



# What is the Environment Research and Technology Development Fund?

## ■ Objective

### **To contribute to the promotion of environmental policy through research and technical development**

The aim of the Environment Research and Technology Development Fund (ERTDF) is to collect scientific knowledge and accelerate technological development as necessary to promote policies such as global warming prevention, establishment of a sound material-cycle society and establishment of a society in harmony with nature, while ensuring security and safety through environmental risk management. The fund promotes research and development in the area of environmental issues overall.

## ■ Features

### **Adoption and execution of research proposals which meet administrative needs in accordance with environmental policies**

The ERTDF is a policy-oriented, competitive research fund. It calls for proposals from industry, academia and government institutes. Proposals are expected to meet administrative needs, and are competitively examined and selected by the committee and appropriate subcommittees.

The ERTDF strongly promotes research and development in accordance with strategic administrative needs. For example, the “Strategic Research and Development Area” consists of competition among research teams based on an outline for selecting research themes and project leaders established by the Ministry of the Environment.

### **Ensuring a transparent and fair evaluation process by using committees composed of outside specialists**

The ERTDF comprises a committee and several subcommittees consisting of outside specialists. The committee is responsible for selection of proposals, intermediate evaluation and ex-post evaluation. Proposals are examined and selected by the committee and appropriate subcommittees in terms of the necessity and effectiveness of the research, and efficient use of funds.

To ensure transparent, fair and efficient fund management, the Ministry of the Environment refers to evaluation results to decide which research projects to adopt and allocate the research budget in order to support appropriate progress in the research projects.

## ■ Research Fields

In fiscal 2016, the seven former research fields have been reorganized and condensed to five fields in line with the “Promotion Strategy for Environmental Research & Environmental Technology Development” (Policy Recommendation Report of the Central Environmental Council in August 2017).

### • **Common to All Fields / Cross-sectional through Different Fields**

- Research related to an ideal society (sustainable society) under a long-term state vision
- Win-win research and development that contributes to multiple fields at once
- Research and development to eliminate trade-offs between fields
- Other related research and development

### • **Low Carbon Field**

- Formulating low-carbon scenarios that flexibly respond to climate change
- Clarifying the global warming phenomenon and measures to adapt to the situation
- Promoting low-carbon technology for the energy supply system
- Other related measures

### • **Sound Material-cycle Field**

- Thorough implementation of the 3Rs (Reduce, Reuse, and Recycle), and optimal disposal
- Improving heat recovery efficiency
- Collecting rare metals and establishing recycling systems
- Other related measures

### • **Harmony with Nature Field**

- Protecting biodiversity
- Sustainably securing and using national land, water, and other natural resources
- Other related measures

• **Safe and Secure Field**

- Risk evaluation and management that takes account of previously unidentified risks (such as chemical substances and vulnerability)
- Healthy circulation of water and air
- Other related measures

\*Research and technological development for CO<sub>2</sub> emission reduction at energy origin is funded by the Special Account for Energy Policy.

A website has been created which explains the ERTDF system and provides information on calls for proposals.  
<http://www.env.go.jp/policy/kenkyu/suishin/english/index.html>



■ **History of the ERTDF**

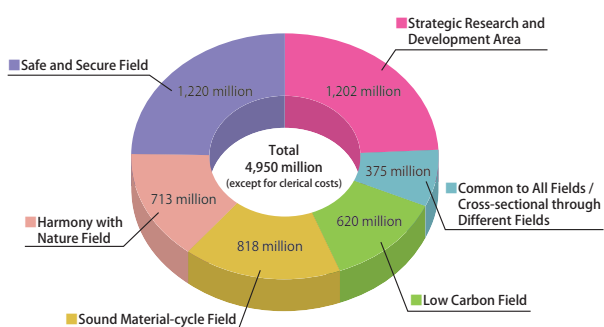
The ERTDF originated through the integration of three competitive research funds, the Global Environmental Research Fund (GERF), the Environment Technology Development Fund (ETDF) and the Grant-in-Aid for Scientific Research about Establishing a Sound Material-cycle Society.

In fiscal 2012, the Rehabilitation Adoption budget was established, in addition to the General Adoption budget of the ERTDF funded by the general account. The former was funded by a special account for the Great East Earthquake Rehabilitation, and solicits proposals for “contribution to earthquake restoration and reconstruction.” It was created to promote technical development and accumulation of scientific knowledge absolutely necessary for expediting rehabilitation in disaster areas. Researches which were funded by a special account for the Great East Earthquake Rehabilitation finished its term in fiscal 2014.

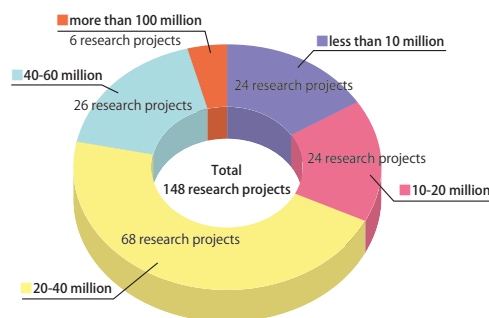
■ **The Number of Research Projects Underway and Budget in Fiscal 2016**

Under the General Adoption budget, two new strategic projects in the Strategic Research and Development Area has been launched along with 43 new research projects in the Environmental Problem Research Area. The research projects conducted in fiscal 2016 comprise six strategic projects and 142 research projects.

**Research Projects Conducted in Fiscal 2016**



Budget allocated for research fields (unit: yen)



Numbers of research projects per budget size (unit: yen)



## Integrated Research on the Development of Global Climate Risk Management Strategies

(Period I: FY2012-2014)  
(Period II: FY2015-2016)  
Budget in FY2016: JPY 257,527,000

**Seita EMORI**, National Institute for Environmental Studies (cooperation of 14 institutions)

<S-10>

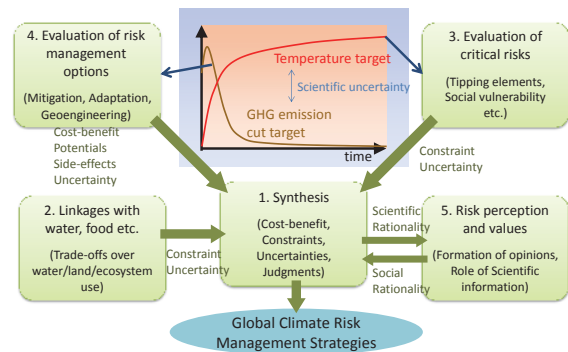
In this study, we adopt a risk management approach to tackle the long-term global aspects of climate change issues and explore them as one way of decision-making at the human level.

We are conducting research under the following five themes:

- (1) Synthesis of global climate risk management strategies,
- (2) Optimization of land, water and ecosystem uses for climate risk management,
- (3) Analysis of critical climate risks,
- (4) Evaluation of climate risk management options under technological, social and economic uncertainties, and
- (5) Interactions between scientific and social rationalities in climate risk management.

Through this research, we will develop and provide concepts and options for climate risk management

strategies which can be considered rational from both scientific and social standpoints, by comprehensively taking into account various constraints, uncertainties, risk management options, social value judgments and other factors. This will help us to contribute to international consensus building, national policy planning and deeper public understanding on climate issues.



## Evaluation of SLCP Environmental Impacts and Promotion of Climate Change Countermeasures through Seeking the Optimal Pathway

(Period I: FY2014-2016)  
(Period II: FY2017-2018)  
Budget in FY2016: JPY 180,499,000

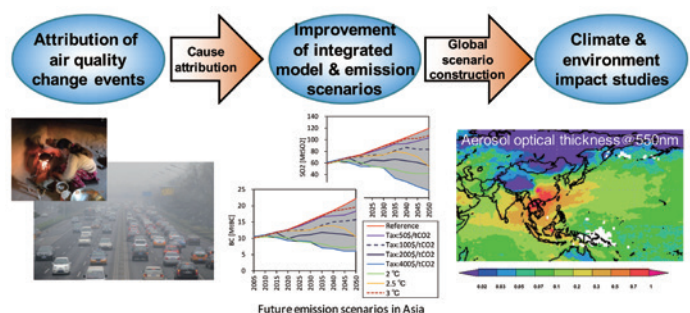
**Teruyuki NAKAJIMA**, Japan Aerospace Exploration Agency (cooperation of 12 institutions)

<S-12>

Air pollution is a serious global problem, especially in Asia. Development of countermeasures is a pressing issue for society. Air pollutants include black carbon, tropospheric ozone, methane, hydrofluorocarbons (HFCs) and other components which warm the earth's systems, accelerating global warming. These pollutants are called SLCPs (Short-lived Climate Pollutants). Reduction of SLCPs is an important action to take for mitigating global warming. For this purpose, we have to decrease the large uncertainty involved in estimating the climate impacts of SLCPs that result from their complex characteristics and distributions. This project aims at reducing the uncertainty of SLCP impact estimates via the following activities for seeking optimum SLCP pathways and effective countermeasures for impact reduction:

- (1) Cause and effect analysis of atmospheric quality change events and construction of an evaluation system.

- (2) Improvement of integrated models and their application to developing future scenarios.
- (3) Impact assessment of climate and environmental effects using numerical models.
- (4) Development of an integrated operational system.
- (5) Evaluation of the environmental effects and promotion of countermeasures to climate change.



Flow of the SLCP impact study and seeking the reduction path ways





## Development of Coastal Management Method to Realize the Sustainable Coastal Sea

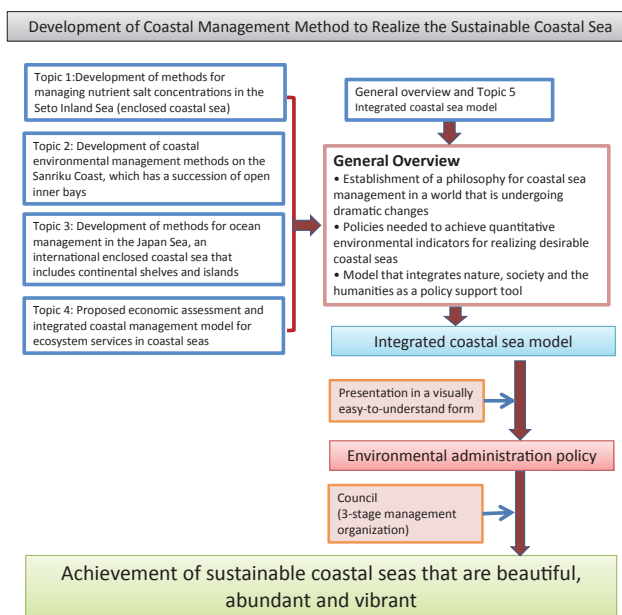
(Period I: FY2014-2016)  
(Period II: FY2017-2018)  
Budget in FY2016: JPY 135,373,000

Tetsuo YANAGI, International EMECS Center (cooperation of 13 institutions)

<S-13>

This project will involve a comprehensive examination of natural and human activity in and on coastal seas and the land areas that constitute their hinterlands in order to determine how these areas should be transformed from their present state to an appropriate status in terms of material circulation and ecotones. Specific actions will be proposed as methods for the environmental management of coastal seas in Japan. To create methods for environmental management of coastal seas near land areas, a policy must be established for the environmental management of coastal seas using the following as model areas.

- (1) Seto Inland Sea (enclosed coastal sea)
- (2) Sanriku Coast (open coastal sea)
- (3) Japan Sea (international coastal sea)



## Strategic Research on Global Mitigation and Local Adaptation to Climate Change

(Period I: FY2015-2017)  
(Period II: FY2018-2019)  
Budget in FY2016: JPY 277,662,000

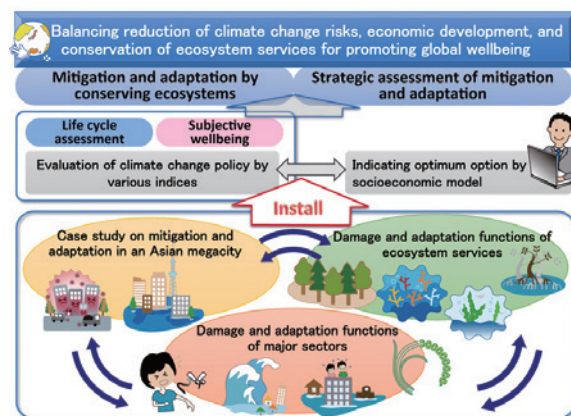
Taikan OKI, The University of Tokyo (cooperation of 12 institutions)

<S-14>

How to improve the balance of investments in mitigation and adaptation will be assessed using various indices including subjective wellbeing and livelihood assets, in addition to conventional economic indices, thereby supporting the development of an effective, efficient climate change policy based on environment risk management under conditions of limited available resources.

In FY2015, we collected basic information for estimating damage in the main sectors, formulated mathematical simulations, and constructed a prototype damage function for the main sectors for a cost-benefit analysis. In particular, we disclosed global mangrove distribution maps on the Tropical Coastal Ecosystems Portal ([www.nies.go.jp/TroCEP/](http://www.nies.go.jp/TroCEP/)), and also developed a tool predictive of temperature increases that included the heat-island effect in megacities. To evaluate this basic information, we further established a conceptual design for developing an “Integrated Assessment Model Incorporating Global-Scale Climate Change Mitigation and Adaptation” integrated

with a global hydrological model, and we collected necessary data. Moreover, we differentiated personal preferences on adaptation and mitigation measures when developing our cost-benefit analysis method using metrics such as subjective wellbeing and disability-adjusted life years.





## Predicting and Assessing Natural Capital and Ecosystem Services through an Integrated Social-Ecological Systems Approach (PANCES)

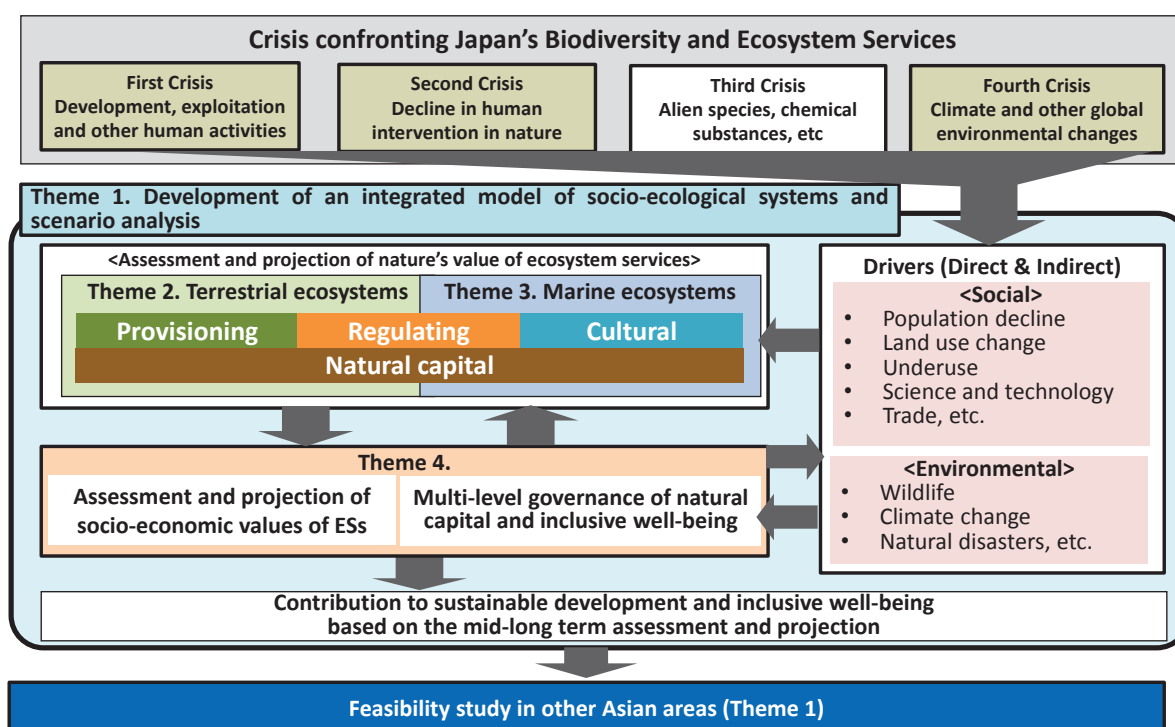
(Period I: FY2016-2018)  
(Period II: FY2019-2020)  
Budget in FY2016: JPY 189,994,000

Kazuhiko TAKEUCHI, The University of Tokyo (cooperation of 12 institutions)

<S-15>

While the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) has identified the development of scenarios as a key to helping decision makers identify potential impacts of different policy options, it has yet to accumulate a good number of scenario-approach studies. This five-year research project (PANCES) aims at predicting and assessing natural capital and ecosystem services in Japan through an integrated social-ecological systems approach with four thematic components: 1) building an integrated model of social-ecological systems and strengthening the science-policy interface, 2) predicting and assessing the natural values of terrestrial

natural capital and ecosystem services, 3) predicting and assessing the natural values of marine natural capital and ecosystem services, and 4) promoting multi-level natural capital governance by predicting and assessing socioeconomic values of natural capital and ecosystem services. The project will develop future scenarios at both national and local scales to explore potential changes in natural capital, ecosystem services and human wellbeing under different scenarios. This project has been expected to provide useful scientific evidence and insights for effective policy support with the eventual goal of building a society “living in harmony with nature.”





# Policy Design and Evaluation to Ensure Sustainable Consumption and Production Patterns in Asian Region

(Period I: FY2016-2018)  
(Period II: FY2019-2020)  
Budget in FY2016: JPY 161,485,000

Masahiko HIRAO, The University of Tokyo (cooperation of 11 institutions)

<S-16>

The Rio+20 Conference in 2012 confirmed that Sustainable Consumption and Production (SCP) is a cornerstone of sustainable development. At the United Nations Sustainable Development Summit in 2015, a set of 17 Sustainable Development Goals (SDGs) was adopted, with SCP as an important goal (Goal 12).

To achieve SCP within the planetary boundaries, various stakeholder practices will be essential. In addition to an efficiency approach where energy- and resource-efficient products are promoted, we have to design and implement a new sufficiency policy by indicating an appropriate structure of consumption and production and by changing consumers' lifestyles.

Our Strategic Research Project (S-16) consists of four research themes and will present policy packages for achieving SCP by means of various stakeholders' practices, considering characteristics of individual nations or regions including their economy and lifestyles. We will evaluate the effect of policy packages by employing economic model analysis and life cycle analysis. The outcome of this project will contribute to policy planning's achievement of SCP in Asia, including Japan, and to policy dialogues with Asian countries.

**Theme 1: Measures to Reduce Green House Gas Emissions and to Promote Resource Circulation by Intensifying Relations between Consumption and Production**

After investigating producer roles in manufacturing and resource circulation and those of consumers with life cycle

thinking, we will propose possible measures to intensify the relations between consumption and production.

**Theme 2: Transition Measures for Asian Consumption and Production Patterns Based on Activities and Dynamics of Diverse Stakeholders**

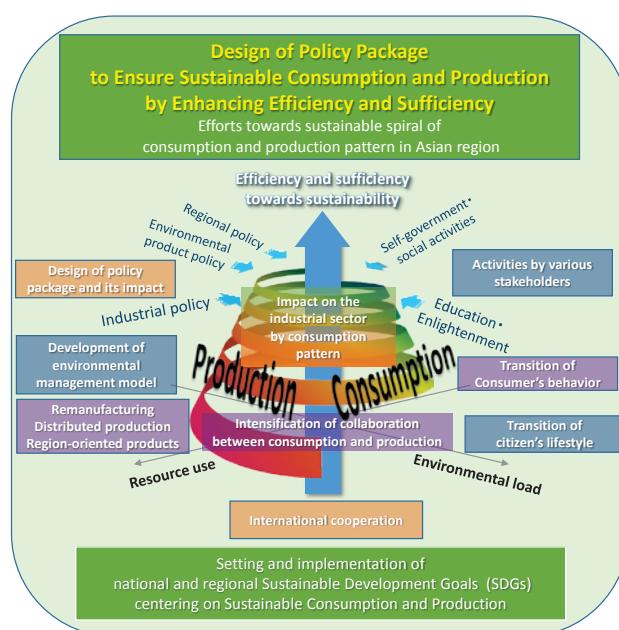
After in-depth fact finding on various stakeholders' activities relating to consumption and production, we will propose directions and actions for transition of consumption and production patterns. Citizens, business entities, and communities will be focused on in particular.

**Theme 3: Policy Shift towards a Sufficiency Approach Aiming to Satisfy Needs under Environmental and Resource Constraints in Asia.**

Utilizing economic model analysis and a series of field surveys, we will set mid- and long-term goals based on the planetary boundaries and propose policy packages contributing to promotion of energy- and resource-saving lifestyles and transitions in the forms of consumption and needs.

**Theme 4: Governing Sustainable Consumption and Production in terms of Goal 12 of the Sustainable Development Goals (SDGs)**

SCP is considered to be at the heart of the environmental SDGs. Under this theme we will investigate governance for Goal 12 and related SDGs, thereby drawing general insights into and proposals for governance for the SDGs. An integrated approach is indispensable, because governing implementation of Goal 12 is related to implementation of other goals, such as Goal 7 on energy.





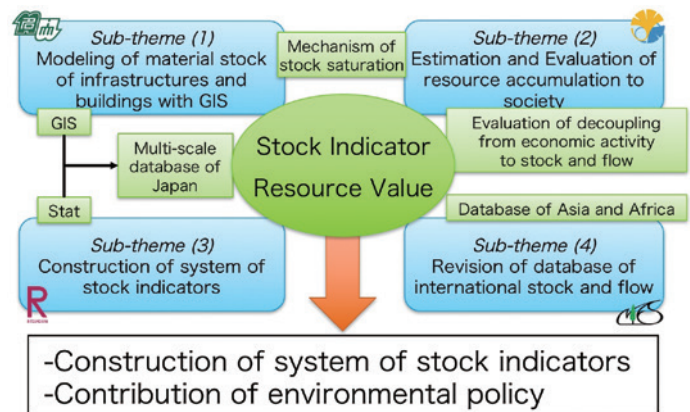
## Next-generation Material Stock that Realize the Full Potential of Resources

(FY2015-2017)  
Budget in FY2016: JPY 24,425,000

**Hiroki TANIKAWA**, Nagoya University (Cooperation of 4 institutions)

<1-1402>

This research focuses on material stocks, in particular infrastructure and buildings which together form half of Japan's material stock. The objective is to provide a chronological and geographical overview of wealth and establish utility and recyclability values for these in-use materials. The approach utilizes a system based on human activities, i.e. stock with high resource value in support of minimizing economy-wide material flows. Furthermore, this project develops tools for evaluating strategies to promote the recyclability value of stocks, and includes indicators of the utility value of stocks by considering socio-economic trends and geographical conditions. On an international level, this research will enable a road map to be proposed as a leapfrog scheme for material cycles which lead to optimal material stocks. This will showcase a strategic move demonstrating, especially to rapidly developing nations in Asian and African nations, how to strive towards a next-generation sustainable society.



## Developing Visualization Techniques of Biodiversity to Harmoniously Achieve Aichi Biodiversity Targets

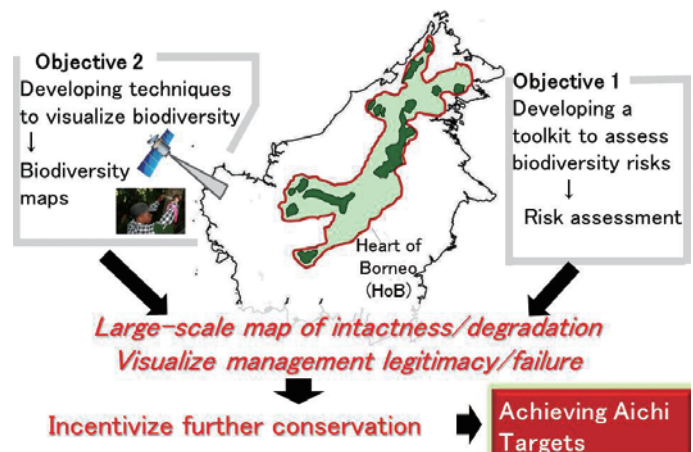
(FY2014-2016)  
Budget in FY2016: JPY 17,416,000

**Kanehiro KITAYAMA**, Kyoto University

<1-1403>

The Convention on Biological Diversity has set forth the Aichi Targets as biodiversity goals for 2020, with sustainable use and conservation of forest ecosystems and biodiversity among the most important goals. Conservation of Southeast-Asian tropical forests is critical to achieving the 2020 goals pertinent to forests because recent forest degradation has been occurring largely in Southeast Asia. In order to achieve the goals, developing adequate institutions and techniques to incentivize the synergy between sustainable use and conservation is essential. In this study, we aim to develop 1) a toolkit to diagnose potential risks to biodiversity in managed tropical forests areas, and 2) techniques to visualize and map the intactness/degradation of biodiversity in large areas of tropical forests. If we can diagnose risks and/or map biodiversity, we can provide managers with adequate suggestions for environmental safeguards. On the other

hand, we can provide wider support to managers if their forests are shown to be sustainable based on biodiversity maps. Our techniques will also be useful for quantitatively assessing progress toward the Aichi Targets.







## Research on Evaluation of Mitigation Strategies to Achieve Long-term Reduction Targets of Greenhouse Gases in Japan and the World

(FY2014-2016)

Budget in FY2016: JPY 52,564,000

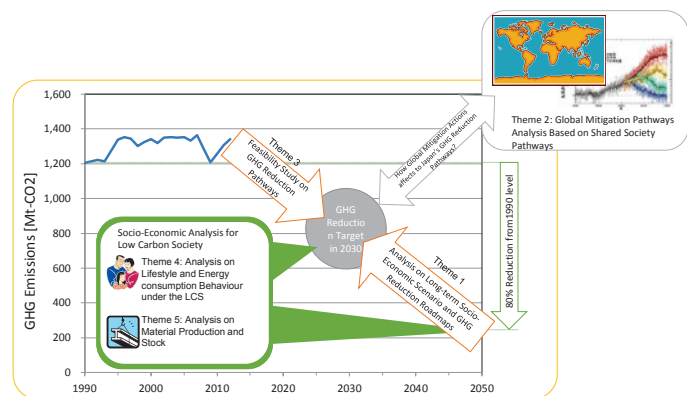
**Shuichi ASHINA**, National Institute for Environmental Studies (cooperation of 3 institutions)

<2-1402>

New low-carbon society scenarios and roadmaps for achieving drastic reduction of greenhouse gas emissions in Japan need to include new viewpoints, such as behavior changes for energy saving, acceleration of renewable energy diffusion, economic growth through low-carbon oriented actions, dematerialization of lifestyles and utilization of material stocks.

This study aims to establish methodology for designing visions/scenarios and implementation strategies for achieving a low-carbon society in Japan by the year 2050 through the use of integrated assessment models. As for new socio-economic scenarios, the study puts emphasis not only on the structure of industry but also on lifestyles, energy consumption behavior and energy-intensive material production and stocks. Through the study, we will propose a concrete strategy for achieving a low-carbon society in Japan by 2050 and determine mid-term (esp.

2030) GHG reduction targets in line with the long-term target of 80% reduction from 1990 levels. We will also propose new growth patterns and innovation strategies for Japan in order to achieve a low-carbon society in Japan.



## Improvement of Methane Emission Estimate from South Asia using GOSAT and Development of an Emission Mitigation Proposal

(FY2015-2017)

Budget in FY2016: JPY 40,904,000

**Sachiko HAYASHIDA**, Nara Women's University (cooperation of 6 institutions)

<2-1502>

Methane (CH<sub>4</sub>) is the second most significant anthropogenic greenhouse gas. From Asia most methane emissions are attributable to ruminant animals and rice fields, but quantitative estimates of methane emissions remain highly uncertain. Thus this project has the following two goals.

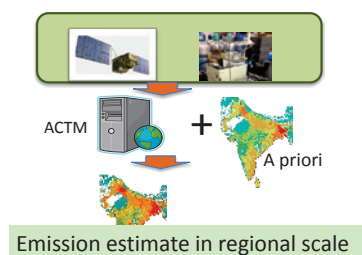
The first is to downscale the emissions estimates from global into regional scales and improve methane emissions estimates from South Asia by using GOSAT and ground-based data. To accomplish this goal, we are now collaborating with many local scientists and farmers to carry out in-situ measurements of methane emissions in India and Bangladesh.

The second goal is to develop emissions mitigation proposals. In this project, we are focusing on methane emissions from rice fields. One approach to reducing methane emissions from rice fields is intermittent draining of water, and another is proper fertilizer management.

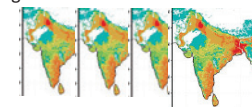
Based on local experimental work on those measures, we will arrange some mitigation scenarios, and input them into an atmospheric transport model to examine whether the results would be realizable or detectable.

Goal 1: Improvement of Methane Emission Estimate from South Asia

Goal 2: Development of Emission Mitigation Proposals



Mitigation scenarios from rice fields



by proper water management and/or fertilizer management

Evaluation: realizable? detectable?



## Development of New Environmentally-safe Technology for a Seismic-resistant Landfill Capable of Withstanding a Massive Earthquake

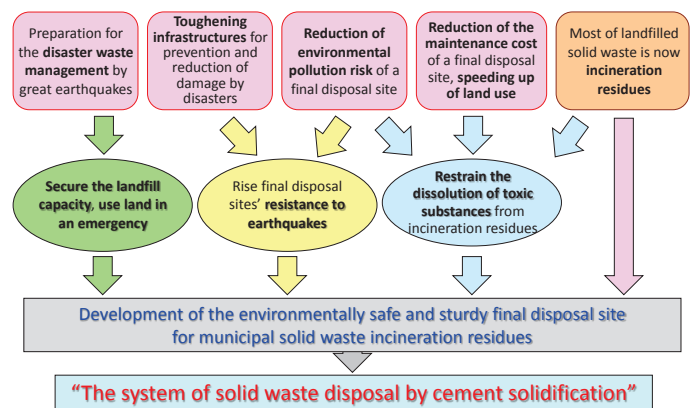
(FY2014-2016)  
Budget in FY2016: JPY 26,497,000

Takayuki SHIMAOKA, Kyushu University (cooperation of 2 institutions)

<3K14001>

In Japan, tougher infrastructure is demanded for withstanding major earthquakes. Recently, most solid waste landfilled at final disposal sites consists of incineration residues. We propose a new, environmentally safe, sturdy final disposal system for incineration residues. In our system, incineration residues are landfilled in the form of a high density cement-solidified body formed by adding cement and applying high frequency vibration, thereby (a) increasing the landfilled ground's resistance to earthquakes, (b) restraining landfill capacity consumption, (c) eliminating rainwater percolation, (d) restraining toxic substance elution, (e) prolonging landfilling periods, (f) reducing costs by shortening the period after landfill closure, (g) promoting early and high-degree use of the land after landfill abandonment, and (h) anticipating land use in disasters. Our study will clarify (1) proper material

composition, (2) material characteristics, (3) durability of the solidified body, (4) feasibility of on-site solidification, and (5) resistance of the solidified ground to major earthquakes.



## Study on Assessment and Technology for Safe Disposal of Mercury Waste

(FY2014-2016)  
Budget in FY2016: JPY 31,145,000

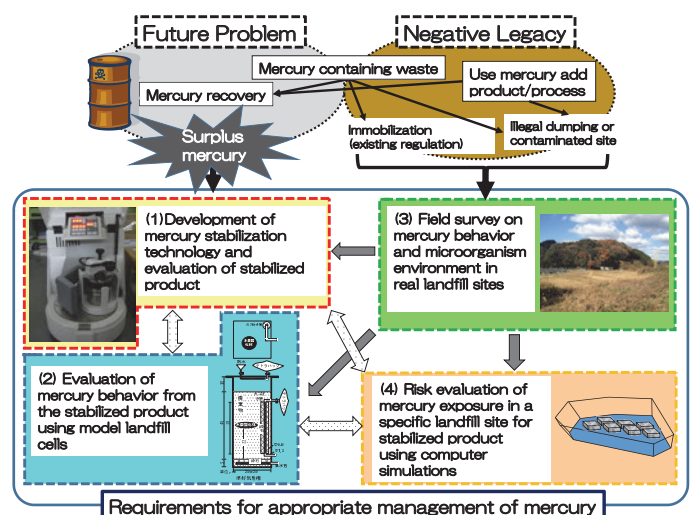
Masaki TAKAOKA, Kyoto University (cooperation of 4 institutions)

<3K143002>

In near future, use of mercury will be extremely limited in response to the adoption of the Minamata Convention on Mercury. Surplus mercury should be treated as a hazardous waste. Therefore it is necessary to manage mercury waste in environmentally sound manners. In Japan, there are no waste salt mines, which are considered primary disposal sites in EU. We are thus obliged to dispose of mercury waste in artificial structures. The purpose of this study is to provide basic scientific information for appropriate mercury management policies for long-term, safe disposal in order to prevent environmental pollution and health damage from mercury disposal.

We investigate the following research themes considering multiple protections: development of mercury stabilization technology and evaluation of the stabilized product; evaluation of mercury behavior in the stabilized product using model landfill cells; field surveys on mercury behavior in real landfill sites and risk evaluation of mercury exposure at a specific landfill site from stabilized products using computer simulations. Finally, we will

integrate the results and clarify the requirements for appropriate management of mercury.





## Development of a Sustainable Network to Support Genetic Diversity in Rare and Endangered Japanese Plant Species through Ex-situ Conservation

(FY2014-2016)

Budget in FY2016: JPY 45,663,000

Hiroaki SETOGUCHI, Kyoto University (cooperation of 3 institutions)

<4-1403>

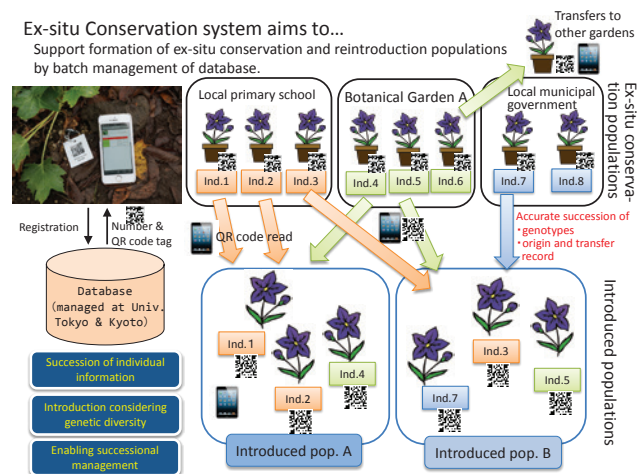
The broad purpose of this study is to investigate a sustainable network for conserving rare and endangered plant species in Japan. This project comprises 1) Collection and propagation of branchlets or seeds from extant populations, living stock at botanical gardens and private residential gardens near natural habitat, 2) DNA barcoding to identify lineage and individual and population genetic structures, 3) input of individual past records into the database, including original habitat and transfer records among botanical gardens or fanciers, and DNA ID profiles, 4) QR-code data management, 5) formation of ex-situ conservation populations with high genetic diversity based on QR-code data management, and finally 6) reintroduction to natural habitat.

One noteworthy merit of this system is “sustainable management” that can trace individual past records and DNA profiles “at a glance” by using smartphones to scan QR-code tags. To promote technical development and demonstration tests, we have constructed a network system to conserve six endangered species in the prefectures of

Fukui, Kyoto, Chiba, Saitama and Kochi and the island of Amami Oshima in Japan. This project will contribute to achieving Strategic Goal C of the Aichi Biodiversity Targets for safe-guarding biological diversity.

Ex-situ Conservation system aims to...

Support formation of ex-situ conservation and reintroduction populations by batch management of database.



## Spatial Prioritization of Protected Areas in East Asian Biodiversity Hotspots: Assessment of Conservation Bias and the Long-term Effectiveness Based on Ecological Big Data

(FY2015-2017)

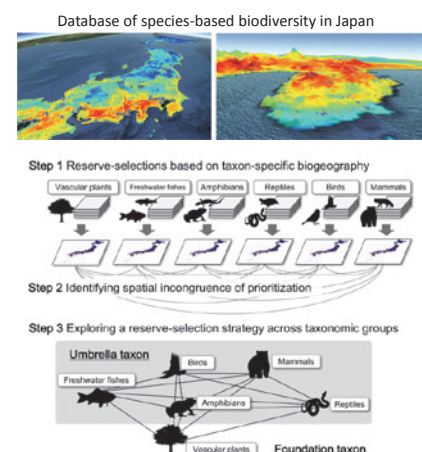
Budget in FY2016: JPY 12,302,000

Yasuhiro KUBOTA, University of the Ryukyus (cooperation of 2 institutions)

<4-1501>

The aim of this project is to propose effective conservation planning of a protected area network that can preserve the origins and maintenance of biodiversity, based on a balance between biodiversity conservation and its socio-economic cost. We will first build a database on distribution of vascular plant and vertebrate species including foundation and umbrella taxa, and assess its representativeness of biodiversity in Japan: how well existing protected areas capture the variables that drive multi-taxon diversity patterns at a regional scale. We will then perform a spatial prioritization analysis, based on using a zonation reserve-ranking algorithm, and test the spatial incongruity of priority rankings between taxa. We will finally explore priority areas for developing a consistent conservation network across taxonomic groups with different biogeographical processes or conservation weights. Ultimately, by understanding taxon-specific biogeographical patterns and the effects of subjective

taxon weighting in the surrogacy approach, we will demonstrate the importance of hierarchical spatial prioritization based on multi-taxon biodiversity. This study will provide a fundamental basis for implementing conservation actions and achieving the Aichi Targets for retaining the ecological and evolutionary potentials of Japan's endemic biota.





## Study on Global Multimedia Fate and Bioaccumulation to Marine Organisms of Mercury

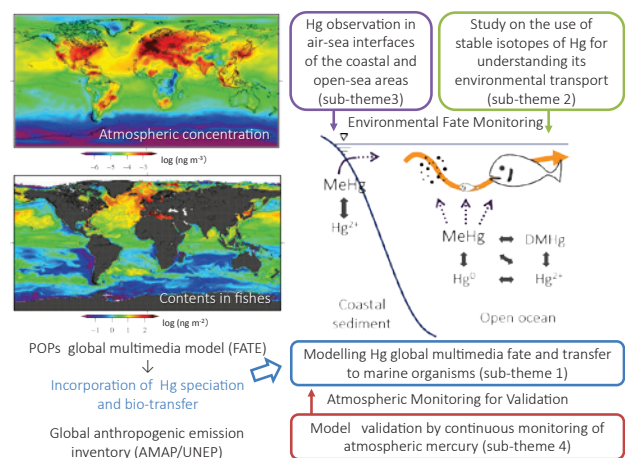
(FY2014-2016)  
Budget in FY2016: JPY 37,860,000

Noriyuki SUZUKI, National Institute for Environmental Studies (cooperation of 3 institutions)

<5-1405>

Under the Minamata Convention on Mercury, we need to reduce anthropogenic emissions of mercury comprehensively. Public exposure to mercury may occur through consumption of ocean fishes, to which mercury from anthropogenic sources is transported via multimedia environments, such as air, ocean, terrestrial surfaces, sediments and aquatic organisms. Chemical species of mercury changes between elemental, oxidized and organic forms during the processes above. A new global multimedia model for mercury needs to be established so that we can better understand the global fate of mercury by integrating those complex processes. This project aims to develop a model based on a previously established global model for POPs (persistent organic pollutants). An extensive field survey of ocean environments using ultra-trace and isotopic analyses to clarify isotopic fractionation of mercury in fate processes is also conducted in the project, and is expected to provide information for process description and validation of the model. We expect that the

new model will be useful in its effectiveness at evaluating of the Convention, giving a methodology for simulating the possible impact of reducing mercury emissions at a global scale.



## Association of Child Development and ADHD with Prenatal and Postnatal Exposures to Environmental Chemicals

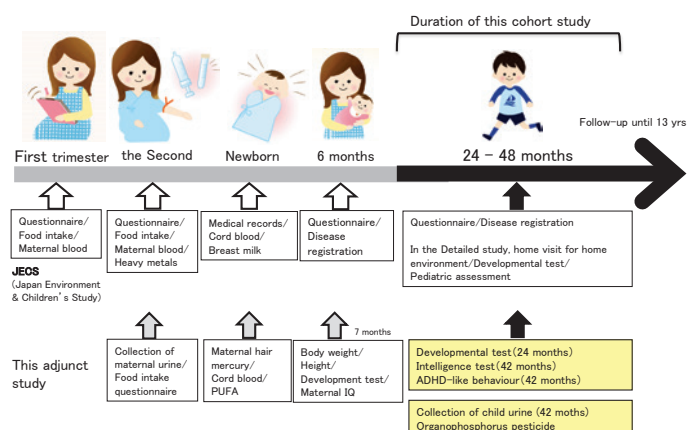
(FY2014-2016)  
Budget in FY2016: JPY 38,217,000

Kunihiko NAKAI, Tohoku University (cooperation with 2 institutions)

<5-1451>

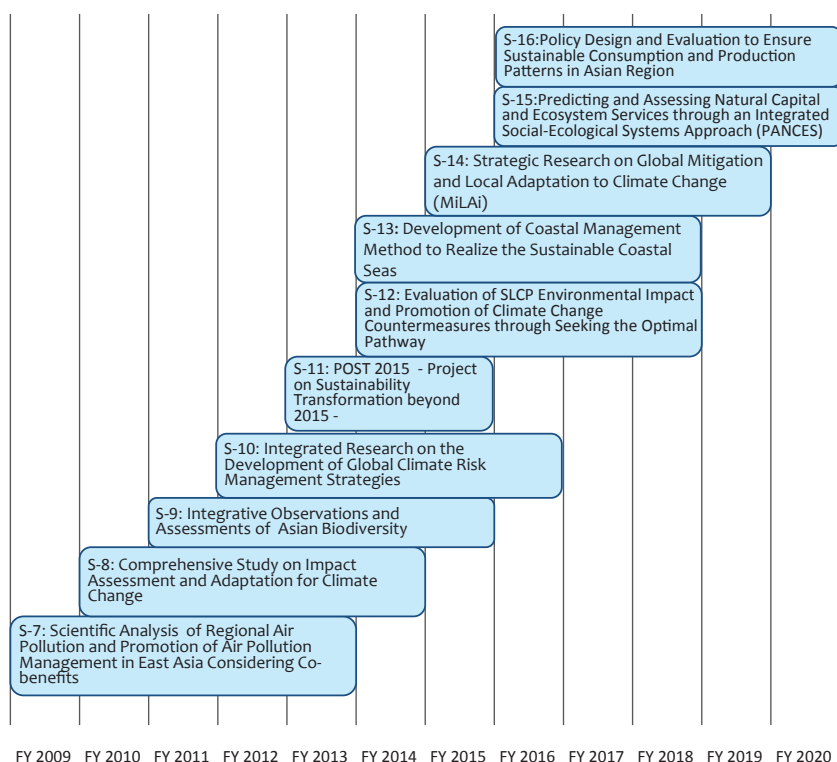
Growing evidence suggests an association between perinatal and postnatal exposures to chemicals and adverse effects on neurobehavioral development and attention-deficit/hyperactivity disorder-like behaviors in children. Therefore it is necessary to examine this possibility in Japanese children. For this purpose, we have designed a birth cohort study by participating in the Japan Environment & Children's Study (JECS) as an adjunct study. JECS is an ongoing large national prospective cohort study from early pregnancy up to the day the child reaches 13 years of age, evaluating the impact of various environmental factors on child health and development. In addition to JECS, we have established an objective observation method to measure ADHD-like behavior with the cooperation of kindergarten and nursery schools. Chemical exposures determined in this study include

organophosphorus pesticides, lead, methylmercury and others. Identifying environmental factors which may affect behavioral problems in children will enable a variety of preventive policies to be adopted in the future.





## Strategic Research and Development Area – Projects and Research terms -



## List of Research Projects Conducted in FY2016

Project Code / Research Title

### Strategic Research and Development Area total 6 research projects

- S-10 / Integrated Research on the Development of Global Climate Risk Management Strategies
- S-12 / Evaluation of SLCP Environmental Impact and Promotion of Climate Change Countermeasures through Seeking the Optimal Pathway
- S-13 / Development of Coastal Management Method to Realize the Sustainable Coastal Sea
- S-14 / Strategic Research on Global Mitigation and Local Adaptation to Climate Change (MiLAi)
- S-15 / Predicting and Assessing Natural Capital and Ecosystem Services through an Integrated Social-Ecological Systems Approach (PANCES)
- S-16 / Policy Design and Evaluation to Ensure Sustainable Consumption and Production Patterns in Asian Region

### Common to All Fields / Cross-sectional through Different Fields total 16 research projects

- 1-1401 / Development of Ecosystem Assessment Methods in Offsets for Biodiversity and Ecosystem Services
- 1-1402 / Next-generation Material Stock that Realize the Full Potential of Resources
- 1-1403 / Developing Visualization Techniques of Biodiversity to Harmoniously Achieve Aichi Biodiversity Targets
- 1-1404 / Development of Simplified Dry Methane Fermentation Process for Livestock Wastewater Treatment and Effective Utilization of Dry Methane Fermentation Residue
- 1-1405 / Development of Satellite Remote Sensing Methods for Broad Scale Estimation and Monitoring of Biodiversity
- 1-1406 / A Study of Science and Technology Literacy of Public for Consensus Building on Environmental Policy Making
- 1-1407 / Study on the Blue Carbon derived from Short-lived Species and Their Ecosystems in a Coastal Secondary-natural Landscape "Satoumi"

- 1-1501 / Risk Governance through the Cooperation of a Risk Evaluation Technology and the Institutional System
- 1-1502 / Development of the Platform on Energy Demand Structure and Forecasts in Asian Residential and Commercial Sector
- 1RF-1503 / Development of Low-carbon Scenarios for Transition of Regional Energy Systems based on Socio-economic Analyses
- 1-1601 / Development of Models for Resource Use and Waste Management and Evaluation of Effectiveness of Policies towards a Sound Material-cycle Society
- 1-1602 / Development of Aquatic Ecosystems Monitoring System that Seamlessly Connects Field Investigation and Robot, Sensor and Communication Technology
- 1-1603 / Integrated Approach for Dissemination of Decentralized Domestic Wastewater Treatment System in Southeast Asia
- 1-1604 / Development of Innovative Resource Recycling System Using the Functions of Black Soldier Fly (*Hermetia illucens*)
- 1RF-1601 / Development of Biomimetic and Biomass-recycling Antifouling Material
- 1RF-1602 / Practical Application of Multi-channel Radioactivity Depth Distribution Measuring System and Establishment of Its In-situ Measurement Technique

### Low Carbon Field total 19 research projects

- 2-1401 / Integrated Observation and Analysis System for Early Detection of Carbon Cycle Change Globally and in Asia-Pacific Region
- 2-1402 / Research on Evaluation of Mitigation Strategies to Achieve Long-term Reduction Targets of Greenhouse Gases in Japan and the World
- 2-1403 / Comprehensive Estimates of Black Carbon Radiative Forcing Leading to Global Warming
- 2-1404 / Planning and Evaluation Model for Green Growth Centers based on Spatial Inventory Analysis

2-1405 / Prediction of Climate Variability with a Focus on Newly Discovered Modes, and its Application  
 2-1501 / Study on Indicators to Assess Progress of Climate Change Policies at National Level  
 2-1502 / Improvement of Methane Emission Estimate from South Asia Using GOSAT and Development of an Emission Mitigation Proposal  
 2-1503 / Studies on Possible Changes of Climate and Precipitation Systems in East Asia and around Japan Associated with the Global Warming  
 2-1504 / Development of the Regional-scale Assessment System of Carbon Dynamics in Bornean Peat Ecosystems  
 2-1505 / Impacts of Short-Lived Climate Pollutants from Asia on the Arctic Climate and Environment  
 2-1506 / Improving Database of Historical Ocean Subsurface Temperature Observations and its Climatological Evaluation  
 2RF-1501 / Evaluating Impact Assessment of Forest Disaster Using Terrestrial Laser Scanner  
 2RF-1502 / Development of Urban Form Model and its Planning Theory for Eco-Livable City  
 2-1601 / Evaluation Study on the Soil Carbon Changes through the Land Use Changes between Forest Land and Cropland and its Application to GHG Inventory  
 2-1602 / Asian Precipitation — Highly-Resolved Observational Data Integration Towards Evaluation (APHRODITE) of the Extreme Events  
 2-1603 / Comprehensive Research on Carbon Capture and Storage Legal Framework, Policy and Strategy  
 2-1604 / Global warming impacts on thermohaline circulation and subsequent biogeochemical change in the Japan Sea  
 2-1605 / Assessing and Projecting Greenhouse Gas Release from Large-scale Permafrost Degradation  
 2RF-1601 / Development of the Comprehensive Simulation Model of Sun-Induced Fluorescence for Estimating the Ecosystem-level Photosynthesis

### Sound Material-cycle Field

**total 44 research projects**

3K143001 / Development of New Environmentally-safe Technology for a Seismic-resistant Landfill Capable of Withstanding a Massive Earthquake  
 3K143002 / Study on Assessment and Technology for Safe Disposal of Mercury Waste  
 3K143003 / Investigation of Separation System of Indium and Gallium in Urban Mine  
 3K143005 / Selective Leaching of Rare Earth Elements from Neodymium Magnet Using Molten Salt Electrolysis  
 3K143006 / Energy Recovery in Collaborating with Venous Infrastructures through Changes in Future Society and Technology  
 3K143007 / Strategic Optimization of Incineration Residues in Recovery and Disposal Focusing on Behaviors of Valuable and Toxic Metals  
 3K143008 / Development of Recycle System of Rare Earths from Neodymium Magnet Scrap  
 3K143009 / Study on the Final Disposal Method mainly using Thermal Treatment of the Wastes Polluted with Radioactive Cs and Sr  
 3K143010 / Evaluation of the E-waste/ELV Generation and the Systems of Metals/Fluorocarbons Collections in Asian Countries  
 3K143011 / Development and Study on the Room-temperature Decomposition and Reuse of Asbestos involved in Construction Materials Wasted in Large Quantities  
 3K143012 / Clay Chemistry Approach for Volume Reduction of Radioactively Contaminated Soil  
 3K143013 / The Basic Research for the Recycle Technology for the Creation of the High-performance and High Durability Recycling Plastic  
 3K143014 / Development of Novel Extractants for Rare Metals and Highly-Efficient Metal Recycling Processes  
 3K143015 / Studies on Estimating the Earthquake Damage of Human-made and Natural Capital Stock with Evaluation of Countermeasures  
 3K143016 / A Study on Cost-Effective Energy and Resource Recovery Systems from Municipal Solid Wastes  
 3J143002 / Development of Practical Machine for Separating the Metal-Plastic Bindings and Promotion of Recycling of the Separated Materials  
 3K153001 / Waste Prevention - System Analysis and Application  
 3K153002 / Study on Sustainability Assessment and Strategy for Improvement of Solid Waste Management System

3K153003 / Estimation of Substance Flows and Environmental Emissions of Chemicals Associated with Waste Incineration  
 3K153004 / Proposal of Disposal Standard for Long-term Environmentally-Sound Management of Mercury Waste  
 3K152005 / Evaluation of Organic Carbon Content in Recovered Soil Materials Derived from Disaster Waste  
 3K153006 / Application of Used Reverse Osmosis Membrane to Reclamation of Industrial Wastewater in Emerging Countries  
 3K152007 / How Should the Carcasses of Specified Wildlife be left at Hunting Sites?  
 3K153008 / Assessment of Sustainable Adaptation Measures to Manage Disaster Waste from Great Earthquake against Related Social Risks  
 3K153009 / Organization of Comminution and Separation Technologies for More Efficient Recycling System  
 3K153010 / Development of Anhydride-modified Resins Using the Properties of Recycled Plastic Containers and Packaging  
 3K153011 / A Trash Bin as a Gateway of Used Products to Waste Management System: Serviceability Analysis and Design Effect on Waste Disposal Behaviors  
 3K153012 / Development of a Dry Process for Refining Gallium Compound from Used LED Devices  
 3K152013 / Sophisticated Recycling System for Lithium-ion Battery  
 3K153014 / Development of Novel Biofuel Production Process and Design Tools for its Sustainable Implementation  
 3K153015 / Study on the Accumulation Mechanism of Cesium in the Amorphous Phase around Mineral Particle in Incineration Bottom Ash and its Application  
 3J153001 / A Study for Reinforced Clinker-free Concrete Elements Comprising By-product Additives and Recycled Cement Produced from Wasted Fresh Ready-mixed Concrete  
 3K163001 / New Assessment Indicators and Indicator Framework for Establishing a Sound Material-Cycle Society  
 3K162002 / Development of Processes for Efficient Biogas Production from Organic Wastes by Induction of Electric Syntrophy  
 3K163003 / Development of the Utilization System for Captured Animals "Wild boar and Sika deer" by Appropriate and Efficient Processing  
 3K162004 / Selective Fragmentation of Photovoltaic Panels by High Voltage Pulse and Subsequent Physical Separation  
 3K163005 / Study on the Environmentally Sound Management of Wastes Containing Newly Listed POPs  
 3K163006 / Development of Quantitative Estimation Procedure for Disaster Debris in the Catastrophic Disasters in Collaboration with Disaster Prevention Research  
 3K163007 / Development of New Treatment Technology for Exhaust Gas Generated by Waste Incineration using Carbonate Type Mg-Al Layered Double Hydroxides  
 3K162008 / Development of a Novel Recycling System for Precious Metals and Rare Metals Using Organic Aqua Regius  
 3K163009 / Study on Policy, Consciousness and Behavior to Improve the Effectiveness, Safety and Reliability of Disaster Waste Management  
 3K163010 / Development of PGM Recycling Processes without Emissions of Toxic Substances Including Nitrate-Nitrogen  
 3K163011 / Large-scale Disaster Waste Treatment and Management System considering Disaster and Region Characteristics  
 3K162012 / Establishment of Appropriate and Efficient Disposal System for Captured Wildlife

### Harmony with Nature Field

**total 24 research projects**

4-1401 / The Countermeasure Development for Intensive Control of Invasive Alien Species  
 4-1402 / Integrated Approach for In-situ and Ex-situ Conservation of Threatened Species in the Ogasawara Islands  
 4-1403 / Development of a Sustainable Network to Support Genetic Diversity in Rare and Endangered Japanese Plant species through Ex-situ Conservation  
 4-1404 / Assessment of Criteria and Indicators for Securing the Co-benefits of Local Community in Developing Countries  
 4-1405 / Strategy and Tactics for Management of Hyper-abundant Deer in Kushiro Wetland  
 4-1406 / Novel Lake Ecosystem Management by Sustainable Harvesting and Effective Utilization of Aquatic Weed Biomass

- 4-1407 / Developing Tools for Evaluation, Planning, Management and Consensus Building in Protected Areas as Cores for Sustainable Local Communities
- 4-1408 / Development of a New Method for Extermination Invasive Foreign Fish Based on Infertility Using Gene Editing Technology
- 4-1409 / Development of an Information Exchange System for Collaborative Management in Nature Reserve Areas: Amami Oshima Island as a Model
- 4RF-1401 / Development of the RAKUEN Index: Evaluating Tourism Impacts in the Ishigaki and Palau Islands
- 4RF-1402 / New Method for Controlling An Invader Animal (Cane Toads) Using Intraspecific Competition
- 4-1501 / Spatial Prioritization of Protected Areas in East Asian Biodiversity Hotspots: Assessment of Conservation Bias and Long-term Effectiveness Based on Ecological Big Data
- 4-1502 / Study on Behavior and Environmental Risk of Microplastics Drifting in Coastal Waters and Open Oceans
- 4-1503 / Development of Techniques for Conservation of Endangered Species and Biodiversity in Forested Areas of Amami and Ryukyu Islands
- 4-1504 / Green Infrastructure in the Depopulated Society under the Climate Change, Evaluated by Biodiversity, Disaster Prevention and Social Acceptance
- 4-1505 / Development of Ecosystem-based Disaster Risk Reduction Methods Based on the Processes of Habitat Loss and Comprehensive Cost-benefit Evaluation Methods
- 4-1506 / Rehabilitation of Ecosystem Services on Degraded Tropical Peat Swamp Forest and Construction of the Implementation System of REDD+ Safeguard
- 4RF-1501 / Examination of Marine Protected Areas Based on the Prediction of Northward Migration of Coral Reef Organisms Using Gene Flow Analysis
- 4-1601 / Conservation planning for SE Asian tropical forests based on assessments of undescribed tree species richness and forest management policies
- 4-1602 / Development and Application of Environmental DNA Methods for the Estimation of Community Composition and Genetic Diversity in Aquatic Systems
- 4-1603 / Development of Bird Sensitivity Mapping for Reducing Bird Collision Risk Caused by Wind Power Mills
- 4-1604 / Studies on Gut Bacteria of Japanese Rock Ptarmigans for Its Potential Use in In-situ and Ex-situ Conservation Protocol
- 4-1605 / Optimum Conservation of Species Designated by the Endangered Species Preservation Act using Information Obtained from Sequencing Breakthrough
- 4-1606 / Studies on Population Management and Habitat Restoration of Socio-Ecological Production Landscapes for the Successful Reintroduction of Crested Ibis.

## Safe and Secure Field

total 39 research projects

- 5-1403 / Characterization and Source Apportionment Studies of PM2.5 Using Organic Marker-based Positive Matrix Factorization
- 5-1404 / Proposals of the Effective Countermeasures against the Attack of Oxygen Depleted Water Mass and Blue Tide to Tidal Flat and Sea Grass Beds Enclosed by Artificial Coastline
- 5-1405 / Study on Global Multimedia Fate and Bioaccumulation to Marine Organisms of Mercury
- 5-1406 / Transformation Products of Neonicotinoid Pesticides and their Ecotoxicity
- 5-1407 / Impact Assessment of Neonicotinoid Insecticides on Terrestrial Insects
- 5-1408 / Improvement of a Simulation Model and Emission Data and Evaluation of the Aerosol Volatilization Characteristic for the Improvement of the Accuracy of PM2.5 Forecast
- 5-1451 / Association of Child Development and ADHD with Prenatal and Postnatal Exposures to Environmental Chemicals
- 5-1452 / Research on Health Effects of Short-term Exposure to PM2.5, Composition, and Asian Dust Particles on Cardiovascular and Respiratory Diseases
- 5-1453 / A Study to Determine the Toxicity of Substances Contained in Asian Dust and PM2.5, and Monitor Their Effect on Health
- 5-1454 / Environmental Chemical Exposure in Early Life and the Neurodevelopment of Children: the Role of Environment, Gene and Epigenome
- 5-1456 / An Epidemiological Study on Effects of Fine Particulate Matter (PM2.5) and Ozone on Respiratory Health in Areas with Different Air Pollution Levels
- 5-1457 / Aggravating Effects of the Combined Air Pollution by Asian Dust and PM2.5 on Lung Inflammation and Allergy Disease, and Elucidation of the Mechanism
- 5RF-1401 / Reaction Mechanism and Source Apportionment of Secondary Aerosol
- 5-1501 / Interdisciplinary Study on Inhalation Exposure and Risk Assessment focusing on Suspended Particles Derived from the Nuclear Accident
- 5-1502 / Development of an Advisory and Assessment System for the Environmental Impacts of Aeolian Dust
- 5-1503 / Development of Onsite Soil Detection Method for 1,4-Dioxane Based on the Environmental Behaviors
- 5-1504 / Development of Low Cost and Energy Efficient Green Advanced Wastewater Treatment System for Small Scale Stockbreeding
- 5-1505 / Development of an Integrated Numerical Method for Prediction and Evaluation of 1,4-Dioxane-contaminated Groundwater Remediation
- 5-1506 / Development of Measurement Method of Semi-volatile Primary Aerosols by Isothermal Dilution at Combustion Sources
- 5-1551 / Biological Monitoring of Insecticide Exposure during Toddler Years as a Critical Period for Brain Development
- 5-1552 / Development of an Endocrine Disruptor Screening System Using Molecular Imprinting Materials and Exact Mass Spectrum
- 5-1553 / Impact of Active and Secondhand Cigarette Smoking of Pregnant Women on the Placental Nutrient Transport Function
- 5-1554 / Effect of Fetal Exposure to Endocrine Disruptor on Sex Differentiation, Gonadal Function and Puberty: Elucidation of Gene-Environment Interaction on Sexual Development
- 5-1555 / Short-Term Health Effects on Infants of Asian Dust: Considering Fossil Fuel Related Air Pollution as an Effect Modifier
- 5-1556 / The Study about a New Evaluation System of the Ecological Effect with Chemicals
- 5-1557 / Estimation of Exposure Factors of Soil, Dust and Personal Care Products for Children and Pregnant Women
- 5-1601 / Establishment of a Reference Modeling for Source Apportionment and Effective Strategy Making to Suppress Secondary Air Pollutants
- 5-1602 / Evaluation and Management of Emerging Chemicals by the Comprehensive Monitoring using Local Networks
- 5-1603 / Development and Application of Novel Microbial Source Tracking Tools for Waterborne Infectious Disease Control
- 5-1604 / Factors Controlling Enhancement of Urban PM2.5 and Development of a Supporting Method for Administrative Monitoring Data
- 5-1605 / Studies on PM2.5 composition, oxidative potential, health hazard and their model prediction
- 5-1606 / Determination of Natural and Anthropogenic Sources for Contaminants in Soils Using Instrumental Analyses and Leaching Tests
- 5-1607 / Evaluation of organic carbon budgets in Lake Biwa for management of water quality and ecosystem
- 5-1651 / Identification of the Factors Responsible for the Health Effects of PM2.5 by Newly Developed Sampling Methods and Exposure Experiments
- 5-1652 / Determination of Exposure Source of Persistent Organic Pollutants (POPs) in Japanese Cohort Studies: Using Rapid and Simultaneous Analysis of POPs in Human Serum
- 5-1653 / Study on the Management of Anthropogenic Chemicals with the Consideration of Their Transformation Processes
- 5-1654 / Assessment of the Exposure and Effects of Antibacterial Substances such as Paraben and Triclosan on Allergy in Infants
- 5RF-1601 / Comprehensive Molecular Identification of COD Composition in Lake by High Resolution Mass Spectrometry
- 5RF-1602 / Development of the differentiation methods for natural and anthropogenic source of chromium (VI) based on the elution rates

## Information on calls for proposals

### Schedule

The schedule and arrangements are announced on the ERTDF website, as well as on environmental and scientific websites. A call for applications is announced in around October. Applications are accepted with a deadline of mid-November.

### Application Procedures

All necessary application forms for proposals can be downloaded from the ERTDF website. The proposals are accepted through the Cross-ministerial R&D Management System (e-Rad).

### Selection of Research Projects

After the application forms have been checked, the Planning Committee for Environment Research and its subcommittees, composed of outside specialists, will evaluate the proposed research projects. First, the proposals will be narrowed down in an initial screening of the written description. The remaining proposals will then be evaluated for final selection on the basis of interviews. Notification of approved proposals will be made every March. The results of the evaluation will include comments on the proposals and will be sent to the applicants after the selections have been made.

## Inquiries

### Ministry of the Environment, Government of Japan

- General inquiries, Common to All Fields / Cross-sectional through Different Fields, Safe and Secure Field  
**Environmental Policy Bureau**  
**Office of Environmental Research and Technology**
- Safe and Secure Field (Health risks)  
**Environmental Health Department**  
**Environmental Risk Assessment Office**
- Low Carbon Field, Harmony with Nature Field  
**Global Environment Bureau**  
**Research and Information Office**
- Sound Material-cycle Field  
**Waste Management and Recycling Department**  
**Waste Management Division**

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