in Japan as it is anywhere else in the world. Global perspectives are also essential for everyday living because what happens in one corner of the world can have instant effects anywhere on the planet in today's age of globalization. All-round education involves focus on the values of human culture. In the arena of practical learning, we've got to be aware of how this educational approach is applied because sustainability has become a buzzword in the 21st century – an era when scientific development no longer guarantees a rosy world. Japan started on the path to modernization in the Meiji Period, which ran from 1868 to 1912. I believe the key to success was education. However, despite the technological advances made, intangible aspects of infrastructure have begun to collapse. The development of these aspects requires innovation: the playing field needs to be changed. To make this happen, young people need to be aware of what's needed, which requires solid education. I want to promote initiatives that will help to encourage people who come to HU to turn their eyes to the rest of the world.

Sakai: I want the university to be more open to society and act as a forum for academic work as well as for discussions involving people from various backgrounds so that it will send students with a broad range of perspectives into the world.

Arisaka: Since I came to Hokkaido, I've been to lots of farms. I'm worried about food safety, and especially about possible contamination of farm products due to genetic modification of crops. I'd like to be involved in the development of institutions that will help to support safe everyday living.

Yamaguchi: If the principal roles of a university are to engage in research and nurture future leaders, we've got to accept that university research and education should meet the needs of society. The current situation doesn't allow universities to continue business as usual. The Center of Innovation Program begun on HU's North campus represents industry-university collaboration in the true sense of the term. On this program, HU works closely with various companies in the fields of food and health. The university is striving to help create a healthy society based on research findings in medical care and pharmaceuticals as well as in food based on a future vision for social development.

Overview of Hokkaido University's Sapporo Campus

Covering an area of around 1.77 million square meters, Hokkaido University's Sapporo Campus is a place of work or study for over 20,000 people and provides habitats for a wide variety of flora and fauna. HU engages in various initiatives using the campus as a living laboratory.

1 Poplar Avenue

2 Hokkaido University Museum

3 Biogas plant

4 Sakushukotoni River

5 Hokkaido University Information Center (Elm Grove)

6 Site of Old Village

Sapporo Campus

Kita 8, Nishi 5, Kita-ku, Sapporo, 060-0808
Lands: 1,776,249㎡
Total building area: 764,254㎡

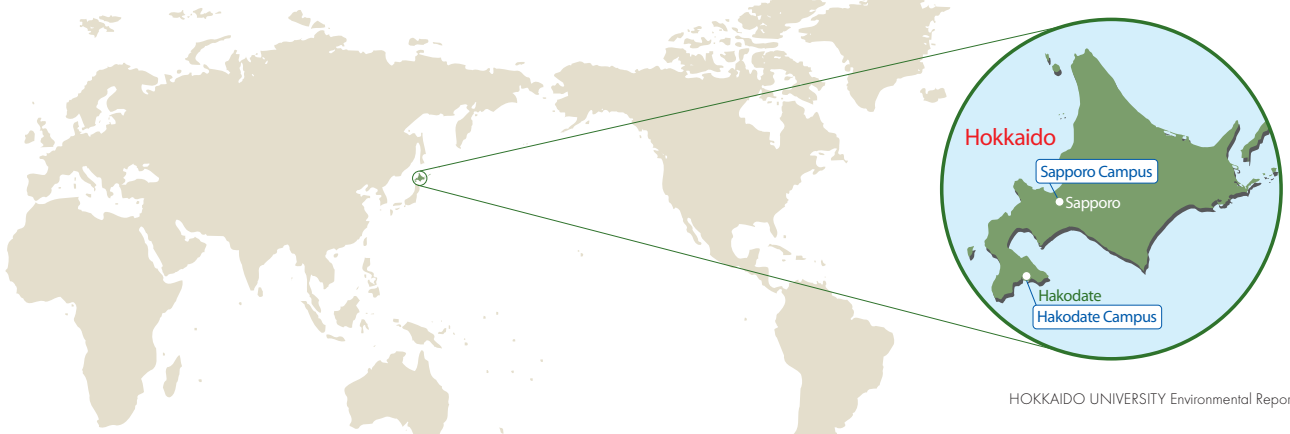
Hakodate Campus

3-1-1, Minato-cho, Hakodate, 041-8611
Lands: 105,149㎡
Total building area: 37,771㎡

Number of Staff and Students

(as of May 1, 2014)

Number of staff: **3,920**
Number of students: **17,909**
Student breakdown:
Undergraduate schools: **11,649**
Research institutes and centers: **65**
Graduate schools: **6,195**



Pioneering Work and a Chance Encounter Leading to a Haagen-Smit Prize

Kimitaka Kawamura
Professor, Hokkaido University Institute of Low Temperature Science

Kimitaka Kawamura graduated from the Department of Chemistry at Shizuoka University's Faculty of Science, completed a master's degree in the Department of Chemistry at Tokyo Metropolitan University's Faculty of Science, and earned a Doctor of Science degree in the Department of Chemistry at Tokyo Metropolitan University's Faculty of Science. He served as a Postdoctoral Fellow at the Japan Society for the Promotion of Science (JSPS) and at the UCLA Institute of Geophysics and Planetary Physics (IGPP), and as a Visiting Investigator at the Woods Hole Oceanographic Institution (WHOI) in the US. He assumed the post of Associate Professor in the Department of Chemistry at Tokyo Metropolitan University's Faculty of Science in 1987 before becoming a Professor at Hokkaido University's Institute of Low Temperature Science in 1996. In the same year, he also assumed the post of Professor at the Graduate School of Environmental Science.

Thrust into the forefront of the field

Ukichiro Nakaya of the Institute of Low Temperature Science was the first person ever to create artificial snow. The Institute was founded in 1941 as the first research facility affiliated with HU, and has since promoted interdisciplinary studies to meet the needs of the times.

In 2013, the Haagen-Smit Prize (given in recognition of outstanding papers in the atmospheric environment field) was awarded for a paper written by three scientists including a Canadian researcher with Prof. Kawamura as its lead author. The title of the paper was Source and reaction pathways of dicarboxylic acids, ketoacids and dicarbonyls in arctic aerosols: One year of observation. In this study, the scientists monitored and analyzed air in the Arctic Circle with a unique focus on organic matter.

Asked how he had dared to pursue such an uncharted path, Prof. Kawamura said he had not initially been aware he was doing so. During his graduate school years, under the guidance of a professor specializing in Lake Biwa he had researched whether organic matter in sediment could be used to help restore the natural environment. After graduation, he went on to the University of California to continue his studies. This was the time of early research on organic acids as a cause of acid rain, and Prof. Kawamura was invited to work in the field. Not knowing how to refuse, he began the work and met the Canadian scientist with whom he would later write his prize-winning paper. He said that he was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1. Haze layers seen from near the top of Mount Tai in China
2. High-volume air sampler and haze
3. Aerosol particles collected on a quartz filter by the sampler

pleased to have been given an opportunity and that it led to results worthy of a world-class award.

The global warming suppression effects of PM2.5

The natural environment of the Arctic Circle may seem pristine, but in fact is quite polluted. Air containing impurities is pushed into the atmosphere over the region during winter, and springtime sunlight induces photochemical reactions in the air that cause a phenomenon known as Arctic haze. Sampling and analysis of fine aerosol particles in the atmosphere at a Canadian base in the Arctic Circle identified them as low-molecular-weight dicarboxylic acids (a type of water-soluble organic matter) converted from a variety of organic materials. The concentration of these acids in the air increases from late March to April.

Atmospheric aerosols absorb and reflect solar radiation as well as providing nuclei for cloud formation, thereby helping to cool the earth's surface. The term PM2.5, which is now well known thanks to news on China's air pollution, refers to fine aerosol particles with diameters of up to 2.5 micrometers. Clean air may seem desirable, but temperatures on the earth's surface would increase significantly without aerosols.

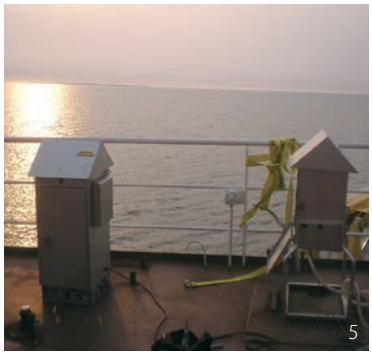
Living finite lives

Prof. Kawamura also researches aerosols in Japan and China in addition to his work in the Arctic Circle. A Chinese student who wanted to help address air pollution because of its effects on his family and others learned about Prof. Kawamura's work and contacted him in regard to doing research at HU.

Prof. Kawamura encourages students to consider how they should live their finite lives and carve out new paths to the future even if they believe it is difficult for researchers today to earn a living or

that an academic degree does not guarantee job security.

When asked the secret to succeeding in research, Prof. Kawamura highlighted the importance of students thinking intrinsically and viewing themselves as compounds of different elements, and added that logical thinking and imagination are also essential.



4. The Amundsen – a Canadian Coast Guard Ship (CCGS) operated as a research icebreaker in the Arctic Sea with sea ice in August
5. Air sampler on board the ship

Hokkaido University as Seen by Non-Japanese People

Do HU's initiatives toward internationalization appear to be making progress in the eyes of non-Japanese people? An interview was conducted with individuals from the US and China, which have close connections with Japan.

Lei Wang

Lei Wang is an Assistant Professor on the Economic Policy Course in the Graduate School of Economics and Business Administration's Division of Modern Economics and Management. After graduating from Hokkaido University's Graduate School of Economics and Business Administration, she began to work for HU in 2014.

Serena Forrest

Serena Forrest is an exchange student from the University of Massachusetts Amherst in the US. She is on the Japanese Course and the History Course of the Japanese Language and Culture Studies Program at the Office of International Affairs. She is also a member of HOSUP – a Hokkaido student volunteer organization supporting the reconstruction of the tsunami-devastated Tohoku region.

Welcome to HU.

What made you come to this university?

Wang: I came to Japan as an international student to earn a degree and improve myself academically. I chose Sapporo because I'm from northeastern China, and Shenyang in Liaoning Province, which is one of China's Three Northeastern Provinces, is a sister city of Sapporo and has a similar climate. Lots of students in these three provinces choose Hokkaido as a place to study. HU is particularly appealing because of its good scholarly reputation.

How about you, Serena?

Forrest: I studied in Osaka in the final year of high school and then went to the University of Massachusetts Amherst, where I chose Japanese as one of my majors. All students on the Japanese Language and Literature Program come over to Japan to study. Dr. Clark was an alumnus of UMass Amherst, which is why the ongoing exchange program was set up. My other major is history, so I hope to be able to help promote exchanges between the two countries.

What are you doing at HU?

What are you engaged in right now?

Wang: I analyzed China's CO_2 emissions reduction policy in economic terms on the doctoral degree program. Now I teach on the Environmental Economics and Modern China courses. Japanese people tend to think that China isn't doing anything to control air pollution, but we're trying. In my lectures, I talk about the background to pollution and the Chinese government's policies. Today we have a new environmental problem in China. I plan to write a paper about its characteristics and related responses by the Chinese government.

What's the new environmental problem?

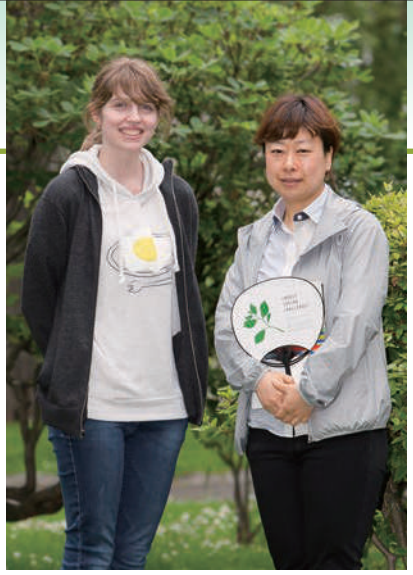
Wang: Groups of more than 100 elderly women dance in public squares from 5:00 to 7:00 in the morning and again from 5:00 to 7:00 in the evening, or sometimes from 7:00 to 9:00 at night. The problem is the significant noise pollution they create.

What activities are you engaged in, Serena?

Forrest: I'm taking lessons on the Japanese Language and Culture Studies Program. I'm also writing a report on the romantic novel Shunshoku Umegoyomi, or Spring Colors: The Plum Calendar in English. It's by Shunsui Tamenaga, an Edo-period Japanese novelist.

I hear you also do volunteer activities.

Forrest: Yes, I do. I went to Tohoku as a member of HOSUP – a Hokkaido student volunteer organization



supporting the reconstruction of the tsunami-devastated Tohoku region. I've believed since I was very young that university students should do something meaningful for society. Just like the students who joined Martin Luther King's campaign and protested against the Vietnam War, I'm trying to make a difference.

How can we make HU a better institution?

What do you think of the university's internationalization efforts?

Forrest: I'm often in the Office of International Affairs, and I see a lot of non-Japanese people there. I speak Japanese with my Chinese and Russian friends, which is good practice, but I don't get the chance to interact with Japanese students very much. If I want to join a club, for example, I don't know what to do.

Wang: It seems lots of Japanese students want to devote themselves to study at HU, but it would be better if clubs and events were organized so that they could interact with students from other countries. This would help them realize the enjoyment of international exchanges.

Forrest: I guess exchange students tend to meet only Japanese students who want to interact with people from other countries. This is good because it means international students have a chance to see that Japanese people are kind and open-minded, but anybody who's hesitant about actively interacting with people from other countries should make more of an effort to do so.

How do you envisage the ideal future HU?

Wang: I think it's great already!

Forrest: I hope the greenery in the campus areas will be preserved. If you go to a pond in the morning, you can see ducks there.

If you could change one thing, what would it be?

Forrest: I'd install a drinking-water fountain because there aren't any on campus. People have to buy PET bottles from vending machines every day, which goes against HU's work toward campus sustainability.

Wang: I'd like to establish an HU volunteer organization for overseas dispatch and international exchange. China has a non-profit organization called Teach For China that provides support to under-resourced Chinese schools. They recruit American graduates as English teachers, who work in groups of four including Chinese educators. Installing a drinking-water fountain is a good idea, too.

Forrest: If you forget to bring a PET water bottle, you have to either buy one or just not drink. It isn't about money. PET bottles are recyclable, but isn't the 3Rs concept known in Japan? It's about reducing resource consumption, reusing things and recycling things that can't be used anymore. We have this drilled into us from elementary school onward.

Wang: HU has a power-saving campaign, but electricity is always available in Japan. The same is true of water. There's no shortage of these resources, so people tend to take them for granted. Rather than thinking that it's OK to use PET bottles because they're recyclable, we should try to minimize their use and ultimately aim to not use them at all.

Forrest: It's true that PET bottles can be recycled, but it takes energy to produce them and fuel is also burned to get them to HU so it's better to try not to use them. As part of efforts to promote campus sustainability, UMass Amherst uses compostable disposable forks and provides new students with a reusable bottle featuring the university logo. Students in the US take pride in their schools, so things with the university name on them are popular.

What kind of items or merchandise would you like to see at HU?

Forrest: Hoodies would be good. There are some things with the Hokkaido University name in small letters, but it would be much better if the writing were more prominent.

Wang: I think the design of HU merchandise is too simple.

Thank you very much for coming today.

New Learning to Turn Crises into Opportunities

Takashi Miyazaki
Professor, Faculty/Graduate School of Education
Takashi Miyazaki left the doctoral degree program at Hokkaido University's Graduate School of Education in 1986 and became an Instructor at the School of Education in the same year. He assumed his present post in 2005.

Adventure-like learning to overcome obstacles

School is not the only place for learning. There are various opportunities to learn in daily life and in the careers of working members of society. Prof. Miyazaki at the Faculty of Education specializes in social education and is absorbed in research with a focus on learning support. His approach is based on the idea that learning in line with the needs of the times gives people control over the direction of their lives. Specifically, his research is focused on the theory of learning support to help students overcome obstacles and achieve their goals.

Prof. Miyazaki sees crises as opportunities, and believes that people do not need to think deeply when things go as expected. When things do not progress according to plan, people wonder why; this is the area in which there is a need to change the nature of learning. Things may no longer work when surroundings and social conditions change. Some people are petrified when confronted with an obstacle, but this can be seen as an opportunity to review tacitly accepted assumptions and try new approaches.

Prof. Miyazaki argues that such experiences provide a new type of learning, which is also related to academic pursuits at university. He believes that whereas high school study involves efficiently and effectively solving problems proposed by teachers, university students need to identify problems themselves; this requires a more exploratory and creative educational approach that can be seen as adventure-like learning in a field of unknowns.

Interview survey with a youth supporter at a youth support facility in Northern Ireland

Youth support facility in Northern Ireland (a downtown facility for practical training in hairdressing)

A starting point of research on deep-sea fish

Prof. Miyazaki's initial research interest was in deep-sea fish. When he was a first-year high school student, he was inspired by The Limits to Growth, a 1972 Club of Rome publication warning of a crisis threatening the very existence of humanity. This inspired him to engage in research that would help to address food issues in the future. His studies on deep-sea fish were an extension of this research.

When he began his studies at the university, Prof. Miyazaki realized that food crisis issues could not be addressed on the basis of natural science alone. While researching coastal fisheries, he focused on cooperative associations in the industry, which pay attention to both the market and people's livelihoods and have a mechanism by which all stakeholders can reach a consensus despite conflicting interests. He came to focus his research on the learning processes of fishermen, who developed a new mechanism to use resources and fishing grounds in a way that sets an appropriate balance among people, nature and society when economic activities prioritizing market value had reached an impasse.

His current work on the theory of social education and his past research on deep-sea fish appear to be in wholly different fields, but his underlying ideas remain unchanged. He believes that the globalization needed in the true sense of the term involves human collaboration to build a society in which all people can look back and realize that their lives have been meaningful. Prof. Miyazaki proposes that learning based on the review of past assumptions is necessary, and that universities are places for such learning.

Eliminating fear of setbacks

Prof. Miyazaki believes that setbacks in life are nothing to be ashamed of. Anybody coming up against a wall should take a short break to consider their relations with society and then take a step further. This approach helps people to find a new way of life after the initial period of confusion.

Life story research at a youth support facility in Northern Ireland

French poet Louis Aragon wrote that to teach is to talk of hope and that to learn is to pledge truthfulness in the heart. Prof. Miyazaki says, "What matters is where hope comes from. It comes not from within, but from relations with others." He hopes to continue his pursuits in conjunction with students in order to help build a new society and a new world.

Lawn in front of the School of Education

Life as a clinician in waste management

Toshihiko Matsuto
Professor, Division of Environmental Engineering in the Faculty of Engineering

Toshihiko Matsuto graduated from the Department of Sanitary Engineering at Hokkaido University's School of Engineering and completed master's and doctoral degree programs in the Division of Sanitary Engineering at the university's Graduate School of Engineering. He began to work for HU in 1983. He serves as a Professor at the School of Engineering, the Director of the Environmental Preservation Center, a member of the Steering Committee of the Office for a Sustainable Campus, a member of the Committee for the Safety Management of Chemical Substances, etc., a member of the Steering Committee of the Office of Health and Safety, a member of the Executive Office on Campus and Environment Planning, and the Director of the Faculty of Engineering's Safety and Health Office. He also serves as a Director of the Society of Environmental Science, Japan, and as the Chairman of the Japan Society of Material Cycles and Waste Management (JSMCWM).

Optimization of holistic waste management

Prof. Matsuto, who conducts waste management research in the Faculty of Engineering' s Division of Environmental Engineering, recently identified his role as a clinician in waste management. Medical specialists often treat patients with focus only on the affected areas, but they should in fact examine the whole body. In waste studies too, it is important to consider all related processes as a system. These include waste generation, separation, collection, recycling, intermediate processing and landfill. It is necessary to optimize waste management with a holistic approach. Based on this philosophy, Prof. Matsuto now looks at all related matters, such as financial aspects, environmental impacts and residents' awareness.

Waste, or garbage to use its common name, consists of household and industrial types. Waste management methods include physical treatment (turning waste into solid fuels), biological treatment (composting and methane fermentation) and thermal treatment (incineration, carbonization and hydrothermal treatment). Regardless of the method used, waste management ultimately produces residues that require landfill treatment. Prof. Matsuto conducts research on waste management processes ranging from separation to final disposal in view of both hard infrastructure (e.g., experiments, examinations and chemical analysis) and soft infrastructure (e.g., questionnaires and data analysis) toward the establishment of a comprehensive waste

Field survey at a landfill site

Field survey at a waste disposal landfill site

management structure. Based on the results obtained, he points out that some waste management mechanisms have failed because the steps involved focused on actions to be taken after waste generation rather than before.

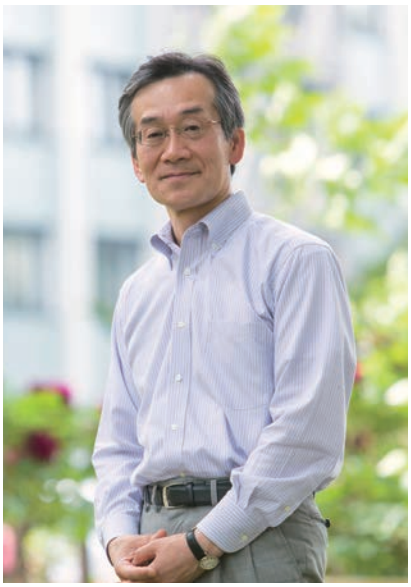
The involvement of real application to society in practical learning

Waste management research is a typical area in which today's practical learning is needed, and is an appropriate theme for HU because practical learning is one of its basic philosophies of education and research. This style of learning is often associated with university-industry collaboration, but Prof. Matsuto focuses on the societal applicability of research results. He also believes that HU should continue to produce human resources that meet the needs of society as it has done since its establishment.

In this regard, Prof. Matsuto advises students aspiring to be researchers to view things with a sense of perspective and consider objectives. Research involves the processes of achieving objectives as well as methods and results, which in turn lead to further objectives. The best research involves looking at the issue and considering what the problem is. Researchers need to then determine whether the problem is structural or associated with awareness, and must then identify the needs of the situation.

Optimizing the rest of your life

Prof. Matsuto's life view is centered on individuals' optimization of their future. There is no point in wondering what might have been if you had chosen another option, for example, because you didn't. People should consider the future based on the choices they made rather than



harboring regrets. This also applies to research as well as to choices of jobs and marriage partners.

Prof. Matsuto also believes that there are two sides to everything. In addition to thinking about good things in life, it should be remembered that every gain has a corresponding loss. Based on this thinking, he encourages students to observe individual fields and carefully consider what is important.

Survey at a temporary storage site for debris from the Great East Japan Earthquake

Survey at a temporary storage site for debris from the Great East Japan Earthquake

Composition analysis of tsunami debris from the Great East Japan Earthquake

Sustainable Communication

Hokkaido University (HU) promotes its initiative to serve as a driving force behind the development of a sustainable society while maintaining communication with people from HU and elsewhere.

International Symposium on Sustainable Campus Creation 2013

■November 6, 2013 ■Conference Hall ■95 participants (42 from HU, 53 from outside HU)

The International Symposium on Sustainable Campus Creation 2013 was based on the theme Sustainable Campus Creation in Collaboration with Local Communities. Lecturers were welcomed from the Ministry of Education, Culture, Sports, Science and Technology (MEXT), the University of Tokyo, and three European universities with which HU is implementing an international collaborative project known as Value Metrics and Policies for a Sustainable University Campus (UNI Metrics). These are the Polytechnic University of Turin, the University of Cambridge and VU University Amsterdam.

Representatives from the University of Tokyo and the University of Cambridge spoke about the Urban Design Center Kashiwa-no-ha (UDCK) and the North West Cambridge initiative, respectively. These practical projects are intended to support the creation of sustainable campuses in collaboration with local communities. The MEXT representative highlighted a plan to position university campuses as platforms for exchange in order to make universities more open to society. Representatives from the Polytechnic University of Turin and HU detailed a comparative study on energy management and environmental impacts, and the VU University Amsterdam representative spoke about policy strategies to promote industry-academia-government collaboration.

International Symposium on Sustainable Campus Creation 2013 Expert Conference

■November 7, 2013 ■Conference Hall ■14 participants

The Expert Conference had the same theme as the International Symposium on Sustainable Campus Creation 2013, and was attended by researchers and other participants from the Polytechnic University of Turin, the University of Cambridge, VU University Amsterdam, Nagoya University, Osaka University and HU. The event featured presentations on the case example of the North West Cambridge campus (which has been developed based on real property management strategies), the regional cooperation agreement concluded between HU and the City of Sapporo, and other topics. These were followed by discussions on how universities can better attract the attention of the government and the private sector.

3rd Environmental Impact Reduction Promoters Meeting: Sustainable Campus Café

■February 4, 2014 ■Conference Hall ■38 participants

The 3rd Environmental Impact Reduction Promoters Meeting was held in an unprecedented style with seating decided by a lottery. A total of 38 participants (10 Environmental Impact Reduction Promoters, 22 Assistants to Environmental Impact Reduction Promoters and 6 Facilities Department members) wrote down things they wanted HU to continue, change and try. The attendees then broke into groups of four or five and discussed three themes – HU today, its unique characteristics and its future – in an amicable atmosphere at separate tables in the World Café style. At the end of the meeting, participants wrote details of the HU they wanted to see in

the future on wooden votive tablets and presented their thoughts.

Popular things to be continued and protected at HU included the rich natural environments of its campuses as well as initiatives to save power and water. Problems to be addressed included on-campus vehicle speeds, buildings not designed with cold-region specifications, and poor cycling etiquette. The opinions expressed at the meeting will be reflected in future actions to be taken for campus sustainability.

HU Candle Night 2013

■June 21, 2013 ■Area from the Main Gate to the Centennial Hall ■10 staff members, approx. 1,300 onlookers

The Sapporo Candle Night event is held every year to encourage people to turn off their lights on the night of the summer solstice and slow things down for a while. The year 2013 marked the third instance of HU's participation in the event, and around 600 candles were lit in areas from the Main Gate to the Centennial Hall, where streetlights, vehicle gate lighting and other lights were turned off. The candles, protected against the wind with tracing paper, were designed by members of the Student Council for Sustainable Development (SCSD; a student organization). Around 100 candles provided by the Acacia Youth Activity Center were also used.

A limited number of cookies baked from local ingredients provided by Sapporo confectioner Kiki Corporation were given out to visitors, and HU's Guitar Ensemble Club played live. All these contributions made the event a pleasant experience to see, taste and hear.

Candle Making and Discussions on the Future at Kankyo Hiroba Sapporo 2013

■August 2 – 4, 2013 ■AXES Sapporo (Sapporo Exposition Center) ■approx. 100 parents/children and groups (total visitors: 30,865)

The Kankyo Hiroba Sapporo (Environmental Square Sapporo) event has been arranged and held since 2003 by an organizing committee consisting of representatives from the Sapporo Municipal Government and other organizations. Its aims are to raise awareness of initiatives engaged in by industry, academia, government and communities, promote environmental business and encourage visitors to take green action. The venue featured seven exhibition zones, with HU exhibiting in the Kankyo Yokocho (Environmental Alley) zone designed to highlight environmental conservation activities by NPOs, schools and civic groups.

This was HU's third time as an exhibitor at the event. The university held a workshop titled Candle Making and Discussions on the Future at which candles were made from waste tempura oil in conjunction with members of the Student Council for Sustainable Development (SCSD), and also exhibited panels and distributed pamphlets. HU's contribution was favorably evaluated, and some workshop participants were even inspired to make candles at home because the activity is not only fun but also eliminates the need to dispose of used oil. A total of 60 of the 200 candles made at the workshop were donated for next year's HU Candle Night event.

Development of Sustainable Campuses

HU engages in a range of initiatives as part of global efforts toward sustainability through research and education while acting as a role model for a sustainable society by using its campuses as living laboratories.

[1] Office for a Sustainable Campus

The Office for a Sustainable Campus works to develop a green university environment based on collaboration among its three divisions.

●Campus Assessment Division

①Planning for the development of for campus sustainability
②Implementation of sustainability assessment
③Planning of participatory programs
④Establishment of domestic and international networks

●Environmental Impact Reduction Division

①Formulation of environmental impact reduction plans
②Promotion of energy-saving initiatives
③Application of intellectual assets to the campus environment

●Environmental Preservation Center

・Establishment of separation and collection systems for waste and recyclable resources
・Collection, sorting and unified management of information on campus waste

[2] Action Plan 2012 for Campus Sustainability and Sustainable Campus Assessment System 2013

●Action Plan 2012 for a Sustainable Campus

HU's target of environmental impact reduction is to achieve a 20% reduction in CO_2 emissions compared with 2005 level by 2020. Our long-term goal until 2030 is a 35% reduction in CO_2 emissions. Toward attaining these goals, "The Action Plan 2012 for a Sustainable Campus" was formulated in March, 2012 as HU went ahead of other Japanese universities.

This Action Plan is based on HU Environmental Policy. We have set "Education" and "Research" in area of the first policy "Eco-friendly Activities through Education and Research". The items for social contribution and networking mainly have been set in area of the second policy "Social Contribution through Dissemination of Information about Environmental Issues". Regarding the third policy "Environmental Impact Reduction in University Management", not only environmental aspects and physical aspects but also items in transportation planning and Space saving have been set in this area. HU has developed university–wide campus sustainability through implementing of these actions since April, 2012.

●Sustainable Campus Assessment System 2013

There are university sustainability assessment system such as STARS by AASHE, UNI metrics (see below), and AUA (Alternative University Appraisal) by Hokkaido University Office of International Affairs. Our office drew from the above, focused on campus sustainability, basic functions of sustainability education and research and Living Laboratory, and students involvement, and included our own original assessment criteria. Thus we completed Sustainable Campus Assessment System in 2013. Our assessment system is comprised of four categories: Management, Education and Research, Environment, and Local Community. The assessment result from these 4 comprehensive fields helps the university decide its future strategy for sustainable campus.

Sustainable Campus Assessment System 2013 (Fields and Sections)

I Management

Field	Section
I-1 Policy and overall plan	I-1-1 Education and research
	I-1-2 Campus
I-2 Organiz a t ion to consider sustainability	I-2-1 Dedicated staff
	I-2-2 Activities
	I-2-3 Mechanisms to support policy decisions
I-3 Financial resource managemen	I-3-1 Long-term planning
	I-3-2 Securing budgets and acquiring funds
	I-3-3 Operations
I-4 Asset management	I-4-1 Community utilization of university assets
	I-4-2 Servicing of university assets
I-5 Facility management	
I-6 Network to enhance sustainability	
I-7 Personnel training	I-7-1 Faculty evaluation
	I-7-2 Recruiting talent
I-8 Procurement and contracts	I-8-1 Procurement
	I-8-2 Contracts

Ⅱ Education and Research

Field	Section
Ⅱ-1 Education	Ⅱ-1-1 Curriculum
	Ⅱ-1-2 Sustainability Literacy
Ⅱ-2 Research	Ⅱ-2-1 Sustainability research
	Ⅱ-2-2 Living lab
	Ⅱ-2-3 Practical community research
Ⅱ-3 Students	Ⅱ-3-1 Encouraging and supporting student activities
	Ⅱ-3-2 Student participation in university management

Ⅲ Environment

Field	Section
Ⅲ-1 Ecosystem	
Ⅲ-2 Land	Ⅲ-2-1 Green space and forest land
	Ⅲ-2-2 Other open space
Ⅲ-3 Public Space	
Ⅲ-4 Landscape	
Ⅲ-5 Waste	
Ⅲ-6 Energy and resources	Ⅲ-6-1 Energy management
	Ⅲ-6-2 Greenhouse gases
	Ⅲ-6-3 Renewable energy
	Ⅲ-6-4 Other resources
Ⅲ-7 Basic Equipment	
Ⅲ-8 Facilities	Ⅲ-8-1 Environmental performance
	Ⅲ-8-2 Indoor environment
Ⅲ-9 Transportation	Ⅲ-9-1 Flow planning
	Ⅲ-9-2 Pedestrians and cycling
	Ⅲ-9-3 Connecting with the local community
Ⅲ-10 Use of historical assets on campus	
Ⅲ-11 Disaster prevention locations	

Ⅳ Local Community

Field	Section
Ⅳ-1 Collaboration between industry, academia, and government	
Ⅳ-2 Community	Ⅳ-2-1 System
	Ⅳ-2-2 Activities
Ⅳ-3 Dissemination of Information	

[3] Action Taken at HU and Elsewhere (Results to be Reflected in Assessment)

●Regional Cooperation Agreement on Community Development concluded with the City of Sapporo

(Corresponding to Ⅳ-2-2 Activities in Category in Ⅳ Local Community of the Sustainable Campus Assessment System 2013)

HU and the Sapporo Municipal Government concluded the Regional Cooperation Agreement on Community Development in July 2013. This was because an HU faculty member was involved as a Council Member in the formulation of the municipal government's Sapporo City Development Strategic Vision and the Basic Energy Plan, and HU was asked to collaborate in the formulation of Long-term Energy Strategies. In the meantime, HU and other universities were asked by the Ministry of Education, Culture, Sports, Science and Technology (MEXT) as part of university reform initiatives to serve as: 1. centers for regional regeneration; 2. public spaces; and 3) social models. Under the Regional Cooperation Agreement, a liaison and coordination conference of working-level officials was established. The agreement is valid for two years and can be extended with mutual consent.

[Objective]

The objective of the agreement is to contribute to regional revitalization by addressing community development issues based on effective utilization of the resources and functions of HU and the City of Sapporo.

[Major areas of cooperation]

①Surveying and research on a comprehensive energy policy framework

②Implementation of cutting-edge exemplary energy initiatives

③Efforts to promote the regional economy, e.g., the advancement of environmental and energy businesses based on regional cooperation

④Other activities required for regional revitalization (community development)

●HU's accession to the International Sustainable Campus Network (ISCN)

The International Sustainable Campus Network (ISCN) is a global network of colleges and universities designed to support the discussion of environmental impact reduction on campus, facility management, college/university strategies and management, and other topics. ISCN has more than 40 institutions in the US, Europe (e.g., Yale University and the University of Oxford) and elsewhere, and has also recently worked to expand and incorporate Asian universities. HU drew the attention of the organization by making presentations at ISCN conferences and other places, and was asked to join the network. It did so in October 2013 with the aims of collecting information based on a global perspective and reinforcing its collaborative relations with overseas universities.

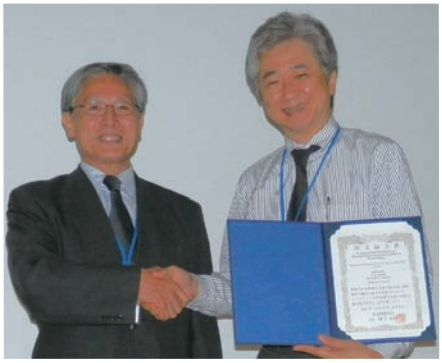
ISCN International Sustainable Campus Network

TOPICS

Awards

Prof. Ryosuke Suzuki of the Faculty of Engineering receives the Thermoelectrics Society of Japan (TSJ) Outstanding Paper Award

The paper was titled Computational Simulation of Thermoelectric Generators in Marine Power Plants, and was co-authored by Dr. Min Chen and Mr. Yuto Sasaki. Based on an analogy to a ship's engine room, Dr. Suzuki examined the idea of attaching thermoelectric transducers to internal combustion engine walls in combustion chambers. He predicted related effects based on computation rather than combustion experiments and obtained novel results suggesting that fuel spray optimization is related to such transducer attachment.



Faculty of Environmental Earth Science wins the 2013 Energy Conservation Grand Prize

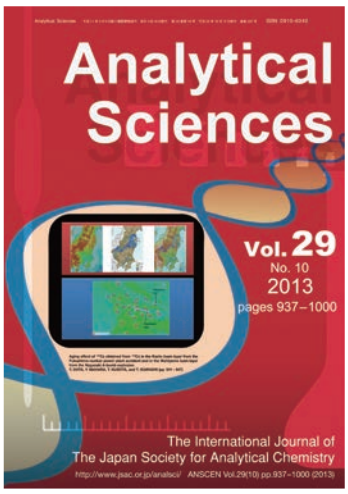
This prize is sponsored by the Energy Conservation Center, Japan (ECCJ) with the support of the Ministry of Economy, Trade and Industry (METI). The theme of the winning efforts was Power-saving Initiatives at a Graduate School with Laboratory-based Courses in a Cold Region. The Faculty of Environmental Earth Science won the ECCJ Chairman Prize in the Successful Case of Energy Conservation Category in recognition of accomplishments made under the Faculty's Environmental Impact Reduction Achievement Project Using Visualization Systems, which has been in place since academic 2011.

Mr. Yared Yohannes and Dr. John Yabe of the Graduate School of Veterinary Medicine receive Outstanding Research Presentation Awards

Mr. Yared Yohannes and Dr. John Yabe received these graduate student awards at the 6th SETAC Africa Conference in 2013. Mr. Yohannes conducted research titled OCPs in fish and bird species from Lake Ziway, Ethiopia: Association with trophic level and human health risk assessment and examined the ecological impacts of DDT and other chemicals. Dr. Yabe studied lead poisoning in children from townships in the vicinity of a lead-zinc mine in Kabwe, Zambia, and reported on the serious situations that resulted.

Assistant Professor Tomoko Ohta of the Graduate School of Engineering's Division of Sustainable Resources Engineering wins the Hot Article Award 2013 in Analytical Sciences

Assistant Professor Ohta's paper, titled Aging effect of ^{137}Cs obtained from ^{137}Cs in the Kanto loam layer from the Fukushima nuclear power plant accident and in the Nishiyama loam layer from the Nagasaki A-bomb explosion, compared differences in underground migration behavior between the ^{137}Cs mentioned in the title.



Research

Support for efforts toward international certification for blue shark fishery in Kesennuma

All parts of blue sharks caught by longline fishing fleets in waters off Kesennuma are used; the flesh is made into fish paste and fillets, and the bones and skin are used in the manufacture of health food and cosmetics. Fleet owners are currently working to obtain Sustainable Fishery Certification from the Marine Stewardship Council (MSC) to set their fishing method apart from finning fishery, in which only fins are removed and the rest of the shark is thrown back into the ocean. Specially Appointed Assistant Professor Gakushi Ishimura of HU's Center for Sustainability Science is leading the initiative to raise global awareness of sustainable fishing based on the certification.

Continuous measurement of radiation at the School of Engineering

The March 2011 nuclear disaster prompted the School of Engineering to start monitoring the radiation dose rate in the air on the roof of its building.

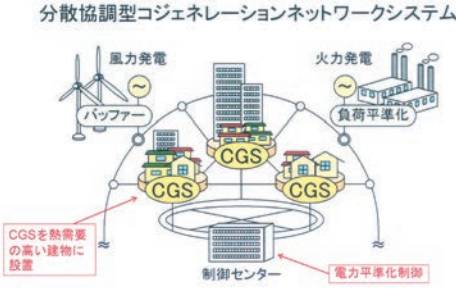
Minuscule amounts of radionuclides from the accident (^{131}I, ^{134}Cs, ^{137}Cs) were detected until early April 2011, but no impact on the radiation dose rate in the air was observed. People are constantly exposed to environmental radiation from various sources, and monitoring continues as of September 2014 because information on natural background radiation dose levels is expected to support decision making in emergency situations.

Continuous monitoring of soil radon in woodland

A range of radionuclides are found on the earth. Radon (^{222}Rn), the only radioactive gas in the uranium series of radionuclides, is readily absorbed into the body via the respiratory system and may cause health hazards due to internal exposure. However, it also serves as a useful parameter in the elucidation of lower-atmospheric movement. The School of Engineering continuously monitors soil radon in woodland on the HU campus to clarify the extent and variation of radiation levels, related factors and other considerations to support the use of soil radon as a tracer for the clarification of air movement in the soil surface layer.

Energy conservation and CO_2 emissions reduction via a cogeneration network

Cogeneration (the simultaneous production of electricity and heat from gas) is known for its high energy efficiency, and also helps to reduce CO_2 emissions. However, correct system configurations and operation methods are essential in maximizing the effectiveness of this approach. Accordingly, HU's engineering and economic researcher groups have engaged in a research project titled Scenario Analysis of CO_2 Reduction, Economic Impact, and Effective Policy to Realize a Co-generation Network System (commissioned by the Ministry of the Environment) in collaboration with industry and government partners since academic 2013. The project is intended to develop cutting-edge energy, environmental and economic systems in Hokkaido.



Effective Utilization of Energy and Resources

Hokkaido University Campus Ecology Task Force (Academic 2013 Projects)

HU' s overall campus area is among the nation' s largest, and features an unspoiled natural environment as well as playing an important role in preserving local biodiversity. HU works to identify the species found on campus and elucidate the details of their habitats, and also engages in related conservation and creation efforts. Projects are implemented in line with the university' s long-term plan so that these natural resources can be used in environmental education and hometown study. The projects outlined below were among those implemented in academic 2013.

● Campus flora and fauna survey

This survey was conducted around the School of Engineering building (a location with limited natural surroundings but a large number of recorded plant species), in the southern part of adjacent primeval forest land, and at the Model Barn site (a location with a large number of plant species). This was the fifth year of the survey, and most of the originally targeted areas have now been covered.

● Establishment of a database

The Task Force works to share collected data in a viewer-friendly manner on the HU website, in environmental reports and through other channels. In this connection, efforts are made to process data for the publication of distribution maps, flora and fauna photos, inventories of growing species, and other related information.

● Promotion of growth in precious wild plant communities based on weeding periodicity adjustment

The Yellow Star of Bethlehem (a wild plant indigenous to Hokkaido) is known to produce more flowers when weeding is conducted after seeds fall. Accordingly, the Task Force adjusted the periodicity of weeding conducted as part of its maintenance work.

Promotion of green purchasing

HU promotes green purchasing in line with its Policy for the Promotion of Eco-Friendly Procurement – an initiative based on the Act on the Promotion of Eco-Friendly Procurement by the State and Other Entities (also known as the Green Purchasing Act). In addition to its efforts to purchase goods and services that are less harmful to the environment, HU also focuses on the procurement of environmentally friendly items bearing an Eco Mark or other eco-labels in the event that products complying with the Green Purchasing Act are unavailable for the purpose at hand. HU' s average purchase ratio for designated procurement targets (i.e., the kinds of eco-friendly purchases to be prioritized by the national government and other entities) among all 271 items was 100% in academic 2013.

■Major designated procurement amounts in academic 2013 and the related procurement ratio

Item	Total amount procured	Procurement ratio for products complying with the Green Purchasing Law
Toilet paper	51,854kg	100%
Ballpoint pens	12,108	
Paper envelopes (office supplies)	411,712	
Sticky notes	22,602pads	
Chairs	1,703	
Printers (purchases + new leases)	544	
Refrigerators	218	
Fluorescent lamps	798	
Curtains	349pairs	
Items of workwear	3,007	
Work gloves	3,528pairs	
Printing (service)	1,267orders	

Changes in environmental data

HU works to minimize its own environmental impacts in order to support the creation of green campuses with zero emissions based on the use of natural, renewable and other green energy sources.

In the second phase of HU' s Medium-term Goals that began in academic 2010, the university set the target of reducing greenhouse gas (GHG) emissions by approx. 2% annually from the record-high of 91,270 tons set in academic 2005. If this rate is achieved, emissions will be reduced by 20% by 2020 and by 35% (32,000 t) by 2030.

HU focuses on the indicators outlined below as part of efforts to reduce environmental impacts. The figures show five-year changes in environmental data.

◇Energy consumption by academic year

HU constructed new buildings, renovated existing structures and replaced/upgraded equipment across its campuses from academic 2010 to 2013. As a result, the total floor area of the Sapporo Campus had increased by 5.3% (or 37,600 ㎡) as compared to 2010 by May 1, 2014. The degree of energy use reduction per total floor area was not improved from that of the previous year in academic 2010 due to extreme heat during summer and in academic 2012 due to extreme heat in summer and cold waves in winter.

As part of the renovation, building air-conditioning was changed from central heating based on the use of boilers in the power center to individual gas-powered air-conditioning. Along with the addition of cooling functionality, this significantly increased gas consumption. Power usage also increased due to the academic 2013 introduction of medical facilities with large basic units of power consumption (kWh per ㎡ of total floor area) in the Proton Beam Therapy Center and the Outpatients Building of Dental Clinical Division of University Hospital.

◇Greenhouse gas (GHG) emissions by academic year

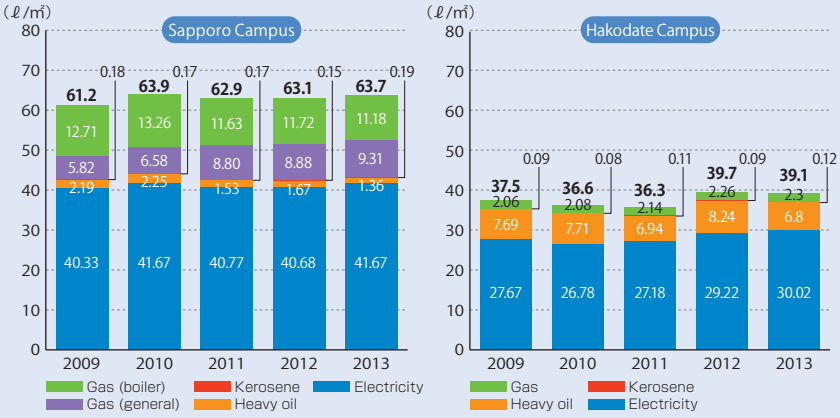
If HU had reduced GHG emissions by approx. 2% annually from levels seen in academic 2005 (the base year for the second phase of the Medium-term Goals), GHG emissions in academic 2013 would have been 84,100 tons, representing a reduction of 8%. However, although the reduction targets were exceeded in academic 2009 and 2010, GHG emissions have remained above those of the base year level since academic 2011, when the Great East Japan Earthquake occurred. This is because the CO_2 emissions coefficient for electricity has significantly increased due to the shutdown of a nuclear power plant in Hokkaido, and this has noticeably affected emissions because HU depends on electricity for more than 65% of its energy needs. The university' s management is currently considering new GHG emission reduction measures.

◇General waste generation (Sapporo Campus)

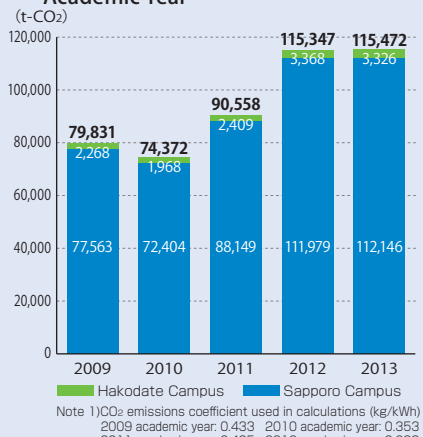
In academic 2013, HU changed its waste separation and collection methods to promote waste reduction in response to an increasing trend in the amount of general waste generated.

[Environmental Data]

◆Energy Consumption by Academic Year (crude oil per equivalent in ℓ / square meter of total floor area)

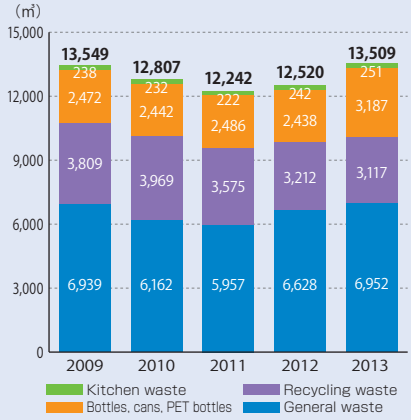


◆Greenhouse Gas Emissions by Academic Year



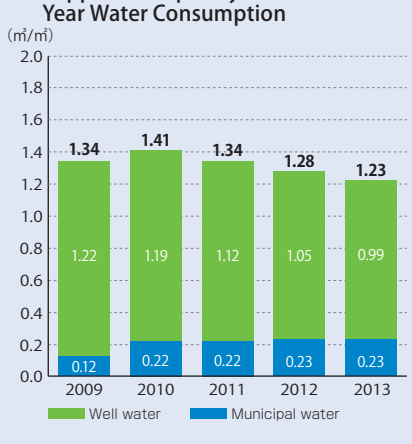
Note 1)CO_2 emissions coefficient used in calculations (kg/kWh)
2009 academic year: 0.433 2010 academic year: 0.353
2011 academic year: 0.485 2012 academic year: 0.688
Note 2)The CO_2 emissions coefficient for 2012 academic year was used for 2013.

◆General Waste Generation Figures (Sapporo Campus)

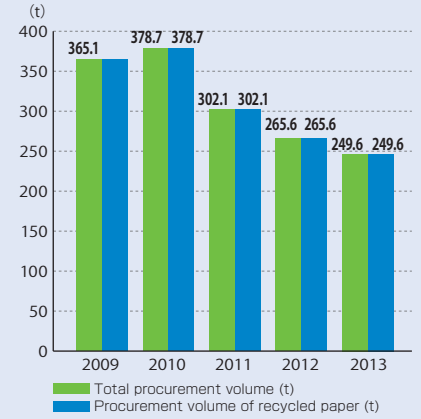


Note 1) Kitchen waste is generated by the university hospital's food preparation facilities.

◆Sapporo Campus by Academic Year Water Consumption



◆Paper Procurement Volume (Sapporo Campus)



Facilities and the Environment

Completion of the Frontier Research in Applied Sciences Building

In March 2014, HU opened the Frontier Research in Applied Sciences Building as a new center for research and education toward innovation in materials science. The facility is intended to continue the tradition of achievements made by Professor Emeritus Dr. Akira Suzuki, who was awarded the Nobel Prize in Chemistry 2010, and to provide education to the younger generation. It was designed with due consideration to energy conservation, longevity, eco-material usage, environmental conservation, the surrounding landscape and safety.

◆Facility overview

- Structure and size: seven floors above ground and one basement floor (total 10,430 ㎡)
- Three divisions in applied chemistry, applied physics and environmental engineering, each with laboratory research spaces ranging in size from around 1,500 to 1,800 ㎡
- Space for inter-disciplinary meetings and discussions
- Development of laboratories for green innovation

◆Examples of energy-saving design characteristics

- Energy conservation improvement by around 30% as compared to a conventional facility with a similar scale
- Electric power demand limitation to around 260 kW (similar-scale facility: around 350 kW)
- Optimum fresh-air intake control based on laboratory fume hood operation
- Lecture Hall with outdoor air cooling and CO_2-based ventilation control

Dental Clinical Division outpatient service integrated into Hokkaido University Hospital's New Outpatients Building of Dental Clinical Division

The aging Dental Clinical Division was relocated to Hokkaido University Hospital's New Outpatient Building, which was completed in August 2014. Efforts will be made to achieve closer collaboration among clinical buildings via corridor connections to the Outpatient Building and the Central Clinical Building.

◆Building development policy

1. Intuitive user-friendly floor planning; 2. an infection-sensitive safe medical environment; 3. consideration of universal design; 4. safe disaster management planning; 5. easy maintenance and operation; 6. eco-friendliness and reduction of indoor air contaminant presence

◆Examples of energy-saving design characteristics

- Reduction of CO_2 emissions by 45% from facilities with standard hospital specifications
- A highly insulated building exterior with 75-mm sprayed polyurethane foam for the external walls and 200-mm urethane foam insulation boards for the roof
- Use of high-efficiency Hf fluorescent bulbs
- Reduction of fresh air load via CO_2 sensor-based adjustment of fresh air intake
- Enhancement of heat source efficiency based on the use of an air-heat-source heat-pump chiller for cooled water
- Reduction of water consumption using water-saving equipment

Traffic environment improvement

[1] Campus Master Plan and related issues

HU laid out basic principles for facility development in its Campus Master Plan 2006 and established the Master Plan Realization Task Force within the Executive Office on Campus and Environment Planning. The Task Force examines the improvement of traffic environments and the development of related public spaces. To address issues identified in the January 2012 Survey on Sapporo Campus Traffic Conditions, the Task Force highlighted the need to establish and separate flows of different transportation modes (i.e., pedestrians, bicycles and cars) and to secure related public spaces, and is currently studying specific development measures in areas near the Clark Memorial Student Center and Kita 18-jo Street. However, measures in soft infrastructure (e.g., etiquette training) also need to be considered in addition to regulations.

Hokkaido University Environmental Policy

September 5, 2005

Policy Statement

Hokkaido University is a national establishment with a central role in Japan's academic research and human resource development (targeting areas such as 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.

Sustainability Weeks 2014

Core period: October 25 – November 9, 2014

Scheduled events (partial list)

Oct. 15 (Wed.)	Why is Eating so Enjoyable? (Graduate School of Dental Medicine)	Nov. 6 (Thu.)	Symposium: Center for Regional Economic and Business Networks —The Future of Manufacturing in Hokkaido
Oct. 20 (Mon.) – Nov. 3 (Mon., nat'l holiday)	Open Access and HUSCAP	Nov. 8 (Sat.)	The Role of Civil Engineering for a Safe and Sustainable Society: A Diverse Field for the Diverse Needs of the Developed and Developing Worlds
Oct. 30 (Thu.)	Lecture Series on Disaster Prevention in Hokkaido: Risk Management and Disaster Prevention in Winter	Nov. 9 (Sun.)	5th Sustainable Campus Contest —A Bridge for a Sustainable Tomorrow (SCSD; The Students Council for Sustainable Development)
Oct. 30 (Thu.)	Special Lecture: Ethics of Sustainability (Graduate School of Letters)	Nov. 25 (Tue.)	International Symposium on Sustainable Campus Creation 2014 —How can universities interact with the society?
Oct. 31 (Fri.)	Open Symposium: Agricultural Life in Urban Areas —Enjoyment of Plants and Idyllic Lifestyles	Dec. 20 (Sat.)	Indigenous Heritage and Tourism: Constructing Cultural Landscapes and Indigenous Heritage Issues

※Events and schedules are subject to change.

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Environmental Report Compilation

Editorial Policy
This Environmental Report was drawn up in line with the Act on the Promotion of Business Activities with Environmental Consideration by Specified Corporations and Other Organizations Based on the Facilitation of Access to Environmental Information and Related Measures (also known as the Environmental Consideration Act) and in reference to the Japanese Ministry of the Environment's Environmental Report Guidelines 2012.

Organizations Covered
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Sapporo Campus
(incl. contracted business operators on campus)
Hakodate Campus

Period Covered
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Field Covered
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