

India's Environmental Strategy and Future Cooperation with Japan

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The Kyoto Protocol came into force in February 2005. For Japan, which is required to reduce its greenhouse gas (GHG) emissions by 6 percent below the level of 1990, it is vital to cooperate with India, which is the largest GHG emission country next to China among the developing countries, for reducing her GHG emissions.

In India, environmental measures are addressed under a five-year plan in linkage with the Millennium Development Goals (MDGs) adopted by the United Nations. These measures are not intended to serve only a single purpose but concurrently pursue multiple purposes such as the prevention of pollution, the prevention of global warming and the alleviation of poverty.

In recent years, improvements have been made in terms of the implementation of these measures such as by an order of the Supreme Court. However, because of limited resources and India's vast land area, it is difficult to uniformly and simultaneously implement environmental measures. Consequently, it is necessary to first implement environmental measures on a site basis such as at pollution sources, affected villages and plants causing pollution. These measures should then be networked and expanded to include surrounding areas.

In the past, environmental cooperation between Japan and India was principally implemented through official development assistance (ODA). The future framework of cooperation will involve clean development mechanism (CDM) projects and will use local plants of Japanese companies operating in India as the venues. Accordingly, it is important to promote economic interchange that can serve as the basis for such future cooperative activities in the environmental field.

I The Kyoto Protocol and Japan's Responsibility

In February 2005, the Kyoto Protocol, which was adopted at the Third Session of the Conference of the Parties (COP3) to the UN Framework Convention on Climate Change, came into force. Through the implementation of the Kyoto Protocol, it has become Japan's responsibility to reduce its emissions of greenhouse gases (GHG) by an average of 6 percent below 1990 levels over the period from 2008 to 2012. Because it is difficult for Japan to independently achieve this reduction target, Japan will implement projects to achieve this goal in the framework of international cooperation. Not only China but also India is being given increased attention as a partner in the endeavors to reduce emissions.

In recent years, a number of moves have been taken to accelerate exchange between Japan and India in economic activities as well, with the initiative taken by the government in many cases. While the Japan-India exchange activities in the business field had at one time rapidly decreased with India's underground nuclear test in 1998, these activities are now gradually increasing.

Similarly, in the environmental field, some activities, such as survey programs conducted by the Japan International Cooperation Agency (JICA), the Japan External Trade Organization (JETRO) and the Institute of Developing Economies (IDE), as well as the Asia-Pacific Integrated Model (AIM) programs implemented by the National Institute for Environmental Studies are ongoing. However, only a limited amount of information is available in Japan on India's current environmental strategy.

Under these circumstances, Nomura Research Institute (NRI) conducted studies on the current status of the environmental measures adopted by India and on the possibility of collaboration between Japan and India in the environmental field as a member company for the joint international studies conducted under the auspices

of the Cabinet Office's Economic and Social Research Institute in fiscal 2004 (April 2004 – March 2005). This paper outlines such studies and examines the appropriate means of collaboration between Japan and India in the environmental field.

First, in order to consider the necessity of Japan-India environmental cooperation, the following section outlines India's position in the world in terms of environmental issues, its relationship with Japan, and its economic situation. Following this, with reference to the basic concept of India's environmental strategy, the trends of individual environmental measures and global warming prevention measures as well as the policies adopted in recent years to ensure the effectiveness of these measures are discussed. Finally, some appropriate ways are examined for future cooperation in environmental issues between Japan and India.

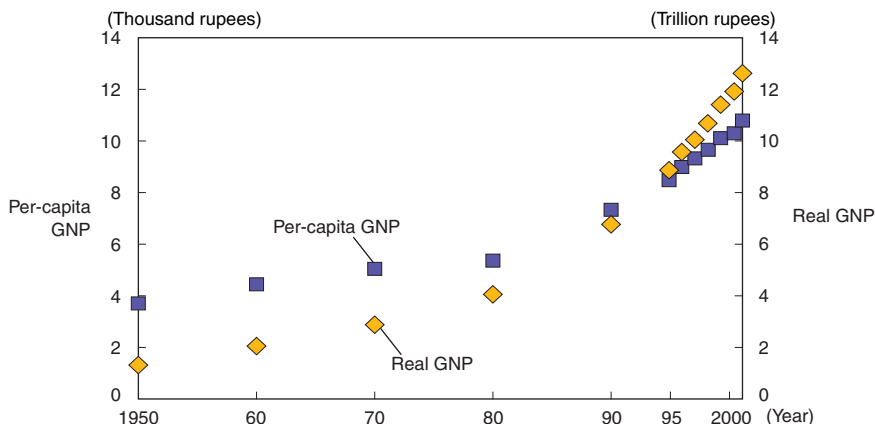
II Considering Japan-India Environmental Cooperation

In dealing with the issues of global warming, the current Japan-India environmental cooperation framework, which is focused on official development assistance (ODA) programs, should be reviewed from two perspectives: the large quantity of CO₂ (carbon dioxide) emissions in India and the change in recent years in India's policy to accept ODA.

With respect to the first perspective, in terms of the rate of CO₂ emissions in each country in fiscal 2000, India ranks fifth (4%) in the world, following the United States (24%), China (13%), Russia (10%) and Japan (5%).

India is positioned as a developing country under the Kyoto Protocol. Unlike the industrial countries, no total emission allowances were allocated at present. However, when we look at India's economic activities, we see that it has recently been achieving stable economic growth (Figure 1). In consideration of its capability of

Figure 1. Growth of India's GNP



Notes: 1 rupee = about 2.5 yen; GNP = gross national product.
Source: India Central Statistical Organization.

achieving further economic growth and its increase in population, future increases in CO₂ emissions are inevitable. Actually, some projections indicate that India's CO₂ emissions may exceed those of Japan by 2010 (Figure 2).

These circumstances suggest that India's impact on the issue of global warming in the future will be extremely significant.

The second perspective concerns India's position as a leader of the developing countries. In 2003, India announced its policy to accept overseas assistance and decided to accept assistance only from several countries such as the United Kingdom, the United States and Japan, which have so far provided assistance totaling a large sum of money, in addition to international organizations. While India expanded the list of countries from which it would accept assistance to include the G8 (the Group of Eight) after the change in its administration in 2004, India appears to have started asserting itself as being at a position next to the G8 countries in terms of international economy.

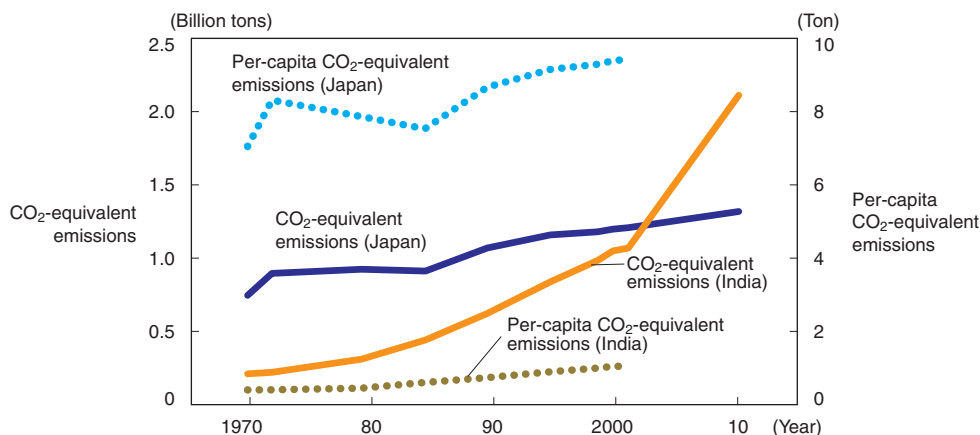
The amount of ODA from Japan to India has been following an increasing trend since 2000 (Figure 3), and a

variety of projects is currently being implemented in the environmental field (Table 1).

However, as represented by discussions in recent years on the reduction of ODA for China, environmental cooperation in the form of ODA is in a declining trend by keeping pace with the economic growth of the recipient countries. If India's growth continues smoothly in the future, the sustainability of environmental cooperation relying only on ODA is considered weak. Furthermore, there is no guarantee that India would continue to accept ODA unconditionally. At the same time, the method of cooperation between developing and developed countries known as the clean development mechanism (CDM)¹ has been provided in the Kyoto mechanisms that constitute the framework to reduce GHG emissions, which was adopted under the Kyoto Protocol. This means that systems of cooperation other than conventional ODA are specifically provided from the standpoint of dealing with the issues of global warming.

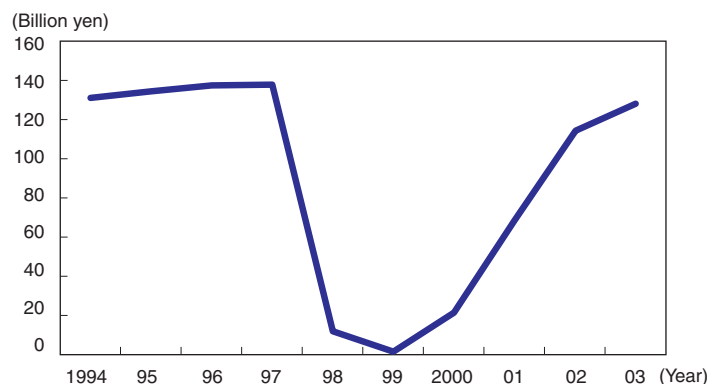
In light of the situation explained above, while the utilization of ODA is still an effective option, the importance of examining methods other than ODA is

Figure 2. Comparison of CO₂-Equivalent Emissions between Japan and India



Notes: (1) Japan's projected emission for 2010 is a high estimate by the Industrial Structure Council. (2) CO₂-equivalents are calculated by converting GHG into CO₂.
 Source: Compiled based on P. R. Shukla et al., "Conclusion: Policy Insights, AIM Cooperation and Road Ahead," in *Climate Policy Assessment for India*, Universities Press, 2004, etc.

Figure 3. Record of Japan's Economic Cooperation with India



Source: Compiled based on data of the Ministry of Foreign Affairs of Japan.

Table 1. Yen Loans to India

	Project name	Recipient organization	Field
Fiscal 2002	Delhi Mass Rapid Transport System Project (IV)	Delhi Metro Rail Corporation	Railway
	Punjab Afforestation Project (II)	Department of Forests and Wildlife, Government of Punjab	Forestry
	Rajasthan Forestry and Biodiversity Project	Rajasthan Forestry Department	Forestry
	Yamuna Action Plan Project (II)	Ministry of Environment and Forests, Government of India	Water and sewage, public health
	Ajanta-Ellora Conservation and Tourism Development Project (II)	Ministry of Tourism, Government of India	Tourism
Fiscal 2003	Delhi Mass Rapid Transport System Project (V)	Delhi Metro Rail Corporation	Railway
	Uiam Stage-II Hydro Power Station Renovation and Modernization Project	Meghalaya State Electricity Board	Power plant
	Bisalpur Jaipur Water Supply Project	Public Health Engineering Department, Rajasthan	Water and sewage, public health
	Integrated Natural Resource Management and Poverty Reduction Project in Haryana	Haryana Forest Department	Forestry

Note: Compiled based on the materials of the Ministry of Foreign Affairs of Japan.

increasing in securing sustainable environmental cooperation between India and Japan.

III Current Status of Environmental Measures in India

1 Basic Concept of Environmental Measures

Before we discuss the appropriate ways of environmental cooperation between Japan and India, the following section reviews the current status of environmental measures in India.

In India, environmental issues, social issues such as poverty alleviation and economic development are, in principle, treated as being interrelated; no measures have been adopted that focus only on the issues of global warming (Figure 4).²

The resolution of environmental issues has been discussed in the same context as that for mitigating poverty

and resolving education problems at the World Summit on Sustainable Development (in Johannesburg, South Africa) and in the framework of the Millennium Development Goals (MDGs).³ By following the outlook of the international community, the government of India has included individual measures to protect the environment and measures to prevent global warming within the framework of measures to deal with poverty and other social issues in the country.

In India, the Planning Commission of India's government (the organization responsible for formulating plans on the national level) has held conferences with all ministries and agencies, industrial associations, the Infrastructure Development Finance Corporation (IDFC; the financial institution for the construction of infrastructure) and non-governmental organizations (NGOs) to incorporate measures for the prevention of global warming into the tenth five-year plan to be implemented from 2003 to 2007.

Table 2 outlines the relationships between the MDGs of the United Nations and the tenth five-year plan and the issues of climate change in India.⁴ According to this

Figure 4. Relationship between MDGs and India's Tenth Five-Year Plan

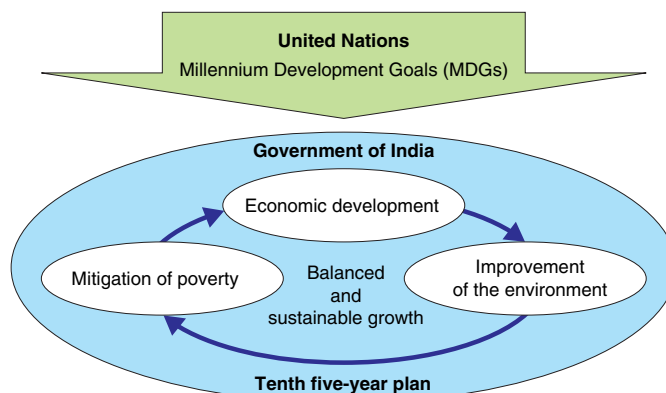


Table 2. Millennium Development Goals, Related Indian Targets and Climate Change

MDGs and global targets	Targets in and beyond India's 10th Five-Year Plan	How these address climate change concerns
Goal 7: Ensure environmental sustainability	Increase in forest and tree cover in India to 25% by 2007 and 33% by 2012 (from 23% in 2001)	Lower GHG emissions and local emissions; lower fossil fuel imports; reduced pressure on land, resources and ecosystems
Target 9: Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources	Sustained access to potable drinking water to all villages by 2007	Higher adaptive capacity to climate variability due to enhanced water supply
Target 10: Halve the proportion of people without sustainable access to safe drinking water by 2015	Commission 14.4 GW hydro and 3 GW by other renewables in total power generation capacity additions of 41.1 GW between 2002 – 2007	Resilience to cope with health impacts of climate change due to access to clean water and electricity
Target 11: Achieve a significant improvement in the lives of at least 100 million slum dwellers by 2020	Electrify 62,000 villages through conventional grid expansion by 2007 and the remaining 18,000 villages through decentralized non-conventional sources such as solar, wind, small hydro and biomass by 2012	Higher adaptive capacity due to enhanced reach of health/education facilities dependent on electrical equipment and flexibility of economic activities in rural areas
	Cleaning of all major polluted rivers by 2007 and other designated sections by 2012	

Source: Compiled based on P. R. Shukla et al., *Climate Change and India: Vulnerability Assessment and Adaptation*, Universities Press, 2004.

table, one goal of the MDGs is linked with several goals of the tenth five-year plan. This confirms that the tenth five-year plan of the government of India has the same awareness of problems and orientation as the international community.

For example, in line with the Millennium Development Goal of sustainable development, the tenth five-year plan of the government of India is aimed at increasing the share of the national land occupied by forested areas from 23 percent in 2001 to 25 percent in 2007 and 33 percent in 2012. As implications of these measures in climate change, the plan cites the mitigation of GHG emissions, the reduction of fossil fuel imports, the preservation of ecosystems, etc.

As such, India gives equal priority to all issues such as industrial development, poverty alleviation and environmental protection, and is attempting to implement comprehensive measures that encompass all of these issues. In dealing with environmental problems, both industry and local governments are working to raise awareness of the issues among citizens and companies. In Delhi, for example, there is a program underway for relocating small and medium enterprises in industries such as metal plating to suburban sites to improve the environment within the city, while promoting environmental measures in industrial centers. In India, there is no trade-off (antinomy) between the policy for development and measures addressing the environment and climate change; measures may be regarded as primarily aimed at attaining both economic growth and environmental improvement.⁵

2 Environmental Regulations and Management System in India⁶

After the Stockholm Summit in 1972, India enacted some laws stipulating general matters related to the environment (Table 3). In addition, individual regulations

were enacted for water quality, air quality, the mining industry, waste disposal, the seas, wildlife, forestry, etc.

Under supervision of the Ministry of Environment and Forests, the underlying environmental management system in India consists of the Central Pollution Control Board, environmental protection agencies of states and municipalities, and pollution control boards, which actually implement management activities.

For example, in Gujarat, the Gujarat Pollution Control Board has 200 engineers and scientists to ensure compliance with laws and regulations at plants, etc. Board members periodically inspect plants to identify possible sources of potential pollution and objectively analyze the current situation based on the measured data. The board requires all plants to update their data concerning pollution every five years.

If the board finds evidence of pollution at a plant, it issues an order to close the plant on a phased basis. The plant is first given 15 days to remedy the situation. However, if the detected pollution is excessively serious, a closure order is immediately issued. If the plant does not comply with the closure order, the board initiates legal action. After the closure of the plant, if measures are taken and the situation causing the pollution is remedied, the board permits the plant to resume operations. Following the resumption of operations, inspections are conducted every three months to monitor the

Table 3. Laws Related to the Environment in India (Excerpt)

Year of enactment	Law
1976	Forty-Second Amendment to the Constitution of India
1986	The Environment (Protection) Act
1994	Notification on Environmental Impact Assessment
1995	The National Environment Tribunal Act
1997	The National Environment Appellate Authority Act

Source: JICA, *Country Profile on Environment (India)*, 2002.

Table 4. Industries Requiring Implementation of the Environment Impact Assessment

Industries where investment is Rs. 500 million or above	Industries where investment is Rs. 10 million or above
<ul style="list-style-type: none"> • Petroleum refineries including crude and product pipelines • Chemical fertilizers (nitrogenous and phosphorus) excluding single super phosphate • Petroleum complexes and petrochemical intermediates • Exploration, production, transportation and storage of oil and gas • Synthetic rubber • Hydrocyanic acid and its derivatives • Primary metallurgical industries • Electric arc furnaces • Electrochemical industry • Viscose staple fibre and filament yarn • Storage batteries integrated with manufacture of oxides of lead and lead antimony alloy • Pulp, paper and newsprint • Cement 	<ul style="list-style-type: none"> • Pesticides • Bulk drugs and pharmaceuticals • Asbestos and related products • Integrated paint complex including manufacture of resin and basic raw materials • Distilleries • Raw skins and hides • Dyes • Glass industry • Electroplating

Source: JICA, *Country Profile on Environment (India)*, 2002.

situation. The number of orders requiring plant closures due to pollution that were issued in 2003 was 450 for a total of 19,000 plants located in Gujarat; the number of warnings that were issued that same year was 3,000.

The notifications issued in 1994 were related to the environmental impact assessment. The types of industries designated by the government that are listed in Table 4 are required to submit an “environmental impact assessment report (including the health and safety of workers),” an “environmental management plan” and a “risk analysis report.” If required, a “disaster management plan” must also be submitted. If the relocation of 1,000 or more inhabitants is necessary, a “rehabilitation plan” must be submitted.

If these procedures are taken, an “environmental implementation permit” is issued. This permit is required in order to convert the application form (letter of intent) that is necessary to conduct manufacturing operations in India into an industrial license. This means that manufacturing operations can only be started after compliance with environmental laws and regulations is confirmed by a state’s pollution control board, and a permit is issued. This mechanism ensures compliance with environmental laws and regulations by a relatively large number of companies that are particularly regarded as sources of environmental pollution. At the same time, companies are introducing the latest in environmental facilities to comply with applicable regulations, and the number of companies using outdated facilities is declining due to bankruptcy, etc.

Through these control measures, the problems of environmental pollution are being resolved as compared to the situation in the past. Conversely, these measures are facilitating the relocation of plants presenting pollution problems to suburban areas, causing increased pollution in these areas.

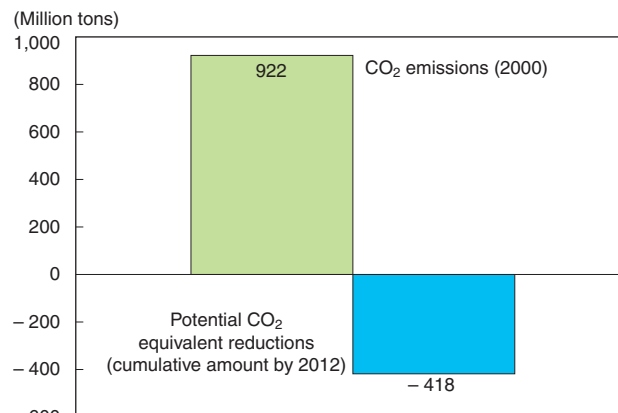
3 Possibility of CDM in India

Although measures that focus only on the prevention of global warming are not being adopted in India, approaches to the CDM are being taken under the framework of the Kyoto Protocol. On January 31, 2005, the National Strategic Study (NSS) was announced in India.⁷ Based on NSS, the following section outlines the potential of the reduction of GHG emissions.

While the total CO₂ emissions in India were 922 million tons in 2000, NSS projects that the volume of CO₂ equivalents that can be reduced by 2012 is 418 million tons (Figure 5).

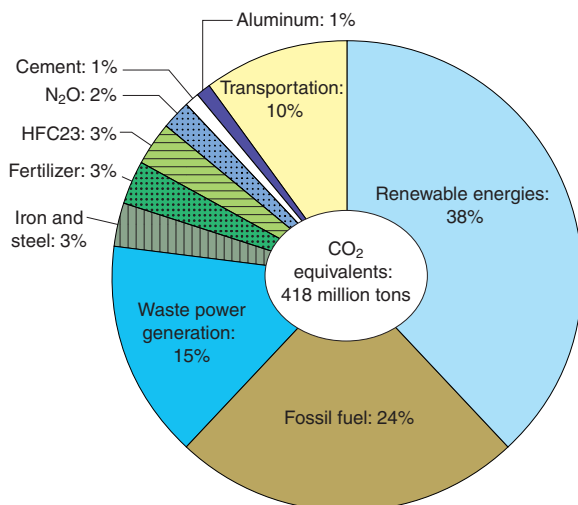
Figure 6 indicates the potential reduction of CO₂ equivalents by field. The highest reduction potential is seen in the field of power generation using renewable energy, followed by fossil fuel-based power generation. Power generation using solid waste occupies the third rank. The transportation field accounts for 10 percent of

Figure 5. CO₂ Emissions from Fossil Fuels and Potential CO₂ Equivalent Emission Reductions in India



Source: Compiled based on *CDM Implementation in India; The National Strategic Study*, 2005, World Bank.

Figure 6. Potential CO₂ Equivalent Emission Reductions by Sector



Note: N₂O = nitrogen monoxide.

Source: Compiled based on *CDM Implementation in India; the National Strategic Study, 2005*, World Bank.

the total, showing a large reduction potential. Following these fields are steel and fertilizers where improved efficiency will also lead to a reduction of CO₂ emissions.

Studies have already begun in India concerning these possibilities of reducing CO₂ emissions. Funds have been provided by assistance organizations in a number of countries, and feasibility studies and surveys to create project design specifications are ongoing. Currently, the countries providing funds include European countries such as the United Kingdom, Canada and Japan. In particular, a large amount of funds has been provided for improving energy efficiency and biomass-related projects.

At present, there is only one case in Japan in which subsidies were provided for feasibility studies by the Global Environment Center (GEC) and the New Energy and Industrial Technology Development Organization (NEDO) in relation to CDM projects in India. Newspapers report that only about three cooperation CDM projects have been established between Japan and India. Considering ongoing moves to promote CDM projects in India, it can be said that Japan lags somewhat behind other countries. However, because CDM feasibility studies by GEC and NEDO are being conducted chiefly for countries for which the NSS was issued, it is expected that the number of cooperation CDM projects in India between Japan and India will gradually increase.

4 Recent Moves to Secure the Effectiveness of Regulations

A variety of moves has begun in India to prevent pollution and global warming. However, it is unclear whether these moves are actually functioning efficiently. It has long been said that environmental measures in develop-

ing countries such as India are vulnerable in terms of their implementation. Accordingly, the following section examines five possible approaches to be taken for improving the effectiveness of regulations in India.

(1) Public hearing

As part of the environmental impact assessment system, a legal framework has been established in which residents can express their views and opinions. Companies operating plants must announce the target values, etc. for their environmental management activities in newspapers and other media, and must hear the opinions of residents during a prescribed period. The purpose of this public hearing is to obtain the consent of the affected residents. Such a public hearing is required as a precondition for acquiring the environmental implementation permit explained previously, and constitutes a mechanism in which the opinions of residents are reflected in environmental management by companies.⁸

(2) Voluntary activities by companies

In India, there is a system in which a company and the government reach an agreement on the deadline of satisfying regulatory standards based on the environmental management capacity of the company and the status of infrastructure developed by the government. This is known as Corporate Responsibility for Environmental Protection (CREP). Observance of the agreed deadline is mandatory. If the company fails to meet this deadline, it becomes subject to punitive measures such as revocation of its business license. However, as the CREP system is now in the preparatory stage before achievement of the prescribed standards, future moves related to CREP merit attention.

(3) Building capacity

Among the measures to address climate change, the highest priority is given to building capacity. At present, the Confederation of Indian Industry (CII) and the Federation of Indian Chambers of Commerce and Industry (FICCI) are promoting activities to disseminate information among manufacturers and financial firms. Under the current situation, Indian companies have almost no information on climate change, and thus their level of awareness of such change is low. In the future, their awareness level will gradually increase through these efforts.

In addition, ODA and other forms of assistance from developed countries are being used to build capacity among affected residents. Representative examples include tree-planting projects supported by the Japan Bank for International Cooperation (JBIC), projects for construction of wastewater treatment plants and work supervision for construction of the Delhi Metro.

(4) Progress of public interest litigation

Due to India's long-standing democracy, the power of the judiciary works efficiently in relation to public

administration. In recent years, it has also been functioning effectively with respect to environmental administration.

For example, if pollution is caused by a company in an area of jurisdiction, three steps are taken for examination, which consists of (1) a warning or order by the Pollution Control Board, (2) public interest litigation (PIL) and (3) rulings by a high court or the Supreme Court. The rulings have binding force, and this system assures that the regulations are effective. Public interest litigation ensures a system in which residents can engage in environmental litigation.

As an example of issuing a court order, a trial concerning the introduction of CNG (compressed natural gas) buses in Delhi was held in 2000. The order to convert fuel to CNG is one of the reasons that Delhi has more CNG vehicles than many other cities. In the past, there were complaints about air pollution, and the citizens in Delhi sued the city. As a result of the suit, the Supreme Court ordered the Delhi Transport Corporation to convert its buses to CNG vehicles by April 1, 2000. In addition, it ordered the city government to convert the fuel of autorickshas and taxicabs manufactured before the 1990s to CNG and also ordered that private automobiles meet the Euro II emission standards, which are the gas emission standards of 1996 for European automobiles.⁹

According to the rulings by the Supreme Court, what impeded the introduction of CNG was not the issue of the possibility of using such technology, but was the lack of a mechanism compelling the use of CNG. As of December 2004, all local transportation facilities such as buses, taxicabs and autorickshas that operate in the city of Delhi use CNG as fuel.

Another example of a court order was to prevent odor during the transportation of waste. A court ordered that trucks hauling waste must cover their loads with tarps.

(5) Policy-oriented financial system

One of the institutions promoting the use of renewable energy is the Indian Renewable Energy Development Agency (IREDA), a governmental financial institution affiliated with the Ministry of Non-Conventional Energy (MNES). The principal business of the IREDA consists of finance and promoting the achievement of autonomous and sustainable growth by companies. In addition to financing new energy projects, it functions as a window for subsidies from the MNES.

The IREDA has so far been involved in 1,635 projects, including 724 for photovoltaic power generation, 463 for wind power generation and 44 for biomass power generation. Its financing is available to all corporate organizations, whether public or private. However, its financing rules limit the recipients to Indian-owned companies, and loans are not available to foreign countries or foreign capital companies. To enable the provision of loans to foreign capital companies, the companies must establish joint ventures with Indian firms.

IV Japan-India Collaboration in the Environmental Field

1 Two Perspectives

This paper has so far introduced the basic concept of environmental measures in India including the prevention of global warming, individual environmental measures and the possibility of reducing CO₂ emissions. It is important to keep the following two perspectives in mind to understand these environmental measures in India.

First, an environmental measure is not intended to address only a single individual measure such as the prevention of pollution or global warming. With respect to water quality management, for example, the headwaters of a river are used as sources of water downstream. If the quality of water in a river is improved, not as much energy is required for water purification. Measures to prevent water pollution can concurrently serve as measures to prevent global warming, to promote the health of residents and to preserve ecosystems. Such an approach to serve multiple purposes by one measure can be cited as one of the features of India's environmental policies.

Second, the vast size of India's land significantly hinders the promotion of environmental measures. Under the federal government structure, the implementation of environmental measures is the responsibility of state governments and municipalities. Because of such indirect rule, it is difficult to develop uniform measures nationwide. Such huge land areas also make it extremely difficult to take environmental measures at a single stroke from the viewpoint of the funds required. In addition, through the tightening of regulations, plants have been moved to suburban areas, spreading pollution. In addition, India is thought of as being broadly divided into five areas, each having different characteristics. Accordingly, the methodologies to implement environmental measures differ and the characteristics of the people who are responsible for implementing such measures also vary. This means that the implementation as well as the effects of the measures is not the same.

With regard to environmental measures, these characteristics make it important to first implement the measures properly and thoroughly at each location, such as an affected village, a plant causing pollution and a pollution source. As the next step, such measures should be expanded to cover the surrounding area. In other words, measures at specific locations should be expanded horizontally by networking multiple locations, etc. In this sense, in addition to individual environmental measures, the strategy involved in the evolution of the measures also becomes important.

In light of these perspectives, what should be done to promote cooperation between India and Japan in the environmental field?

2 Smoothly Progressing ODA vs. Slow CDM Moves

Possible cooperation schemes generally include ODA, cooperation projects in the private sector (e.g., technical cooperation), cooperation programs between the government of India and Japanese companies and between the government of Japan and Indian firms, and cooperation plans involving NGOs. However, when the specific techniques required for cooperation in the environmental field are considered, the current focus of the cooperative activities will be given to existing moves such as ODA, which represents programs of cooperation between the governments and CDM, which involves affiliation in the private sector in both countries.

India has already become the top recipient of Japanese ODA. Various projects have been implemented in the environmental field as well. Results were achieved as anticipated in fields such as tree planting, water supply and wastewater treatment facilities and municipal transport. According to a newspaper report, the government of India requested yen loans from the Japanese government in relation to the construction of express freight-only railways linking Delhi, Mumbai and Kolkata.¹⁰ As such, cooperation at the government level is moving forward with relative ease.

However, with respect to CDM projects that can be regarded as representative examples of cooperation on the private-sector level, the project of the reduction of GHG emissions by thermal oxidation of HFC23, which is jointly being implemented in Gujarat by Sumitomo Corporation and Gujarat Fluorochemicals, is the only project that was approved by the CDM Board (CDM supervisory organization) from among the CDM activities implemented by Japanese firms in India.

This project is the third project officially registered by the United Nations, and is the first one with Japan as a participant. The expected annual credit in this project is 3,380,000 tons of CO₂. While this project by Sumitomo is the leading project from among the CDM programs by Japanese firms, CDM activities by Japanese firms in India are relatively slow as compared to those in other countries.

CDM projects are essentially the same as other projects by private-sector companies and are not implemented unless expected revenues exceed the break-even point. In the case of CDM, emission credit referred to as certified emission reductions (CERs) is given. While this credit contributes to an increase in revenues as compared to ordinary projects, the cost to implement the procedures for approval as a CDM project increases. Consequently, the total project cost expands.

Whether the number of CDM projects by Japanese firms in India increases depends on how CER prices change and the balance between CER prices and the cost of approval procedures. What is expected to have a sig-

nificant influence before discussing such balance is the ease of implementing ordinary projects in India.

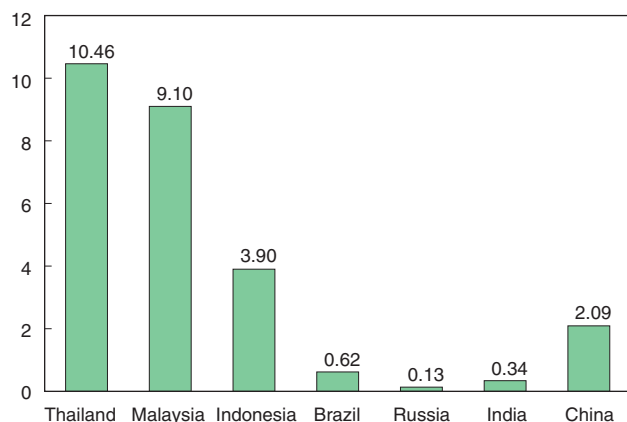
3 Japan Faces the Need to Resolve Resource Shortages

As of 2002, the total number of Japanese firms having local companies in India was 176. This number is smaller in comparison to that of local companies in Southeast Asia where many Japanese firms have established local companies and representative offices, China that is achieving rapid growth, Brazil and Russia. However, the economic scale of each country should be considered in comparing the number of local companies.

Figure 7 compares the number of local Japanese companies per 1 billion dollars of GDP of each country. The number of local Japanese companies per 1 billion dollars of GDP in India corresponds to only about one-sixth of the number of local Chinese companies and one-tenth of the number of local Indonesian companies, although the number is larger than the number of local Russian companies.

One of the reasons for such a small number of local Japanese companies in India is that Japanese firms believe that there are many factors that hinder advancement in the Indian market. Such factors, which are frequently cited, include underdeveloped infrastructure (electricity, roads, ports and communications), government of India contact points that do not function well, inefficiency, lack of transparency and inconsistency in the bureaucracy and complicated and time-consuming administrative procedures. Other factors discouraging progress by Japanese companies include insufficient measures for the preferential treatment of foreign capital, labor regulations, investment regulations, discrimination in corporate taxes, customs on yen loan projects, high tariff rates, foreign currency regulations, R&D

Figure 7. Number of Local Japanese Companies in India per 1 Billion Dollars of GDP



Sources: Compiled based on *Kaigai shinshutsu kigyō soran 2002 (kunibetsu hen)* (Comprehensive List of Companies Operating Businesses in Overseas Markets, 2002: By Country), Toyo Keizai, and *Data Book of the World, 2005*, Ninomiya Shoten Publishing, Co.

taxes, software taxes, bank-related regulations, regulatory capital requirements and loan limitations.¹¹

Accordingly, while Japanese firms are interested in the Indian market, it is not easy for them to move forward due to such obstacles. However, companies in other countries also face these obstructions. Nevertheless, some European, US and South Korean companies have already entered and even dominate the Indian market. For example, Hyundai (an automobile manufacturer) and Samsung (a consumer electronics manufacturer) have successfully established their brands in India. Similarly, Suzuki Motor Corporation and Honda Motor Co. (Japanese manufacturers) have already established their brands in the fields of automobiles and motorcycles. A plant manager of a local Japanese company points out that the issues that must be overcome to enter the Indian market are no different from those in other countries in Southeast Asia.¹²

Through interviews about this issue with Japanese companies, the Ministry of Economy, Trade and Industry of Japan and the Japan Chamber of Commerce and Industry, it was found that Japanese companies are now devoted to advancing into the Chinese market and are deeply engaged in responding to free trade agreements (FTAs) with Southeast Asian countries. Consequently, they lack the additional capacity to deal with the Indian market. In order to promote economic and environmental cooperation including CDM projects between Japan and India in the future, it is necessary to resolve Japan's shortage of resources.

4 Contribution to Environmental Education

Turning our eyes to activities other than CDM, we see that the factories of local Japanese companies in India are now serving as venues for environmental education.

For example, a factory of Denso India located in the suburbs of Delhi achieved zero emissions in 2003 (ultimately eliminating waste by converting one sector's waste into another's resources). The amount of waste generated before conversion was also reduced by 21 percent as compared to the level it had in 1999. In addition, energy consumption has also been reduced through separate collection of waste and its recycling, replacement of incandescent lights with fluorescent lights and introduction of a cogeneration system. Water consumption was reduced by 30 percent through water reclamation and reuse.

Other activities include the creation of a park (similar to "Forest of Toyota," the environmental education facilities constructed by Toyota Motor Corporation, although the scale is smaller) within the plant premises; the creation of blocks from residual materials of wastewater treatment and ash generated in neighboring power plants; the production of charcoal and fertilizers from raw garbage, which are donated to nearby agricultural

villages; and the establishment of a mechanism to develop groundwater by constructing a water reservoir from rainwater.

Denso India makes these facilities and activities available for use as research areas for the Indian Institute of Technology and provides a program of commendations for people engaged in environmental protection activities with distinguished achievements.

At present, the level of environmental awareness among small and medium enterprises and local companies in India is still low. However, it is expected that the environmental management level of domestic companies in India will increase if Japanese companies operating in India adopt globally accepted environmental standards and environmental management systems, and require their Indian suppliers to comply with these standards. In addition, Japanese companies are providing education to employees as part of their kaizen (continuous improvement) activities. Through such efforts, they not only promote improvement of the level of environmental awareness among employees, but also perform functions as the basis of environmental education in the community since employees are local residents.

5 Moving Toward Japan-India Environmental Cooperation

For Japan, which is required to reduce its CO₂ emissions based on the Kyoto Protocol that has come into force, it is essential to cooperate with India and other developing countries in the future. While growing cases have been seen in moves in the private sector, such as CDM projects and the use of a local Japanese company plant as the venue for environmental education, in addition to government moves including conventional ODA programs, it is important to understand the way of thinking of the partner country as the first step towards the promotion of cooperation. Suzuki, which achieved success in India, devoted a lot of time to fostering local plants.

While it is expected that an accelerated trend in CDM activities and the establishment of distribution and production centers in India by Japanese firms will be seen in the future, it is difficult to immediately understand the situation of India having such vast land areas. Accordingly, how to establish a partnership with Indian firms and NGOs that have a good knowledge of local situations through environmental cooperation and/or economic interchange would constitute the key to the vitalization of Japan-India relationships.

Notes

- (1) CDM is a mechanism in which Annex I countries (developed countries) implement energy-saving projects in non-Annex I countries (developing countries), and Annex I countries acquire emission credits known as CERs (certified emission reductions) that correspond to

the additional reduction amount achieved through such projects.

- (2) Based on an interview with P. R. Shukla of the Indian Institute of Management, Ahmedabad.
- (3) MDGs refer to a series of measurable and time-bound targets adopted at the United Nations Millennium Summit in September 2000 for overcoming global issues such as poverty, hunger, disease, illiteracy, environmental degradation and discrimination against women. MDGs provide a framework for UN member states to achieve the targets under the support of the United Nations Development Programme (UNDP).
- (4) Based on Reference 4.
- (5) Based on an interview with the Federation of Indian Chambers of Commerce and Industry.
- (6) This section was mainly based on Reference 1.
- (7) NSS is a program jointly established by the Swiss Government and the World Bank in 1997 to support Activities Implemented Jointly (AIJ), Joint Implementation (JI) and capacity building for CDM. Major survey contents include the current status and projections of GHG emissions in a host country, analysis of measures to prevent global warming that can be implemented by a host country, projections for GHG emission reductions and analysis of reduction costs, identification of feasible projects, formation of a market by GHG emission reduction projects and analysis of financing opportu-

nities, etc. (source: "Evaluation Study Report on ODA Related to Global Warming Prevention Measures," the Ministry of Foreign Affairs of Japan, July, 2004).

- (8) Based on interviews with the Gujarat Pollution Control Board and Indian companies.
- (9) By order of the Supreme Court of India in July 1998.
- (10) *Nihon Keizai Shimbun*, June 17, 2005.
- (11) Based on materials owned by the Ministry of Economy, Trade and Industry of Japan.
- (12) Based on an interview with Denso India.

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