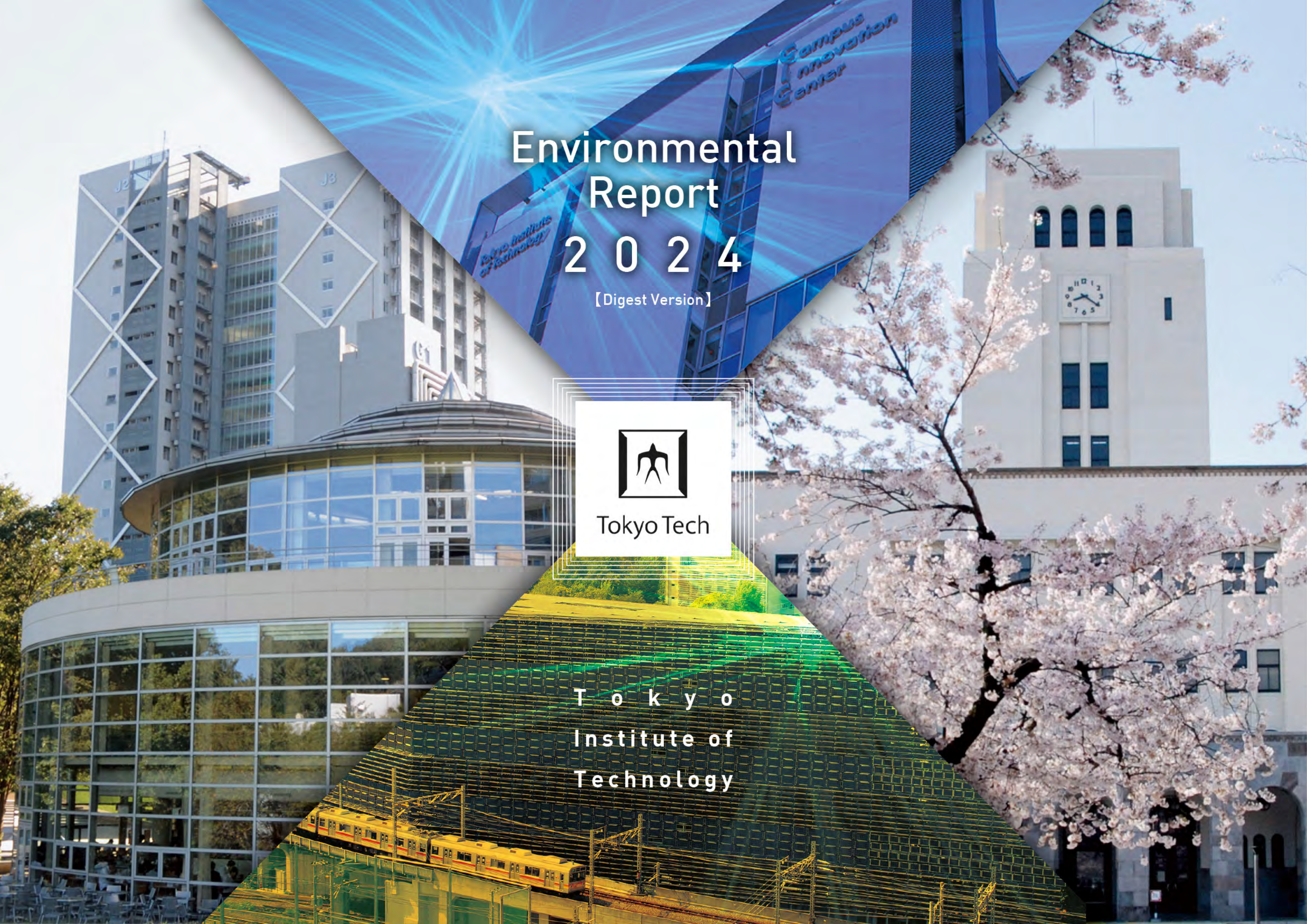
Environmental Report 2024

【Digest Version】



Tokyo Institute of Technology

President's Message

Humanity is facing a variety of previously unimaginable challenges, including the degradation of the global environment, novel and reemerging infectious diseases, and declining birthrates and aging populations. Society expects universities to consolidate their knowledge and play an increasingly larger role in solving these challenges.

In the area of the environment, Tokyo Tech has engaged in a wide variety of initiatives based on the following environmental principle: Environmental problems are "major challenges on a global scale that pose an existential threat to all of humanity. To ensure that future generations have a viable global environment, Tokyo Tech will contribute to the creation of a sustainable society as it fulfills its mission as a research and education institute." This includes the promotion of green transformation (GX) initiatives such as Tokyo Tech GXI, which is meant to help achieve carbon neutrality; research activities such as the establishment of the Multidisciplinary Resilience Research Center, which is dedicated to conducting research into social resiliency against multidimensional disasters that occur on different temporal and spatial axes; and talent development efforts focused on an environmental curriculum. Our goal is to achieve one specific target we set in the Designed National University Corporation Proposal: "Generate outstanding knowledge and human resources in interdisciplinary fields that tackle global issues such as clean energy, climate action, and other environmental issues."

In October 2024, Tokyo Tech will merge with Tokyo Medical and Dental University, to be reborn as the Institute of Science Tokyo. The new university will bring together the many achievements and knowledge both schools have accumulated in science and engineering and the medical and dental sciences. The new entity will develop the field of "convergence science," which is based on the comprehensive knowledge that can be acquired by converging these fields with other fields such as informatics, liberal arts, and the humanities and social sciences. By doing so, we will be able to solve new global issues. In addition, we will contribute to society by organically linking liberal arts education with specialized education to produce highly specialized professionals who can identify and lead the way to solutions to various issues confronting modern society.

This report summarizes the environmental, safety and health activities of Tokyo Tech in FY2023, focusing on environmental performance, in light of the international SDGs, and in accordance with the Ministry of the Environment's Environmental Reporting Guidelines. It is our last environmental report as Tokyo Tech. We hope that you will read it and continue to support our activities as we become part of the Institute of Science Tokyo.

Kazuya Masu
President, Tokyo Institute of Technology

Tokyo Institute of Technology Environmental Policy

Enacted January 13, 2006

Basic Principle

As we strive to become the world's best science and engineering university, Tokyo Institute of Technology recognizes that environmental problems are not just issues for certain regions. They are major challenges on a global scale that pose an existential threat to all of humanity. To ensure that future generations have a viable global environment, Tokyo Tech will contribute to the creation of a sustainable society as it fulfills its mission as a research and education institute.

Basic Policies

In accordance with the basic principle "To share the global environment with future generations," Tokyo Tech will deal with the various problems facing the environment, based on the following policies, to create a twenty-first century civilization in which the earth and humanity coexist harmoniously.

- **Research Activities**
  We will further promote scientific and technological research that contributes to the creation of a sustainable society.
- **Talent Development**
  To foster the creation of a sustainable society, we will develop talented individuals with high environmental awareness, a rich knowledge base, and the potential to become leaders in various fields.
- **Social Contribution**
  We will contribute to Japan and the world through our research activities and talent development.
- **Reduce Our Environmental Footprint**
  We will establish environmental goals, develop plans based on those goals, and execute those plans to minimize our impact on the environment.
- **Environmental Management System**
  We will create an advanced environmental management system suitable for a world-leading science and engineering university, implement it effectively, and strive to continually improve it.
- **Promote Environmental Awareness**
  We will conduct environmental education and awareness-building activities that target every student and university employee, including executives, to increase their understanding of Tokyo Tech's environmental policies, etc. and the environmental awareness of everyone associated with the university.

Photosynthesis Research Contributing to Renewable Energy

Let's discuss renewable energy, which is a hot topic these days. As we learn in physics, energy is defined as "the ability to do work." Although it cannot be created or destroyed, energy can be transformed.

By this logic, living organisms are a form of matter that is continually transforming energy. Do you eat rice for breakfast? Rice is the seed of the rice plant, which like other plants produces organic matter from inorganic carbon dioxide and water through photosynthesis. Unhulled rice grains contain a large amount of organic matter. We animals need to consume such organic matter as food to survive. There may be people who say they only drink water in the morning, but no ever got big by drinking only water. Why is that?

As we learn in home economics, carbohydrates are the main source of energy in our diets. The electrons that form the bonds between the carbon (C) and hydrogen (H) atoms in carbohydrates contain energy, which as stated above is the "ability to do work." The electrons C and H share are extracted during digestion and combined with oxygen inhaled by the lungs, becoming the electrons between oxygen atoms (O) and H, which are then expelled as H_2O (through sweat, urine, etc.).

During this process, the energy C-H electrons hold is converted into various other forms of energy. When you move your muscles, for example, it becomes kinetic energy. Fossil fuels power cars in much the same way. This conversion of energy cannot be done with 100 percent efficiency, so a portion of the energy is lost (as heat). O-H electrons are therefore less able to do work than C-H electrons. The O-H electrons in H_2O have almost no ability left to do work, which is why people cannot continue to work no matter how much water they drink.

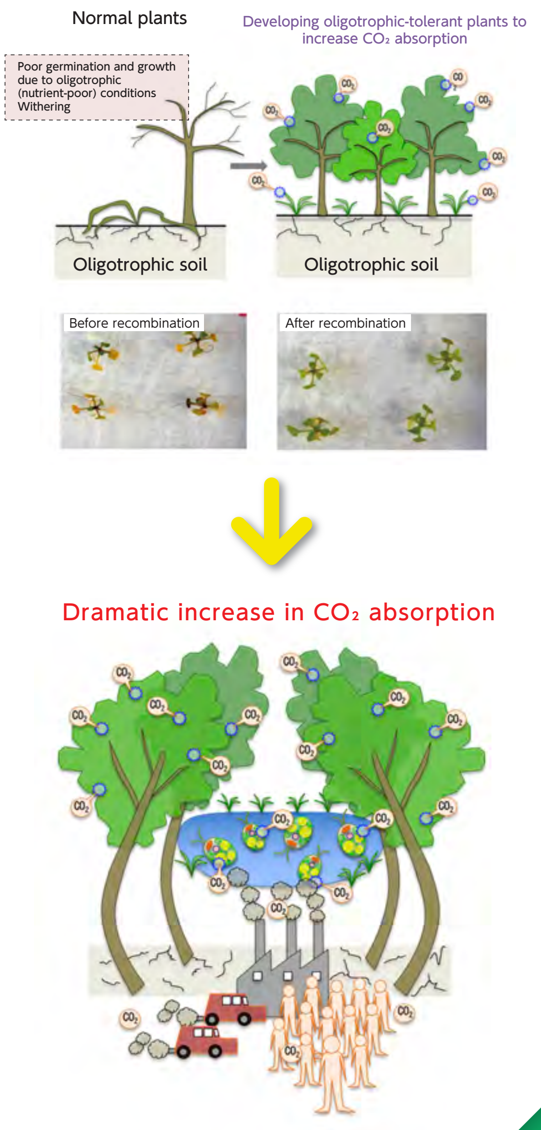
Photosynthesis can be described as a reaction that uses light energy to create C-H electrons from O-H electrons (light energy is stored in the C-H electrons). Therefore, the activities of almost every organism on Earth depend on light energy from the sun, so photosynthesis can be thought of as the foundation that supports this activity. The electrons reused through photosynthesis are the essence of renewable energy.

Our laboratory is researching regulatory mechanisms of photosynthesis, chloroplast and photoreceptor functions, and we are developing technologies for the efficient use of renewable energy based on the results of this research.

School of Life Science and Technology
Department of Life Science and Technology
Professor Shinji Masuda

●Masuda Lab HP https://www.photobiolab.bio.titech.ac.jp/~official/labhp/index.html

The Importance of Plant Biomass Genetic Augmentation to Creating a Low-Carbon Society



Envisioning a Sustainable Society from Farmland and Dry Stone Walling

Farmland and agriculture have a recognizable and significant impact on the environment, and research focusing on the relationship between agriculture and the environment is being conducted worldwide. Although farmers are the ones who directly engage in agriculture, policy and consumer behavior greatly influence agriculture's direction. As shown in Figure 1, I clarified the policy and the environment that influence agriculture and farming communities as well as the relationships between agriculture and cities while decoding economic policy and other factors. I compiled my findings in the publication *Fukei wo Tsukuru Gohan* (Meals Producing Landscape) (2023, Rural Culture Association Japan).

Our laboratory conducts research that considers the environmental and economic value of farmland against the backdrop of such aforementioned social structures. For example, *shitsuden* (paddy fields that remain wet year-long)—which are most commonly found in low, marshy areas—were actually once abundant, even among terraced rice paddies. Our literature review revealed that they disappeared in the process of modernization for the sake of efficiency. Subsequent literature review, interviews and field surveys (Figure 2) revealed that *shitsuden* were once intentionally created for reasons such as agricultural resilience and to protect farmland.

Another example is our work on the Yoshino River estuary, which is known for growing local specialty crops such as lotus root and carrots. We clarified the distribution of these crops through field surveys and aerial photography (Figure 3), and analyzed their relationship with flooding by superimposing the crop distributions with flood histories, geological maps, microtopography and other data. By understanding the agricultural benefits of flooding, we hope to use this information to promote river basin flood management.

In addition, to help consumers understand the impact of agriculture on the environment and society, we have developed a Meals Producing Landscape game with our students. We use the game at events and elementary and junior high schools, and are also studying its impact on consumer behavior.

Another area of our research is the dry stone walls of terraced rice paddies. This method, which has fallen out of use, contributes to sustainability in part because it does not use mortar or concrete. Analysis of failure modes using photographs taken after disasters revealed that terraced paddies built using this method tend to have smaller failures than concrete retaining walls (Figure 5).

As you can see, although our methods and subjects very widely, we are conducting research to reevaluate farming communities from an environmental perspective.

School of Environment and Society
Department of Civil and Environmental Engineering
Professor Junko Sanada

●Sanada Lab HP http://sanada.cv.ens.titech.ac.jp/

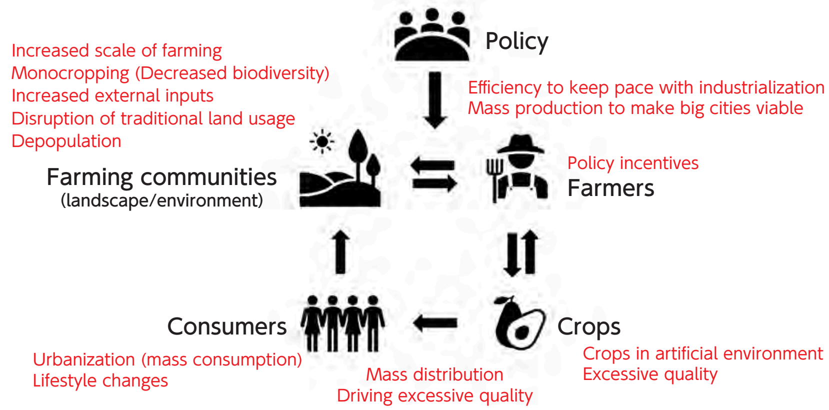


Figure 1: Policies and the Environments That Influence Agriculture and Farming Communities as Well as Relationships between Agriculture and Cities

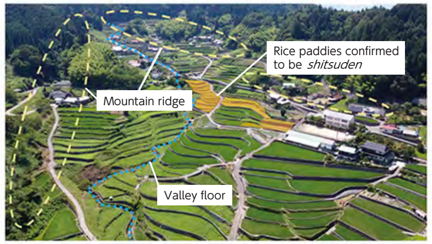


Figure 2: Distribution of terraced *shitsuden* identified during field survey

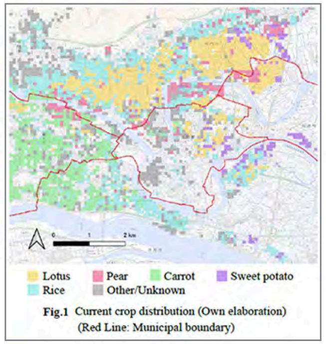


Figure 3: Flooding and local specialty crop distribution in the Yoshino River estuary

Figure 4: Using the Meals Producing Landscape game and evaluating its effectiveness

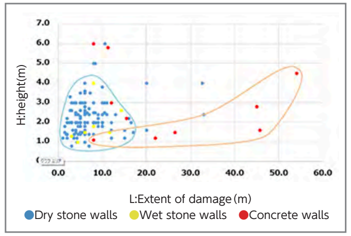


Figure 5. Research on Dry stone retaining wall failure modes

Scientific and Technological Research Contributing to the Environment

Q&A

Professor
Shinji Masuda

Professor
Junko Sanada

Q1 What inspired you to begin researching this field?

I've always been interested in the mechanisms that regulate gene expression in response to environmental changes. The subject I studied in my first laboratory was E. coli. In graduate school, however, I realized the importance of photosynthesis and started research on the regulatory mechanisms of photosynthetic gene expression.

Q2 What plants are you studying in your research into the environmental adaptation mechanisms of photosynthetic organisms? Are you able to study familiar plants?

We mainly use thale cress as our model plant. It has a number of characteristics that make it easy to conduct genetic studies, such as that it has a small genome, grows fast (allowing us to quickly harvest the next generation of seeds), and is easy to transfer genes into. We also occasionally experiment on tobacco, which has larger leaves. It's not easy to conduct genetic studies on more familiar plants, but doing so will be necessary when are at the stage of applying our findings from model plants.

thale cress

Q3 What are some specific developments to increase the efficiency of using renewable energy?

One example is the development of techniques to increase plant biomass for use as a renewable energy source. There are generally two strategies for doing this: 1) increase the size of individual plants, and 2) expand the type of land they can be grown on. Recent studies found that using certain genetic techniques can suppress the function of the chloroplasts that carry out photosynthesis, spurring plants to actually grow larger in nitrogen-deficient soils. We believe this technique can contribute to both strategies.

Q4 What are your aspirations regarding environmental issues, SDGs initiatives and so on?

Photosynthesis and plant research is vital for solving environmental problems. I hope to spread this knowledge and increase the number of people following this research area.

Q5 What is your message to aspiring researchers now in junior or senior high school?

Research has always required originality, but people demonstrate their originality in different ways. I hope that students will acquire their own techniques for exhibiting originality as they continue their studies and research.

Q1 What inspired you to begin researching this field?

The impetus for my research was my first exposure to the landscapes of farming communities after Tokushima University hired me. Landscape planning—formulating a plan for the formation of a good landscape based on the Landscape Act—is mostly about controlling the shape and color of building structures, etc. It's not really suitable for "landscapes of livelihoods," such as the landscapes of farming communities. I wanted to study a landscape planning method suitable for these communities that was about more than just regulation and would also benefit the farmers who actually work the land.

Q2 You mentioned that *shitsuden* (rice paddies that are moist year-round) were once created intentionally for the purposes of agricultural resilience and protecting farmland. Can you tell us more about why creating *shitsuden* benefits such purposes?

If there are rice paddies kept moist by spring water when a drought occurs, only those fields can be harvested. Diversity of farmland leads to resilience. This is the exact opposite of what we do in normal times for the sole sake of efficiency. In the case of terraced rice paddies with soil tiers, if the soil dries up in a drought, it will crack and no longer hold water. This is why that keeping rice paddies wet all year is a suitable way to protect farmland, even at the expense of efficiency.

Q3 You are also involved in preserving and popularizing the use of dry stone walling in agriculture. What are the attractive qualities of dry stone walling?

Dry stone walling has the benefit of being environmentally friendly since it uses only natural materials and has gaps. I also find the process of stacking the stones enjoyable. When building dry stone wall on a farm, it is important to expend as little effort as possible. The stones are sourced locally and stacked with as little processing as possible, taking advantage of the different shape each stone natures. Rather than trying to work the stones the way you want, you let the stones lead you. This sense of surrendering control to the environment is quite enjoyable.

Q4 What are your aspirations regarding environmental issues, SDGs initiatives and so on?

Using new technologies is the main way we solve environmental problems at Tokyo Tech, but traditional methods often also have the value of being sustainable. I'd like to reinterpret traditional techniques from the perspective of their future value, and consider how to integrate them into modern society.

Q5 What is your message to aspiring researchers now in junior or senior high school?

The seeds of research—such as how the food we eat is connected to the environment—can be found all around us. The research that sprouts from these seeds can become new research unbound by any field. I ask students to start by looking around themselves.

Example of an Undergraduate Course

Introduction to Geochemistry

(Undergraduate major in Chemical Science and Engineering)

School of Materials and Chemical Technology
Department of Chemical Science and Engineering

Associate Professor Sakae Toyoda

This course, Introduction to Geochemistry, introduces geochemistry to students majoring in chemical science and engineering who may not be familiar with earth science.

How are the elements on the periodic table created (Figure 1)? How are elements and compounds distributed in various parts of the Earth, such as the core, mantle, crust, ocean and atmosphere, and how do they change? How has life interacted with the Earth over its approximately 4.6-billion-year history? This course looks at these and other questions of massive scale in terms of time and space from a chemical viewpoint.

Life, including human beings, is supported by the material cycles that take place in just the thin surface layer of the Earth (Figure 2). Modern human activity is rapidly weakening the global environment, however. In this course, students review their basic knowledge of physics, chemistry, biology and geology from high school and the first year of university while considering how this knowledge can be utilized to understand the various problems of the Earth and the environment. The two instructors (including myself) from the Department of Chemical Science and Engineering at the School of Materials and Chemical Technology also introduce our respective research projects that leverage geochemical knowledge and methodologies (Figures 3 and 4). We hope our students, who will work on developing new substances, materials and energy sources that are useful in our daily lives, will become aware of relationship between their work and the global environment.

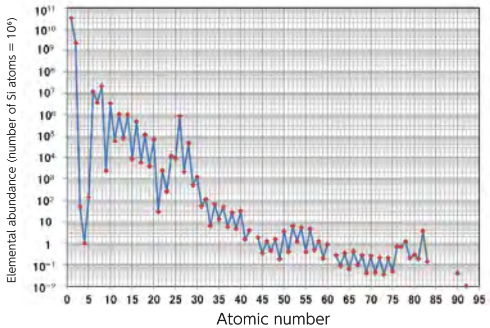


Figure 1. The abundance of each element in our solar system is not uniform. It exhibits interesting characteristics that reflects the production processes of the element.

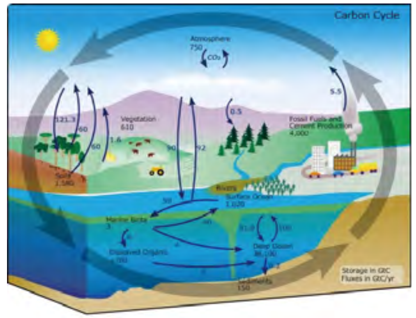


Figure 2. Carbon changes its chemical form such as carbon dioxide, carbonates and organic matter as it circulates through the atmosphere, land and ocean.

Figure 3. Balloons allow us to sample the stratospheric atmosphere at an altitude of 10 to 30 kilometers to determine the concentration of greenhouse and ozone-depleting gases. We have conducted such experiments at several locations around the world, including Syowa Station in Antarctica.

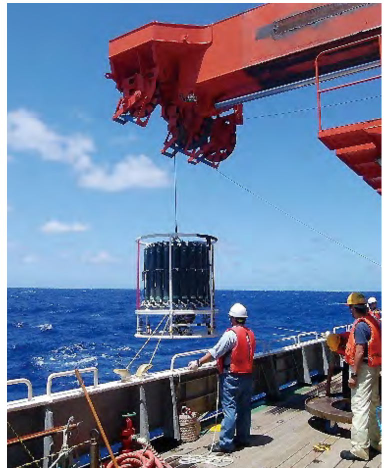


Figure 4. Using the water-sampling equipment on research vessels, we can determine the constituents dissolved in seawater at various depths from the surface to the seafloor. We have conducted such surveys in the Pacific, Arctic and Indian Ocean.

Example of an Graduate Course

Numerical Simulation of Environments

(Graduate major in Life Science and Technology)

School of Environment and Society
Department of Architecture and Building Engineering
Associate Professor Takashi Asawa

The environments surrounding us are diverse, ranging from the global environment to our immediate living environment. It is well known that human activity and other factors are causing environmental degradation in the atmosphere, bodies of water, forests, cities and other places. However, little is known about the mechanisms responsible for this degradation and to what extent this will progress. While field studies are an essential part of understanding these phenomena, numerical simulations using computers are also a powerful tool.

The Tokyo Institute of Technology's School of Environment and Society has three departments: Architecture and Building Engineering, Civil and Environmental Engineering, and Transdisciplinary Science and Engineering. The school's faculty consists of experts in a variety of environmental fields. This course, Numerical Simulation of Environments, is guided by an interdisciplinary team of faculty members from all three departments. They introduce cutting-edge research that uses numerical simulations to reveal environmental phenomena at different spatial and temporal scales. Students from all departments participate in the course, which provides them with an excellent opportunity to learn about environmental research and initiatives happening in other fields. Faculties explain concepts using many visualizations, including still images and videos, giving this course a reputation for being easy to comprehend.

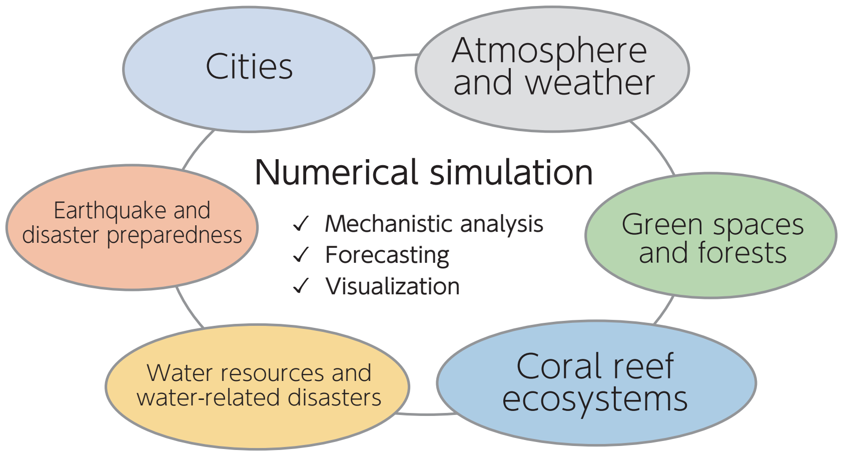


Figure 1: Environmental fields covered in the lecture

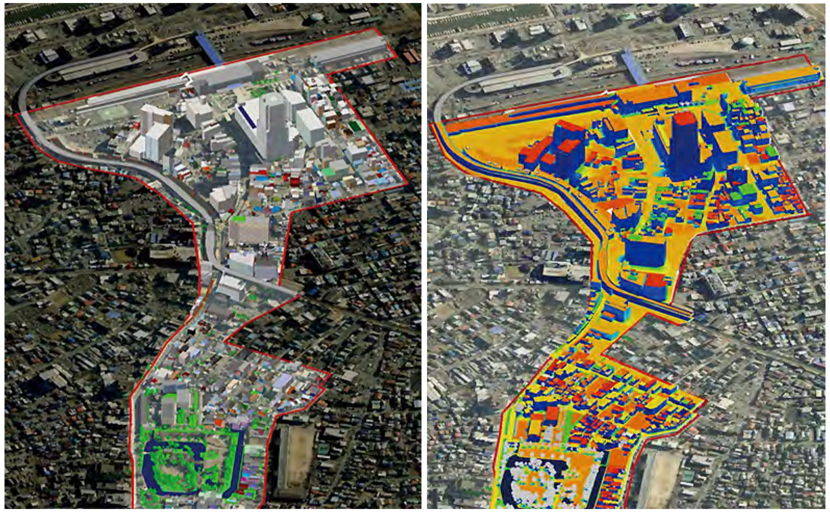


Figure 2: Results of a numerical simulation of an urban thermal environment

Tohoku Co-Learning Camp 2023

Taking place from February 27 to March 1, 2024, Tohoku Co-Learning Camp 2023 was one of the breadth courses in which students visited the Tohoku region to experience agriculture firsthand and learn about the earthquake disaster. As a teaching assistant, I assisted in preliminary visits to and coordination with the areas and facilities visited during the camp. I also helped run the pre-camp class (Figure 1) and the camp itself.

Sixteen participants came from eight countries: Japan, Indonesia, China, Vietnam, Taiwan, Italy, Thailand and Sweden. The students stayed with host families in Kakuda City, Miyagi Prefecture. They learned about agriculture and local culture, and also explored the history of the city, which has long dealt with flooding from the Abukuma River (Figure 2).

The students also visited areas and facilities in Fukushima Prefecture's Hamadori region that the Great East Japan Earthquake affected (Figures 3 and 4), and heard about the status of the region's reconstruction. Through discussions with local residents and the course instructors—School of Engineering Department of Mechanical Engineering Professor Hiroshi Yamaura and Associate Professor Hideharu Takahashi—they deepened their insights on a variety of topics, including the state of science, technology and energy and the environmental impact of natural and nuclear disasters, as well as their prevention.

The agricultural experience as part of the camp started in 2008 because Kakuda City is a sister city of Meguro Ward, where our campus is located. The program continued until 2018, but was suspended from 2019 due to the coronavirus pandemic. It was finally resumed in AY2023.

Student visits to the areas and facilities affected by the Great East Japan Earthquake are made possible thanks to the cooperation of Associate Professor Hiroshige Kikura from the Laboratory for Zero-Carbon Energy, Institute of Innovative Research. He has been researching reactor decommissioning and reconstruction at Tokyo Tech since the 2011 earthquake. The course instructors and I made preliminary trips to the areas and facilities we would be visiting during the camp and coordinated the visits.

The activities of the camp participants were reported in the March 5, 2024 edition of *Kahoku Shimpo*, a regional newspaper. A survey of the participants showed that they were satisfied with the course content and would recommend the course to other students. As someone researching the development of agricultural support robots (at the Takahashi Laboratory), I found the course to be a valuable opportunity to hear from farmers. I hope to continue to contribute to society through this course and other social contribution activities related to the reconstruction of Tohoku and environmental issues.

School of Engineering
Department of Mechanical Engineering
Takahashi Lab
4th-year undergraduate student
Tomoaki Kaneko

●Tohoku Co-learning Camp 2023 URL https://www.titech.ac.jp/english/international-student-exchange/students/news/2023/062526
●Takahashi Lab HP http://www.smart-agri-forest.mech.e.titech.ac.jp/en/index.html

Figure 1. Pre-camp class

Figure 2. A view of the Abukuma River from the roof of the Ejiri Drainage Pump Station

Figure 3. Tomato harvesting at Wonder Farm, a sunlight type plant factory

Figure 4. Aquamarine Fukushima's "Taberabo," where you can check the radioactivity of fish from Fukushima and eat them after confirming that they are safe

Fukushima Reconstruction Lessons

We at the Kikura Laboratory presented science and learning lessons at the Namie Tokaichi Festival of Revival, which took place in Namie Town, Fukushima Prefecture at the town's Regional Sports Center Gymnasium on November 18 and 19, 2023. Our intent was for everyone in the community to learn how fun and fascinating science can be through familiar subjects.

During our Super Science lesson, we played an educational science video on the theme of water—the liquid most familiar to us in daily life—to give participants an intuitive understanding of its scientific properties and raise their environmental awareness. The video, shown on a large screen, featured a collection of experiments using devices made with familiar materials to show that anyone can experience the wonders of water.

During the hands-on Tokyo Tech Robotics lesson, participants operated three types of small robots to perform different tasks, earning a robotics expert certificate. We believe that remotely operating robots to accomplish the tasks allowed participants to experience how fun and familiar robots are.

The Kikura Laboratory researches the safety of nuclear reactors, and promotes research designed to support the reconstruction of Fukushima and other disaster areas. We are also researching ways to turn the telemetry technologies we have developed in that field into fundamental technologies for environmental protection. Using experimental equipment, we demonstrated two of these technologies: ultrasonic velocity profiling method using robots, and the coagulation-sedimentation method, which is an environmental water purification method.

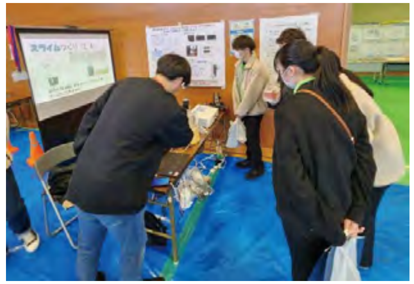
We were able to deepen people's understanding of energy, Fukushima's reconstruction and the environment as well at the festival, and show them how fun and fascinating science can be.


Group photos at the Namie Tokaichi Festival of Revival

School of Environment and Society
Department of Transdisciplinary Science and Engineering
Kikura Lab
2nd-year master's student
Shuji Oshima

●Kikura Lab https://kikura.zc.iir.titech.ac.jp/en/index.html

Science experiments and research presentations



A demonstration of fluid measurement


At the Tokyo Tech Robotics lesson

Tokyo Tech VG Environmental Conservation Activities

FURUHON ICHI

Used Book Fair

Some people have commented that some of the textbooks and reference works assigned for university courses are used infrequently but very expensive. In addition, books that are used frequently when classes are in session sometimes end up collecting dust after a course ends.

Tokyo Tech VG (Student Volunteer Group) organizes a used book fair with the goal of effectively reusing these books.Unneeded books can be placed in a collection box on the first basement floor of Taki Plaza. VG members check the donated books to determine their condition, after which they are placed on a bookshelf on Hisao & Hiroko Taki Plaza's second basement floor. Students are then free to take them.

Since the fair started in September 2023, as of March 18, 2024 around 130 books had been collected, with 104 of them being given to students. (The fair also ran for a limited time in June.)

The students who benefited from the used book fair have commented that they were glad to obtain expensive technical books at no cost. The books donated cover a variety of fields, with many being textbooks for first-year liberal arts and basic science courses. Tokyo Tech VG plans to continue running the used book fair, and we hope to see such reuse activities on campus spread.

The bookshelf used to distribute used books

Collected used books

MIDORI SANTA

Midori Santa Project

Tokyo Tech VG members participated in the Midori Santa Project 2023 held in Midori Ward, Yokohama City, on December 10, 2023. Because the Suzukakedai Campus is located in Midori Ward, Tokyo Tech was invited to participate in the cleanup again this year.

The participants consisted of around ten elementary school students accompanied by their guardians, Midori Ward employees, and students from four colleges/universities in the ward. They picked up trash around JR Nakayama Station. After picking up the trash, the participants enjoyed learning about food loss by playing food loss *sugoroku* (a Japanese boardgame).

The half-day event was a great opportunity for the students to communicate with local residents. They interacted with elementary school students, asking questions such as "Why would someone litter like this?" and "How can we produce less trash?" Tokyo Tech VG will continue activities like this that raise environmental awareness in the community and among children.

Picking up trash while wearing Santa hats

University and college student friendly exchanges through food loss *sugoroku* game

School of Environment and Society
Department of Civil and Environmental Engineering
1st-year master's student
Saki Okawara

School of Engineering
Department of Information and Communications Engineering
1st-year master's student
Shota Matsuo

https://twitter.com/titechVG

Material Balances

Tokyo Tech's activities consume a great deal of energy and a wide range of materials. Most of the energy we consume is in the form of electricity and gas. The primary materials we use are chemical substances, paper, and water. While we need to use these to conduct our cutting-edge education/talent development activities and research activities, we're also engaged in minimizing the environmental footprint of our operations.

We have summarized our FY2023 inputs (resource and energy used) and outputs (environmental emissions) as the material flow shown below.

INPUT

Energy

Purchased Electricity (1,000 kWh)	68,956
City Gas (1,000 m^3)	299
Fuel Oil (kl)	0.86
Gasoline (kl)	0.17

Material

Chemical Substances (t)	85.1
PRTR-related Substances (t)	41.4
Paper (t)	28.5
Water (1,000m^3)	191.5

OUTPUT

Atmospheric Emissions

Greenhouse Gas Emissions (t-CO_2)	27,696
Purchased Electricity (t-CO_2)	26,893
Fossil Fuels (t-CO_2)	670
Water and Sewage (t-CO_2)	133

Waste

General Waste (t)	213
Industrial Waste (t)	1107

Water Discharged

Total Sewage Discharged (1,000m^3)	194.3
Pollutant Emissions	
BOD (t)	10.3
Nitrogen (t)	8.2
Phosphorus (t)	0.7

RESYCLE

Paper (t)	255
Other Recycled Materials (t)	432
Graywater Reuse (1,000m^3)	37

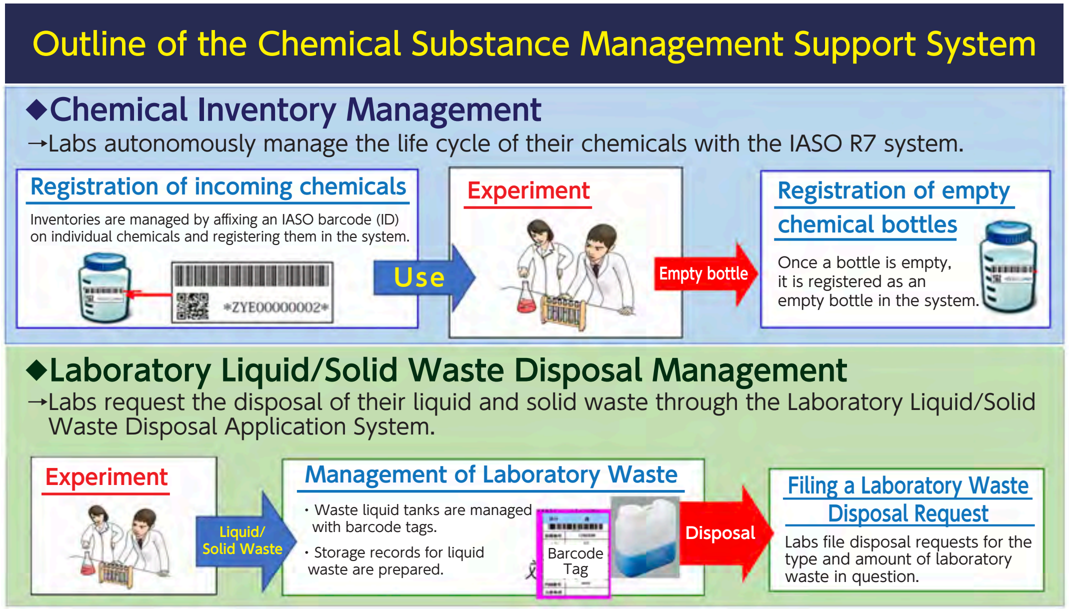
Initiatives to Minimize the Environmental Impact of Chemical Substances

An Overview of Chemical Substance Management at Tokyo Tech

Tokyo Tech is a science and technology university, and around 500 of its 700 laboratories keep chemical substances on hand. The chemical substances these labs use are extremely diverse, both by type and usage, with most only being employed in small quantities.

Since our labs are conducting cutting-edge research, the types and quantities of chemicals they use are changing constantly and radically. For this reason, labs use the chemical substance management support system to register every bottle of every chemical substance using IDs and manage the inventory of chemical substances in their possession (type, amount, storage location, amount used, etc.). The system's chemical information database (chemical master) contains data on approximately 530,000 chemicals provided by both manufacturers and users, around 60,000 of which are registered as inventory.

The total amount of chemicals used in our laboratories per year is approximately 30,000 to 40,000 bottles. This system makes it possible to monitor usage trends of PRTR chemicals, the amount used, and other information. We conduct annual seminars on chemical substance management for faculty, staff and students to enhance their understanding of how Tokyo Tech is reducing its environmental impact.



Chemical safety workshop materials

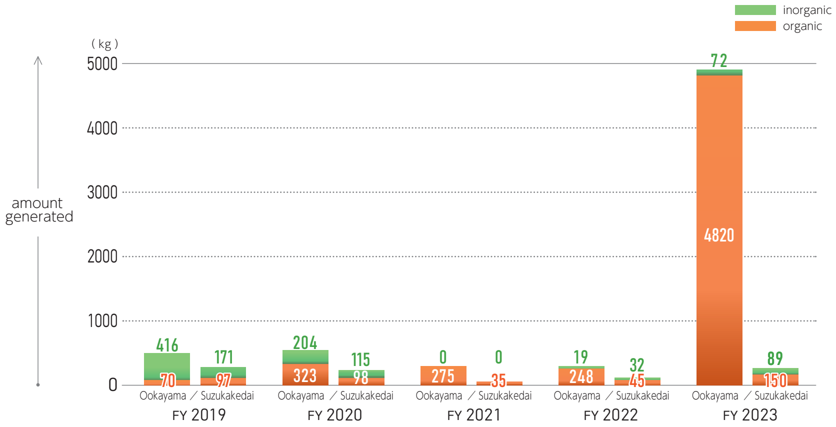
Data on Results of Environmental Initiatives

Laboratory wastes contain a wide variety of chemical substances. Therefore, we treat them appropriately according to their properties.
In addition, we prioritize heat recovery during incineration and the recycling of residual materials when carrying out the disposal process, and we carefully select contractors.

Waste Reagents and Samples

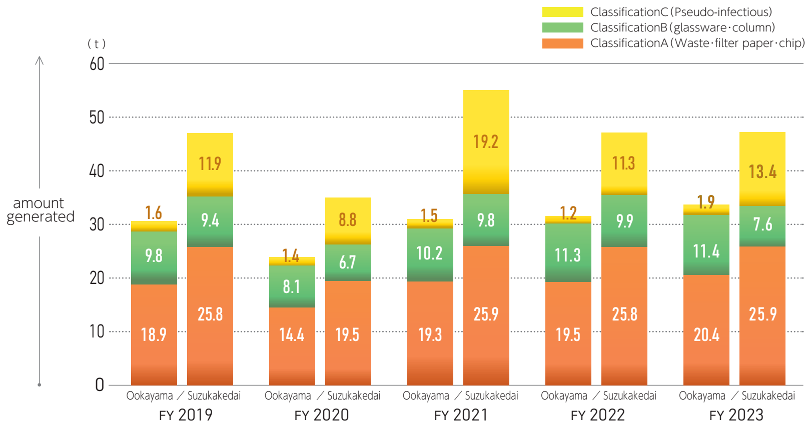
We ensure the proper disposal of waste reagents and samples by contracting companies specializing in the disposal of organic and inorganic waste, respectively.

The increase in the amount of such waste generated at the Ookayama Campus in FY2023 occurred because part of the campus was redeveloped.



Solid Laboratory Waste

Solid laboratory waste is incinerated or melted down as industrial waste. The residual waste slag is reused as soil conditioner, etc. Slag produced from glass material in laboratory waste—such as empty reagent bottles—is an important recycling source.



Editorial Note

Since this is our final environmental report as the Tokyo Institute of Technology, we decided to take a look back at a number of topics beyond the current year, covering our past energy usage (from FY2009 to FY2023). For about the past three years, we've made a concerted effort to ensure that our environmental reports are both interesting and easy to understand. Since it's best to have a clear target audience, we created our reports under the assumption that junior and senior high school students would read them. We focused on using more figures and less text, and on making the figures both interesting and easy to understand.

We've not received much feedback, however, either positive or negative. In my research, I study communications between cells and cells, cells and matrices, bacteria and cells, and viruses and cells. For that reason, I'd hoped to make our environmental reports a means of communicating with the reader rather than just a recounting of facts. I realize now that this was easier said than done.

On another note, June 5 is United Nations World Environment Day, and Tokyo Tech has made June its Environment Month. The Tokyo Tech Environmental Report Preparation Working Group jointly organizes a special Environment Month presentation every June with Ota and Meguro wards . In 2023, Professor Takeharu Tsuge gave a talk entitled "Natural Plastics – Biodegradable return to the soil and sea." In 2024, Associate Professor Shigeo Nishikizawa gave a talk entitled "Is Renewable Energy Good for the Environment?" The event consisted of a Tokyo Tech faculty member's presentation, dialogues between the speaker and myself, the chair of the Working Group, and questions from attendees. We conduct surveys of attendees after the talks, and they have provided us with some good feedback. After the start of the COVID-19 pandemic, we began holding the events online, but they have still been a great opportunity to communicate with people in the community about the environment.

I hope that those of you who read this report will learn about activities like this and provide us with your thoughts and opinions. Your candid feedback allows us to improve our environmental activities.

Finally, I'd like to express my heartfelt thanks to everyone involved in preparing this report, as well as all of our past reports.

September 2024
Environmental Report 2024 Preparation Working Group Chair
Yoh-ichi Tagawa

[Contact Us]
National University Corporation Tokyo Institute of Technology
Environmental Report 2024 Preparation Working Group

Environmental Report Preparation Office
2-12-1 Ookayama, Meguro-ku, Tokyo 152-8550
Tel：03-5734-3407
Email：kankyouhoukoku@jim.titech.ac.jp

●About the cover

Because this is our last report as Tokyo Tech, we chose to use photos of our Ookayama, Suzukakedai and Tamachi campuses, as well as a photo of the distinctive Ookayama North Bldg. 3 (the Environmental Energy Innovation Building).
The central blue and green hues are meant to evoke the environment.

Published September 2024