Nature Conservation / Environmental Management / Water and Sanitation / Disaster Risk Reduction / Climate Change Measures

For the Termination of the Vicious Circle of Poverty and Environmental Destruction

Of the eight Millennium Development Goals (MDGs), relevant goals are shown in color.

In developing countries, a vicious circle occurs as the destruction of the environment, which is a basis for human life, and causes the further escalation of poverty. Each passing moment brings the further destruction of the irreplaceable natural environment on which humanity depends, driving the need for the creation of a sustainable society based on the concept of harmony with the environment. With the goal of preserving the global environment that affects all human life, JICA is focusing on the five issues of nature conservation, environmental management, water and sanitation, disaster risk reduction and climate change measures.

Nature Conservation

Overview of the Issue

Over the past decades, excessive exploitation and large-scale land use changes have led to the rapid destruction of natural environment worldwide. Those include deforestation, reduction in wetland, deterioration of coastal ecosystems, soil degradation and the extinction of species, by logging, erection of infrastructure and other large-scale development and conversion to farmland. The world's forest are decreasing by about 13 million hectares annually, the equivalent of one third of the land mass of Japan. Similarly, it is estimated that overfishing, tourism development and other factors have caused the loss of 19% of the world's coral reefs. In addition, 80% of the world's fishing resources are being overexploited.

The natural environment supplies people with various resources essential to their lives, such as food, clothes and medicine; it also offers natural protection from disasters and other environmental risks. Degradation of ecosystem services damages the foundations of human existence.

As members of the international community, we need to contribute to the creation of a society that conserves the natural environment, such as the disappearing forests and wetlands of the world, and maintains harmony between ecosystems and

Case Study **International Joint Research for Reduction of Greenhouse Gas Emissions**

Contributing to Understanding the Mechanism of Greenhouse Gas Emissions from Forestry Activities

JICA's study on greenhouse gas emissions from tropical forests contributes to strengthening forestry management capability in developing countries and also to promoting the REDD-plus framework for mitigating global deforestation and forest degradation.

Survey on carbon emissions of the Amazonian forest in Brazil.

Strengthening of Forestry Management Capability

Carbon emissions in the form of CO_2 due to deforestation and forest degradation are estimated to account for about 20% of artificial emissions. To contribute to the REDD-plus framework for mitigating global deforestation and forest degradation, JICA and the National Institute of Amazonian Research in Brazil jointly set up survey plots at about 1,200 sites in the central Amazon region that had not been investigated, in order to understand carbon dynamics in individual forests. Jointly with the National Institute for Space Research and its advanced remote-sensing technology, JICA engaged in developing an evaluation technology to assess the carbon dynamics of the vast forest by utilizing satellite data in the Carbon Dynamics of Amazonian Forests Project.

This effort successfully allowed improvement in the measurement accuracy of carbon emissions reduction due to prevention of deforestation and forest degradation.

Moreover, tropical peat that exists widely in Indonesian swamps have a large accumulation of carbon and are called "explosives warehouses for global warming." Carbon in the area has been released into the atmosphere due to peat fires resulting from development, such as canal construction, intentional burning by farmers, and farmland reclamation. Working with research representatives of Hokkaido University, JICA established a model dealing with fire and carbon management of peat and forests in Indonesia in the project Wild Fire and Carbon Management in Peat-forest in Indonesia. In this project, carbon emissions from tropical peat soil to the air was measured comprehensively for the first time in the world; consequently, this achievement provided scientific backing for emission limits and also contributed to institutionalization of REDD-plus.

human activity.

JICA Activities

During the period from 2000 to 2013, JICA pursued natural conservation activities on 17.81 million hectares of land (12.12 million ha for forest, and 5.69 million ha for conservation of other ecosystems). In addition to conducting activities such as collecting forest data, formulating management plans, and improving the livelihoods of local residents, JICA carried out afforestation activities for forest restoration on 3.05 million ha in various countries. These activities also contributed to the capacity-building of 600,000 administrative officials and residents.

Nevertheless, land use changes along with development and the increased pressures on natural resources remain major issues in developing countries. To that end, JICA provides cooperation on nature conservation in the following three areas, with the aim of facilitating harmony between the maintenance of the natural environment and human activities.

1. Climate Change Measures through Sustainable Forestry Management

Forests not only function timber resources; they also have the function of retaining and providing stable supplies of water, conserving soil while absorbing and accumulating greenhouse gas, i.e. CO_2 and mitigating natural disasters such as floods and landslides. JICA recognizes that not only is it important to regenerate forests through afforestation and other methods, but also to make efforts to maintain and improve forest quality through proper management. Through support for system improvement in developing countries by promoting REDD-plus (Reducing Emission of greenhouse gases from Deforestation and forest Degradation or through forest conservation in developing countries), JICA supports the proper management of forests, which are a sink for CO_2. JICA is also providing assistance for disaster risk reduction and watershed management utilizing multilateral functions of forests in key watersheds, disaster-prone areas, and so on [➡ see the Case Study on page 83].

2. Sustainable Utilization of Natural Resources for Improvement of Livelihoods in Vulnerable Communities

In developing countries, most people rely on local natural resources in daily life. However, there are many cases where the foundation for local livelihoods has been exploited in such way that excessive usage destroys the ability of nature to reproduce itself. Moreover, sometimes friction occurs between residents and public administrations over the usage and management of resources. In these cases, it is important to take the views of the local residents into consideration in the decision-making process. While collaborating with public administrators is necessary, the issue is achieving natural resource management in which local residents play major roles.

To achieve proper conservation of forests and soils in vulnerable areas, such as the arid and semiarid lands in Sub-Saharan African countries, JICA is promoting activities for sustainable utilization of natural resources in surrounding communities and improvement of livelihoods. If the administrative system of the partner countries is vulnerable, JICA actively pursues cooperation with international organizations and NGOs.

3. Biodiversity Conservation through Management of Protected Areas and Surrounding Buffer Zones

It has been estimated that over 20,000 species of wildlife are at risk of extinction because of the loss of natural habitats, overhunting of wildlife, introduction of alien species, climate change and other factors.

In important protected areas such as national parks and surrounding buffer zones, JICA is providing various forms of support: development of management plans, implementation of surveys and monitoring, capacity-building of administrative officials and researchers, introduction of ecotourism, and environmental education.

JICA is also assisting the efforts of developing countries to contribute to achieving the world's goals for conserving biodiversity through approach of technical transfer, human resource development and other aid. JICA's efforts take into consideration the "Aichi Target" that was adopted at the tenth meeting of the Conference of the Parties to the Convention on Biological Diversity (COP 10).

Environmental Management

Overview of the Issue

Along with economic development, population growth and urbanization, the water and air pollution and inappropriate disposal of waste have become serious problems in many developing countries. These problems threaten the health and life of humans and other wildlife and inhibit the sound development of economic activities. Japan's experiences in the past prove that it is too late to address environmental issues once our ecosystems and human health are significantly damaged. Restoring the damaged environment requires much larger expenditures. And, in recent years, cross-border pollution issues such as increasing greenhouse gases, air pollution by PM2.5, and pollution in international rivers have become prominent. In June 2012, at the United Nations Conference on Sustainable Development (Rio + 20) held in Rio de Janeiro, Brazil, it was recognized once again that further measures by the international community to deal with environmental issues were indispensable. Moreover, the conference agreed that promoting green economies is essential for development in harmony with the environment and that developed countries would strengthen their aid for developing countries. Furthermore, a treaty titled the Minamata Convention on Mercury was concluded in October 2013 in order to reduce the artificial discharge of mercury and prevent global-scale mercury contamination, including cross-border pollution.

Because many environmental issues involve complex factors in a multilayered manner and are spread over a wide spatial area, it is difficult to find solutions in a short period of time. Moreover, in comparison with direct investments, such as in infrastructure, the response to environmental issues is slow in many cases as outcomes of efforts are hard to detect. Especially due to their tight national budgets, this trend can be seen frequently in developing countries.

JICA Activities

JICA provides various forms of aid in accordance with the development status of each developing country or region. Within that process, JICA gives priority to preventive measures and is emphasizing the establishment of environmental management systems through a capacity development approach. JICA recognizes that it is essential to enhance the capacity of the organizations and individuals to conduct environmental management. Specific measures being taken to strengthen environmental management are as follows.

1. Water Environment

JICA supports measures to prevent pollution in rivers, wetlands and oceans. This includes support for increasing the capability to monitor water quality, for drafting management plans and making policy proposals and implementing them. JICA also provides support for the drafting of plans and the operation and management of facilities needed to treat waste water from households and industry and improve the hygienic environment, such as support for the improvement of sewage facilities.

2. Atmospheric Environment

JICA supports measures to prevent air pollution, such as increasing the capability to monitor air quality, and improving capacity for drafting management plans and making policy proposals. JICA is also providing support for the development of air pollutant removal facilities, and new methods to measure contaminants such as PM2.5.

3. Waste Management

JICA supports measures for improving waste management, such as increasing the administrative service capabilities for the collection, transportation, intermediate treatment and final disposal of waste, and improving capacity for developing management plans and making policy proposals. Especially in recent years, JICA is increasing its support to create a sound material-cycle society by promoting the 3Rs (Reduce, Reuse, Recycle) of waste. JICA is also providing support for building recycling systems for electrical and electronic waste, "e-waste."

4. Efforts in Other New Fields

JICA also supports more advanced environmental management issues and undertakes other efforts that respond to new problems. These efforts expand to various measures, such as management to treat chemical substances that have a large impact on the environment as well as being harmful for human beings, efforts for realization of the Eco-future City vision in light of urban planning and environmental protection measures, and support for environmental protection measures focused on cross-border regional environmental management [➡ see the Case Study below].

For tackling such diverse problems, JICA utilizes Japan's knowledge, experiences, and technologies. JICA strengthens the cooperation with Japan's local governments that have know-how on environmental administration, partnerships with private companies that possess techniques for improving environmental management, and other collaborations. By installing evidence-based evaluation methods, JICA is accelerating more effective activities.

Water and Sanitation

Overview of the Issue

Water is an essential resource for human life. In addition to drinking water, water directly and indirectly supports human

Case Study **Malaysia: Science and Technology Project for Development of Low Carbon Society Scenarios for Asian Regions**

Supporting Development of the Scenario for a 2025 Low-Carbon Society

JICA is conducting the study of developing a scenario for a low-carbon society modeled after the Iskandar Development Region in Johor, Malaysia, where large-scale industrial development is currently underway.

Conceptual drawing of the Iskandar Development Region in Malaysia.
©2014 Iskandar Regional Development Authority

40-percent Reduction in Greenhouse Gas Emissions by 2025

Located at the south end of the Malay Peninsula, the Iskandar Development Region in Johor state is the second-largest urban area after the Kuala Lumpur region. Modeled on the region, JICA is working on developing methods for formulating low-carbon society scenarios, quantifying the vision of a low-carbon society, and creating an implementation roadmap for realization of a low-carbon society. JICA's five-year project that commenced in 2011 is now ongoing, aiming at formulating comprehensive environmental planning methods for solving several issues simultaneously, such as urban air pollution and solid waste management.

In March 2014, the "Low Carbon Society Blueprint for Iskandar Malaysia 2025" was formally approved by the Iskandar Regional Development Authority. This plan was jointly formulated by a team of Japanese and Malaysian multidisciplinary researchers, including universities and administrative agencies. The goal of this blueprint is to reduce 40% of greenhouse gas emissions in the Iskandar region by 2025, relative to business-as-usual 2025 emission levels. This is equivalent to approximately 10% of the reduction that has been planned for the whole of Malaysia. This scenario consists of twelve major actions, such as Integrated Green Transportation, Green Building and Construction, and Green Energy System.

This practical action plan of a low-carbon society on a regional level, equivalent to the prefectural level in Japan, is the first case among ASEAN countries. In Asian countries considering similar issues, this project is expected to become a showcase for developing low-carbon cities.

existence as a necessity for food production and various economic activities to maintain lives of people.

However, the water resources available to humans are not unlimited. Even though the Earth is called the Water World, the amount contained in relatively easily accessible rivers and lakes is a mere 0.01% of all water on the earth.

Nevertheless, the demand for water continues to rise in developing countries as their populations expand. Consequently, these countries are now facing the extremely difficult problem of how to allocate limited water resources for the survival of their citizens, for national economic development as well as for the preservation of the natural environment.

Even though safe drinking water is essential for people to live, such water is still not available for 750 million people in the world, and about 760,000 children age 5 and younger die due to diarrhea every year (2013 estimates by the World Health Organization). Moreover, the labor of drawing water for long hours has prevented women from working and children from going to school. Therefore, stably securing safe drinking water has been the key to solve many social issues regarding health, education, labor, and poverty. Another issue closely related to water is sanitation. Diarrhea in many cases is caused by drinking unsanitary water or infection with pathogenic bacteria discharged from feces transferred to people's mouths through water, food, fingers or other means. Therefore, building sanitation facilities (toilets) is extremely important to isolate human excreta from the living environment. In addition, the infection routes can be cut off by such hygienic practices as washing one's hands after defecation and keeping areas around water supply facilities clean. The simultaneous improvement of water supply and sanitation is extremely important to reduce water-related diseases.

Japan has experience in steadily developing water supply and sewage systems to build sanitary society, while overcoming flooding and drought during postwar economic growth. On the other hand, Japan remains a major water-consuming country, importing large volumes of "virtual water" from other countries. This makes Japan responsible for taking part in solving the water and sanitation problems of developing countries.

JICA Activities

1. Water Resources Management and the Efficient Use of Water

The appropriate management of water resources is essential in the situation where available water resources are limited against the growing demand for water. This refers to a need for coordinating water allocation to different sectors while preserving the water environment. Avoiding this coordination would increase the disorderly use of water, resulting in repeated environmental destruction such as "the Tragedy of the Aral Sea." Furthermore, it is anticipated that there will be frequent incidents of flooding and drought due to climate change. From the perspective of promoting integrated water resource management, evaluating the impact of climate change on water resources, JICA actively supports developing countries mainly in the formulation of water resources management plans.

To properly manage limited water resources, the efficient use of water becomes paramount. This includes the promotion of water-saving in agriculture and reuse of treated wastewater. JICA is proactively providing assistance in this area, particularly in the reduction of non-revenue water caused by leaks from pipes, etc., where Japan's experience and technology can be put to good use.

2. Improving Access to Safe Drinking Water and Sanitation Facilities

The access to safe drinking water and basic sanitation facilities (toilets) is included in the Millennium Development Goals (MDGs) and is one of the major development challenges

Case Study **Ethiopia: The Ethiopian Water Technology Center Project**

Promoting Human Resources Cultivation for Securing Safe Water

In August 2013, the Ethiopian Water Technology Center (EWTEC) was approved as the National Ethiopian Water Technology Institute (EWTI); consequently, it attained the central position in the water sector both in name and in reality. This center has been supported by JICA since its establishment. This is one of the great results of Japan's 15 years of cooperation and self-reliant efforts of relevant ministries and organizations in Ethiopia.

Training Courses for Neighboring Countries

The coverage rate of a safe water supply in rural areas of Ethiopia is 32%, far below the average rate of 60% in other Sub-Saharan African countries. Therefore, developing deep wells and securing safe water are critical issues.

Primarily providing various training courses related to groundwater development, EWTEC widely trains engineers from basic to applied levels.

Looking back, setting up and implementing support of regular training courses in Phase 1 (1998–2005) were mainly provided by Japanese experts. Then, in Phase 2 (2005–2008), implementation and management of the training courses were gradually shifted to counterparts. In Phase 3 (2009–2013), most of the training courses were carried out by Ethiopian counterparts, and they finally acquired the skill of evaluating courses for improvement. In this manner, this project has achieved step-by-step growth.

Field work for an underground water model course. Training participants are using a hydrogeological map and observing the actual landform.

Over 3,500 trainees have been trained in Ethiopia, and today the graduates work actively throughout the nation. EWTEC has also contributed to train engineers specialized in groundwater system in Africa by providing international course training programs to engineers from 18 neighboring African countries.

As a new institution, EWTI is expected to continue to play an important role in the further development of the water sector in Ethiopia.

of the international community. The access to safe water and sanitation was declared a "human right" at the United Nations' General Assembly held in July 2010.

Nevertheless, in 2010, 768 million people around the world still did not have access to safe drinking water and 2.5 billion were without access to basic sanitation facilities (World Health Statistics 2011).

As a member of the international community, JICA is working proactively to accelerate the progress towards improving the situation. Specifically, JICA is promoting construction of water supply facilities through financial assistance while strengthening operation and maintenance of the facilities through technical assistance both in urban and rural areas [➡ see the Case Study on page 24]. Particularly in urban water supplies, JICA deals with the improvement of water supply corporations management, mobilizing private sector financing to meet the huge needs for developing water supply facilities.

With regard to the stagnant progress toward improving access to sanitation facilities, JICA will gradually expand efforts to establish sanitation facilities and conduct health education, primarily in Sub-Saharan Africa.

Disaster Risk Reduction

Overview of the Issue

The prevalence of damage from disasters has increased in the past 30 years or so, as flood damage, weather disasters, earthquakes, volcanic eruptions, and other disasters occur across the globe. Especially, developing countries not only face a delay in the development of social infrastructure, but also they confront a concentration of people in cities and effects of climate change; consequently, they are vulnerable to natural disasters. Natural disasters do more than claim lives; they directly impact people's livelihoods, aggravate the poverty cycle, and cause economic and social damage.

JICA Activities

1. Activity Policy

Based on a disaster management cycle that entails preparedness, emergency response, rehabilitation and recovery, and prevention and mitigation, JICA supports to implement disaster risk reduction (DRR) measures effectively. In the phase of rehabilitation and recovery, JICA aims at building a disaster resilient society under the concept "Build Back Better," which does not simply return the society to the same state as before, but rebuilds a stronger society in the wake of disaster. By simulating possible damage based on risk evaluation and increase investment for DRR, JICA aims to alleviate direct and indirect physical and social damage and reduce the cost necessary for emergency response [➡ see the Case Studies on pages 35, 40, 88, 125, and below].

Strategic Goal 1: Establishment and Strengthening of Disaster Management System

In order to build a disaster-resilient country or region, JICA supports forming a foundation for DRR measures through the following three pillars: 1) Improvement of basic laws related to DRR and establishing an organizational structure responsible for DRR; 2) Strengthening of DRR administrative functions of central and local governments by formulating DRR plans of countries or regions and setting up building codes; and 3) Reinforcement of organizations and human resources related to DRR and promotion of relevant studies through a public-private-academia collaboration system among DRR related organizations.

Strategic Goal 2: Correct Understanding of Natural Disaster Risk and Promotion of Common Understanding

Correct understanding of disaster risk is prerequisite and fundamental for deciding on DRR measures. Toward this aim,

Case Study **Thailand: Project on Capacity Development in Disaster Risk Management**

Enhancing Disaster Risk Management Administration Skills and Raising Local and Community Capacity to Cope with Disasters

Evacuation drill in a CBDRM facilitator training program.

In Thailand, JICA implemented Technical Cooperation to improve the disaster risk reduction capability of administrative agencies and communities, as well as to promote disaster awareness education at schools.

Establishment of an Inter-Institution Coordination System

JICA conducted Technical Cooperation Projects for improving the disaster risk reduction (DRR) capabilities of central and local governments and communities, as well as promoting natural disaster awareness education at schools. These projects were conducted in collaboration with two governmental bodies: the Department of Disaster Prevention and Mitigation of the Ministry of the Interior (DDPM), responsible for disaster risk management administration, and the Ministry of Education (MOE), engaged in school disaster education.

In Phase 1, which ended in 2008, JICA enhanced the capability of the DDPM and also strengthened collaboration among relevant institutions. In addition, it also supported creating not only e-learning materials for natural disaster management but also the Thailand's first "Thai White Paper on Disaster Prevention and Mitigation." Selecting three provinces as models, JICA supported them in developing provincial and community-level hazard maps, strengthening Community-Based Disaster Risk Management (CBDRM) and introducing techniques for school disaster education.

In Phase 2, which started in 2010, in addition to developing national disaster prevention and mitigation plans and specific action plans, JICA is also drawing up curricula for human resource development and implementing Table-top Exercises based on the curricula. Furthermore, JICA supports creating and distributing guidelines for disaster education and related materials to schools throughout the nation.

While multiple organizations and departments are involved in this project, five task forces coordinate them appropriately in a cross-section manner. Considering the project outcomes, relevant authorities of Thailand will work on strengthening inter-organizational collaboration and also promoting the outcomes of model provinces by utilizing the framework of task forces.

JICA supports risk evaluation and analysis, preparation of hazard risk maps, economic analysis of investment for DRR, and assessment of climate change effects. Moreover, JICA facilitates common understanding regarding disaster risk among all stakeholders in the community, through capacity building of community's DRR activities, disaster education, and other approaches.

Strategic Goal 3: Implementation of Risk Reduction Measures for Sustainable Development

In order to protect human lives and mitigate damage to social, economic, and environmental resources by natural disasters, it is important to make preparations—preventive measures—in ordinary times. JICA supports DRR measures in each sector, and measures and policies that consider disaster vulnerable people, impoverished groups, etc., by combining structural and non-structural measures. Furthermore, JICA also supports balanced risk reduction measures, including hazard-prevention measures such as flood prevention projects, and risk avoidance measures such as land-use regulations.

Strategic Goal 4: Speedy and Effective Preparation and Response

For providing effective response immediately before and after natural disasters occur, JICA provides support to technical agencies, central and local governments, and the public so that speedy precautions and evacuation can be implemented based on forecasting and early warning and other information. JICA also enforces appropriate measures that immediately provide relief to victims and afflicted areas.

Strategic Goal 5: Seamless Recovery and Reconstruction for a Disaster Resilient Society

By incorporating the view of DRR into the rehabilitation and recovery stage after natural disasters occur, JICA aims to realize a more disaster resilient society through recovery and reconstruction activities. Furthermore, JICA will further enhance the additional value of post-disaster assistance by providing support immediately after disaster and conduct seamless recovery activities.

2. For Mainstreaming Disaster Risk Reduction

Mainstreaming Disaster Risk Reduction (DRR) means that: 1) government positions DRR as a priority issue in the policies of the country; 2) a perspective of DRR is to be taken into every development policy and plan; and 3) the amount of investment for DRR is promoted.

JICA has implemented projects in some other development sectors that took DRR into perspective. Also, JICA is in the process of building a system to take into consideration DRR in every development sector from the stage of project formulation in JICA's cooperation.

DRR measures in Japan have contributed not only to protecting human lives but also to mitigating economic damage. With this experience, JICA regards that it is necessary for social and economic development to make prior investment in measures that can obviate disaster damage. JICA has developed a model that numerically verifies the contribution of prior investment in national and regional stable growth. The simulation results show that prior investment for DRR can cause differences in economic growth after natural disasters occur.

Climate Change

Overview of the Issue

Climate change has an impact on the entire infrastructure of human life, including the ecosystem, society and the economy. It is a global challenge that poses an enormous threat to equitable

Case Study **Philippines: Preparatory Survey for the Flood Risk Management Project for Cagayan de Oro River (FRIMP-CDOR)**

Support for Development of a Flood Management Plan through Project Implementation

In the Philippines, with frequent storm- and typhoon-related disasters, JICA aims at mitigating and managing flood damage by supporting flood management planning through project implementation in a consistent way.

Evaluating Flood Risk to Establish River Boundaries

In December 2011, Tropical Storm Sendong hit the northern part of Mindanao in the Philippines and inflicted enormous damage, causing over 1,000 deaths. The Cagayan de Oro City, with a population of about 600,000 people, lies downstream on the Cagayan de Oro River. Since this city did not have sufficient measures to mitigate flood damage, the inner-city area along with the river was especially devastated.

JICA conducted the technical assistance on the Preparatory Survey to formulate an ODA Loan project through reviewing and updating the previous Master Plan and Feasibility Study developed by the Government of the Philippines.

The Airborne LiDAR survey was conducted to obtain detailed topographic data for the hydraulic analysis and inundation analysis. Based on the analytical results, the flood risk levels were assessed in reference to the evaluation criteria, which focus on the possibility of evacuation of residents in case of flood. Then, under the basic concept "Not living in dangerous areas," JICA supported establishing the river boundaries, which was the first such project in the Philippines.

The construction of new dikes and floodwalls, improvement of a bridge, and raising the existing road for evacuation will be conducted in the next stage. Moreover, JICA will provide technical cooperation for nonstructural measures, such as development of flood hazard maps and evacuation plans, and land-use plans within the river areas based on the river boundaries.

The Cagayan de Oro City, with properties concentrated along with the river.

and sustainable economic growth, poverty reduction and human security. Nowadays, phenomena that are considered to be affected by climate change, such as the submersion of coastal lowlands due to rising sea levels, increases in extreme weather events including droughts, torrential rain, and floods, and declines in food production and water resources, have been reported in various places. The impact of climate change is expected to seriously affect our lives more intensively and extensively in the future.

JICA Activities

1. Supporting the Efforts for Reduction of Greenhouse Gas Emissions

In recent years, greenhouse gas emissions from developing countries have been increasing rapidly. In order to minimize the negative impacts of climate change, it is essential that the ongoing efforts to reduce emissions of greenhouse gases or "mitigation measures," involve not only developed countries but also developing countries.

For those developing countries faced with various issues such as poverty reduction, it is important to take an approach that both reduces greenhouse gas emissions and bears benefits such as improvements in livelihood and economic development.

JICA extends cooperation in development projects, including the introduction of renewable energy, promotion of energy saving, improvement of urban public transportation system, solid waste management, forest management and support for afforestation. JICA also provides extensive support for policy and capacity development, such as development of national greenhouse gas inventories, establishment of energy-saving laws and low-carbon urban development planning.

2. To Protect People in Developing Countries from the Negative Impacts of Climate Change

Developing countries, and the poor in particular, are extremely vulnerable to the impacts of climate change.

JICA provides assistance to adaptation measures in accordance with each country's needs. These include developing capacity in protection against storm and flood damage, coastal protection and embankments, construction of water supply facilities, appropriate management of water resources, ecosystem protection, promoting irrigated agriculture and dissemination of drought-resistant agricultural crops.

Furthermore, JICA is formulating and implementing adaptation measures tailored for each region and country based on meteorological observation, climate change prediction and impact evaluation. Such cooperation will become increasingly important in the future.

3. Concurrently Targeting Climate Change and Sustainable Development

Developed and developing countries have jointly moved toward the establishment of a new international framework to address climate change. Appropriate support from developed countries is becoming increasingly important for developing countries to achieve climate-compatible development.

By drawing on past experiences and achievements in supporting sustainable development, and on the basis of international discussions, JICA provides support for climate change measures in developing countries in a comprehensive way, from the policy level to implementation of projects, research, human resources development, etc., while collaborating not only with national government agencies but also with wider stakeholders, such as local governments and private companies **[➡ see the Case Study below].**

Case Study **Thailand: Efforts to Address Climate Change in Thailand**

City-Level Climate Change Master Plan and Human Resources Development in the ASEAN Region

The level of greenhouse gas emissions in Bangkok, Thailand, is higher than in large cities in other countries. Promotion of adaptation to climate change, including flood control, has also been critical. Following is JICA's efforts on climate change measures in Thailand.

For Sustainable Urban Development and Promoting Regional Cooperation

Since March 2013, under the project for Bangkok Master Plan on Climate Change 2013–2023, JICA has supported the Bangkok Metropolitan Administration (BMA) for the development of a climate change master plan targeting five fields: energy, urban transportation, waste and wastewater management, urban greening, and adaptation initiatives.

In cooperation with relevant departments of the BMA, JICA aims to draw up feasible action plans in accordance with governmental policies, as well as to improve institutional arrangements with various organizations for better implementation of the Master Plan. With the cooperation of Yokohama City, JICA is providing training programs in Japan and also dispatching experts so that practical knowledge and experience in various fields can be shared for sustainable urban development.

Furthermore, in June 2013, JICA started to cooperate with the Thailand Greenhouse Gas Management Organization (TGO) to establish the Climate Change International Technical and Training Center (CITC) under the Southeast Asian Regional Climate Change Mitigation and Adaption Project. The vision of this center is to become a "One-stop technical and training center on climate change in the region," targeting a wide range of participants from central and local governments and private companies in ASEAN countries.

Participants exchange opinions about training programs at a CITC ASEAN workshop.

This cooperation is regarded as an important project for promoting the East Asia Knowledge Platform for Low Carbon Growth, advocated by the Japanese government; it aims at human resources development as well as to establish networks among various stakeholders.