Projects and programmes incorporating cooperative approaches
to the Transfer of Technologies

The government of Japan

The Japanese government presents a summary of technological transfer programs based on the resolution 4/CP.4.

Japan, recognizing the importance of environmental issues, has actively been assisting environmental protection efforts of developing countries. Shortly before the third session of the Conference of Parties to the United Nations Framework Convention on Climate Change in Kyoto in December 1997, in particular, Japan announced the Kyoto Initiative to further strengthen its support to developing countries combating global warming. The initiative is made up of three major pillars: (1) cooperation in capacity development, (2) ODA loans with the most concessionaire conditions (0.75 percent as an annual interest rate, 40 year as a repayment period), and (3) exploitation and transfers of Japanese technology and know-how.

Compared with other types of assistance schemes, ODA programs have some advantages: it could be offered beyond economic efficiency, and it could also be offered in line with development projects of recipient countries.

With financial resources other than the ODA budget, Japan is also contributing to environmental problems developing countries face. The Ministry of International Trade and Industry, for instance, is implementing the Green Aid Plan (GAP) that aims at achieving both economic development and environmental protection in developing countries in Asia. Under the plan, energy and environment technologies, some of which were developed through Japan's efforts against pollution, are transferred and utilized in developing countries. Most parts of the plan are financed by budgets other than ODA's although the ODA fund could be used in technological cooperation.

In addition to transfers of technologies under project-type technical cooperation schemes, occasional transfers of technologies are done in forms of exchanges of technological information.

Furthermore, the private sector plays an important role in technology transfer regarding combating global warming measures because it plays the leading part of technology development and utilization. In Japan, organizations such as the Association for Overseas Technical Scholarship (AOTS) and the Japan Overseas Development Corporation (JODC) are promoting efforts being made by private companies, including the acceptance of trainees and dispatching experts, partially subsidized by the official development assistance (ODA) budget. In addition, various industry organizations and companies are contributing to improvements in manufacturing technologies and

efficiency and human resources development overseas as part of voluntary actions aimed at preventing global warming.

Moreover, Japan is actively promoting the diffusion of technologies under the Climate Technology Initiative（CTI） which was founded by the proposal of 23 member countries of the IEA/OECD as well as the European Commission since the COP1 held in 1995.

This paper shows, the following examples of major ODA and non-ODA projects as well as technological information exchange projects. among various kinds of the transfers of technologies in both public and private sectors under government initiatives.

＊ Training Course to Develop National Inventories and Strategies Against Climate Change

＊ The Energy Efficiency Center

＊ The National Center for Environment

＊ The Study on Cartography, Inventory and Management of Classified Forest in Northern Area in Benin

＊ The Project for Construction of Electric Training Center

＊ The Project for Rural Electrification in Ache

＊ Study on the promotion of Photovoltaic Rural Electrification in the Republic of Zimbabwe

＊ The Project for the Environmental Protection and Safety Training Center of the Mining of Coal Industry

＊ The Forest Extension Project in the Eastern Region of Paraguay

＊ The Forest Conservation and Afforestation Project in Laos

＊ Project for Transferring Clean Coal Technology

＊ Research Cooperation Project on the practical use of industrial waste water treatment technology for prevention of global warming

＊ Holding a seminar against global warming in the Asia Pacific region and building up a network

on climate change in the Asia Pacific area.

* AOTS Technical Training Program

* JODC Expert Dispatch program

* APEC Virtual Center（Japan） for Environmental Technology Exchange

* Technical transfer in CTI（Climate Technology Initiative）

Project: Training Course to Develop National Inventories and Strategies Against Climate Change

Ministries and agencies in charge: The Ministry of Foreign Affairs, Environment Agency, Japan International Cooperation Agency, Japan Weather Association

Recipients: developing countries

Period and type of assistance: 1992 - Training (technological cooperation)

Purpose and outline of project: Transferring technologies needed to meet the requirements of the United Nations Framework Convention on Climate Change. (Transferring technologies to help the participants make the inventory and informing and transporting technologies to help the participants work out programs to prevent global warming.)

Content of program: Officials responsible for global warming issues at government offices will be given training lectures on the following subjects:

- Information regarding the United Nations Framework Convention on Climate Change and the Kyoto Protocol
- Technologies of measures to prevent global warming in each sector
- Information of IPCC activities including major points of the IPCC Second Assessment Report of the IPCC
- Outline of Inventory and IPCC guidelines and Methods to calculate various types of greenhouse emissions
- Information of measures to prevent global warming in Japan exchanging information among participants

The one-month-and-half course will be held every year, enrolling about 15 persons.

Project: The Energy Efficiency Center

Ministries and agencies in charge: The Ministry of Foreign Affairs, Japan International Cooperation Agency (JICA), and the Ministry of International Trade and Industry

Recipient countries: China (1992-99), Argentina (1995-2000), Bulgaria (1995-2000)

Period and type of assistance: Technical cooperation

Purpose and outline of projects: Transferring energy-saving technologies

Content of project: transferring energy-saving technologies to counterparts responsible for energy conservation in recipient countries, allowing them to conserve energy by themselves.

Programs include:

- training of administrators involved in energy conservation in industries;
- plant diagnosis as well as plant improvement consultation services by the counterparts; and
- providing energy-saving information and conducting publicity on energy conservation.

Programs are being conducted under project-type technical cooperation by sending Japanese specialists, receiving trainees in Japan and providing equipment.

Project: The National Center for Environment

Ministries and agencies in charge: The Ministry of Foreign Affairs, the Environment Agency, the Ministry of International Trade and Industry, the Health and Welfare Ministry, Japan International Cooperation Agency and others

Recipients: Indonesia (1993-2000), China (1992-2001), Mexico (1995-2000), Chile (1995-2000), Egypt (1997-2002) and Thailand (completed, 1990-97)

Period and type of assistance: Grant Aid (Indonesia, Chile, Thailand, China and Egypt) and Technical cooperation

Purpose and outline of project: Transferring environment management technology

Content of project: Technologies on environment management are transferred to recipients to increase their ability to address the environmental issues, which would lead to preventing of global warming.

In case of Chile, the program include

- surveying the current status of environmental problems, monitoring pollution sources and researching on environmental monitoring;
- collecting information on environment and providing them;
- training officials involved in environmental administration; and
- the environmental impact assessment and environmental management.

The center's functions of environmental protection will be strengthened through those programs.

Programs are being conducted under project-type technical cooperation by dispatch of Japanese experts, acceptance of trainees in Japan and provision of equipment.

Project: The Study on Cartography, Inventory and Management of Classified Forest in Northern Area in Benin

Ministries and agencies in charge: The Ministry of Foreign Affairs, the Forestry Agency of the Ministry of Agriculture, Forestry and Fisheries, and Japan International Cooperation Agency (JICA)

Recipient: Benin

Period and type of assistance: 1998-2000. Technical Cooperation (Development Study)

Purpose and outline of project: To prepare a forest Inventory and management plan for forest conservation and to transfer related technologies.

Content of project: Benin is experiencing deforestation due to lack of sufficient precipitation, slash-and-burn farming and over grazing. The timber supply is being damaged. Soil fertility and water retentively are deteriorating, threatening the ecological system. Three classified forests, including Trois Riveres, located in the northern part of the country account for 11 percent of the total forest area in the country. They serve as a barrier which prevent the area from turning to savanna. Within those classified forests, deforestation is taking place because of forest fires, convertion of forests into cottons and yam cultivations and increased demand for fuelwood due to population growth.

A total of approximately one million hectares, 560,000 hectares of the three classified forests and their buffer zone has been designated as a study area. Aerial photography will be taken and a land-use and vegetation map will be prepared. A forest management plan will be formulated with the participation of local residents in the management of 94,000 hectares of forest, including 46,000 hectares of Trois RiveresClassified Forests and it buffer zone, while collecting and analyzing forest information and establishing a forest inventory. Through the planning process and in the course of the study, it is expected that technology will be transferred to the Benin counterpart personnel.

Project: The Project for Construction of Electric Training Center

Ministries and agencies in charge: Ministry of Foreign Affairs, and Japan International Cooperation Agency (JICA)

Recipient: Syria

Period and type of assistance: Grant Aid (1996-1997, 1,671 million yen). Technical cooperation

Purpose and outline of project: developing human resources to improve operation efficiency at existing power stations

Content of project: Japan has extended yen loans to Syria for construction of three power stations, contributing to the improvement of the country's electric supply. However, staff members engaged in operation and maintenance of the power stations do not have enough skills to better perform their jobs, making the electric supply of the nation unstable. Due to poor repairing works, for example, the power generation efficiency is reduced to 70 to 90 percent of their capacity.

Under such circumstances, the Syrian government worked out the Project for Construction of Electric Training Center and sought Japanese government's grant aid to cover the construction and equipment costs.

It is expected that skills of technicians improved by Japan's assistance would secure the stable supply of electricity, improve operation efficiency and curb the emission of environmental load such as sulfur oxide and carbon dioxide.

Japanese experts are sent to Syria both on short- and long-term bases to give technical guidance.

Project: The Project for Rural Electrification in Ache

Ministries and agencies in charge: Ministry of Foreign Affairs, Japan International Cooperation Agency

Recipient: Indonesia

Period and type of assistance: Grant Aid (1997, 643 million yen)

Purpose and outline of project: Electrification in rural areas using non-fossil fuel (hydraulic power)

Content of project: A gap between urban and rural areas is widening in recent years in Indonesia. Electrification rates in rural areas outside Java Island remain to be around 40 percent. Promoting rural electrification is a major challenge for the Indonesian government which is developing infrastructure that could lead to the correction of regional disparities and poverty elimination, most important policy of the nation.

Since 1989, the Indonesian government has been electrifying rural areas building independent small-scale power generation systems that are operated and maintained by village cooperatives. However, it finds it difficult to maintain such systems using on diesel fuel because of increasing operating costs.

Under such circumstances, the government of Indonesia worked out the Project for Rural Electrification in Ache and asked Japan's grant aid to cover the costs of the construction of a small-scale hydroelectric power station and purchasing materials and equipment.

Project: Study on the promotion of Photovoltaic Rural Electrification in the Republic of Zimbabwe

Ministries and agencies in charge: Ministry of Foreign Affairs, and Japan International Cooperation Agency

Recipient: Zimbabwe

Period and type of assistance: Technical Cooperation Development Study between 1995 and 1999.

Purpose and outline of project: Surveying the potential for of solar power generation and transferring related-technologies.

Content of project: The electrification rate in Zimbabwe is 28.2 percent, but that of the rural areas is extremely low, at 4.6 percent. The government of Zimbabwe pursues rural electrification, regarding it as the basis for the improvement of living standards in rural villages. In rural areas, houses are sporadically located. Relatively low-cost electrification can become possible with stand-alone photovoltaic generation systems that require no costly utility lines.

A local company has been established to manufacture solar panels and related components, paving the way to the popularization of photovoltaic systems. However, there are no substantial systems and policies to produce, market and maintain photovoltaic systems.

As a result, the government of Zimbabwe, with the results of the first and second preliminary project surveys conducted in 1994, formally requested Japan's assistance to surveys on rural electrification by solar power. Specifically, Japan has been requested to conduct feasibility surveys and evaluate the potentiality of solar power generation as a means of rural electrification. One of the purposes of the survey is to transfer technologies and know-how, including research methods, by holding training sessions for officials in Zimbabwe.

Project: The Project for the Environmental Protection and safety Training Center of the Ministry of Coal Industry

Ministries and Agencies in charge: the Ministry of Foreign Affairs and Japan International Cooperation Agency（JICA）

Recipient: China

Period and form of assistance: 1997-2002/project-type technical cooperation

Purpose and outline: Technical instructions and construction of facilities aimed at environmental protection in the coal-mining industry

Content of project: China is the world's largest coal producer and consumer. Coals account for 70 percent of the nation's primary energy sources. However, highly sulfuric and highly carbolic coals are extensively used without proper selections or quality controls. As a result, environmental problems caused by the use of coals are becoming serious. Furthermore, there have been many accidents in the process of producing coals, some of which led to fatal results. It is the ultimate goal to improve the safety involving coal mining to an appropriate level.

Under these circumstances, China has been required to conduct comprehensive training and introduce facilities aimed at protecting the environment and enhancing safety.

To that end, the Government of China requested Japan to extend technical cooperation to train personnel to acquire clean-coal technologies as well as safety, production and recycling technologies, with particular emphasis on training technical managers at modernized coal mines. In response, the Government of Japan has decided to extend technical assistance to China.

The objectives of the assistance is:

to help proliferate and improve technologies to protect the environment from coals, clean coal technologies and technologies to ensure safety at coal mines; and

to develop modern coal mining technologies at the center and introduce them to Chinese coal mines through comprehensive technological cooperation including dispatching experts to China, inviting Chinese trainees to Japan and providing necessary equipment.

Project: The Forest Extension Project in the Eastern Region of Paraguay

Ministries and Agencies in charge: the Ministry of Foreign Affairs, the Forestry Agency of the Ministry of Agriculture, Forestry and Fisheries, JICA

Recipient: The Forestry Bureau of Paraguay's Agriculture Ministry

Period and form of assistance: 1996-2001

Purpose and outline: to transfer forest extension methodologies to forest dependent populations in order to promote sustainable forest resources management in the eastern Paraguay.

Content of project :Ninety-eight percent of Paraguay's population is concentrated in the nation's eastern region which accounts for 40 percent of its total land area. The ratio of forests to the land area of the region declined from 44.1% in 1968 to 15% in 1990. By that year, only 11,000 hectares -- or only 0.2 percent of the deforested area over that period -- had been reforested.

Based on the request of the Government of Paraguay, the Government of Japan has transferred expertise and techniques of sustainable forest resources management that can be utilized to farmers, stock farm owners and residents of rural areas -- who could potentially play a leading role in reforestation -- in three areas where deforestation is progressing at a remarkable pace. Specifically, the Government of Japan extends the following comprehensive technical cooperation through the dispatch of experts, inviting trainees and provision of equipment:

(1) To conduct training of those who are concerned with forests.
(2) To improve extension methods and to refine extension materials and contents
(3) To establish seed-collecting forests and to maintain nurseries in order to produce planting stock
(4) To supply planting stock and forestry techniques including thinned wood utilization techniques for the promotion of forest extension activities.
(5) To set up and exhibit demonstration forests.
(6) To conduct socio-economic analysis.

Projects: 1.The Forest Conservation and Afforestation Project in Laos
2.Afforestation Center Project

Ministries and Agencies in cherge: the Ministry of Foreign Affairs, the Forestry Agency of the Ministry of Agriculture, Forestry Research Institute and the Ministry of Education, JICA,

Recipients: Laos

Period and form of assistance: 1996-2003 (Technological Cooperation) 1998, Grant Aid, 416 million yen)

Purpose and outline: to transfer afforestation techniques

Content of project: Rapid deforestation is under way in Laos. The ratio of forests to the nation's total land area, which stood at 70% in 1940, had declined to 47% by 1989. As the request of the Lao Government, the Government of Japan has extended comprehensive technical assistance consisting of the dispatch of experts, inviting trainees and provision of necessary equipment to Laos in order to prepare forest management plans with the participation by local people, to improve and develop forest management techniques, and to establish demonstration forests.

Furthermore, Japan has extended grant aid to build the Afforestation Center in SomBoon sub-district, Vientiane Province, and provides necessary equipment to experts in accordance with the plan on the Afforestation Center. The Center is supposed to be used in conjunction with Plan 1.

Project: Project for Transferring Clean Coal Technology

Ministries in charge: the New Energy and Industrial Technology Development Organization（NEDO）
Period and form of assistance: since 1996/Green Aid Plan（GAP）

Purpose amd outline: Inviting trainees specializing in measures to protect the environment from energy
Content of project: The project is being implemented as assistance for a human resources development project which is part of energy environmental technological cooperation among GAPs.

NEDO has established the Clean Coal Technology Center（CCTC） and implemented a variety of CCTC-related projects, such as technological development, international cooperation and exchanges of information in order to promote the development and proliferation of clean coal technology（CCT） aimed at protecting the environment from being damaged by the use of coals.

Under this project, implemented as an international cooperation project among CCTC projects, the Government of Japan invites and trains technicians from countries in the Asia-Pacific region with the aim of helping deepen their understanding of introducing and proliferating CCTC and technologies of utilizing coals as well as upgrading their skills.

So far, the Government of Japan has invited and trained 169 technicians and other experts from China, Indonesia, Thailand, the Philippines and other Asian countries. Among CCTs, the circulating and floating floor boiler technology, aimed at increasing the efficiency of using coals, is expected to reduce carbon dioxide emissions if introduced.

＊ NEDO : New Energy and Industrial Technology Development Organization

＊ GAP is a cooperative program aimed at transferring and spreading energy and environmental protection technologies based on Japan's experiences and technologies of combating pollution, and thereby supporting self efforts made by developing countries to protect their environment.

Project: Research Cooperation Project on the practical use of industrial waste water treatment technology for prevention of global warming

Ministries and Agencies in charge: NEDO

Recipient: Thailand

Period and form of assistance: 1998-2000/GAP（ODA）

Purpose and outline: Cooperation in conducting research on development on putting into practical use technologies of recovering methane from waste water, and suppressing CO2 emissions

Content of project: Among GAPs, this project is implemented as research cooperation as part of technological cooperation in protecting the environment from energy consumption.

From the viewpoint of preventing global warming and water contamination, the Government of Japan has extended cooperation to the Thai foodstuff industry in its research into waste water treatment technologies -- aimed at treating organic substances in waste water, with an anaerobic process, recovering methane which is a greenhouse gases and thereby reducing substances that contaminate water -- with an eye to putting it into practical use.

By 1997, Japan and research institutes in the recipient country had developed a waste water treatment system. By putting the system into practical use, the project is aimed at establishing the technology of suppressing CO2 from lagoons（ponds that collects and purify waste water from factories） and recovering methane, thereby establishing the technology of efficiently dissolving and reducing substances that contaminate water.

Specifically, the Government of Japan dispatches experts, provides equipment to design and build plants for practical use and invite trainees to Japan.

Project: Holding of the Asia-Pacific Seminar on Climate Change and establishment of Asia-Pacific Network on Climate Change

Ministries and Agencies in charge: the Environment Agency

Recipients: countries in the Asia-Pacific region

Period and type of assistance: since 1991/organizing seminars, helping establish a network of exchanging information of technologies

Purpose: Raising awareness of climate change supporting the efforts being made by countries in the Asia-Pacific region to exchange information on their experiences and step up their efforts to prevent global warming as well as transferring technologies through the formation of a network of exchanges of information on technologies

Content of project: Many of the countries in the Asia-Pacific region have compiled a list of greenhouse gases, established the system of exchanges of information and implemented measures to help reduce emissions of greenhouse gases, such as promoting the efficient use of energy.

Under these circumstances, the Government of Japan has contributed to technological transfer by organizing the Asia-Pacific seminar on global warming on eight occasions to raise the awareness of climate changes, promoting exchanges of experiences, supporting the efforts being made by countries in the region to combat global warming and creating a network for exchanges of information on technologies since 1991.

Specifically, Japan agreed at the eight seminar in 1998 to create a regional information network aimed at facilitating access to information on science, research administration and systems including the state-of-the-art technologies, and exchanges of information.

Japan has made full use of the existing websites to create a regional information network with clearing house functions, called the Asia-Pacific climate change information network (AP NET), which gives easy access to scientific and technological information. Furthermore, Japan supports efforts made by countries in the Asia-Pacific region to develop abilities to compile a list of information on climate changes and utilize the Internet.

Japan is determined to step up these efforts and promote technological cooperation by dispatching experts and organizing training workshops.

Project: AOTS Technical Training Program

Ministries and Agencies in charge: The Association for Overseas Technical Scholarship（AOTS）, private companies

Recipients: developing countries

Period and form of assistance: since 1959/trainees acceptance. etc（technical cooperation）

Purpose and outline: Projects regarding the acceptance of engineers and others from developing countries and training for them

Content of project:

AOTS is a private-based technical cooperation organization that implements projects regarding the acceptance of industrial technicians and others from overseas and training for them（including overseas training） and thereby promote international economic cooperation with the aim of contributing to mutual economic development and friendly relations.

By fiscal 1997, the association had had trained nearly 74,000 trainees since it started the project. The project is subsidized by the ODA budget.

Also as part of the project, the association have implemented projects of inviting environmental technicians from Asian countries by making use of excellent environmental technologies held by Japan's private sector, these projects were initiated in fiscal 1998. Some projects of these are expected to lead to efficient use of energy and improvement in productivity, thereby contributing to reductions in CO2 emissions.

Project: JODC Expert Dispatch program

Undertakers: the Japan Overseas Development Corporation（JODC）, private companies

Recipients: developing countries

Period and form of assistance: since 1979/dispatch of experts（technical cooperation）

Purpose and outline: projects regarding the dispatch of experts to overseas private companies

Content of project: JODC was established in 1970 as a private-based technical-cooperation as part of Japan's overseas economic and technical cooperation program.

The association implements private-sector experts dispatch projects subsidized by the ODA budget. By fiscal 1997, the association had dispatched about 2,800 experts in these projects. Some projects of these are expected to contribute to efficient use of energy improvement inproductivity and therefore reductions in CO2 emissions.

Project: APEC Virtual Center（Japan） for Environmental Technology Exchange
Ministries and Agencies in charge: APEC Virtual Center for Environmental Technology Exchange: Consist of enterprises, local governments, economic groups, research institute（RITE, GEC, NEDO, ILEC） and human resource exchanging organs（ JICA, ICETT, PREX, AOTS） etc.

RITE: Research Institute of Innovative Technology for the Earth
GEC: Global Environment Centre Foundation
NEDO: New Energy and Industrial Technology Development Organization
JICA: Japan International Cooperation Agency
ILEC: International Lake Environment Committee Foundation
ICETT: International Center for Environmental Technology Transfer
AOTS: The Association for Overseas Technical Scholarship
PREX: Pacific Resource Exchange Center

Recipients: APEC member countries

Period and form of assistance: since 1996/forming a network for environmental technology exchanges

Purpose: Contribute to the exchange, dissemination and transfer of environmental technology by having a home page on the Internet and linking it with the home pages of organizations in APEC member economies.

Content of project: An information network that will store, share and publicize the results of research and technological development scattering around the world will be effective in efficiently developing and spreading innovative global environment protection technologies and transferring these technologies to developing countries.

The APEC Virtual Center （Japan） for Environmental Technology Exchange has opened a home page on the Internet, with links to the virtual centers of respective APEC member countries and thereby promoted exchanges of information on technologies aimed at not only overcoming industrial pollution but also reducing carbon dioxide emissions and overall environmental protection technologies. This project was originally proposed by Japan and officially endorsed by the APEC industrial technology working group. The project allows recipients to easily search and obtain information on environmental technologies scattering and stored APEC member economies.

Currently, the virtual centers in Japan, Australia and Chinese Taipei are already in operation and linked to various home pages on environmental technologies, improvement methods. In future, the network can be enlarged in order to exchange more information on environmental technologies（http://www.apec-vc.or.jp/）

Project: Technical transfer in CTI（Climate Technology Initiative）

Ministers and Agencies in charge: the Government of Japan（in cooperation with other OECD/IEA member countries）, NEDO

Recipients: Developing countries

Period and form of assistant: since 1998/organizing workshops and seminars

Purpose and outline:

Japan and other member countries of OECD/IEA jointly organize energy-saving workshops and technical-transfer seminars among others and develop tools for searching information which will be essential for efficient proliferation of climate technologies. These are the core projects of the CTI which was established at the proposal of Japan and other OECD/IEA member countries with the aim of developing and spreading technologies to curb climate changes and thereby helping achieve the goal set by the UNFCCC.

Content of project: As technical transfer activities, the first technical transfer seminar for Asian countries was held in Beijing in May 1998. Since then, such area-focused seminars have been held for governments and industries. In March of this year, a technical transfer seminar for southern Africa was held in Zimbabwe, to be followed by seminars in Eastern Europe, Central Europe and South America. Japan and other OECD/IEA member countries are supporting these activities by dispatching instructors and shouldering some costs of organizing these activities. Moreover, an energy-saving training workshop for experts in the industries of developing countries was held in Japan in October 1998 and in the United States in March 1999. Since last year's projects were effective, an upgraded workshop will be held at a training center in Japan this year. Japan will continue to play an active role in energy-saving training workshops.

Furthermore, member countries are developing tools for helping developing countries to efficiently search information they need from various databases on global environment protection technologies, such as the APEC Virtual Center.

These activities are funded by individual CTI member countries or their common fund.