

ENVIRONMENT RESEARCH AND TECHNOLOGY DEVELOPMENT FUND FY2015



What is the Environment Research and Technology Development Fund?

■ Objective

To contribute to 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 for allocating its research budget in order to support appropriate progress in those research projects.

■ Research Fields

In fiscal 2013, the seven former research fields were 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 June 2010).

• **Common to all fields / Cross-sectional through different fields**

- Research related to an ideal society (sustainable society) under a long-term 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 society**

- 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 society**

- 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

• **Society in harmony with nature**

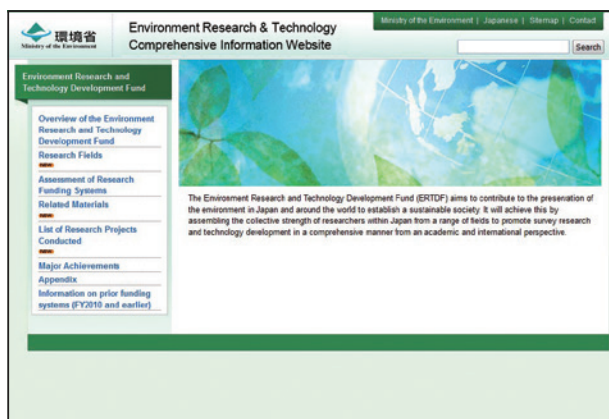
- Protecting biodiversity
- Sustainably securing and using national land, water and other natural resources
- Other related measures

• **Safe and secure society**

- 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 CO₂ 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**

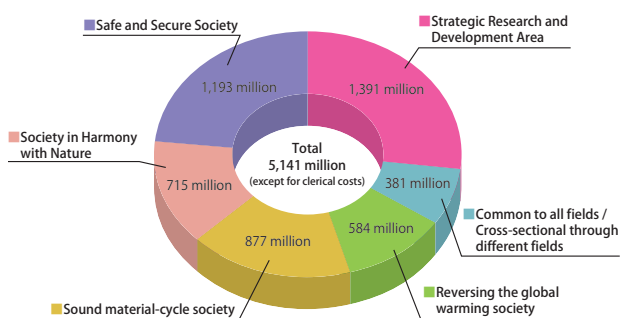
The ERTDF originated through the integration of three competitive research funds, the Global Environmental Research Fund (GERF), the Environment Technology Development Fund (ETDF) and the Grant-in-Aid for Scientific Research about Establishing a Sound Material-cycle Society.

In fiscal 2012, a Rehabilitation Adoption budget was established, in addition to the General Adoption budget of the ERTDF funded by the general account. The former was funded from a special account for Great East Japan Earthquake Rehabilitation, and solicited 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 the disaster areas. The term for research funded through this special account concluded in fiscal 2014.

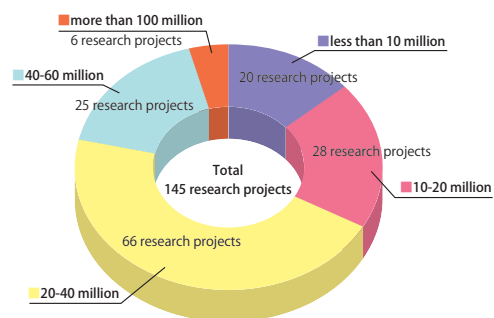
■ **Number of Research Projects Underway under the Fiscal 2015 Budget**

Under the General Adoption budget, a new strategic project in the Strategic Research and Development Area has been launched along with 49 new research projects in the Environmental Problem Research Area. Thus research projects conducted in fiscal 2015 comprised six strategic projects and 139 research projects.

Research Projects Conducted in Fiscal 2015



Budget allocated for research fields (unit: yen)



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



Integrative Observations and Assessments of Asian Biodiversity

(Period I: FY2011-2013)

(Period II: FY2014-2015)

Budget in FY2015: JPY 286,258,000

Tetsukazu YAHARA, Kyushu University (cooperation of 19 institutions)

<S-9>

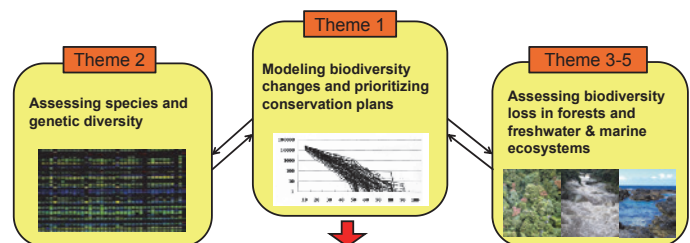
In this project, we are conducting an integrative observation of species together with genetic diversity and biodiversity of forest, freshwater and marine ecosystems; and we are assessing where, how and how much biodiversity is being lost in Asia.

Our specific tasks are as follows:

- Developing methods and models to quantify the rate of biodiversity loss in Asia.
- Exploring methodologies to assess biodiversity loss from time-series data.
- Developing a database of ground-based observations in the Asia-Pacific area so as to enable assessment of biodiversity loss at the Asia-Pacific regional scale.
- Modeling the relationship between species richness and ecosystem functions/services.
- Designing conservation plans by prioritizing terrestrial and marine candidate areas for protection.

By resolving these issues, we will provide a scientific

basis for developing and prioritizing policies effective at reducing biodiversity loss. We also expect that the results of this project will contribute to global efforts toward biodiversity assessment and national efforts to revise Japan's biodiversity strategy and outlook.



Integrative Observations and Assessments of Asian Biodiversity

Integrated Research on the Development of Global Climate Risk Management Strategies

(Period I: FY2012~2014)

(Period II: FY2015~2016)

Budget in FY2015: JPY 271,083,000

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

<S-10>

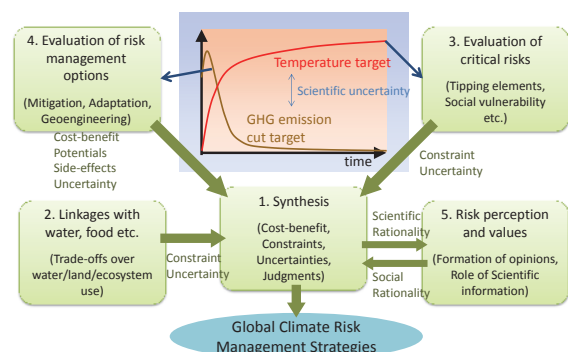
In this study, we adopt a risk management approach to tackle the long-term global aspects of climate change issues and explore them as one way of decision-making at the human level.

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.





POST 2015 - Project On Sustainability Transformation beyond 2015 -

(Period: FY2009-2011)
Budget in FY2015: JPY 208,500,000

Norichika KANIE, Keio University (cooperation of 12 institutions)

<S-11>

The UN Summit in September 2015 will adopt a post-2015 development agenda that includes a set of Sustainable Development Goals (SDGs). The SDGs will address environmental, social and economic dimensions of sustainable development effectively in an integrated manner, to ensure the Earth's life-support system.

Whereas the short-term goal of the present project is to make a scientific contribution to the discussion of the SDGs, it ultimately aims to propose policy recommendations and frameworks for a transformation of human behaviour towards sustainability. The project will achieve this via following five means:

1. Making a scientific contribution to the discussion on the post-2015 development agenda
2. Promoting trans-disciplinary research hinged upon the SDGs

3. Establishing a trans-disciplinary community that promotes research collaboration between development studies and environment studies and across the borders between science and policy
4. Becoming a centre of excellence for international research collaboration on the SDGs
5. Making scholarly contributions to domestic and international debates on transformation for sustainability



Evaluation of SCLP Environmental Impact and Promotion of Climate Change Countermeasures through Seeking the Optimal Pathway

(Period I: FY2014-2016)
(Period II: FY2017-2018)
Budget in FY2015: JPY 190,000,000

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

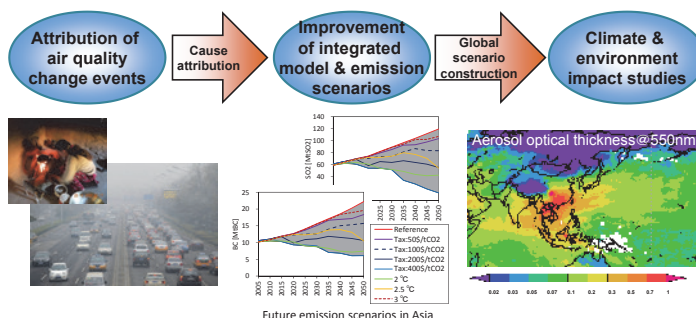
<S-12>

Air pollution is a serious global problem, especially in Asia. Development of countermeasures is a pressing issue for society to promote. Air pollutants include black carbon, tropospheric ozone, methane, hydrofluorocarbons (HFCs) and other components which warm the earth's system, accelerating global warming, and are called SCLPs (Short-lived Climate Pollutants). Reduction of SCLPs 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 SCLPs resulting from their complex characteristics and distributions.

This project aims at reducing the uncertainty of SCLP impact estimates through the following activities for seeking optimum SCLP 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 SCLP impact study and seeking the reduction path ways



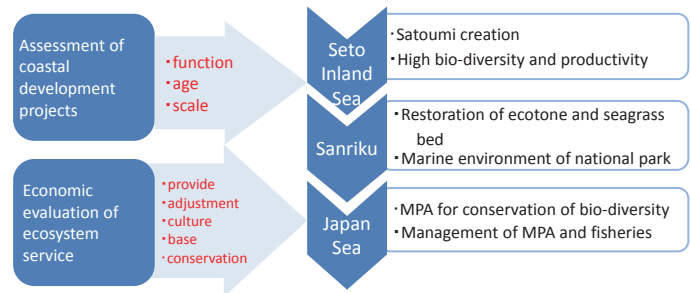
Development of Coastal Management Method to Realize the Sustainable Coastal Sea

(Period I: FY2014~2016)
 (Period II: FY2017~2018)
 Budget in FY2015: JPY 142,498,000

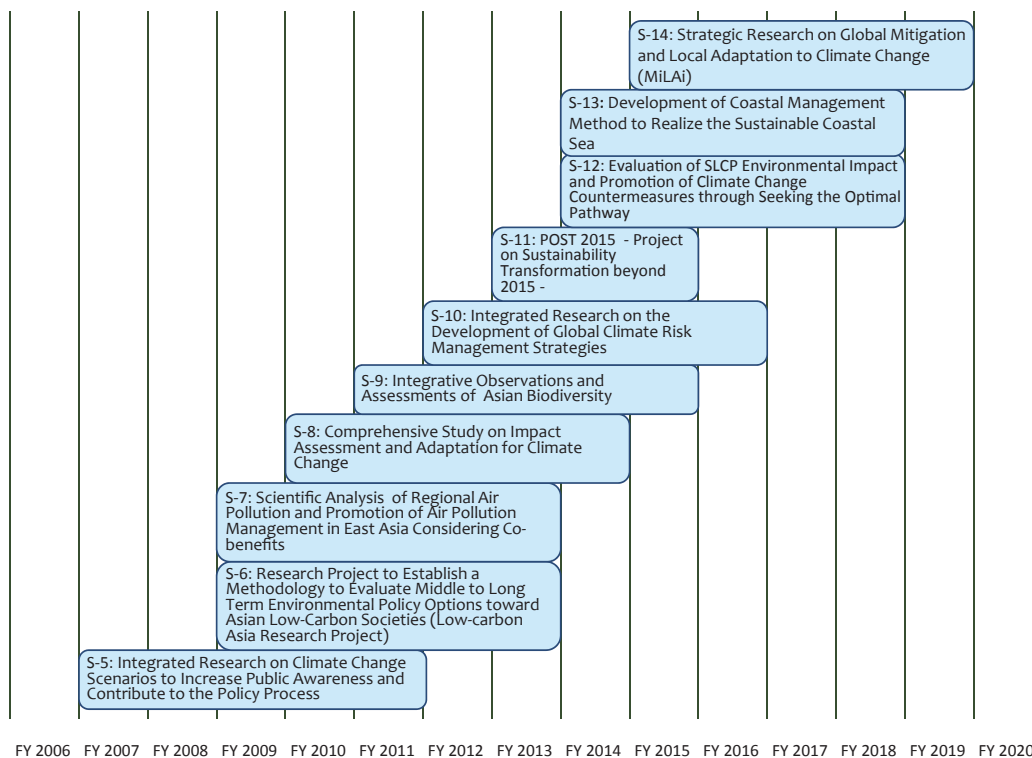
Tetsuo YANAGI, International EMECS Center (cooperation of 14 institutions)

<S-13>

The establishment of marine protected areas (MPAs) is included in the Aichi Biodiversity Targets. The environmental administration, however, has been slow to act in this regard. This study will involve a comprehensive examination of natural and human activity in coastal seas and the land areas that constitute their hinterlands in order to determine how these areas should be changed 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 for the environmental management of coastal seas using the following as model areas must be established.



Strategic Research and Development Area – Projects and Research terms -





Strategic Research on Global Mitigation and Local Adaptation to Climate Change (MiLAI)

(Period I: FY2015-2017)
(Period II: FY2018-2019)
Budget in FY2015: JPY 292,279,000

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

<S-14>

According to the Fifth Assessment Report (AR5) of the Intergovernmental Panel on Climate Change (IPCC), warming of the climate system is unequivocal and many of the observed changes are unprecedented over decades to millennia. Therefore, research on the mechanisms, impacts of climate change and effects of adaptation to climate change is progressing.

This study will assess quantitatively how effectively and efficiently climate change issues can be solved in carrying out measures to construct a sustainable society, with a delicate balance between mitigation and adaptation with limited economic and human resources. It will also contribute to development of climate change policies for risk management.

Our Strategic Research Project (S-14) focuses on five interconnected research themes:

Theme 1: Comprehensive and Strategic Assessment

- The results from all themes under S-14 will be integrated under Theme 1.
- The impacts of mitigation and adaptation to climate change will be revealed by endpoint indicators such as human health and biodiversity using lifecycle assessment.
- A cost-benefit analysis method for mitigation and adaptation utilizing metrics, such as subjective wellbeing and disability-adjusted life years, will be developed.

Theme 2: Integrated Approach for Ecosystem-based Mitigation and Adaptation to Climate Change

- Prediction of future changes in ecosystem services will be investigated under scenarios of various policies.
- Co-benefit or trade-off relationships between global

mitigation and local adaptation measures will be investigated.

Theme 3: Global Cost-benefit Analysis of Climate Change Adaptation

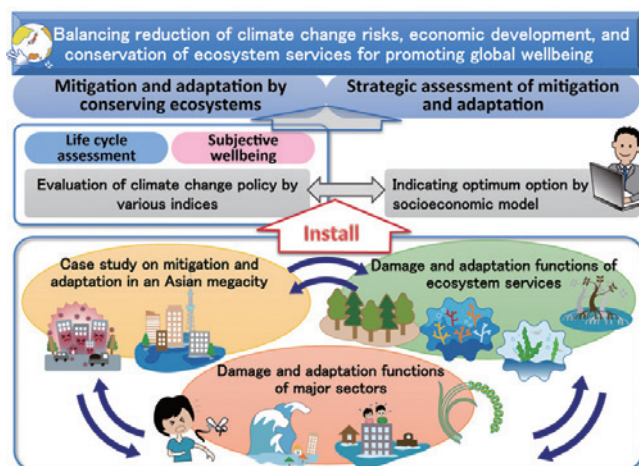
- The effects, costs and benefits of climate change adaptation at the global scale will be evaluated with a focus on water-related disasters, crop production, health/hygiene and coastal disasters.

Theme 4: Case Study on Mitigation and Local Adaptation to Climate Change in an Asian Megacity, Jakarta

- Under this theme a case study will be conducted on mitigation and local adaptation to climate change in an Asian megacity. The expected contributions of this theme will be (1) the establishment of a general methodology for a mixture of mitigation and adaptation for all developing countries and (2) local validation of the global assessments targeted throughout S-14.

Theme 5: Research on Development of an Integrated Assessment Model Incorporating Global-Scale Climate Change Mitigation and Adaptation

- Theme 5 will assess the costs of impacts and adaptation options consistent with global GHG (greenhouse gas) emissions, and suggest an optimal climate policy of mitigation and adaptation. Research will be carried out using a computable general equilibrium model for estimating the following costs: (1) the costs of reducing GHG emissions, (2) the damages from climate change, and (3) the costs of adaptation options.





Common to all fields / Cross-sectional through different fields



Development of LCA Database and Educational Materials about Daily Behaviors aiming for Common Platform Provision

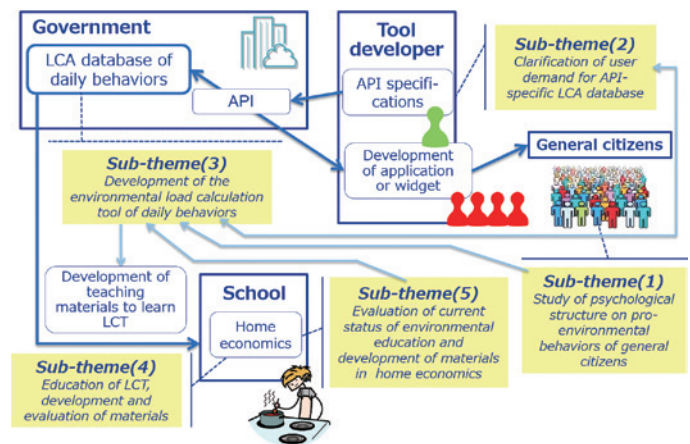
(FY2013-2015)
Budget in FY2015: JPY 24,771,000

Keisuke HANAKI, The University of Tokyo (cooperation of four institutions)

<1-1302>

In order to reduce environmental impacts, it is necessary to promote Life Cycle Thinking (LCT) among citizens. LCT is a mode of thought for reducing impacts from the overall point of view of Life Cycle Assessment (LCA), which is a method of assessing environmental impacts associated with all stages of a product's life (e.g., raw material extraction, manufacturing, use and disposal/recycling). In this study, under the five sub-themes shown in the figure, we have surveyed people's environmental awareness in daily behaviors and are establishing a database of environmental impacts associated with various daily behaviors in preparation for an API-specific dataset (API: Application Programming Interface). This will enable the development of attractive mobile applications for motivating adults to improve their environmental consciousness and behavior. Furthermore, from a long-term standpoint, we also target students and develop teaching materials that incorporate LCT into home economics, a field with strong ties to

everyday life. In addition to individual tool development, we aim to establish a foundation for platforms to make LCT familiar to society by providing this dataset widely to application developers.



Development of Ecosystem Assessment Methods in Offsets for Biodiversity and Ecosystem Services

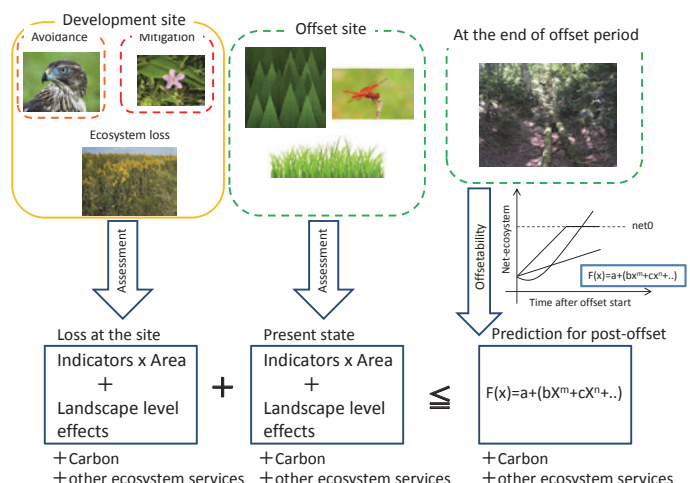
(FY2014-2016)
Budget in FY2015: JPY 50,803,000

Kimiko OKABE, Forestry and Forest Products Research Institute (cooperation of three institutions)

<1-1401>

Biodiversity offsets comprise a system used to compensate for the full impacts associated with economic development and are expected to help achieve the Aichi Targets of the Convention on Biological Diversity, including targets 3 (positive incentives for conservation and sustainable use of biodiversity), 4 (business and stakeholders at all levels take steps to achieve or have implemented plans for sustainable production and consumption), and 5 (rate of loss of all natural habitats halved toward a goal of zero). We propose a new Japanese biodiversity offset that enhances no net-loss carbon storage and other ecosystem services. In this study, we investigate 1) scientific approaches to assessing avoidance, sites and kinds of biodiversity offsets for development and offset sites, 2) tradeoffs and synergy between carbon and conservation of biodiversity, 3) other ecosystem services as an added value, and 4) the challenges for existing biodiversity offsets to developing an

environmental assessment method using indicators such as species and landscape effects for the Japanese system.





Analysis of CO₂ Reduction Extent, Cost and Optimal Policy for the Effective Co-generation System Networked by Power Grids

(FY2013-2015)
Budget in FY2015: JPY 24,549,000

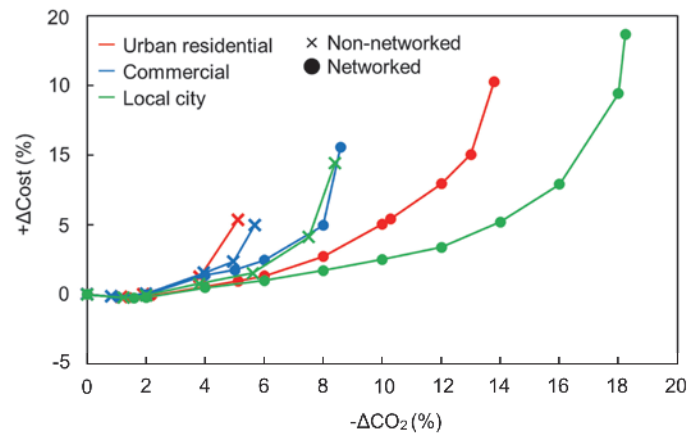
Takemi CHIKAHISA, Hokkaido University

<2-1301>

The installation of CHPs (combined heat and power; also called co-generation) in cold regions is one of the most effective strategies for reducing CO₂ emissions. In general, CHPs are installed independently in buildings. Reverse power flow of surplus electricity to the grid, however, plays a significant role in the effective operation of CHPs. The project proposes a CHP system networked by power grids; *i.e.*, micro CHPs installed in consumer buildings connected to the grid, which are coordinated by a control center. The advantage of this system is the effective utilization of the existing power grid and gas pipes. In this study, analyses are made to clarify the CO₂ reduction effect of networked CHPs compared to conventional non-networked CHPs and to identify business merits for energy companies and customers. The final goal will be to propose effective policies for actualizing the system.

The figure shows one of the results indicating the

effectiveness of networked CHPs for CO₂ and cost reduction in three typical regions.



An example demonstrating the effect of networking CHP system

Integrated Observation and Analysis System for Early Detection of Carbon Cycle Change Globally and in Asia-Pacific Region

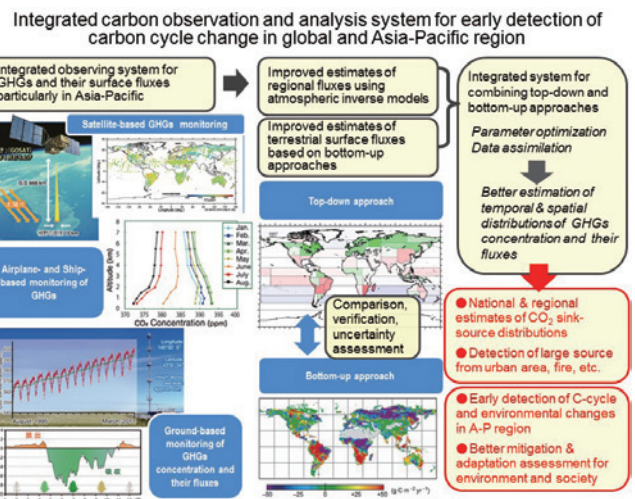
(FY2014-2016)
Budget in FY2015: JPY 59,102,000

Nobuko SAIGUSA, National Institute for Environmental Studies (cooperation of three institutions)

<2-1401>

The number of observational platforms for monitoring atmospheric carbon dioxide such as satellites, aircrafts, ships and ground stations has been increasing. Due to lack of measurement accuracy or observational "blank areas" in time and space, however, high uncertainty remains in carbon budget estimations. The purposes of our study are to produce our best estimations of carbon budgets, to detect carbon cycle changes that might be appearing globally and in the Asia-Pacific under climate change, and to provide scientific knowledge in a timely manner for developing mitigation and adaptation policies. We are developing an integrated carbon observation and analysis system based on satellite, airborne and ground-based observations, along with atmospheric and terrestrial carbon cycle models. Atmospheric transport modeling, inverse modeling and assimilation methods are being tested and improved for better utilization of reinforced observation data from the Asia-Pacific region. Regional net carbon fluxes between the atmosphere and land are estimated by both "top-down" approaches (with inverse models) and "bottom-up" approaches (with surface flux observation network data

and terrestrial ecosystem models). Results from different methods are being examined to improve the accuracy of our estimates.





Soils Recovered from Disaster Debris – Characterization, Standardization and Strategic Utilization

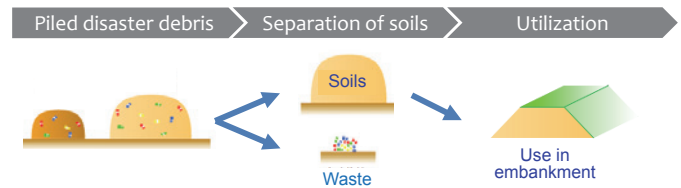
(FY2013-2015)
Budget in FY2015: JPY 11,115,000

Takeshi KATSUMI, Kyoto University (cooperation of fifteen institutions)

<3K133003>

Utilization of soils recovered from disaster debris as geomaterials has been strongly desirable after the 2011 Tohoku earthquake and tsunami, because the soil fraction accounted for a third of the approximately 30 million-ton disaster debris and tsunami deposits. Soils recovered after treatment, however, generally contain a considerable fraction of small wood pieces derived from wooden waste. As future deterioration of such wood in recovered soil may have a negative effect on the geotechnical behavior of the ground, this study seeks to reveal material properties of recovered soils and to establish specific test methods to assess the particularity of materials through laboratory and field tests. The relationship between the quality of recovered soils and treatment systems is also being studied, since the variety in quality of recovered soils might be due to differences in treatment systems installed at each site. These achievements can be expected to contribute to a framework of technical directions for removal, treatment,

utilization, reduction in volume of debris disposed, and prompt, adequate waste treatment after future disasters.



Expected achievements and social contributions

- | | | |
|--|--------------------------------|--------------------------------------|
| 1. What are recovered soils like? | 2. How can we characterize it? | 3. What are key factors for quality? |
| 4. Technical guidelines on disaster waste treatment and utilization | | |
| <ul style="list-style-type: none"> Reduce disposed volume by utilization as geomaterial Ensure prompt & adequate waste treatment in future disasters | | |

Development of Recycling System of Precious and Rare Metals from Waste Electric and Electronic Equipments Using Organic Solvents Containing Copper Bromide

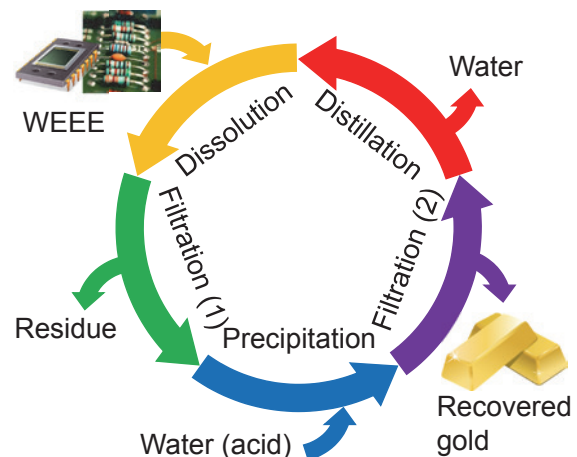
(FY2013-2015)
Budget in FY2015: JPY 3,714,000

Yasunari MATSUNO, The University of Tokyo

<3K133006>

Waste electric and electronic equipment (WEEE) is called an “urban mine” because it contains precious and rare metals. The recovery of these valuable metals from secondary sources should be enhanced. WEEE, however, is diffusely spread throughout society, so effective recovery systems need to be developed. We found that certain organic solvents, such as dimethyl sulfoxide (DMSO) and propylene carbonate (PC), when containing copper bromide can dissolve precious metals, and the dissolved precious metals can be recovered by precipitation with water. We have applied for an international patent on this method. We call these solvents “Organic Aqua Regius” because they can dissolve gold. Applying these solvents in recycling systems could offer a number of advantages, including ease of operation, eco-friendliness and low cost through the repeated use of the solvents. In this study, we are investigating the mechanisms for dissolution and precipitation of metals in the solvents and exploring the

best solvents and solutes and their operating conditions. We ultimately aim to recover precious and rare metals from WEEE.





Studies on the Reintroduction Process of Endangered Birds to Improve its Success from Captive Population

(FY2013-2015)

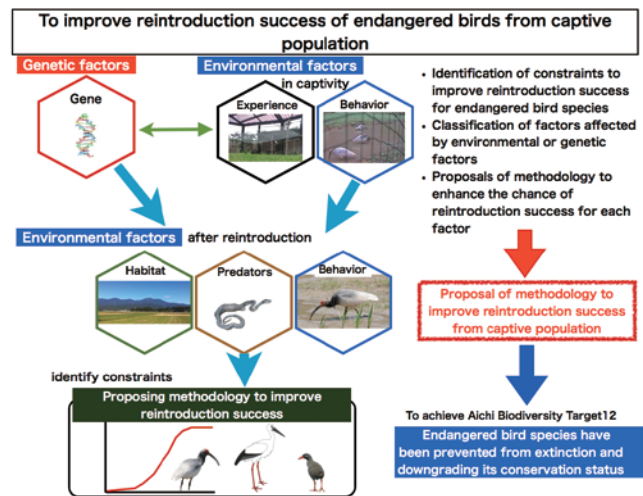
Budget in FY2015: JPY 26,116,000

Hisashi NAGATA, Niigata University (cooperation of three institutions)

<4-1302>

In Japan 89 species have been designated to national endangered species of wild fauna and flora. Among them 37 species are birds, and reintroduction from captive breeding is under consideration for 12 species. The success rate of reintroducing captive-bred endangered bird species has been quite low so far. In order to clarify the reintroduction process, we studied how behavioral traits, experience in captivity and genetic traits affect survival and breeding success after reintroduction, examining three endangered bird species, the oriental white stork *Ciconia boyciana*, crested ibis *Nipponia nippon*, and Okinawa rail *Gallirallus okinawae*, which are the subjects of ongoing reintroduction programs. We can enhance the possibility of successful reintroduction of endangered birds by knowing detailed mechanisms of diminished success. We can also propose a general methodology for improving reintroduction success of captive-bred endangered birds by comparing those cases with other relevant programs implemented around the world. Knowledge of a methodology to improve the chances of successful reintroduction from captive populations could prevent

threatened birds from facing extinction and will improve their conservation status, thus contributing to achievement of Aichi Biodiversity Target 12.



Integrated Approach of In-situ and Ex-situ Conservation of Threatened Species in the Ogasawara Islands

(FY2014-2016)

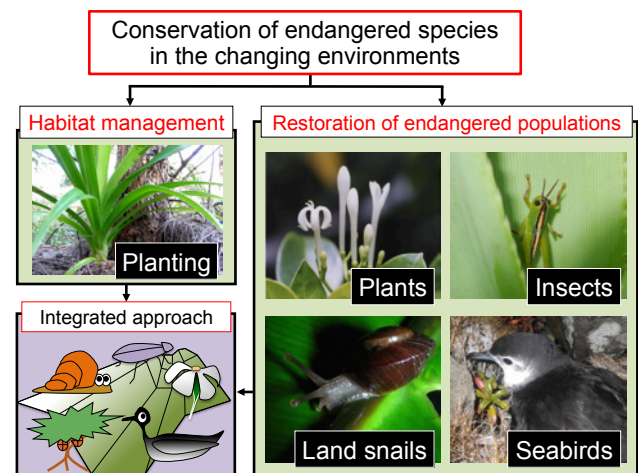
Budget in FY2015: JPY 44,095,000

Kazuto KAWAKAMI, Forestry and Forest Products Research Institute (cooperation of five institutions)

<4-1402>

The Ogasawara (Bonin) Islands were designated a World Natural Heritage site in 2011 for their natural value, including outstanding examples of on-going biological processes of species diversification. In recent years, eradication programs have successfully reduced numbers of invasive alien species such as feral goats. This has had some unexpected consequences, however, due to rapid environmental changes following the eradication programs which have further jeopardized the survival of endemic endangered species in the islands. Therefore appropriate habitat management and conservation intervention in accordance with each species' characteristics are needed. To restore degraded habitats of endangered species, we will develop proper planting methods that take into account the genetic variation of some key native plant species during revegetation. In addition, we will develop in-situ and ex-situ conservation techniques for critically endangered endemic species, including trees (*Psychotria homalosperma* and *Gynochthodes boninensis*), land snails (e.g., genus *Ogasawarana* and *Mandarina*), insects (e.g., *Cicindela bonina* and *Indolestes boninensis*) and seabirds (e.g.,

Puffinus bryani). These projects will help to protect the natural value of the Ogasawara Islands as a World Natural Heritage site into the future.





Development of Risk Management Program for Avoiding Pesticide Residue in Succeeding Crops

(FY2013-2015)
Budget in FY2015: JPY 25,960,000

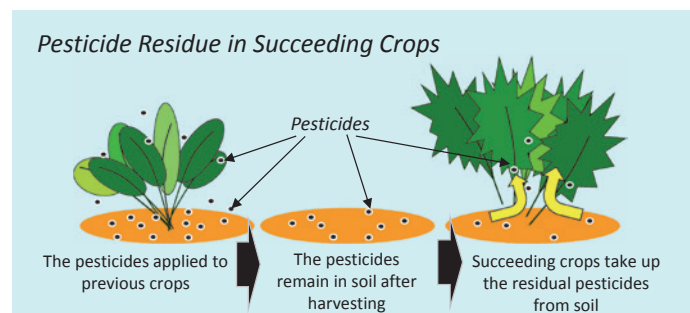
Nobuyasu SEIKE, National Institute for Agro-Environmental Sciences

<5-1302>

In Japan, some pesticides were recently detected in crops exceeding the residue limit set by the Japanese Food Sanitation Law. One of the reasons for this is that succeeding crops take up residual pesticides applied to previous crops from the soils. Under the Japanese registration system for newly developed pesticides, dates for pesticide residue in succeeding crops are required only if the half-lives of pesticides in soils are longer than 100 days. Furthermore, the registration system is based on knowledge from scientific studies performed in the last century, yet approximately 100 new pesticides have continued to be developed every year since then.

In this study, we elucidate pesticide aging processes in soil and uptake mechanisms in crops in order to develop a risk management program for avoiding pesticide residues in succeeding crops. We focus particularly on techniques for evaluating the potential for pesticide residues in succeeding crops, to make them available for setting appropriate plant

back intervals (PBIs). Further, we will propose alternative crops, methods of soil diagnosis and protocols for pesticide residue testing using suitable crops and soil.



A Study on the Estimation of Mother-Fetal Exposure of POPs by Questionnaires and Genetic Factors

(FY2013-2015)
Budget in FY2015: JPY 38,038,000

Chisato MORI, Chiba University

<5-1305>

Persistent Organic Pollutants (POPs) such as polychlorinated biphenyls (PCBs) are fat soluble, and once taken into the human body, they cannot be excluded easily. Many of these POPs have been reported to show endocrine disrupting behavior and affect human health adversely. Fetuses and children are especially vulnerable to the effects of POPs, so it is important to reduce exposure at an earlier stage and reduce the risk in later life.

The major purpose of this study is to estimate the contributing factors of maternal-fetal POPs exposure during pregnancy by analyzing the blood levels of PCBs in maternal and cord blood, and identify relationships with questionnaire responses, such as maternal age, food items, and number of deliveries. The subject mothers are all the participants in the Japan Environment and Children's Study (JECS). The findings of this study will contribute to discovery of chemicals that cause adverse health effects and to creation of effective environmental

policies. Moreover, they will help develop a way to reduce risks among the reproductive age group and contribute to improved health of future generations.

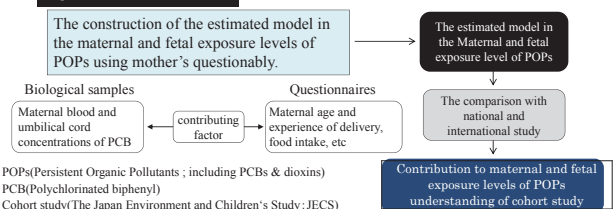
A study on the estimation of mother-fetal exposure of POPs by questionnaires and genetic factors

1. Background and purpose

Chemical exposure during the period from fetal until childhood influences to children's health?

It is known that it takes enormous cost to measure the exposure level of the chemical compounds to carry out cohort study. Therefore, it should develop the method of reducing the costs as much as possible.

2. Main research content



POPs(Persistent Organic Pollutants ; including PCBs & dioxins)
PCB(Polychlorinated biphenyl)
Cohort study(The Japan Environment and Children's Study:JECS)

List of Research Projects Conducted in FY2015

Project Code / Research Title

Strategic Research and Development Area

total 6 research projects

- S-14 / Strategic Research on Global Mitigation and Local Adaptation to Climate Change (MiLAI)
- S-13 / Development of Coastal Management Method to Realize the Sustainable Coastal Sea
- S-12 / Evaluation of SLCP Environmental Impact and Promotion of Climate Change Countermeasures through Seeking the Optimal Pathway
- S-11 / POST 2015 -Project on Sustainability Transformation beyond 2015-
- S-10 / Integrated Research on the Development of Global Climate Risk Management Strategies
- S-9 / Integrative Observations and Assessments of Asian Biodiversity

Common to all fields / Cross-sectional through different fields

total 15 researches

- 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
- 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"
- 1-1302 / Development of LCA Database and Educational Materials about Daily Behaviors aiming for Common Platform Provision
- 1-1303 / Tradeoff Analysis and Local Governance Model of Satoyama Ecosystem Services
- 1-1304 / Study on Development of a Policy Model for Resilient City and its Application
- 1RF-1501 / Predicting and Valuing Ecological and Socio-Economic Values of Ecosystem Services through Integrated Social-Ecological Systems Approach (VES)
- 1RF-1502 / Policy Design and Evaluation for Sustainable Consumption and Production Patterns in Asian Region
- 1RF-1503 / Development of Low-carbon Scenarios for Transition of Regional Energy Systems based on Socio-economic Analyses

Low-carbon society

total 19 researches

- 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 / Improved Database of Historical Ocean Subsurface Temperature Observations and its Climatological Evaluation
- 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
- 2-1301 / Analysis of CO₂ Reduction Extent, Cost and Optimal Policy for the Effective Co-generation System Networked by Power Grids
- 2-1302 / Development of Methodology of Value Assessment and Strategy Planning for Renewable Energy Technologies
- 2-1303 / Effects of Additional CFC Regulation on Fragility of Ozone Layer under Future Global Warming
- 2-1304 / Spatiotemporal Variation of Carbon Budget in Arctic Pedosphere concerned with the Prediction of Global Climate Change
- 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
- 2RF-1303 / Design of New Lifestyles and Regional Development for Low Carbon Society and Economic Revitalization
- 2RF-1304 / Analysis for Climate Change in Water Vapor Variation

Sound material-cycle society

total 45 researches

- 3J153001 / A Study for Reinforced Clinker-free Concrete Elements Comprising By-product Additives and Recycled Cement Produced from Wasted Fresh Ready-mixed Concrete
- 3J142001 / Demonstration Scale Study of Detoxification Technology for Waste CRT Funnel Glass
- 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

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

3K142004 / Development for Novel Metals Recycle Technique from Waste Printed Circuit Board Using Mid-Gut Grand of Scallop

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

3K133002 / Effective Recycling Process of Titanium Alloy Machined Chips by using Hydrogen

3K133003 / Soils Recovered from Disaster Debris - Characterization, Standardization, and Strategic Utilization

3K133004 / Simultaneous Recovery of Mn, Ni, Co from Rechargeable Battery Waste with Dissolution Treatment by Bioreactor

3K133005 / Establishment of Environmentally-Friendly Recycling System for Rare Metals from Electronic Wastes Based on Solvent Extraction Techniques

3K133006 / Development of Recycling System of Precious and Rare Metals from Waste Electric and Electronic Equipments Using Organic Solvents Containing Copper Bromide

3K133007 / Study on Influence and Measure which an Incineration Exhaust-Gas-Treatment Medicine and Fly Ash Processing Chelates Give to MSW Landfill Management

3K133008 / Development of a New Green Process to Selectively Recover Noble Metals from Waste Solutions Using an Inorganic/Organic Hybrid Photocatalyst

3K133009 / Studies on the Environmental Behaviors of Flame Retardants in Waste Electrical and Electronic Equipment for the Establishment of Appropriate Management Techniques

3K133010 / Establishment of Measurement Method for Chlorinated and Brominated Dioxins by using In Vitro Bioassay for Advanced Use as Screening Tool

3K133011 / Mechanical and Environmental Properties of Plastics-included Landfills with Elastic Behavior

3K133012 / Development of Recovery System of Valuable Metals from Printed Circuit Board Using Bioleaching and Mineral Processing Techniques

Society in Harmony with Nature

total 23 researches

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

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

4-1301 / Development of Protection and Management Techniques for Coexisting Harbor Seal and Local Fisheries in the Coastal Water of Oyashio Region

4-1302 / Studies on the Reintroduction Process of Endangered Birds to Improve its Success from Captive Population

4-1303 / Development of Integrated Assessment for Investigating Pesticide Effects on Biodiversity in Paddy Fields

4-1304 / Contribution to the Ecosystem Restoration of Sekisei Lagoon based on Elucidation of the integrated Islands-Reefs-Ocean Network System

4RF-1501 / Examination of Marine Protected Areas Based on the Prediction of Northward Migration of Coral Reef Organisms Using Gene Flow Analysis

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

4RF-1302 / Environmental DNA Methods for Monitoring the Distribution of Aquatic Organisms

Safe and Secure Society

total 37 researches

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

5-1401 / Practical Application of Biofluorescence Method to Asbestos Detection and Nanomaterial Visualization and Tracking

5-1402 / Occurrence of Pathogens in Water Environment and the Limitations of Indicator Microorganisms as a Management Tool

5-1403 / Characterization and Source Apportionment Studies of PM_{2.5} 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 PM_{2.5} 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 PM_{2.5}, 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 PM_{2.5}, 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

5-1455 / Epidemiological Study for the Potential Prevalence of Autoantibody

5-1456 / An Epidemiological Study on Effects of Fine Particulate Matter (PM_{2.5}) 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 PM_{2.5} on Lung Inflammation and Allergy Disease, and Elucidation of the Mechanism

5-1301 / Investigation for Un-measured VOCs That Might Contribute for Photochemical Oxidant Formation

5-1302 / Development of Risk Management Program for Avoiding Pesticide Residue in Succeeding Crops

5-1303 / Development of Risk Reduction and Risk Control Techniques of Soil Fumigants under Japanese Agricultural Conditions

5-1304 / Study on Quantitative Evaluation of Black-box-type Autochthonous Loading in Lake Environments: Benthic Fluxes from Sediments to the Water Column

5-1305 / A Study on the Estimation of Mother-Fetal Exposure of POPs by Questionnaires and Genetic Factors

5-1306 / Study on Potential Threat Caused by Organic Pollutants in the Japan Sea, Surrounding Sea and Atmosphere

5-1307 / Epidemiological Study on Long-Term Health Effect of Low-Frequency Noise Produced by Wind Power Stations in Japan

5RF-1401 / Reaction Mechanism and Source Apportionment of Secondary Aerosol

5RF-1302 / Study on Human Exposure to Organic Pollutants through Environmental Nanoparticles

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 from September to 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 society
Environmental Policy Bureau
Office of Environmental Research and Technology
- Safe and secure society (Health risks)
Environmental Health Department
Environmental Risk Assessment Office
- Low-carbon society, Society in harmony with nature
Global Environment Bureau
Research and Information Office
- Sound material-cycle society
Waste Management and Recycling Department
Waste Management Division

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