National Institute for
Environmental Studies, Japan

Driving environmental research in Japan and overseas, working with society to maximize the impacts of the R&D outcomes, and contributing to environmental policy

WATANABE, Chiho
President

The National Institute for Environmental Studies (NIES) is the only national institute in Japan conducting a broad range of interdisciplinary, integrated environmental research. Since its establishment in 1974, NIES has played the pivotal role in solving various environmental problems.

For our Fourth Medium-and-Long-Term Plan, which covers the five years from April 2016, we have been applying four keywords to our activities: bundle a wide range of research across all fields of environmental science; integrate to pursue comprehensive research connecting basic science to social implementation; network to expand and enrich domestic and overseas research networks; and drive high-level research that helps us to understand and solve various environmental issues. More specifically, we established five Issue-Oriented Research Programs for the current Term and are pursuing integrated research that transcends individual disciplines. Also, in 2016 we started our Fukushima Branch to run the Disaster Environment Research Program, and in 2017, our Lake Biwa Branch Office to research protection of the aquatic environment. In December 2018, we started the Center for Climate Change Adaptation to research and promote adaptation to climate change. Furthermore, we maintain and develop infrastructure for broad range of environmental research activities through basic research on environmental protection, environmental data collection and analysis, and preservation and provision of environmental samples. We play a central role in research networks too, for example GOSAT satellite observations and the Japan Environment and Children's Study (a large-scale environmental epidemiology survey). Also important among our tasks is actively disseminating environmental information in easy-to-understand formats, including the outcomes of our research efforts and projects.

Bearing the four keywords in mind, we are committed to pursuing environmental research, maximizing the outcomes of environmental research and development throughout Japan, serving as a bridge between the research community and society at large, and helping to advance national and global environmental policy. We appreciate your generous support and understanding.

NIES Charter

The National Institute for Environmental Studies (NIES)
strives to contribute to society through research
that fosters and protects a healthy environment
for present and future generations.

Proud to work at NIES and
keenly aware of our individual responsibilities,
we will pursue high level research
based on a firm understanding of the interaction
between nature, society and life on our planet.

NIES Timeline

July 1971	Establishment of the Environment Agency
November 1971	Establishment of the National Institute for Environmental Studies (NIES) Founding Committee
March 1974	Establishment of NIES
April 1985	Visit of Emperor Showa to NIES
July 1990	Restructuring of NIES to include global environmental research
October 1990	Establishment of the Center for Global Environmental Research
January 2001	Environment Agency becomes Ministry of the Environment. Establishment of Waste Management Division at NIES
April 2001	Establishment of NIES as an Incorporated Administrative Agency. First five-year plan (2001-2005) commences
April 2006	Second five-year plan (2006-2010) commences
August 2010	Visit of the Japanese Emperor and Empress to NIES
April 2011	Third five-year plan (2011-2015) commences
March 2013	Amendment of the third five-year plan (2011-2015)
April 2015	National Institute for Environmental Studies relaunched as a National Research and Development Agency
April 2016	Fourth five-year plan (2016-2020) commences Fukushima Branch established
April 2017	Lake Biwa Branch Office established
December 2018	Amendment of the Fourth five-year plan (2016-2020) Center for Climate Change Adaptation established

The National Institute for Environmental Studies (NIES) at the time of establishment

Ceremony to mark the inauguration of NIES as an Incorporated Administrative Agency

Fukushima Branch staff

Research Structure of the National Institute for Environmental Studies

Issue-Oriented Research Programs

1. Low-Carbon Research Program
2. Sustainable Material Cycles Research Program
3. Harmonization with Nature Research Program
4. Health and Environmental Safety Research Program
5. Environment-Economy-Society Integration Research Program

Environmental Emergency Research Programs

1. Environmental Recovery Research Program
2. Environmental Renovation Research Program
3. Environmental Emergency Management Research Program

Research Projects

1. Satellite Observation Center
2. Japan Environment and Children's Study Programme Office
3. Risk Assessment Science Collaboration Office
4. Environmental Emergency Management Office
5. Social Dialogue and Co-production Office

Climate Change Adaptation Services

1. Center for Climate Change Adaptation

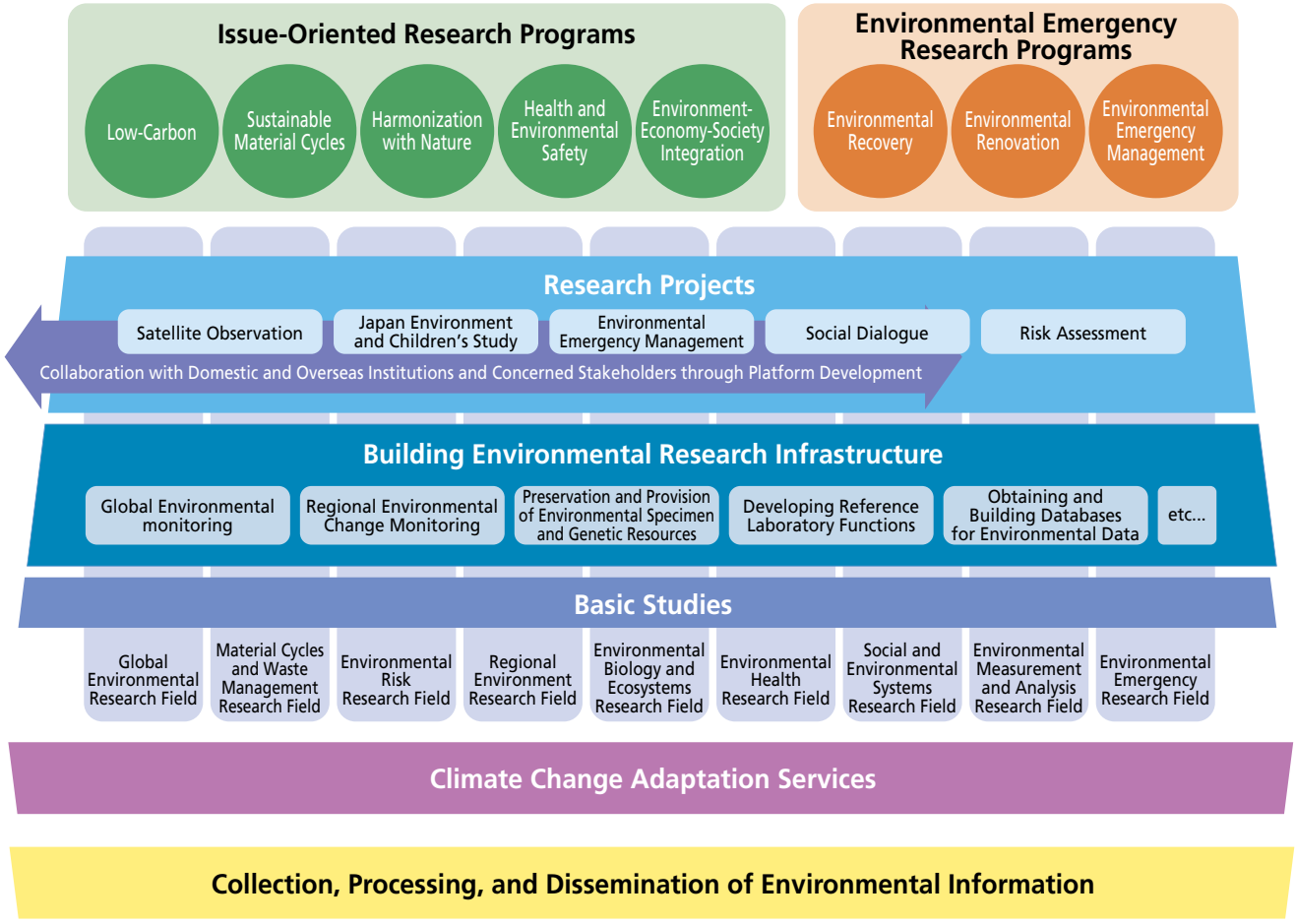
Building Environmental Research Infrastructure

1. Strategic monitoring of the global environment, global environment database development, and support for global environmental research
2. Establishment of informational research fundamentals about resource circulation and waste management
3. Development of the environmental certified reference materials, and establishment of reference laboratory for environmental measurement
4. Long-term storage of environmental specimens (specimen banking)
5. Collection, preservation and distribution of strains of microalgae and endangered algae
6. Preservation of the genetic resources of rare wild animals
7. Development of biodiversity and ecosystem information infrastructure
8. Long-term monitoring of regional environmental change and development of joint observation site infrastructure
9. Long-term monitoring of inland waters, and provision of data to domestic and international monitoring networks

Environmental Research Fields

1. Global Environmental Research Field
2. Material Cycles and Waste Management Research Field
3. Environmental Risk Research Field
4. Regional Environment Research Field
5. Environmental Biology and Ecosystems Research Field
6. Environmental Health Research Field
7. Social and Environmental Systems Research Field
8. Environmental Measurement and Analysis Research Field
9. Environmental Emergency Research Field

Overview of NIES Initiatives



Issue-Oriented Research Programs

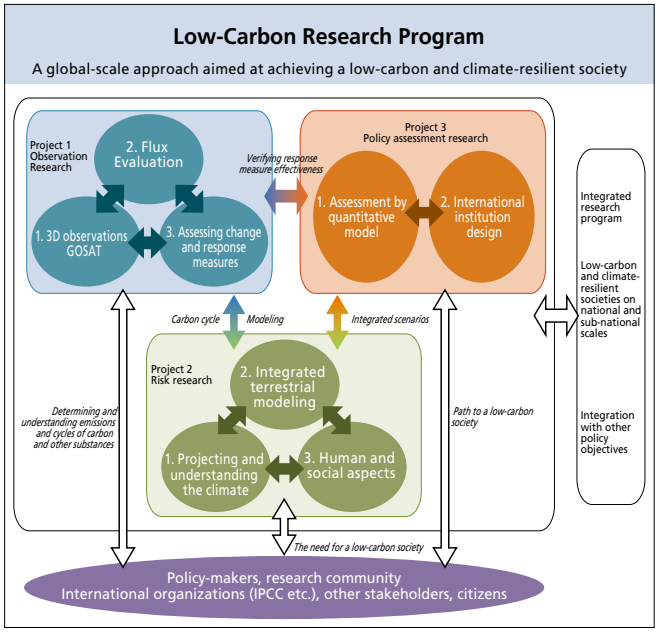
In its Promotion Strategy for Environmental Research and Environmental Technology Development (August, 2015), the Central Environment Council set forth research and technology development priorities for the next five years in the fields of low carbon, material cycles, harmonization with nature, safety, and integrated research to help create a more ideal society over the medium to long term.

NIES established five issue-oriented programs corresponding to these priority fields, and is conducting research accordingly. The five programs are Low-Carbon Research Program to contribute to measures for creating a low-carbon society and mitigating/adapting to global warming; Sustainable Material Cycles Research Program to contribute to sustainable material cycle policy formulation and environmental innovation at both local and national levels; Harmonization with Nature Research Program to help achieve the 2050 goal of building a society that lives in harmony with nature; Health and Environmental Safety Research Program to help build a safe society by contributing to the achievement of WSSD 2020 targets, atmospheric pollution control measures and a sound water cycle; Environment-Economy-Society Integration Research Program to help build sustainable society at all levels from local, rural and urban communities up to global society. NIES is conducting research in all five programs to develop feasible and effective solutions to the environmental issues facing society.

NIES is seeking to maximize the outcomes of this research and development through promoting partnership and collaboration between participants from previously independent research fields, and through developing links with relevant domestic and overseas institutions, researchers and other stakeholders.

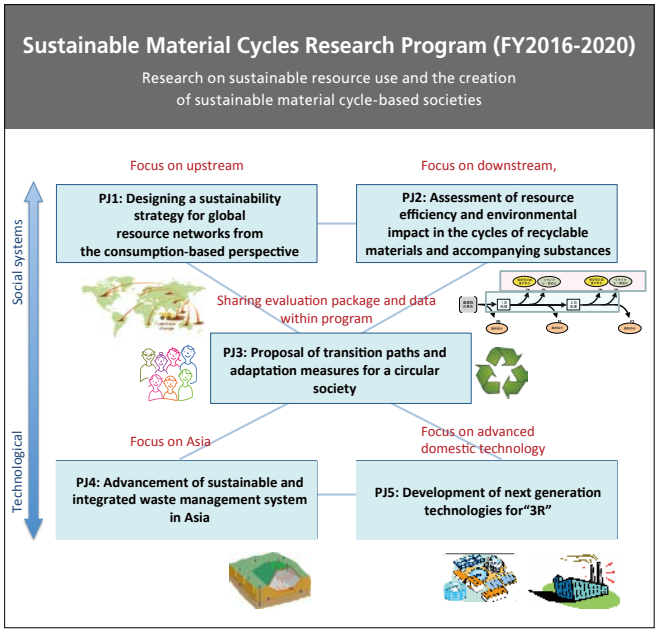
1 Low-Carbon Research Program

With the idea of building the scientific foundation that society will use to tackle the goal of keeping the global mean surface temperature increase below 2°C relative to pre-industrial levels, this program will conduct observations mainly in the Asia-Pacific region to assess the balances of the greenhouse gases that cause global warming, and will implement assessments of impact and control measures. To accomplish that, the program will use surface, oceanic and aerial observations along with satellite observations to develop a highly reliable three-dimensional global-scale greenhouse gas monitoring system. Furthermore, climate change projection models, impact assessment models, and integrated socioeconomic assessment models will be combined and used to discuss the need for and feasibility of building a sustainable, low-carbon society following the path indicated by this comprehensive research program.



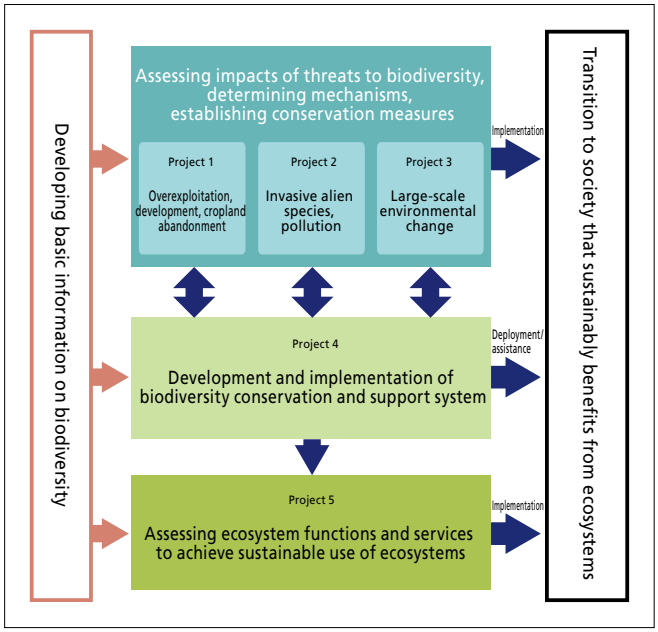
2 Sustainable Material Cycles Research Program

To help materialize the future vision for an international resource use strategy, this program will elucidate supply chain structures and the factors that shape those supply chains. Measures toward sustainable material cycle-based society shall be proposed based on the assessment of the effects of resource and environmental conservation throughout the life cycles of products and services.
The program will also develop and evaluate measures for the advancement of sustainable, integrated waste management systems in Japan and in Asian region.
Fundamental technologies and social system needed for waste prevention/minimization, reuse, and recycling in harmony with a low-carbon footprint society and other initiatives shall be also proposed.



3 Harmonization with Nature Research Program

This program will shed light on the mechanisms by which the four major factors (overexploitation/development, cropland abandonment, invasive alien species/pollution, and climate change) affect biodiversity. It will also assess and project their impacts as well as develop biodiversity conservation measures and adaptation strategies. Additionally, the program will assess the ecosystem functions and services generated by biodiversity, and propose strategies, such as watershed management in harmony with nature, for sustainably benefiting from ecosystems. The program will moreover contribute to the formulation and implementation of management and conservation strategies, consensus building, quarantine policies and related legislation, and to achieving the 2050 target of building of a society in harmony with nature through implementing actions for achieving the 2020 Aichi Target of halting the loss of biodiversity.

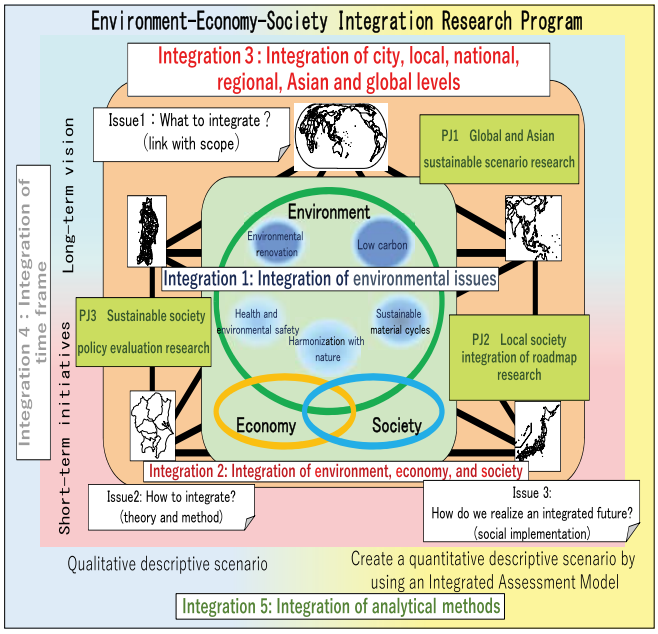


4 Health and Environmental Safety Research Program

This program will conduct systematic research on methods of assessing and managing health- and environment-related risks such as transgenerational effects and risks to higher-order biological functions, new systems for assessing ecological impacts, more comprehensive analyses and improved understanding of environmental dynamics of chemicals, research on PM2.5 and other air pollutants, and on regional water environment conservation. This research will be accomplished by means of eight research projects: health impacts of chemicals on children and future generations; comprehensive analyses of multiple and unknown chemicals; ecological risk assessment based on ecological models; comprehensive assessment of ecological impacts; multi-scale chemical dynamics; the state and impacts of PM2.5 and other air pollutants; development of methods for improvement and assessment of regional water quality; and building a comprehensive system to assess and manage risks. By these means the program will establish systems to assess health and environmental risks, for which there is currently no established approach, monitoring and prediction systems, or comprehensive and effective management framework.

5 Environment-Economy-Society Integration Research Program

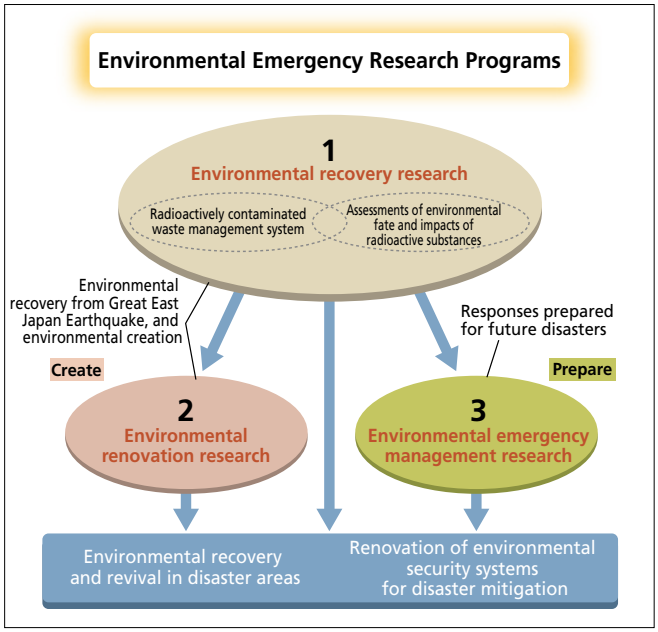
Taking the mitigation of and adaptation to climate change as its departure point, this program develops multilayer models that quantitatively analyze the solutions to both issues on socio-economic activities and environmental problems including those of sustainable material cycles, harmonization with nature, and health and environmental safety, on a variety of scales including global, Asia, Japan, municipality/local, and livelihood. Its aim is to table proposals for both long-term vision formulation and short-term initiatives based on qualitative descriptive scenarios and quantitative scenarios derived from results assessed by models. The following three projects (PJs) are being pursued under this program: PJ1 for making analysis from a global or Asian perspective; PJ2 for presenting roadmaps for Japan from a regional community perspective; and PJ3 for assessing sustainability from the perspective of policy evaluation. In cooperation with the other programs, this program conducts quantitative and qualitative analyses pertaining to the future vision for each scale from the perspectives of environmental, economic, and societal sustainability, and also designs and evaluates international and local/urban policies needed to realize the intended future vision. Additionally, the program will build systems to assist the implementation and realization of proposed policies, response measures, and technologies.



Environmental Emergency Research Programs

NIES has undertaken environmental emergency research from immediately after the Great East Japan Earthquake and Fukushima nuclear disaster, providing scientific knowledge and disseminating information to aid policy formulation and contribute to environmental recovery and environmental renovation in the devastated areas. Based on the accumulated research outcomes, NIES continues to conduct environmental emergency research at its Fukushima Branch, which was established in 2016 in the Fukushima Prefectural Centre for Environmental Creation in the town of Miharu in Fukushima Prefecture, in collaboration with NIES Tsukuba Headquarters.

More specifically, this research is divided into three programs—the Environmental Recovery Research Program, Environmental Renovation Research Program, and Environmental Emergency Management Research Program—that are being conducted in collaboration with Fukushima Prefecture, the Japan Atomic Energy Agency, other related institutions in Japan and abroad, stakeholders, and other entities. In addition to contributing to environmental recovery in the devastated areas, these programs point the way to environmental renovation within reconstruction processes and reconstruction community development, and contribute to creating a disaster-resilient society better equipped to face future disasters from the environmental perspective, based on the lessons learned from previous major disasters.



1 Environmental Recovery Research Program

This program is conducting research and development for volume reduction and other technologies for the purpose of intermediate storage and final disposal of radioactively contaminated off-site waste, which is an urgent task of the highest priority for the nation. It will also carry out research and development for technological solutions to problems related to the treatment and disposal of designated wastes and other contaminated wastes. Additionally, the program will conduct studies and research from a long-term perspective on the environmental fate of radioactive substances remaining in forests, bodies of water, and other environments. Further, it will perform long-term environmental impact assessments in places where residents have returned, develop living environment risk-management methods to secure a livelihood platform where people can live safely and free of concern, and implement ecosystem assessments that include ecosystem services.

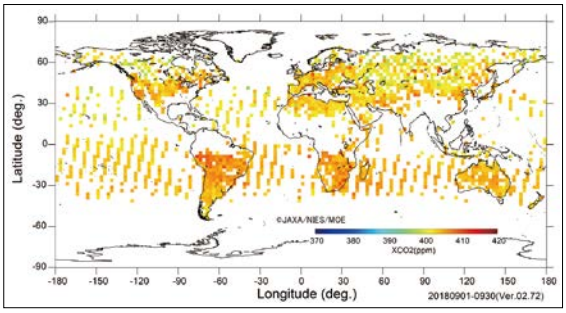
2 Environmental Renovation Research Program

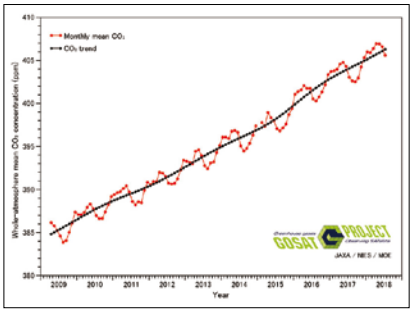
This program will carry out research to support community reconstruction and development mainly in Fukushima Prefecture and its municipalities. For this purpose, the program will build an integrated social monitoring system that quantifies the effectiveness of reconstruction in terms of livelihoods and the environment, and it will propose systematic measures aimed at achieving sustainable communities. Through means including support for the design of locally-optimized distributed energy systems in central districts, the program will carry out research that supports community development and matches it well with the overall regional reconstruction plan. The program will also develop an integrated assessment model for considering future visions and concrete policies for municipalities, and methods for building future scenarios in which industrial development, community development, environmental conservation, and other efforts are harmonized with one another. Further, the program will develop methods for communication among stakeholders for restored communities, which incorporate diverse local needs including livelihoods and a sound environment.

3 Environmental Emergency Management Research Program

To contribute to the development of a strategy to improve disaster resilience of material cycle and waste management system, this program will devise technologies and systems for integrated disaster waste management aimed at achieving smooth and appropriate management of disaster wastes. Additionally, with the aim of creating a strategy to manage the environmental and health risks associated with disasters, the program will investigate approaches for setting risk management targets when disasters strike and the methods and organizational arrangements for emergency environmental surveys. Further, for the purpose of building a research hub for the environmental emergency research network, the program will design and develop an information platform and capacity development system for the environmental emergency. This research will be pursued in collaboration with the Environmental Emergency Management Office.

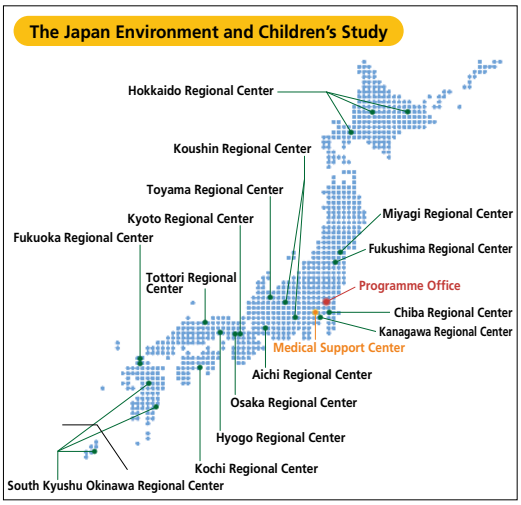
1 Satellite Observation Center





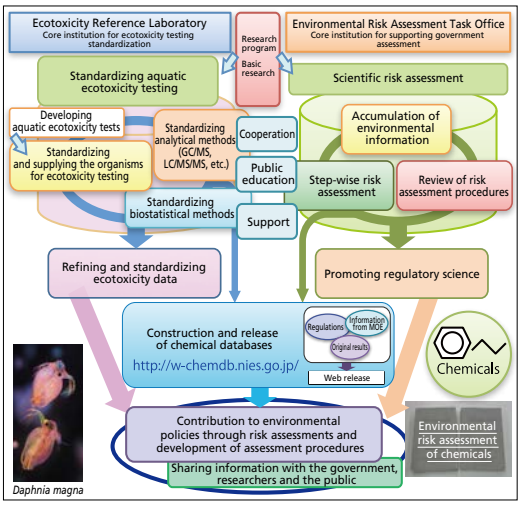
The Center contributes to improved scientific understanding of the carbon cycle, more accurate prediction of the future climate, and climate-change-related policy making by the Ministry of the Environment (MOE) through activities that use data from the Greenhouse Gases Observing Satellite (Ibuki/GOSAT, launched in 2009) and the satellite that succeeds it (GOSAT-2, launched in 2018). Activities include developing and operating data-processing systems for GOSAT and GOSAT-2. These systems are being used to calculate the concentrations and fluxes of greenhouse gases (GHGs) and to verify, archive, or distribute GOSAT or GOSAT-2 products. The Center will also conduct a scientific review of the Earth observation satellites to succeed GOSAT-2, including GOSAT-3. GOSAT and GOSAT-2 projects are jointly promoted by MOE, the Japan Aerospace Exploration Agency (JAXA), and NIES.

2 Japan Environment and Children's Study Programme Office



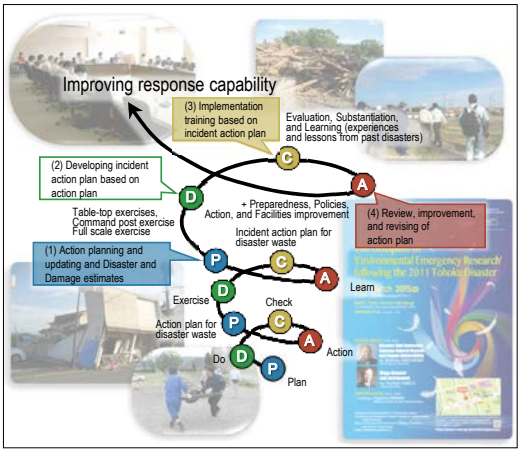
The Japan Environment and Children's Study (JECS) is a large-scale birth cohort study aiming to investigate the impact of chemicals on children's health and development. The National Institute for Environmental Studies (NIES) serves as the JECS Programme Office in co-operation with the 15 Regional Centers and the Medical Support Center (National Center for Child Health and Development). Recruitment of participants began in 2011, and was completed in March 2014 resulting in registering over 100,000 mother-child pairs. Children will be followed until they reach 13 year of age (Main Study). Questionnaires have been administered every 6 months to collect the information about children's health. Biological samples have been collected from mothers during pregnancy and at birth, children, and fathers for clinical tests and exposure analysis. The Sub-cohort Study consists of 5,000 randomly selected children from the Main Study. In the Sub-cohort Study, performed are environmental monitoring by home visits and psychoneurological development and medical examinations. The Programme Office collaborates with domestic and international research institutions for better conduct of the study and harmonization of study protocols and data. The findings of JECS will be shared with the Ministry of the Environment to aid in policymaking.

3 Risk Assessment Science Collaboration Office



Tasked with providing domestic leadership for regulatory science initiatives aimed at realizing safe and secure society, the Risk Assessment Science Collaboration Office coordinates and promotes research and other projects on environmental risks through its two sections.
The Ecotoxicity Reference Laboratory conducts ecological toxicity research; cooperates internationally to develop or standardize new testing methods to ISO or OECD; oversees the stable supply of experimental animals; holds seminars and other events to inform and educate relevant parties about testing methods; and otherwise supports the building of ecotoxicity testing infrastructure and regulatory policymaking. The Environmental Risk Assessment Task Office contributes to administrative policy by conducting researches on testing and risk assessment methods, and assesses environmental risks scientifically by working with government agencies and relevant organizations to support risk assessment. Our Task Office also contributes to step-wise risk assessment and setting of risk assessment guidelines and regulation or target values based on the Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc and other relevant laws, as well as collecting and releasing information on environmental risks to enhance fundamental knowledge for public policy.

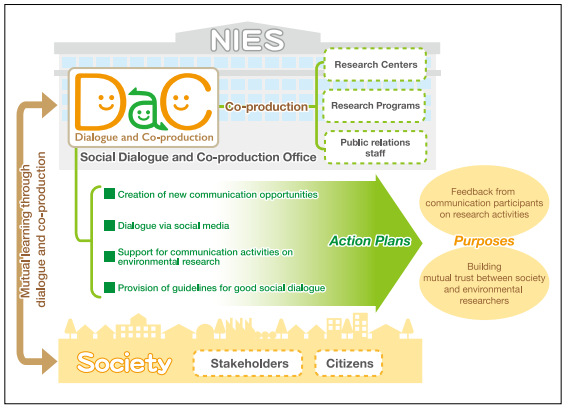
4 Environmental Emergency Management Office



Through research collaboration with organizations in Japan and other countries, this office implements projects aimed to support effective and efficient environmental emergency management by respondents. This includes building and operating institutional and information network systems that serve as a foundation for developing environmental emergency management strategies, training personnel to develop practical expertise in environmental emergency management, providing on-site support for disaster responses, setting up international research hubs for environmental emergency management, and training researchers.
More specifically, this office is establishing a new platform for enabling domestic and overseas institutions to cooperate in collecting and organizing experiences and lessons gained from tackling environmental issues caused by past disasters, and in efficiently and effectively organizing new knowledge derived from environmental emergency management research. It will focus in particular on the smooth management and operation of the central government's Disaster Waste Treatment Support Network (D.Waste-Net), and on building emergency environment monitoring systems centered on regional environmental research institutions.

5 Social Dialogue and Co-production Office

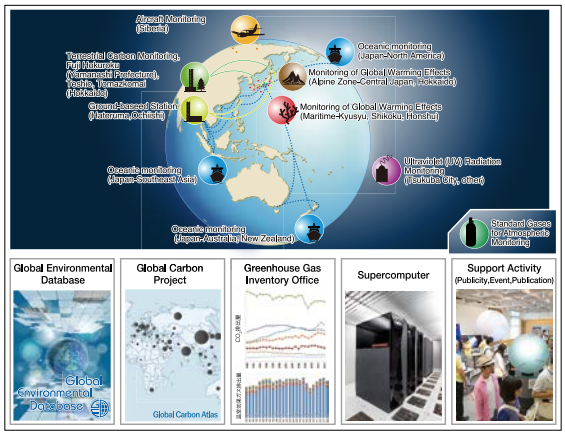
The office encourages dialogue between society and NIES about awareness of environmental problems and the current state of environmental research.
We will plan and hold events such as stakeholder meetings and science cafés, and provide feedback from society to research activities. We also use social media to interact with many more members of the public on the Internet. By supplying timely information in response to social topics via social media, we can encourage a greater diversity of people to get interested in NIES's activities. Further, we will compile and analyze staff members' communication experience at NIES to create guidelines for good social dialogue.
By means of these efforts, the office will endeavor to build a relationship of mutual trust between society members and environmental researchers.



Building Environmental Research Infrastructure

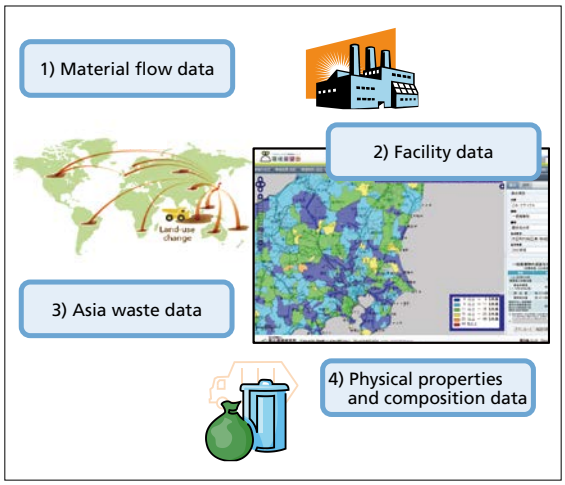
1 Strategic monitoring of the global environment, development of a global environment database and support for global environmental research

NIES investigates the circulation of GHGs in relation to climate change by using aircraft, ships, terrestrial monitoring stations, forest observation sites and other facilities to conduct long-term broad monitoring of the Asia-Pacific region and Siberia. To identify the impacts of global warming on natural ecosystems, NIES also conducts strategic, cutting edge long-term climate change monitoring, including sustained monitoring of alpine vegetation and the northward movement of coral. NIES provides collected observational and inventory data along with information on global environmental issues and the outcomes of its research to the general public in an easily understandable form, and promotes open access to scientific information by maintaining a global environmental research database that includes tools for processing and analyzing data.
NIES also supports global environmental research based on domestic and international cooperation by serving as a regional office for the Global Carbon Project (GCP) and land-based Asian monitoring networks, and hosts the Greenhouse Gas Inventory Office of Japan (GIO) that is responsible for compiling the national inventory of GHG absorption and emission in accord with the United Nations Framework Convention on Climate Change (UNFCCC). In addition, it supports global environmental research by providing access to its supercomputers.



2 Establishment of informational research fundamentals about resource circulation and waste management

NIES has established a material cycle and waste management information and research infrastructure to promote research and decide policies and initiatives for ensuring the responsible use of resources and appropriate treatment of waste. It organizes the data required for these purposes in the four major categories of material flow data, facility data, Asia and international data, and data on the physical properties and composition of recycled materials and waste. NIES will continue to develop and share this information and research infrastructure as befits an age of open science, also cooperating with research projects that collect physical properties/composition data and encouraging the accumulation of data.



3 Development of the environmental certified reference materials, and establishment of reference laboratory for environmental measurement

To help control the quality of measurements of chemicals in the environment, NIES prepares and supplies environmental and joint analytical reference materials that meet international standards according to the needs of society, and improves the utility of existing environmental reference materials by adding certified and reference values. It also considers ways of improving environmental analysis precision management methods and performs environmental chemical measurement reference laboratory functions by crosschecking and other means as required. More specifically, over the current Medium-and-Long-Term Plan period, it aims to start preparing and distributing at least two environmental reference materials related to organic compounds or inorganic elements, and to add certified or reference values of stable isotopes for at least one type of existing environmental reference material.

4 Long-term storage of environmental specimens (specimen banking)

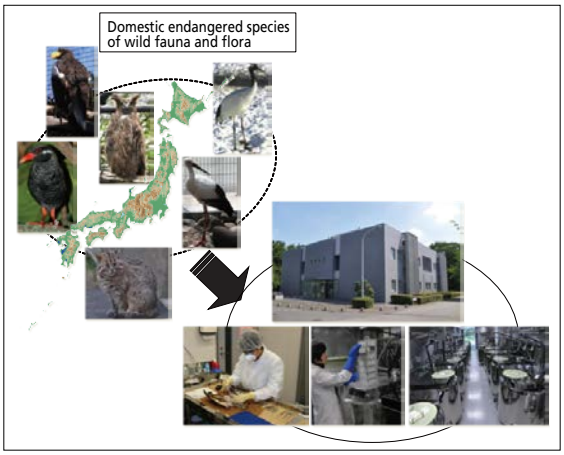
NIES stores bivalves, fish and other environmental specimens in its Environmental Specimen Time Capsule Building, a long-term storage facility in which specimens are cryogenically ground, homogenized and stored at –150 °C in low-temperature storage containers for future uses. NIES collects and stores specimens in line with its own and other long-term monitoring projects, including international cooperative initiatives. It also endeavors to further enhance the value of stored specimens by developing and applying measurement methods for extracting environmental information from them, examining their condition, and reviewing storage technologies. More specifically, it divides Japan into seven blocks, and systematically collects bivalve specimens each year at 10–15 locations, adjusting the homogenized specimens to create a bank of long-term storage specimens from coastal regions nationwide. It also publishes specimen data such as the data on the homogeneity of stored specimens at the start of storage.

5 Collection, preservation and distribution of strains of microalgae and endangered algae

Microbial Culture Collection at NIES (MCC-NIES) maintains strains of environmentally important microorganisms, microalgae, and the endangered algal species in facilities designed for stable long-term preservations, providing those as research materials to Japanese and overseas researchers. In addition, deposition of scientifically important strains has been accepted for further development of various research. MCC-NIES aims to provide approximately 800 strains per year to researchers, and to accept approximately 20 new deposit strains each year. To promote further utilization of the strains, MCC-NIES compiles various additional information on strains (e.g. DNA barcoding and whole genome data, morphological and geographical information, published papers, etc.), and opened successively to public. MCC-NIES also has developed sterilization and cryopreservation techniques with the practical applications to improve the efficiency and stability of routine works in the culture collection.

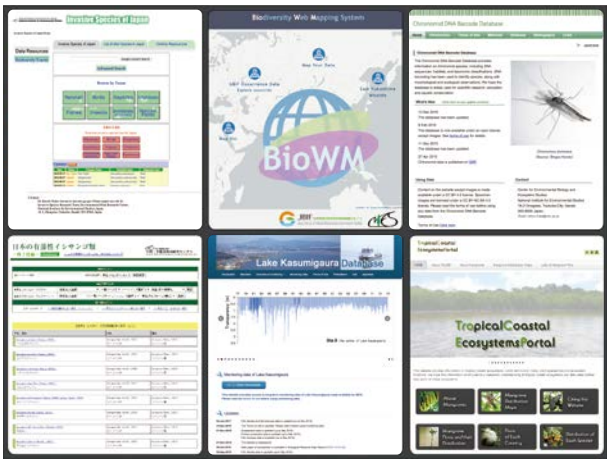
6 Preservation of the genetic resources of rare wild animals

NIES collects for long-term cryopreservation genetic resources (somatic cells, germ cells, organs, etc.) of wildlife species designated under the Law for the Conservation of Endangered Species of Wild Fauna and Flora (Endangered Species Law) as endangered species of wild fauna and flora. In particular, it has designated as priority species the 15 avian and 4 mammal species for which plans for the rehabilitation of natural habitats and maintenance of viable populations have been drawn up under the Endangered Species Law. NIES is also building a system for cooperating with local overseas researchers and both Japanese and overseas zoos and other facilities to collect and preserve the genetic resources of wild fauna of the Asian region that have been designated as internationally endangered species of wild fauna and flora. More specifically, over the next five years it aims to collect 20,000 storage specimens from 1,000 individuals of 50 species of fauna.



7 Development of biodiversity and ecosystem information infrastructure

NIES promotes development of an information infrastructure to assess, predict, conserve and restore biodiversity and ecosystems.
We have released biodiversity and ecosystem databases that address individual issues such as the classification and description of environmental microorganisms, the conservation of endangered species, and the management of invasive species. We plan to further expand the databases as well as develop a cross-reference system for multiple databases. Our data will be published through an international and domestic data portal such as Global Biodiversity Information Facility (GBIF).



8 Long-term monitoring of regional environmental change and development of joint observation site infrastructure

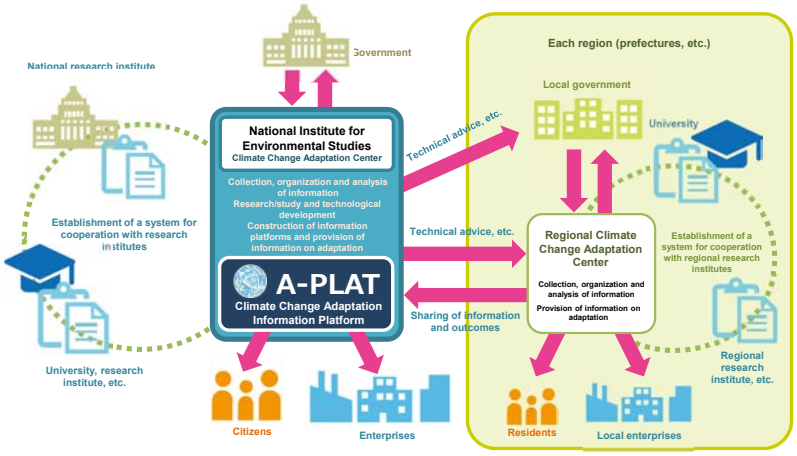
The deterioration of air quality in East Asia as a result of the region's economic growth and associated increase in atmospheric pollutants in recent years is causing concern. To carry out long-term observation of changes in East Asia's atmospheric environment on a continental scale, the Regional Atmospheric Environment Section of NIES's Center for Regional Environmental Research has monitored air quality (gases and aerosols) at NIES's Cape Hedo Atmosphere and Aerosol Monitoring Station (CHAAMS) in Okinawa since 2004. CHAAMS uses both traditional and state-of-the-art measuring instruments to investigate the chemical, optical and physical properties of particulate matter (PM2.5 and other aerosols) suspended in the atmosphere. In the belief that researchers throughout East Asia should cooperate in monitoring East Asia's atmosphere, NIES contributes to the development of environmental research in East Asia by providing access to CHAAMS as a joint monitoring facility. CHAAMS is currently focusing on monitoring PM2.5 mass concentration, vertical concentration distribution of particles (by lidar), ultraviolet radiation, and atmospheric mercury concentration.

9 Long-term monitoring of inland waters, and provision of data to domestic and international monitoring networks

NIES is carrying out long-term monitoring of Lake Kasumigaura and compiling the observational data into a database that can be broadly accessed by researchers and others worldwide. It also contributes to building the domestic and international monitoring networks by serving the Japan office for the United Nations' Global Environment Monitoring System/Water Programme (GEMS/Water), and providing the data to the Japan Long-Term Ecological Research Network (JaLTER). It also helps to drive progress in research on freshwater environments by developing monitoring methods and conducting long-term ecological research. More specifically, it publishes a constantly updated online database of water quality monitoring data for 24 parameters at 10 locations, and aquatic organisms data for 10 species at two locations. In the future, we will expand the database over the Medium-and-Long-Term Plan period by deploying additional sensors and loggers that supply many thousands of additional data.

1 Center for Climate Change Adaptation

The Climate Change Adaptation Act (Act No. 50 of 2018) promulgated on June 13, 2018 provided for new roles of NIES to collect, organize, analyze and provide information related to the impacts and adaptation on climate change and the implementation of technical assistance to local governments and Local Climate Change Adaptation Centers (LCCACs) in Japan. For the purpose of fulfilling these missions steadily, Center for Climate Change Adaptation (CCCA) was established in NIES on December 1, 2018 when Climate Change Adaptation Act came into force. The CCCA is carrying out the following services related to climate change adaptation.



❶ Services for promoting climate change adaptation

The CCCA provides technical assistance to Prefectures and Municipalities on the formulation and promotion of Local Climate Change Adaptation Plans, providing technical assistance to LCCACs established in each region and explaining scientific knowledge, as well as presenting opinions at the request of Regional Councils on Climate Change Adaptation that are organized by regional stakeholders. Furthermore, CCCA works on development of human resource for research on climate change impact analysis and adaptation measures through joint research and trainings with local research institutes such as LCCACs.

In order to understand climate change and resultant impacts, the CCCA promotes the dissemination and enlightenment of research outcomes by considering measures, particularly in the field of global warming research on the aggregation of observation needs, preparation of implementation plans, management and reporting of implementation plan progress and the promotion of data sharing.

The CCCA provides scientific knowledge related to climate change information, observation and monitoring climate change impacts, future impacts assessment and adaptation strategies to respective stakeholders such as the local governments, businesses and individuals who need them to promote climate change adaptation in an easy-to-use form via the portal site "Climate Change Adaptation Information Platform (A-PLAT)".

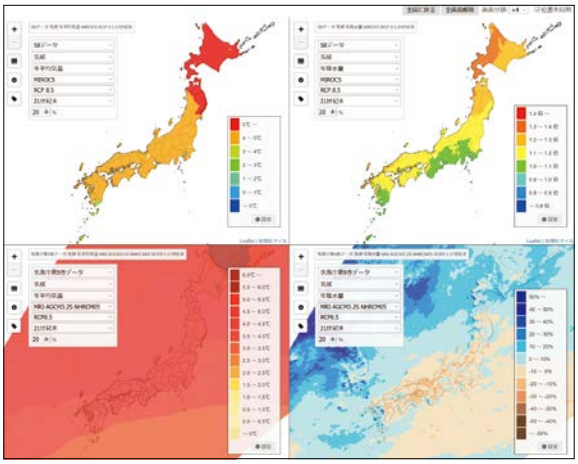
In addition, the CCCA will establish "Asia-Pacific Climate Change Adaptation Information Platform (AP-PLAT)" as a basis for providing information on climate change impacts and adaptation to developing countries in the Asia-Pacific region by 2020 to contribute to international cooperation for climate change adaptation.

A-PLAT website

❷ Research on climate change impacts and adaptation

In order to scientifically support the promotion of climate change adaptation, the CCCA promotes research and technological development on observation and monitoring of climate change impacts, methods of assessing climate change impacts and adaptation strategies by organizing adaptation research programs. This research program's outcomes will contribute to policy making by the government, such as making changes to National Adaptation Plan, and will also assist local governments and other stakeholders to make efforts towards climate change adaptation through the provision of outcomes on A-PLAT and AP-PLAT.

This research program consists of the following three projects:



From the A-PLAT website - National and prefectural information (WebGIS)

- Research on constructing system to observe and monitor climate change impact, analyzing the relationship between long-term climate change trends and the resultant impacts, as well as establishing the theory and its method to identify the causes;
- Improving climate change impact assessment method in multiple fields, implementing climate change impact assessment utilizing the latest climate and socioeconomic scenarios, and constructing systems capable of providing global and domestic climate scenarios;
- Organizing knowledge on climate change impacts and adaptation options in multiple sectors, clarifying gaps that may exist between adaptation plans or scientific knowledge and practice of adaptation measures, and studying measures necessary for effective adaptation strategies.

Environmental Research Fields

1 Global Environmental Research Field http://www.cger.nies.go.jp/en/

Contributing to the Solution of Climate Change and Other Global Environmental Problems

In this field our researchers are determining the current state of the global environment and the physical, chemical, and biological processes of long-term change. Based on those findings, they predict global environmental changes and assess the impact risks associated with those changes, and also conduct studies and research on measures to protect the global environment. Especially in relation to climate change, they assess the long-term changes in atmospheric composition, gauge climate change risks and adaptation measures, and work on problems such as depletion of the stratospheric ozone layer.

2 Material Cycles and Waste Management Research Field http://www-cycle.nies.go.jp/index-e.html

Contributing to the Cyclical and Efficient Use of Resources, and to Decreasing the Environmental Burden of Wastes

On scales from local to international, researchers in this field determine the state and elucidate the mechanisms of resource use and the related environmental burdens arising from socioeconomic activities. We conduct research on assessment methods and proposals for transition strategies for sustainable material cycle-based societies. Researchers also develop and evaluate technologies for the appropriate treatment, disposal, and recycling of wastes and recyclable resources as well as the fundamental technologies needed for resource recycling and material management.

More specifically, research in this field is focused on the following five areas: 1) institutional and policy research for building sustainable material cycle-based societies; 2) research on the dynamics of global material cycles and assessment of their environmental, economic, and social impacts; 3) development of technologies required for resource recycling and materials management; 4) using waste as construction materials, and building more sophisticated systems for testing, assessing and managing landfills; and 5) basic research on the domestic and overseas application of waste management technologies. NIES aims to organize and share the findings of these researches as a scientific and policymaking platform for supporting the building of sustainable material cycle-based societies.

3 Environmental Risk Research Field http://www.nies.go.jp/risk_health/index-e.html

Contributing to the Achievement of a Safe and Secure Society by Reducing Environmental Risks

Studies in this research field include improvement of ecological toxicity testing to develop a new ecological risk assessment system and methods to evaluate exposure and impact of environmental chemicals, effects of environmental hazards on the ecosystem through field studies and laboratory experiments, exposure measurements, and systematic risk management for chemicals with reference to environmental fate and exposure assessment of those substances. These findings are to be applied to the development of risk sciences.

More specifically, researchers develop sophisticated ecotoxicity tests ranging from molecular up to organism levels, elucidate impacts of chemicals on ecosystems in the rivers, perform laboratory experiments and field surveys in enclosed bays and other coastal areas, and finally aim to establish new systems for assessing the ecological impacts of chemicals and propose measures for restoring a sound ecosystem.

We also improve methods to evaluate environmental exposure of chemicals and the effects using new methods such as identification of substances that cause mutagenesis and other health effects, binding assays using ecotoxicity-related receptors, detection of high molecular weight biomolecules, analysis of correlation between exposure and impacts, develop environmental fate and emission models for chemical substances, and study ecological risk assessment of environmental disturbances and systematic risk management. Researchers of this research field group work in collaboration with the Environmental Health Research Field regarding human health, conducting studies that lead to establishment of a comprehensive and precautionary scientific foundation. Finally, we contribute to regulatory sciences to evade risks of human health and ecosystems.

4 Regional Environment Research Field http://www.nies.go.jp/chiiki/en/index_en.html

Contributing to Solutions for Regional Environmental Problems Focusing on Japan and Asian Countries

This field concerns itself with a variety of spatial scales from transboundary to individual city. Researchers are investigating environmental problems including the environmental burdens caused by human activities and the impacts on humans and ecosystems via the atmosphere, water, soil, and other environmental media and are seeking solutions to reduce and control these problems. By integrating their work, researchers conduct studies for finding, applying, and implementing comprehensive and effective solutions for regional environmental problems.

Research outcomes have been used for purposes such as alerting the public about particulate matter forecasts generated by air quality models; introducing a Water Environmental Soundness Index based on ecological functions; recommending concrete policies for improving tidal flats, shallows and other coastal environments; recommending measures and scenarios for resolving or mitigating regional-scale pollution, supporting domestic and Asian aquatic conservation initiatives through proposing and testing site-specific aquatic environment conservation technologies; proposing methods for countering nitrogen saturation in forest and other soil zones; and establishing efficient, low carbon purification systems that make use of microorganisms. NIES is committed to playing a major role in resolving regional environmental issues in both Japan and Asia through integrating and sharing the outcomes of the above research initiatives.

5 Environmental Biology and Ecosystems Research Field

http://www.nies.go.jp/biology/en/index.html

Helping Establishment of a Society in Harmony with Nature that Conserves Biodiversity and Ecosystems, and Enables Future Generations to Benefit from Ecosystems

Researchers carry out studies and research at various temporal and spatial scales to determine the structures and functions of the ecosystems comprised by the diverse organisms on the Earth, the relationships between those structures and functions, the benefits that humans receive from ecosystems, and the impacts of human activities on biodiversity and ecosystems. They also pursue projects related to this body of research. By sharing the fruits of this research with society, NIES contributes to the conservation of biodiversity and sustainable use of ecosystem services.

6 Environmental Health Research Field

http://www.nies.go.jp/risk_health/index-e.html

Preventing Adverse Health Effects Caused by Environmental Factors and Reducing Health Risks for Future Generations

Scientists of this research field perform animal studies, epidemiological research, and exposure analyses to evaluate effects of various environmental factors including chemical substances that may cause adverse health effects to humans, especially to future generations, and also to elucidate the mechanisms of these effects. We investigate the impacts of exposure to atmospheric pollutants, flame retardants, metal/metalloid elements, and other substances through airways, gastrointestinal tracts, and skin on the immune responses, nerve system, reproduction, development, and metabolism. We use genetic information, cells, and laboratory animals. We also conduct epidemiological studies on susceptible populations by measuring exposure to environmental pollutants and other factors, searching for appropriate biomarkers, and investigating impacts of these factors on human health. We promote environmental health sciences and contribute to maintaining sound health into the future through developing methods to reduce health risks, compiling findings of health sciences, publishing the results in both domestic and overseas research reports and journals, and sharing information on health risk assessment with regulatory bodies and stakeholders. We advance health risk assessment as a risk science through a joint-research with researchers of the Environmental Risk Research Field.

7 Social and Environmental Systems Research Field

http://www.nies.go.jp/social/en/index_en.html

Assisting the Transition to a Society and Economy in Harmony with the Environment at Scales Including the Global Environment, Nations, Regions, and Cities

Environmental issues are closely connected with various human environments. They adversely affect our everyday lives, but they are also the outcome of the impacts of human activity on the natural environment. As such, human society needs to be positioned as a vital aspect of research on environmental conservation.

Researchers in this field focus on the development of theory, methods, and tools that will serve as infrastructure for research on various aspects of the interactions between the environment and society. Key research topics in this field include methods for presenting future visions for a sound society and economy that benefits from the environment's bounty, scenarios and roadmaps for achieving that vision, policies and plans for implementing those roadmaps, and methods for assessing those policies and plans that take into account a broad range of both direct and indirect impacts. These activities benefit society through supporting public policy, participatory processes, and other means for transforming social systems from the environmental perspective, with researchers themselves also actively engaging in dialog with society.

8 Environmental Measurement and Analysis Research Field

http://www.nies.go.jp/sosiki/analysis-e.html

Continuing Assessment of Current and Future Environmental Concerns through Exploratory Science, Continuous Development and Deployment of Scientific Methodologies and Strict Management of Measurement Data Quality

Tackling environmental concerns requires early detection of environmental issues and changes. By exacting measurements and careful monitoring, we provide invaluable scientific input for the implementation of domestic and international policy. We further assess the effectiveness of these technological and political measures in mitigating environmental risk. We achieve this through the continuous development of measurement methods, deploying these in the natural environment and extracting information from the measurement data whilst striving to ensure the highest standards of data quality.

During the current Medium-and-Long-Term Plan period, research in this field is focusing on the measurement of chemicals, including the development of new methods for measuring chemicals present in the environment and improving analytical methods according to needs; development and application of methods for monitoring the biogeochemical behavior of chemicals in the environment and tracking any changes they undergo; and on the application of methods to environmental monitoring, including the development and combined use of active and passive spectroscopic measurement methods, application to environmental research of noninvasive measurement of biological systems, and ecosystem monitoring that makes use of image data captured by terrestrial live cameras and other devices. Researchers in this field gather information and work with other research fields and organizations both within NIES and other institutes to ascertain the needs of various environmental research fields, uncover future needs, and lay the ground for further innovation.

9 Environmental Emergency Research Field

http://www.nies.go.jp/fukushima/index-e.html

Contributing to the Environmental Recovery and Reconstruction of the Disaster-Stricken Region from the Great East Japan Earthquake and to Building a Sustainable Society Resistant to Future Disasters

Based on the experiences of the Great East Japan Earthquake and other disasters, researchers in this field conduct research and develop environmental technologies that will contribute to the environmental recovery, reconstruction and renovation in devastated areas, and the creation of sustainable regional environments capable of withstanding major disasters. The outcomes of this research are utilized in environmental emergency research programs and shared with researchers and others worldwide. NIES Fukushima Branch is also leading efforts to build a structure for collaboration between government, industry, and academia in the field of environmental emergency research.

Networking and building bridges with domestic and overseas institutions

NIES has long conducted joint research with various institutions and promoted cooperation through networking with research personnel in universities and other institutions in Japan and overseas, and will further strengthen its capabilities as a core environmental research hub for networking and building bridges between institutions in Japan and worldwide during the Fourth Medium- and Long-term Plan period.

AsiaFlux

AsiaFlux was established as an international observation network for the Asian region in 1999, in order to systematically observe the exchange of greenhouse gases between terrestrial ecosystems (forests and arable land, etc.) and the atmosphere (carbon flux).
Many research bodies both in Japan and overseas are members of this network. NIES contributes to this network not only with its observational activities but also by acting as the main administrative office for the operations of the network.

Liaison for Environmental Research Institutions

In order to effectively promote the regular exchange of information on environmental research, and with the aim of expanding further research collaboration, we have established ties with 13 research institutes in the surrounding area. Since its establishment, NIES has played a central role as a hub environmental research institution for the Tsukuba area, in the "Liaison for Environmental Research Institutions".

Domestic Cooperation with Local Environmental Research Institutes

We are actively engaged in various collaborative research with environmental research institutes with an intimate knowledge of regional circumstances and the environmental issues which are closely tied to particular environments throughout Japan.
Moreover, NIES hosts the "All-Japan Environmental Research Institutions Symposium" every year, which gathers environmental research institutes from throughout Japan to report on their research outcomes. NIES acts as the administrative office for the symposium and assists in summarizing the various opinions exchanged.

Contribution to the Intergovernmental Panel on Climate Change (IPCC)

The IPCC has had great success in assembling scientific knowledge in relation to climate change, and is foundational in the intergovernmental study and assessment of its impacts and related policy. Many of our researchers collaborate as authors of the report which the IPCC produce. The IPCC Report, as a means to summarize scientific knowledge in relation to global warming, is currently the most globally influential report and contributes to the policy formation of governments in every country throughout the globe.

Participation in UNFCCC-COP

In 2004 NIES was admitted as an NGO observer organization, for participation in the United Nations Framework Convention on Climate Change, Conference of the Parties (UNFCCC-COP) of that year. In December of the same year it participated as an observing NGO and hosted a booth as part of the side-event of COP, by which means it was able to positively convey its research outcomes in the environmental research field.

Tripartite Presidents Meeting (TPM)

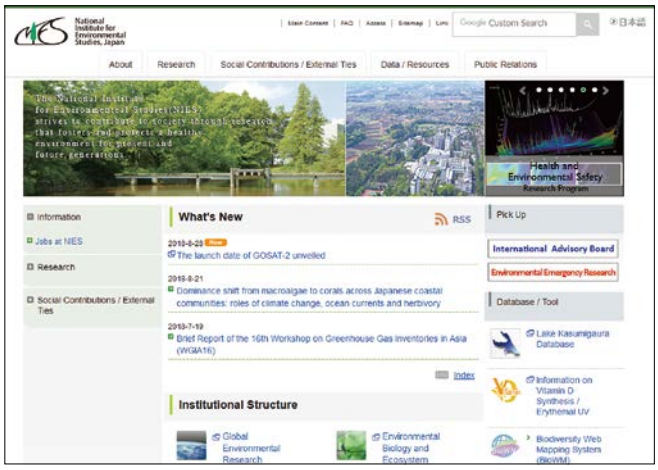
In order to further promote research collaboration in the Asian region, NIES, the Chinese Research Academy of Environmental Sciences (CRAES; China), and the National Institute of Environmental Research (NIER; South Korea) have regularly met since 2004. The three Presidents and representatives of these institutions, which all play a leading role in environmental research in their respective countries, have exchanged views on research fields for collaboration at the annual meeting.

NIES Public Symposium

To facilitate the dissemination of our research outcomes and promote awareness of our activities, we hold a public symposium to coincide with June Environment Month every year, in Tokyo and other areas. Here, visitors can learn about NIES through a number of lectures. They also have the opportunity to communicate directly with NIES researchers during the poster session, which has around 20 displays on research activities. Every year people from all walks of life take advantage of this opportunity.

NIES Open House

Along with giving the general public the chance to fulfill their curiosity about environmental issues, and gain an understanding of environmental research, science and technology, twice a year during Science and Technology Week (April) and the summer holidays (July) we open our doors to the public and introduce the activities of NIES. At the Open Houses, we hold lectures on the environment, displays and interactive activities, with many different attractions each year.



NIES Website

We provide information on our current research activities and outcomes via NIES website. Besides information on the respective research centers and programs, the website also contains a database populated with research results.
It is also possible to download a large spectrum of publications from the website including NIES Annual Report and the research booklets "Kankyo-gi".

NIES Website http://www.nies.go.jp/index-e.html

Collection, Processing, and Dissemination of Environmental Information

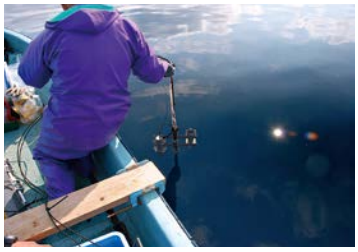
The Environmental Information Department collects and processes various kinds of environmental information, and provides it to the public through the website "Kankyo Tenboudai".
The site helps users to understand the status of the environment easily, and promote wider involvement of the public and related institutions in environmental conservation.

"Kankyo Tenboudai" http://tenbou.nies.go.jp

Major Research Fields in Japan [As of October 2018]

Teshio Carbon Cycle and Larch Growth (CCLaG) Experiment Site

Teshio biomass survey



Lake Mashu long-term environmental monitoring

Cape Ochi-ishi Global Environmental Monitoring Station

Lake Biwa Branch Office
(Inside Lake Biwa Environmental Research Institute)

Research Fields

Branch and Branch Office

Global Environmental Monitoring

Fukushima Branch
(Inside Fukushima Prefectural Centre for Environmental Creation)

Cape Hedo Atmosphere and Aerosol Monitoring Station (CHAAMS)

Lake Kasumigaura long-term environmental monitoring

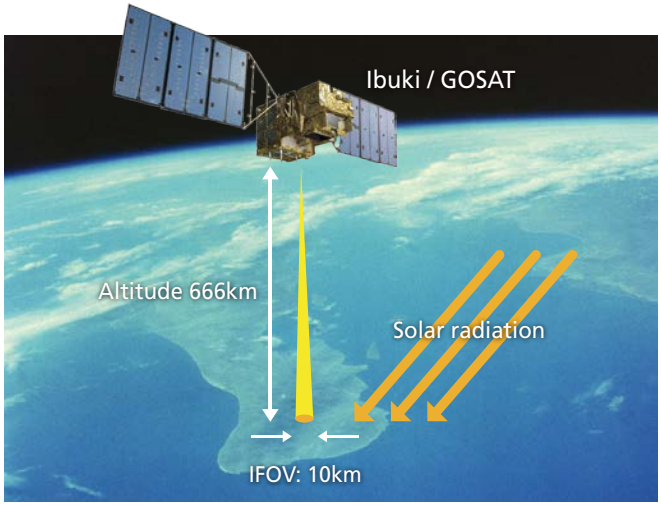
Hateruma Global Environmental Monitoring Station

Fuji Hokuroku Flux Observation Site, Monitoring for carbon dioxide absorption levels

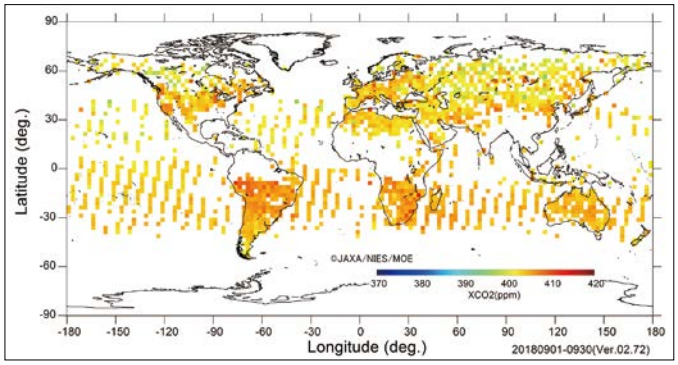
Biological and environmental surveys in Tokyo Bay

Global Environmental Monitoring

Greenhouse Gas Observation



Greenhouse gases Observing SATellite Ibuki / GOSAT



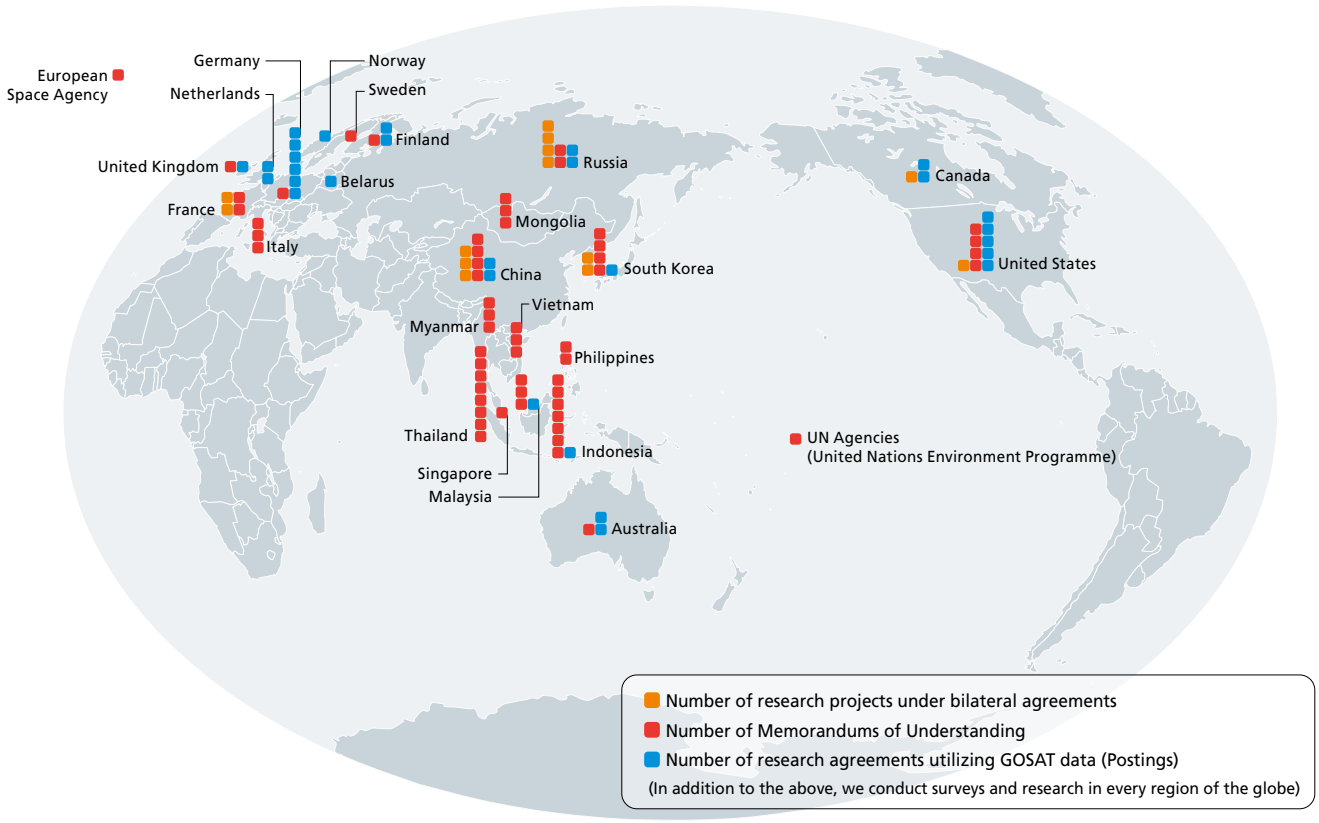
Monthly global map of the CO_2 column-averaged volume mixing ratio as of September 2018 (Level 2 data product)

GHG observation in Siberia using tower network and aircraft

GHG observation using commercial airlines

GHG observation using regular cargo vessels

Status of International Research Collaboration [As of October 2018]



Organization chart

President

Auditor

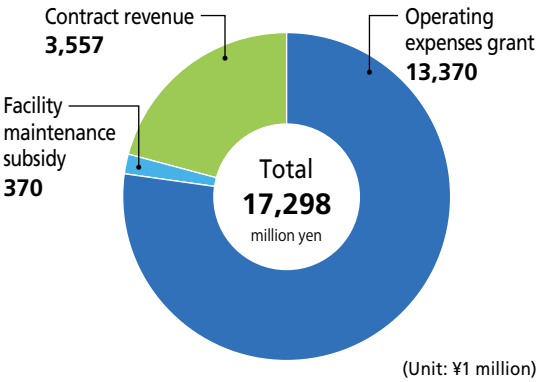
- Vice Presidents
- Advisers

- **Administration Departments**
  - Planning Department
  - General Affairs Department
  - Environmental Information Department
- **Research Centers**
  - Center for Global Environmental Research
  - Center for Material Cycles and Waste Management Research
  - Center for Health and Environmental Risk Research
  - Center for Regional Environmental Research
  - Center for Environmental Biology and Ecosystem Studies
    - Lake Biwa Branch Office*1
  - Center for Social and Environmental Systems Research
  - Center for Environmental Measurement and Analysis
  - Fukushima Branch
  - Center for Climate Change Adaptation*2
- **Research Project Collaboration Division**
  - Satellite Observation Center
  - Japan Environment and Children's Study Programme Office
  - Environmental Emergency Management Office
  - Social Dialogue and Co-production Office
  - Risk Assessment Science Collaboration Office
- Audit Office

*1 Lake Biwa Branch Office is co-managed by Center for Regional Environmental Research and Center for Environmental Biology and Ecosystem Studies.

*2 Center for Climate Change Adaptation is co-managed by Center for Global Environmental Research; Center for Regional Environmental Research; Center for Environmental Biology and Ecosystem Studies; and Center for Social and Environmental Systems Research.

Budget for FY2018



(Unit: ¥1 million)

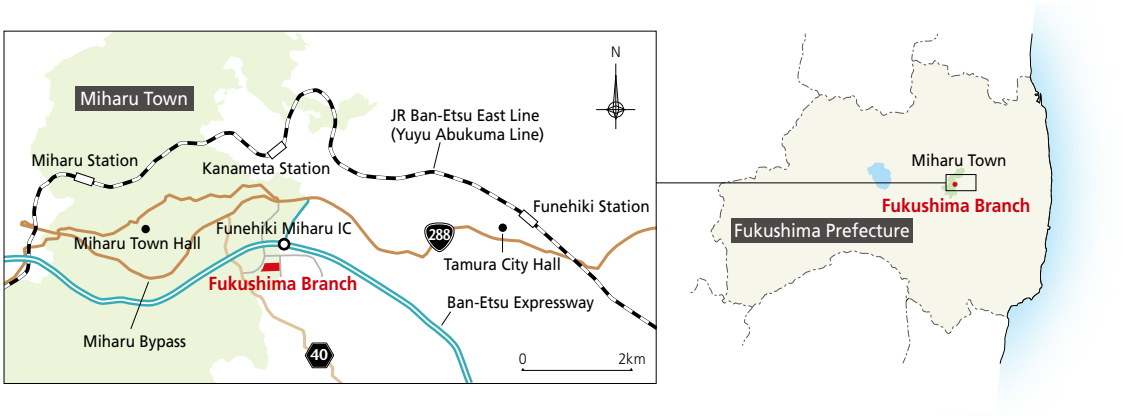
Staff Breakdown

		Persons
Permanent staff	Research	205
	Administrative	71
Contract staff	Research	153
	Administrative/ technical	514
Executives and Advisers		5
Total		948

as of October 1, 2018

Fukushima Branch

Fukushima Branch was established in April 2016 in the Fukushima Prefectural Centre for Environmental Creation located in Miharu Town, Fukushima Prefecture. Its objective is to promote and maintain rigorous scientific research activities focused on the areas devasted by the Great East Japan Earthquake. The Fukushima Branch conducts the Environmental Emergency Research Programs for contributing to environmental recovery and environmental renovation in the devastated areas, in collaboration with not only NIES' Tsukuba Headquarters but also Fukushima Prefecture, the Japan Atomic Energy Agency, other related institutions and stakeholders.



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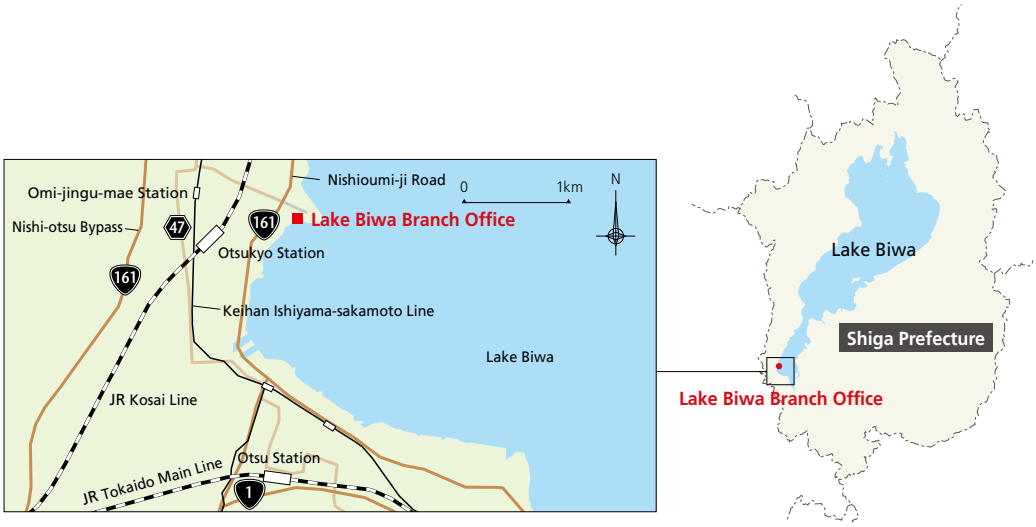
Telephone: +81-247-61-6561
E-mail: fukushima-po@nies.go.jp

Lake Biwa Branch Office

Based on the Basic Policy on the Transfer of Authority of Government-Affiliated Institutions determined by Headquarters for Overcoming Population Decline and Vitalizing Local Economy in Japan, NIES established the Lake Biwa Branch Office in April 2017 within Lake Biwa Environmental Research Institute in Shiga. As leaders in freshwater environmental research, NIES and Lake Biwa Environmental Research Institute is working together on projects that involve local universities and private industries in advancing freshwater environmental research and utilizing research outcomes to benefit local vitalization in the region.



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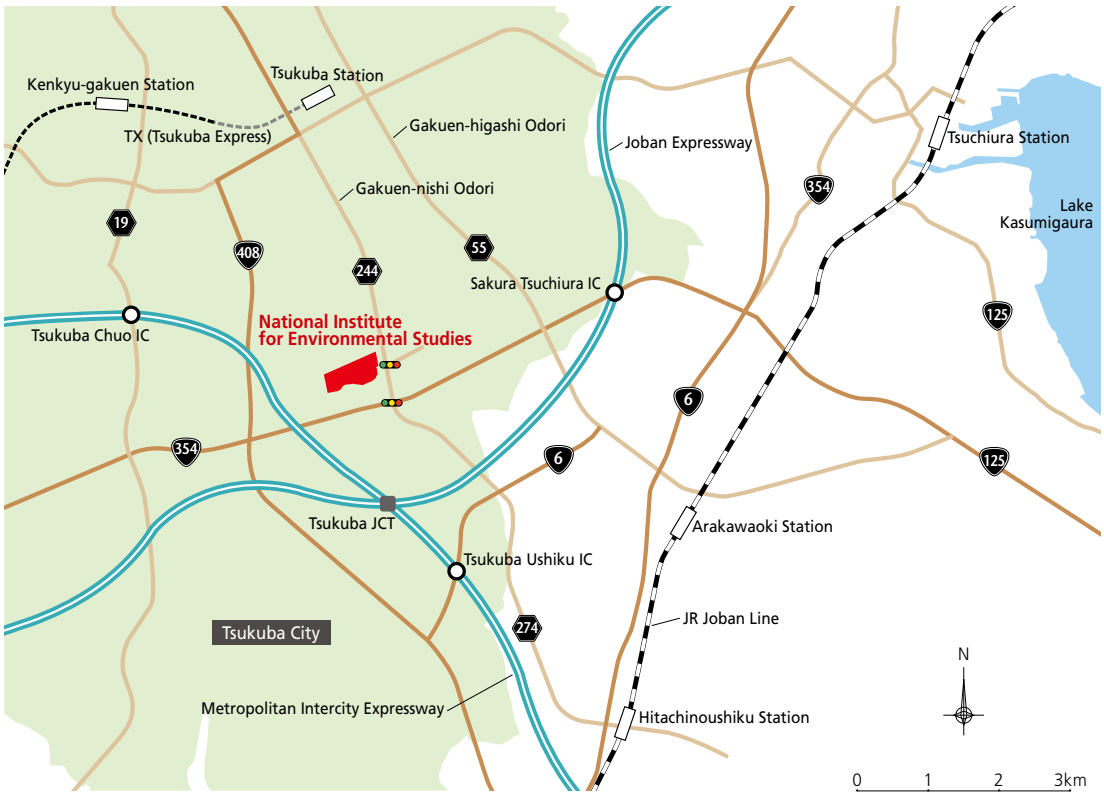
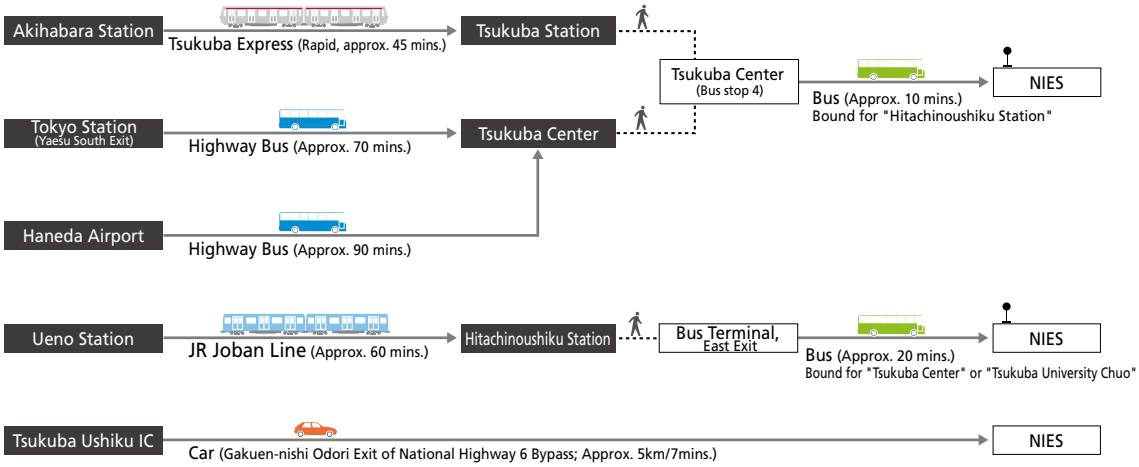
(Inside Lake Biwa Environmental Research Institute)
Telephone: +81-77-526-8561
E-mail: biwako@nies.go.jp



Access Routes



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