JICA

No.

Thematic Evaluation (Environment) by External Party

Environmental Center Approach: Development of Social Capacity for Environmental Management in Developing Countries and Japan's Environmental Cooperation

March 2003

Evaluation Team on Environmental Cooperation,

Japan Society for International Development (JASID)

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JR
03-12

Acknowledgement

The expansion of project evaluation for more effective and efficient support is required in Japan under the current severe financial situation and prolonged economic stagnation.

In the past, the Japan International Cooperation Agency (JICA), the implementing organization for Japan's ODA, has asked academic experts, influential individuals and consultants who have abundant experience to evaluate and research projects from a wide viewpoint and a neutral stance. In 1999 evaluations by external organizations were started as a part of the expansion of evaluation by introducing third party perspectives to the process, and the execution of evaluation has been handed over to external organizations that have expertise in various development related tasks.

The efforts for environmental management of the government, firms, and citizens in recipient countries are described as a *social environmental management system (SEMS)* in this evaluation. From the viewpoint of program evaluation, this evaluation study aims to analyze how the Environmental Center projects, which JICA has implemented to improve the *social capacity for environmental management (SCEM)* of developing countries, have contributed to the development of the SEMS, to evaluate related cooperation projects and policy systems according to need, and to propose a direction for more effective and efficient JICA environmental cooperation.

This evaluation research was handed over to the Japan Society for International Development (JASID), the biggest academic society for this field in Japan, which has abundant domestic human resources and wide ranging overseas networks. The evaluation research group consists of the society's members, who are familiar with Japanese environment related knowledge, current environmental situations and administrations of recipient countries, and domestic and foreign environmental cooperation projects. This report was completed through fieldwork, domestic surveys and study meetings with the task force from JICA.

When considering management of the Environmental Center projects currently under way, and when development and execution of similar projects in the future are implemented, we would like to utilize the proposals and lessons that have been derived from this evaluation research.

We wish to express our gratitude to everybody for giving us so much cooperation and support for this research.

March 2003

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Preface

This report gives the program evaluation of the Environmental Center projects that the Evaluation Team on Environmental Cooperation in the Japan Society for International Development (JASID) has worked on intensively for one and a half years, including a preparation period by the arrangement committee.

The Environmental Center projects started as grant aid (1989) and project-type technical cooperation (1990, currently called a technical cooperation project) to the Thai Environmental Research and Training Center (ERTC), which was established for environmental monitoring, research and training. After this start, the Environmental Center projects which Japan supports were expanded to include the Indonesian Environmental Management Center (EMC), the Sino-Japan Friendship Center for Environmental Protection, the Mexican Environmental Research and Training Center (CENICA), the Chile Environmental Center (CENMA), and the Egyptian environmental monitoring training center. An Environmental Center project in Vietnam is scheduled to start during this year (2003).

The Environmental Center project is an approach that aims to improve the capacity of developing countries to deal with environmental problems by themselves. The Ministry of Foreign Affairs has designated this approach as the Environmental Center approach in *the Japanese Official Development Assistance White Paper 1997* and has positioned it as a business model for typical Japanese environmental cooperation. It can be said that the Environmental Center projects, which have implemented the transfer of environmental monitoring technology as their core work, have contributed to the improvement of the environmental analysis capacity of developing countries as described in the previous project evaluation reports. In previous reports, however, the answer to the question of whether or not there was an identifiable effect which corresponded to the building construction and equipment donations from the enormous amount of grant aid and long-term dispatch of Japanese experts was not sufficiently addressed. How much these actions actually contributed to the solution of environmental problems in developing countries is what the citizens in developing countries and the taxpayers in Japan most want to know.

This evaluation study aims to answer this question by applying the latest academic research findings in JASID to an actual assistance project evaluation. This evaluation study refers to the capacity of developing countries to deal with environmental problems by themselves as their

social capacity for environmental management (SCEM). In turn, this social capacity can be defined as an operating capacity for the *social environmental management system (SEMS)* formed by and the interactions among the government, firms, citizens, and relations between central and local entities. In addition, it was initiated to analyze and evaluate the impact of the Environmental Centers on the development and improvement of the SCEM through a consistent methodology by clarifying the development stages of the SEMS. At the same time, appropriate starting and ending points for the Environmental Center project were clarified by their relationship to the development stages.

Under the prolonged stagnation and severe financial deficit, a new wisdom for future directions regarding environmental cooperation is needed. Also the development and implementation of more effective and efficient methods, which the citizens in Japan and developing countries can be convinced by, are needed. We hope that this evaluation report can make a positive contribution to the new environmental cooperation efforts.

This evaluation is done under an official research contract from the Japan International Cooperation Agency (JICA) to JASID. Stated evaluation results are the individual opinions of the Evaluation Team members from JASID and do not represent the opinion of JASID. This evaluation report includes the main report, individual study reports which the Evaluation Team members undertook on specific topics related to the Environmental Center approach, research reports that were entrusted to the researchers of China, Thailand, Indonesia and Mexico (Separate Volume 1: China, Separate Volume 2: Thailand, Indonesia, and Mexico), and this English language report, which is equivalent to the main report in Japanese.

March 2003

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List of Abbreviations

ADB	Asian Development Bank
ASEAN	Association of South East Asian Nations
AusAID	Australian Agency for International Development
BAPEDAL	Environmental Impact Management Agency (Budan Pengendalian Dampak Lingkungan), Indonesia
BAPEDALDA	Local Environmental Impact Management Agency (Budan Pengendalian Dampak Lingkungan Daerah), Indonesia
BHNs	Basic human needs
BMA	Bangkok Metropolitan Administration
BOD	Biological oxygen demand
CAB	Current account balance
CAC	Command and control
CDE	Capacity development in the environment
CDM	Clean development mechanism
CENICA	National Center for Environmental Research and Training (Centro Nacional de Investigación y Capacitatión Ambiental), Mexico
CENMA	National Center for Environment (Centro Nacional del Medio Ambiente), Chile
CESPEDES	Business Council for Sustainable Development (Centro de Estudios del Secter Private para el Desarrollo Sustentable), Mexico
CFCs	Chlorofluorocarbons
CNG	Compressed natural gas
CO, CO_2	Carbon monoxide, Carbon dioxide
COD	Chemical oxygen demand
CONAMA	Conselho Nacional do Meio Ambiente
CSO	Civil society organization
DAC	Development Assistance Committee
DEMS	Decentralized Environmental Management System
DEQP	Department of Environmental Quality Promotion, Thailand
DIW	Department of Industrial Works, Thailand
DOE	Department of Energy, Thailand

DPSER, DPSIR	Driving force, Pressure, State, Effect or Impact, Response
EANET	Acid Deposition Monitoring Network in East Asia
EcoISD	Environmental Conservation Initiative for Sustainable Development
EEA	European Environmental Agency
EEAA	Egypt Environmental Affairs Agency
EKC	Environmental Kuznets Curve
EMC	Environmental Management Center, Indonesia
ERTC	Environmental Research and Training Center, Thailand
ESI	Environmental Sustainability Index
ESCAP	Economic and Social Commission for Asia and the Pacific
EU	European Union
FDI	Foreign direct investment
FTA	Free trade agreement
GDI	Gender Development Index
GDP, GDP-PPP	Gross domestic product, Purchasing power parity
GDFI	Gross domestic fixed investment
GEF	Global Environmental Facility
GEM	Global Environmental Monitoring
GEMS	Global Environmental Monitoring System
GNP	Gross national product
GRP	Gross regional product
GTZ	Deutsche Gasellschaft für Technische Ausammenarbeit (Government-owned corporation for international cooperation)
HDI	Human Development Index
HPI	Human Poverty Index
ICETT	International Center for Environmental Technology Transfer
IETC	International Environmental Technology Center
IGES	Institute for Global Environmental Strategies
IISD	International Institute for Sustainable Development
IMECA	Metropolitan Air Quality Index (Indice Metropolitano dela Calidai del Aire)
INE	National Institute of Ecology (Instituto Nacional de Ecologia)
ISD	Initiatives for Sustainable Development toward the 21 century
ISO	International Standard Organization
JASID	Japan Society for International Development
JBIC	Japan Bank for International Cooperation
JETRO	Japan External Trade Organization

JICA	Japan International Cooperation Agency
LGEEPA	Federal General Law of Ecological Equilibrium and the Protection of the Environment (Ley General del Equilibrio Ecológico y la Protección al Ambiente), Mexico
LNG	Liquefied natural gas
MBIs	Market-based instruments
MDGs	Millennium Development Goals
MOE	Ministry of Environment, Indonesia
MONRE	Ministry of Natural Resources and Environment, Thailand
MOSTE	Ministry of Science, Technology and the Environment, Thailand
NAFTA	North American Free Trade Agreement
NEB	National Environmental Board, Thailand
NEPA	National Environmental Protection Agency, China
NEQA	National Environmental Quality Act, Thailand
NGO	Non-governmental organization
NPO	Non-profit organization
O_3	Ozone
ODA	Official development assistance
OECD	Organization of Economic Cooperation and Development
OECF	Overseas Economic Cooperation Fund (presently called as JBIC)
OEPP	Office of Environmental Policy and Planning, Thailand
ONEB	Office of National Environmental Board, Thailand
OOF	Other official flow
PCD	Pollution Control Department, Thailand
PDM	Project design matrix
PEMEX	Petróleos Mexicanos (Mexican petroleum public corporation)
PICCA	Integral Program Against Atmospheric Contamination (Programa Integral Contra la Contaminación Atmosférica)
PM_{10}	Particulate matter which is less than 10 μ m in diameter
PPI	Policy Performance Index
PROAIRE	Program to Improve Air Quality in the Valley of Mexico City (Programa para Mejorar la Calidad del Aire en el Valle de Mexico)
PROFEPA	Attorney General of Environmental Protection (Procuraduría Federal de Protección al Ambiente)
PROKASIH	River Care Programme (Program Kali Bersih)
PROPENAS	National Development Plan (Program Pembangunan Nasional)

PROPER PROKASIH	Program for Pollution Control, Evaluation and Rating (Program Penilaian Kinerja Perusahaan di Lingkungan Program Kali Bersih)
PRSP	Poverty Reduction Strategy Paper
R & D	Research and development
SCEM	Social Capacity for Environmental Management
SEDESOL	Ministry of Social Development (Secretaría de Desarrollo Social), Mexico
SEDUE	Ministry of Urban Development and Environment (Secretaría de Desarrollo Urbano y Ecología), Mexico
SEMARNAP	Ministry of Environment, Natural Resources and Fishery (Secretaria del Medio Ambiente y Recursos Naturales y Pesca), Mexico
SEMARNAT	Ministry of Environment and Natural Resources (Secretaria del Medio Ambiente y Recursus Naturales), Mexico
SEMS	Social Environmental Management System
SEPA	State Environmental Protection Administration, China
SES	Samut Prakarn Environmental Society, Thailand
SIDA	Swedish International Development Cooperation Agency
SOx, SO_2	Sulfur oxide, Sulfur dioxide
SPM	Suspended particulate matter
TBCSD	Thailand Business Council for Sustainable Development
TDRI	Thailand Development Research Institute
TEI	Thailand Environment Institute
TSP	Total suspended particles
UNCED	United Nations Conference on Environment and Development
UNCSD	United Nations Commission for Sustainable Development
UNCTAD	United Naitions Conference on Trade and Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
WALHI	Wahana Lingkungan Hidup Indonesia (Friends of the Earth)
WHO	World Health Organization
WRI	World Resources Institute
WSSD	World Summit on Sustainable Development
WTO	World Trade Organization

Executive Summary

1. Background, Objectives, Target and Methodology of the Evaluation

1.1 Background

At the World Summit on Sustainable Development, WSSD Johannesburg, which took place from late August to early September, 2002, the Japanese government introduced EcoISD (Environmental Conservation Initiative for Sustainable Development), an advanced plan of Initiatives for Sustainable Development toward the 21st century (ISD). In this plan, Japan, presenting a new policy emphasizing the importance of partnerships with developing countries, as well as principles of ownership which Japan had pursued for a long time, defined capacity development in the environment as the first of several basic policies. Specifically, under the Koizumi Initiative (the concrete actions of Japanese government to be taken for sustainable development -towards global sharing, announced by Prime Minister Koizumi), Japan gave first priority to development of human resources for sustainable development, raised education aid to more than 250 billion yen over five years and supported human resource development of 5,000 experts in the environmental field.

However, Japan has been trimming down the amount of its ODA in the past few years because of its severe fiscal situation and gave up its position as No. 1 among ODA donors in 2001. In the meantime, Japan's FDI has been growing steadily and has become approximately five times as big in scale, overtaking its ODA in 1992. Furthermore, the role of civil society organizations (CSOs), such as NGOs and NPOs, has expanded dramatically in the fields of development assistance and environmental protection in developing countries. When thinking of sustainable development in developing countries as stated above, it is more important than ever before for both private (firms and citizens) and public sectors to take their own share of responsibilities and to cooperate with each other.

Although the proportion of environmental ODA out of the total ODA is on the rise, now is the time to give careful consideration, in these circumstances of environmental cooperation, to how to approach effective and efficient international cooperation, including other development

support from OOF (other official flows than ODA) and other cooperation based on private funds.

1.2 Objectives, Targets and Methodology

This report is the result of the evaluation of the Environmental Center approach, which was conducted by the Evaluation Team on Environmental Cooperation in the Japan Society for International Development (JASID) under an official contract with the Japan International Cooperation Agency (JICA). The evaluation of the Environmental Center approach in this report is the program evaluation of Environmental Center projects. In a broad, high-level framework, Japan's contribution to developing countries' *social capacity for environmental management (SCEM),* examining the results from the Environmental Centers (one of Japan's representative environmental cooperation programs), was evaluated from diverse viewpoints.

In this report, the evaluation was conducted on projects in four main countries (China, Thailand, Indonesia and Mexico) out of six countries where Environmental Center projects had been implemented, taking into consideration the duration of each project and the characteristics of each Environmental Center.

The Environmental Center approach, which has been implemented since 1990, mainly consists of grants and technical cooperation for the establishment of a center which has (1) a research function of monitoring skills for air and water pollution, along with environmental research, and (2) a training function for environmental experts with technical cooperation from Japan. Hence it may be said that the Environmental Center approach is a main feature of Japan's environmental cooperation, representing showing its characteristics.

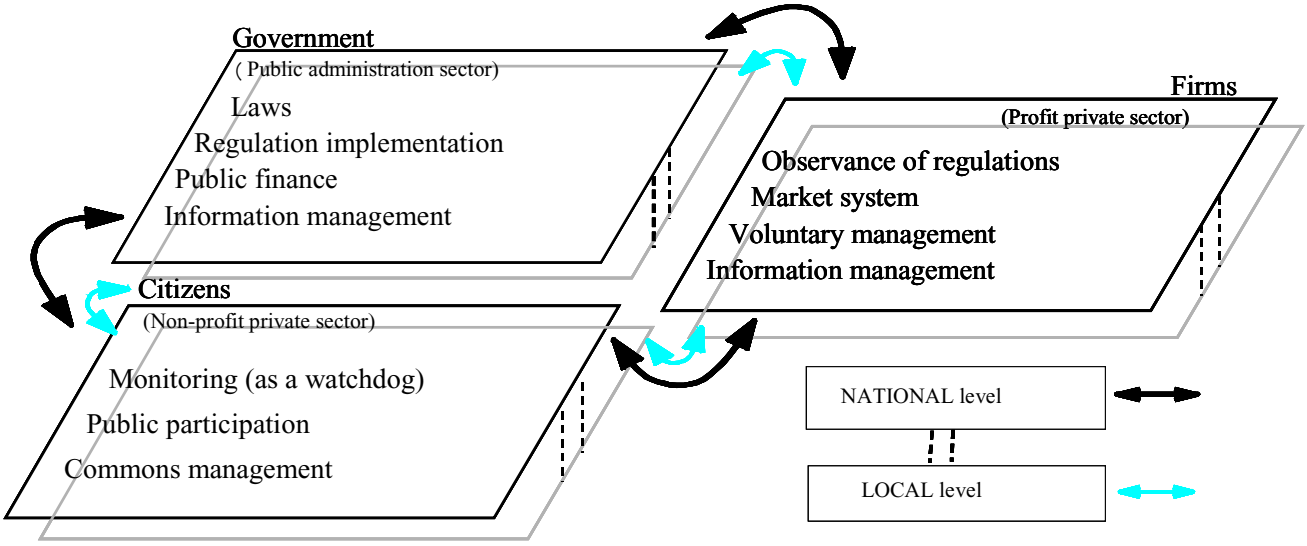
This report presents a proposal for how a more effective and efficient environmental cooperation program from JICA should appear, based on the concept of social capacity development for environmental management as the framework for program evaluation, and analyzing how the Environmental Center projects have contributed to the participating countries' social capacity development, while conducting evaluations of related cooperation projects and policy systems, as required.

2. Development Stages of Social Capacity for Environmental Management in Developing Countries

2.1 Social capacity for environmental management and the Social Environmental Management System

Social capacity for environment management (SCEM) indicates the overall capacity that is addressing environmental management by government, firms and citizens. This capacity is defined as the social environmental management system (SEMS) on the basis of a systematic and institutional argument (See Figure 1). SEMS has three main actors for environmental management, namely, government, firms and citizens, and the system works according to the actions of these three actors in environmental management as well as interactions among them. As for SEMS, the relationship of the two levels of the country, central (national) and local, should be considered, too.

Fifure1: Social Environmental Management System (SEMS)



Source: Matsuoka (2002)

2.2 Development Stages and Benchmarks of the SEMS

There are three stages in the development process of SEMS: system-making, system-working, and self-management. The system-making stage is the one in which the fundamental functions of SEMS are developed. Since this stage particularly needs capacity development in the government sector, benchmarks should be the development of environmental laws (basic laws and specific regulations), environmental administration, and environmental information

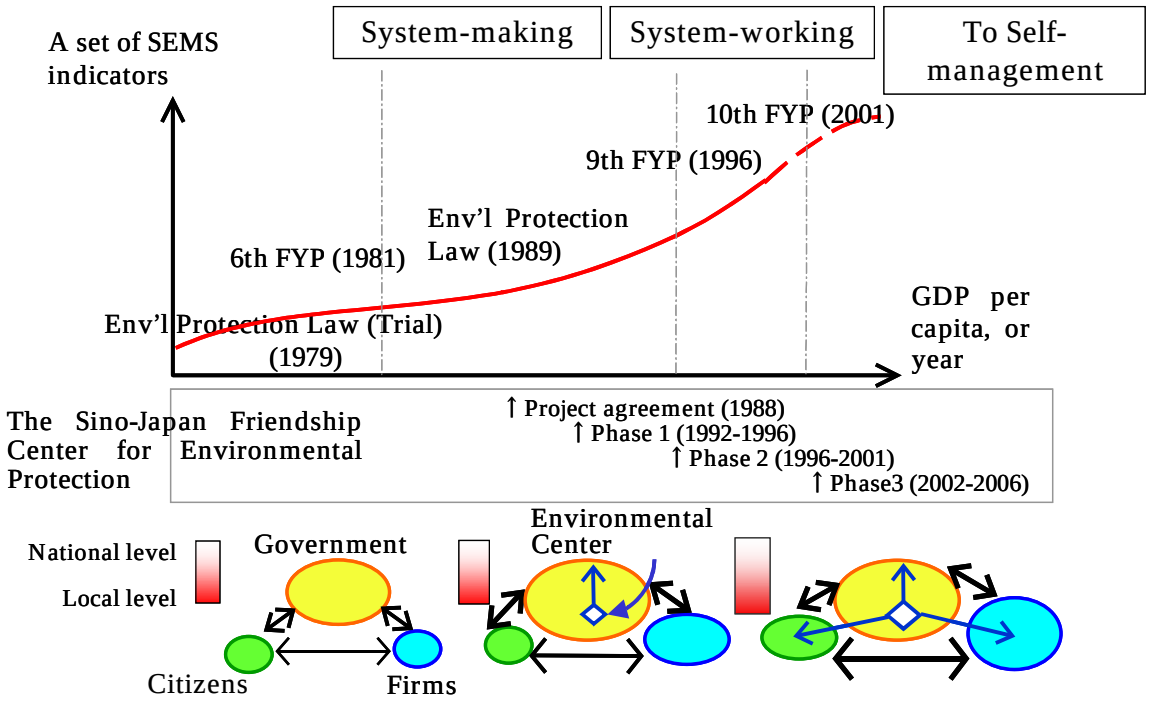
(establishment of monitoring networks, and collection, use and disclosure of the data). The system-making stage enters its final phase when an environmental administrative organization is established following the enactment of environment laws. Going through the final adjustment, such as the development of environmental information, toward the execution of the environmental policy, the system shifts to the system-working stage.

In the system-working stage, the system makes a full-fledged start of the execution of pollution reduction followed by development of the environmental administration, which should be fundamental in the system. In this stage, pollution changes its tendency from increasing to decreasing and a turning point of the environmental Kuznets curve (EKC) should be observed. With such a turning point observed, this stage is assumed to fully open up.

The self-management stage is the stage in which the system develops self-sustainingly through stronger interrelationships between the government, firms and citizens, and comprehensive environmental management is enforced. Especially firms and citizens take the initiative in environmental management through their voluntary efforts. For example, firms make efforts to obtain ISO14001 certificates as part of internal environmental management and begin to carry out more efficient environmental and business management, making the most of the environmental accounting. Firms appeal to the society with these achievements and they gain a competitive edge in the market with consumers' appreciation of their efforts. From the aspect of international cooperation, a developing country should become more independent from the donor country’s assistance and utilize its own financial resources at the beginning phase of this self-management stage.

The roles and the relationships among the three actors also change along with the development process of the stages. Although the government shoulders the biggest role in the system-making and system-working stages, in the self-management stage, it is responsible for creating a framework for comprehensive environmental management and supporting the other actors. The Chinese case of the development process of SCEM is shown in Figure 2. Regarding the evaluation indicators of SCEM, on the basis of the Human Development Index of the United Nations Development Programme (UNDP), evaluation indicators for air quality management capability of the World Health Organization (WHO) and the United Nations Environment Programme (UNEP), and the evaluation theory in capacity development in the environment (CDE) promoted by OECD, the evaluation analysis in this report focuses on the benchmark indicators in the development stages, assuming a bundle of evaluation indicators as shown in Figure 3.

Figure 2: The development process of SEMS in China



Source: Matusoka (2002)

Figure 3: SCEM indicators

Government

Process	Factors	Indicators
Monitoring | Analysis and evaluation | Policy-making | Policy implementation	(1) Law and policies	Basic environmental law, pollution control acts
	(2) Human resources	Staff (number and quality)
	(3) Organization	Status of Ministry of Environment, organizational performance
	(4) Financial resources	Budget
	(5) Infrastructure	Technological and information infrastructure
	(6) Information, knowledge, and technology	Monitoring, data analysis, policy-making, administration

Information disclosure
Open system for public
Environmental education
Policy priority

Access to information
Pollution claims
Media
Demonstration
Lawsuits
Negotiations & lobbying
Policy proposal

National/local relations
Decentralization
(Budget, decision-making, implementation)
Initiatives for environmental management

Background indicators
<Economy> GDP per capita, GDP growth rate, industrial structure
<Society> population, population growth rate,
<Environment> ambient level, energy shift

Regulation implementation
Subsidies
Environmental tax
Polity priority

Regulation observation
R & D
Negotiation and lobbying
Lawsuits

Citizens

P	F	Indicators
M | A & E | P-M | P-I	(1)	Environmental disciplines, *commons* rules
	(2)	Education
	(3)	Academics, NGOs, media, organizational performance
	(4)	Budget
	(5)	Technological and information infrastructure
	(6)	Monitoring, data analysis, policy-analysis

Access to information
Pollution claims
Lawsuits
Media
Green consumption
Research

Information disclosure
Eco-label
R & D

Firms

P	F	Indicators
M | A & E | P-M | P-I	(1)	Environmental disciplines, Charter of a business council
	(2)	Education, training
	(3)	Self-monitoring, reporting, env'l division, organizational performance
	(4)	Investment
	(5)	Technological and information infrastructure
	(6)	Monitoring, data analysis, business strategies

Source: The author

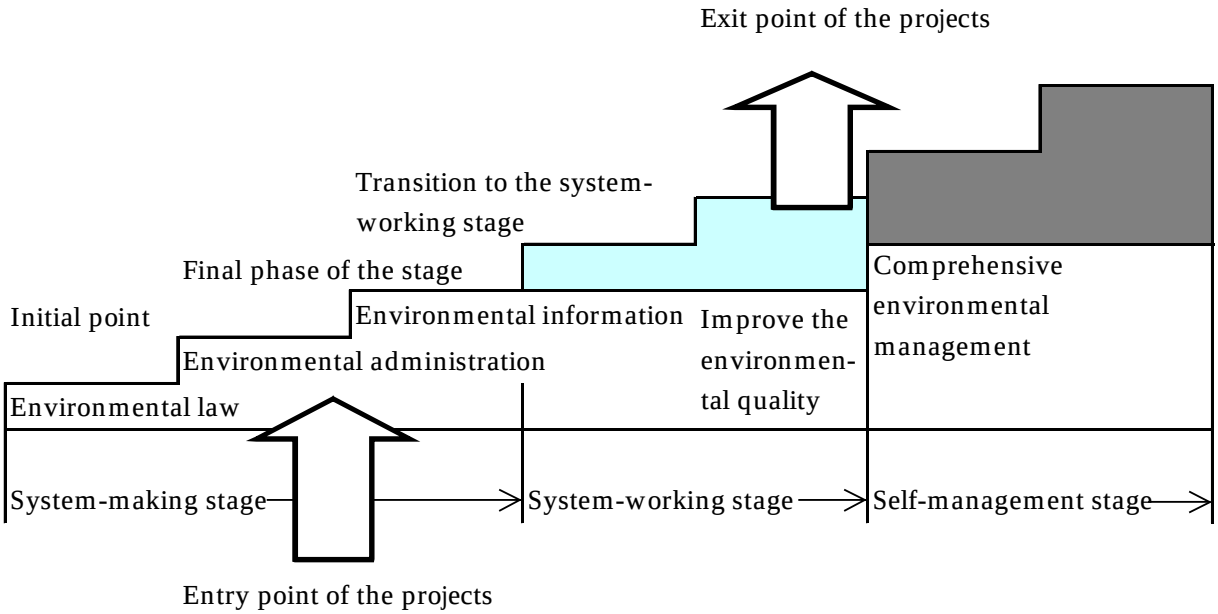
3. Environmental Center Approach and Social Capacity Development for Environmental Management

3.1 Entry Point and Exit Point of Environmental Center Projects

In terms of social capacity development for environmental management in developing countries, it should be considered important to identify what environmental cooperation should be, and when it should be implemented most effectively. In this report, both suitable entry and exit points for Environmental Center projects are examined.

Suitable entry and exit points in development stages of the SEMS and Environmental Center projects are shown in Figure 4. When Environmental Center projects, whose key activities are monitoring, researching and training, are started in the final phase of the system-making stage in which environmental law and environmental administration are ready established, the most effective results for the formation of social capacity development for environment management in the counterpart country are delivered. In short, the final phase of the system-making stage is the most suitable entry point for the Environmental Center projects.

Figure 4: Entry/exit points of Environmental Center projects



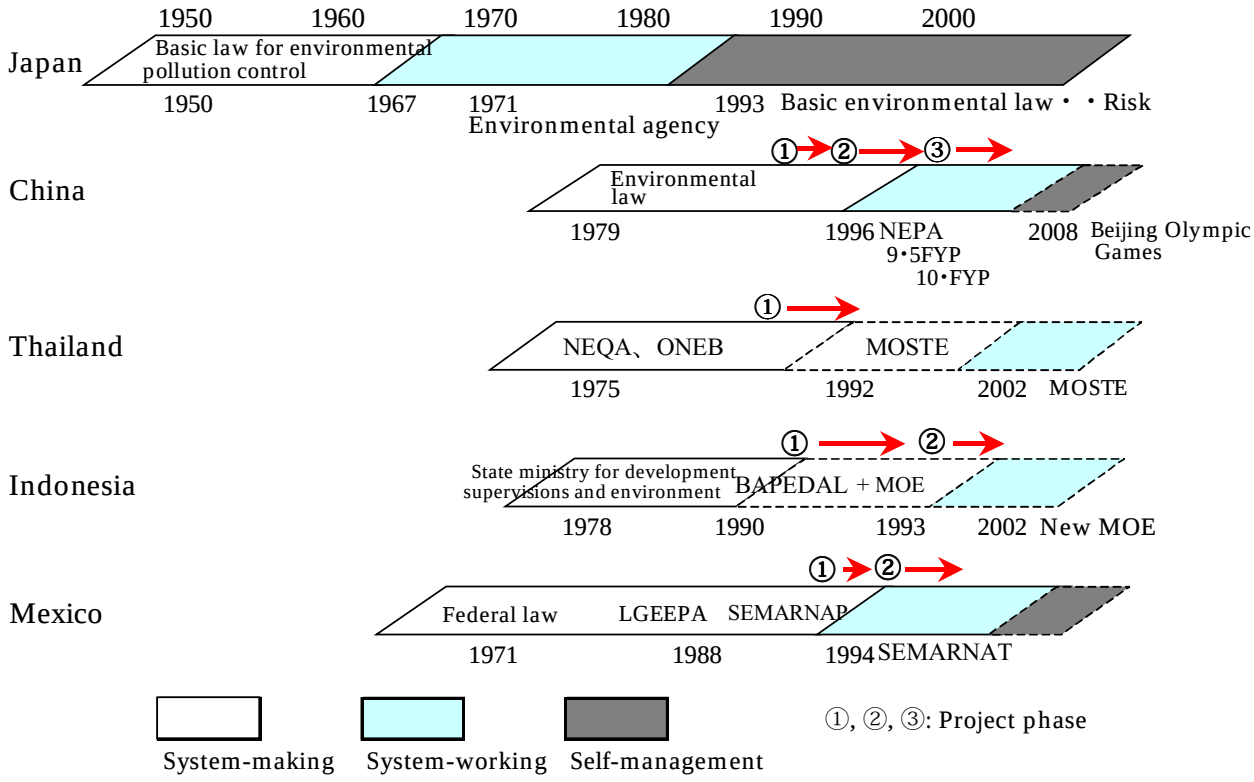
Source: The author

On the other hand, the turnaround to pollution decrease in the system-working stage means that the counterpart country's social system has established the capacity to reduce conventional

industrial pollution, such as SOx. Thus, the Environmental Center faces a new task by having attained one of its original purposes, and the time to aim at self-sustaining development begins. Also, the cooperative relationship shifts to one that is well balanced, with and without ODA, from one where ODA takes a large part, in other words, from vertical to horizontal cooperation. Therefore, it is desirable for Environmental Centers to reach the exit point of the projects at the moment when the stage spreads out fully, after it passes through the turning point of pollution reduction in the system-working stage.

From the point of view stated above, the contribution of Environmental Center projects to social capacity development for environmental management in the four countries is evaluated. Note that, although an evaluation was made by actor (government/firms/citizens) in the SEMS in Chapter 3, evaluation in this summary is done by country. The development process of the SEMS and the input timing of Environmental Center projects in the four countries are shown in Figure 5.

Figure 5: Development stages of SEMS



Note: FYP indicates Five Year Plan

Source: The author

3.2 China

Both environmental law and administration have been satisfactorily established in the 1990s, and the China Environment Yearbook, which is equivalent to China's State of the Environment, has been issued since 1990, upgrading its quality since 1994. This evidence shows that the system-making stage in China was over in the mid-1990s, meaning that the first half of the 1990s matches the final phase of the stage. With Air Pollution Control Act Amendments enacted in 1995 and the Ninth Five Year Plan started in 1996, China implemented effective countermeasures, and entered the system-working stage in the second half of the 1990s. Since SO_2 emissions from industry in China reached a peak in 1996, there is a possibility that China reached the turning point of pollution decrease in the latter half of the 1990s. The development process of social capacity, which appears to be extensive in China, as stated above, implies that the government, firms and citizens, acting as a single body, appear to be actively promoting environmental management prior to the Beijing Olympic Games to be held in 2008 and the Shanghai International Exposition to be held in 2010, and the country seems to have started shifting to the self-management stage from the system-working stage.

Figure 5 indicates that the Sino-Japan Friendship Center for Environmental Protection project in China had started in 1992 (an agreement for a grant aid was reached and project-type technical cooperation started), which was the final phase of the system-making stage, and the project was initiated at a suitable entry point. Furthermore, full-scale technical cooperation and actual center activities were started in 1996 as the second phase of the project. With project input having been given at the right time to make a significant contribution to the system, the Sino-Japan Center has been developing along with the development of the SEMS in China.

In the meantime, China had experienced the system-working stage since the latter half of the 1990s and is now gradually shifting to the self-management stage from the early 2000s, and the Sino-Japan Center project entered the third phase in 2002 (scheduled to be completed in 2006). Although the Sino-Japan Center might not need further assistance from Japan, considering the exit point of the project on the basis of the original concept of Environmental Center projects, it is relevant for Japan to continue supporting the Environmental Centers if they find a new target or meaning for their activities, like the case of the Sino-Japan Center, also in terms of strengthening the relationship between both countries' governments, firms, and citizens.

3.3 Thailand

In Thailand, environmental law, administration and information are mostly prepared, and the country shifted to the system-working stage from the system-making stage in the mid 1990s. However, it has taken considerable time to set up the system-working stage in the SEMS because of social and economic trouble caused by the currency crisis in 1997. Furthermore, in Thailand, a period of reorganization of the governmental system and the early stage of the system-working stage have coincided due to the reformation of the former Ministry of Science, Technology and Environment (MOSTE) into the present Ministry of Natural Resources and Environment (MONRE) after the establishment of the new Constitution in 1997, the enforcement of the Decentralization Plan and Process Act in 1999 and restructuring of the ministries in October, 2002.

Figure 5 shows that the Environmental Research and Training Center (ERTC) project started in 1990 (an agreement was reached in 1989), which was the final phase of the system-making stage, and ERTC appears to have been implemented prior to the transitional period to the system-working stage. The Thai administration and economy began a restructuring period after the completion of the project in 1997 and it was impossible to predict conditions like this in the latter half of the 1980s. So, it may be said that the entry point of the Environmental Center project in Thailand was consistent with the background in those days. Furthermore, although the ERTC project ended in 1997, the input of the project should have been continued a little more longer to be more rational, considering that the system was at the beginning phase of the system-working stage and far behind the time when it could be in full operation.

3.4 Indonesia

Environmental law and administration in Indonesia were developed in the late 1980s and early 1990s. Nevertheless, Indonesia is behind in terms of the development of its environmental information, that is, a nationwide monitoring network is not established, and periodical dissemination of the state of the environment is not being done, either. Under these conditions, this country appears to have been at a standstill in the final phase of the system-making stage since the beginning of the 1990s. Furthermore, Indonesia went through social and economic confusion due to the change of the Suharto administration along with the currency crisis in 1997, the independence movement of East Timor, and the restructuring of all administrative bodies with establishment of the new Ministry of the Environment (January, 2002) from the State Ministry of Environment and BAPEDAL (Environmental Impact Management Agency) in the

revision of central ministries, and enactment of the Decentralization Act (2001). Under unstable administrative conditions like these, they may remain in the final phase of the system-making stage.

The analysis of the development process of the SEMS in Indonesia leads to the conclusion that that the start of project input of the Indonesia Environmental Management Center (EMC) in the beginning of the 1990s and also in the final phase of the system-making stage (an agreement for the grant aid in 1991, and the start of project-type technical cooperation in 1993) was appropriate timing.

On the other hand, regarding the accomplishment of the project, there are often remarks made that the EMC still has a long way to go to become self-sustaining and the project is subject to being continued. From the viewpoint of development of the SEMS, the analysis goes as follows. Indonesia's own particular conditions led to need a much longer time in years for the final phase of the system-making stage because of external factors and other problems, and in consideration of concrete needs, such as preparation of an environmental information system and development of environmental experts, it is relevant to continue inputting aid funds into the EMC project for a while longer.

The second phase of the EMC project, which is aimed to support the decentralized environment management system, started in July, 2002. Although the project design, such as the way to connect with environmental policy and the definition of the scope, is controversial, it is expected to contribute to social capacity development for environmental management in Indonesia in the future.

3.5 Mexico

In Mexico the environmental law and administration was developed from the end of the 1980s to the middle of the 1990s (SEMARNAP, Ministry of the Environment, Natural Resources and Fishery started in 1994). Environmental information was also established and introduced to the public around the same time. The development of the social environment management system in Mexico was finished in the mid 1990s and now appears to be shifting to the self-management stage from the system-working stage. However, for Mexico City there was a turning point for SO_2 emissions from 1992 to 1993, and according to this data, the system-working stage already started in the first half of the 1990s. Moreover, the Action Plan for Air Pollution Control (in 1988) and the Integral Program for Air Pollution Control (PICCA, 1990-1995) were implemented. With this evidence and these countermeasures, it can be said

that the system had already been in the system-working stage and also in the final phase of the system-making stage simultaneously in the late 1980s. The analysis stated above suggests that the start of CENICA (National Center for Environmental Research and Training of Mexico) in 1992 was a little too late to contribute significantly to Mexico's social capacity development for environmental management.

The project ended in June 2002, after a follow-up period of two years. When it is seen from the viewpoint of the development of the SCEM, the CENICA project started from the early phase of the system-working stage, and the project input could have been terminated before 2002, because Mexico had the technology for environmental management and policy study of an adequate level. Unlike the case of China, whose Environmental Center has renewed and furthered the scope of its functions in the middle of its course, CENICA does not seem to have a clear and newly developed target to achieve. CENICA should have been given an opportunity to search for a fresher approach to development of the Environmental Center at an earlier stage of consideration of the development of its SEMS. Therefore, it was possible for Japan to offer different assistance other than the prior Environmental Center project.

4. Development of Environmental Center Approach and Environmental Cooperation in the Future: Lessons and Recommendations

Recommendations made in this report are roughly categorized into two levels. The first level is aimed at organizations comparatively directly concerned with the Environmental Center projects or other environmental cooperation, including JICA, the project implementing agency. Recommendations at this level suggest how to make a supportive Environmental Center to contribute to developing countries' social capacity development for environmental management, and what an ideal environmental cooperation partnership between developing countries and Japan and among developing counties through the Environmental Center approach should be (4.1, 4.2, and 4.3).

The second level is aimed at stakeholders at a higher level or in a broader area from the perspective of social capacity development for environmental management in developing countries and the improvement of Japan's international environmental cooperation. This level comprises three suggestions: development of comprehensive assistance in the environmental field and other fields; environmental cooperation in the global economy; and a developed system for providing assistance and environmental cooperation with significant impact (4.4).

4.1 Environmental Center Projects in Social Capacity Development for Environmental Management

(1) Administrative Status of the Environmental Centers

In order to contribute more to the development of environmental monitoring, research and training, it is fundamental to give a relevant administrative status to the Environmental Center, so that the Environmental Center can make an impact on environmental policy-making. To achieve this, it is important to identify what specific authority in the environmental administration it belongs to during the development process and implementation of the project. Moreover, it is important to work out how the Environmental Center could be freed from the authority of any specific department office in order for it to perform effectively in the environmental administration system.

When considering the Environmental Center's contribution to the social capacity development for environmental management in the long run, it is more important to set up a wide scope of functions or a wide support system in the project. The support system should be prepared to be flexible so that the cooperation approach can be altered to improve its effectiveness according to the development of the Environmental Center, to expand its cooperation range or to shift focus to policy study even in the middle of the project.

(2) Entry Point and Exit Point of the Environmental Center Projects

As mentioned earlier, the final phase of the system-making stage, in which the fundamental features of the SEMS such as environmental law and administration are well prepared, is an optimum entry point (a project starting time) for the Environmental Center projects. Furthermore, the time when the turning point for decrease in pollution appears in the system-working stage, showing that the stage is fully functioning, is the preferable exit point to impel the Environmental Center to become self-sustaining. At that time, the project should shift emphasis to a horizontal cooperation type of partnership. Investigating, from the viewpoint mentioned above, whether the counterpart country is in the appropriate time of the planning process for the Environmental Center project implementation and setting up necessary cooperation items in advance are key procedures. Finally, taking advantage of the entry and exit points, Japan should not disrupt the relationship with the Environmental Center after the exit point nor stick to the Environmental Center as the sole cooperation approach but should continue flexible cooperation according to the development of the SEMS.

4.2 Future Perspectives of the Environmental Centers

(1) The Environmental Centers and the Capacity Development for Environmental Management in Firms, Citizens and the Local Actors

In order to make a further contribution to the social capacity development for environmental management of the counterpart countries, the Environmental Center should strengthen ties with firms and citizens and make a greater impact on these primary actors of the system. At the same time, assistance to local actors to increase their capacity for environmental management will be indispensable in the tide toward the local decentralization in developing countries, which is anticipated to accelerate.

(2) Further Qualitative Improvement of the Environmental Centers

As mentioned above, it is imperative for the Environmental Centers to improve their staff member's capacity for contribution to the development of SCEM. Although pieces of important research have been done in the Environmental Centers, in terms of doctoral degrees, there are only 16 in China (about 20% of the total number of researchers in the Center), five in Thailand (about 10%) and none in Indonesia. They do not need to match the case of developed countries (about 90% of researchers at Japan's National Institute of Environmental Studies are doctoral degree holders), but in order to become a leading research center for environmental studies in and outside of the country, at least one third to one half of the researchers should hold a doctoral degrees and efforts to increase the number of research workers who have a degree is necessary.

4.3 Further Impact of the Environmental Centers: Building Partnerships

(1) Partnership between Japan and Developing Countries

It is important for Japan to make the most of both tangible and intangible assets in Environmental Centers, to bring about a relationship of mutual trust with developing countries, and to develop partnerships in different levels of the government, firms, citizens and local actors. This will lead to creation of social capital. Through exchange activities like this, the relationships between Japan and counterpart countries can blossom into a horizontal form of

cooperation, in which both sides follow a give and take system with interest and concern for each other, separate from the vertical one influenced by ODA.

(2) Partnership among the Environmental Centers

In terms of future capacity improvement of the Environmental Centers or development of the new Centers, it is very useful to exchange experiences and to undertake collaborative research between Environmental Centers. For instance, China's and Indonesia's Environmental Centers have taken part in the Acid Deposition Monitoring Network in East Asia (EANET). Thailand's Center is expected to join them. Furthermore, there is a hope that each Center will start South-South cooperation to neighboring countries by becoming a regional center.

4.4 Further Environmental Cooperation in the Future by Japan: Recommendations from the Broader Point of View

(1) Development of Assistance Programs and Assistance Coordination

When Japan pursues ideal environmental cooperation in the future, programmed assistance aiming to develop the capacity of the entire field of the environment, that is, social capacity development for environmental management, is fundamental. In the assistance programs for the environment in counterpart countries like China, Thailand, Indonesia and others, there is insufficient coordination between the program for brown issues (air and water pollution) and green issues (forest preservation and diversity preservation). Commitment to structuring a link between the problem-countering project and the system-developing program is not strong enough either. Environmental cooperation policy should be clarified, with the linkage of brown and green environmental issues, such as countermeasures to pollution and forest preservation, and global environmental issues, such as global warming, desertification, and the decrease in biodiversity, within the larger movement for social capacity development for environmental management in countries of interest. Moreover, a cooperative relationship at the program level will be also fundamental, such as cooperation to counter the vicious circle of poverty and environment degradation, which have not always been organized together.

(2) Globalization of Economy and Environmental Cooperation

There are more free trade agreements (FTA) being concluded between two countries and even among several countries, as well as active free trade among WTO (World Trade Organization) member countries along with globalization of the economy and environmental cooperation. In future free trade agreement negotiations, Japan should call for a many-sided cooperative agreement, including, not only mutual cooperation between economies, but also environmental preservation, following NAFTA's leadership. In terms of implementation of future environmental cooperation, Japan should give full attention to the trend toward economic agreements like this.

(3) Establishment of an Aid Supply System and the Impact of Environmental Cooperation

In order to realize the new policy of environmental cooperation stated above, drastic reform of Japan's aid supply system is required. Japan has usually depended on central ministries, including the Ministry of Environment, and local public bodies for technical expertise and experts required for cooperation programs. However, as a consequence of recent progressive administrative and fiscal reform, the Ministry of Environment is finding it difficult to send new staff members to the programs. Moreover, the ministry does not seem to have sufficient expertise or knowledge regarding international cooperation. The local public bodies, as well, are operating under the same conditions. When it comes to thinking of the future social capacity development for environmental management, it is imperative to make the most of expertise from firms and citizens, and to search widely for and foster human resources, because there is a shortage in staff and knowledge from the central and local government. In preparation for that, the administration, firms and NGOs should jointly contemplate how to foster advanced experts and re-educate people who have a certain level of experience, in graduate schools focusing on international cooperation and the environment, and the academic society JASID and other societies should also be involved in these efforts.

CHAPTER 1

The Background, Objectives, Targets and Methodology of the Evaluation

1.1 The Background and Objectives

The international conditions relating to environmental cooperation have greatly changed from the beginning of the 1990s. It is obvious that a main basis of the change was the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro in 1992. The beginning of the 21st century has seen the new developments shown in Table 1.1. During the World Summit on Sustainable Development (WSSD) in Johannesburg, held from the end of August 2002 to the beginning of September under the momentum of what is referred to as the Rio plus 10, the engagements after the Rio Summit were reviewed and future directions were discussed.

At the WSSD, the Japanese government announced the Environmental Conservation Initiatives for Sustainable Development toward the 21st century (EcoISD), which is a more fully developed version of the Initiatives for Sustainable Development toward the 21st century (ISD) submitted in 1997. Adding to ownership, which was a philosophy promoted in the past, the importance of partnership with developing countries is highlighted and the development of capacities in the environmental field is indicated as a first basic policy. The Koizumi Initiative (the concrete actions of Japanese government to be taken for sustainable development -towards global sharing, announced by Prime Minister Koizumi) places top priority on human resource development toward sustainable development as a practical policy and designates the donation of over 250 billion yen in five years for educational support and human resource development of 5,000 people in the environmental field as a practical goal.

On the other hand, because of recent severe financial conditions, the amount of Japanese ODA has declined and Japan finally lost the top ranking of donor countries in 2001. Even

under these conditions, the amount of foreign direct investment (FDI) has increased steadily and surpassed the amount of ODA in 1992 and at present it is about 5 times as much as the amount of ODA (Figure 1.1). Besides this increase, the role of CSOs (civil society organizations) such as NGOs (non-governmental organizations) and NPOs (non-profit organizations) in the field of development assistance and environmental conservation for developing countries has rapidly grown in importance. When we consider the development and environmental conservation of developing countries, the role allocation and coordination between private sectors (firms and citizens) and the public sector become more important than before.

As shown in Figure 1.2, the share of so-called environmental ODA in the total amount of ODA is increasing. But under this condition of environmental cooperation, it might be the time to consider the most effective and efficient approaches to international cooperation, including development assistance with other approaches such as OOF (official funds other than ODA) and cooperation on a private basis.

The Environmental Center approach implemented in 1990 includes the use of monitoring technology over air pollution, water pollution, etc.; the creation of research centers for environmental study; and the establishment of support and technical cooperation for environmental training centers as its main components. The Environmental Center approach of Japan's environmental ODA is unique and its main work. For example, the Environmental Center approach is mentioned as the first case in Section 3 (Improvement of Government's Capacity [Policy Planning Capacity]) in Chapter 3 (Pollution Control) of Part 2 (Security of Mankind and Initiatives for Sustainable Development toward the 21st Century [ISD]) in *Japan's Official Development Assistance 1997 (ODA White Paper)*. It reads as follows (translated from original Japanese):

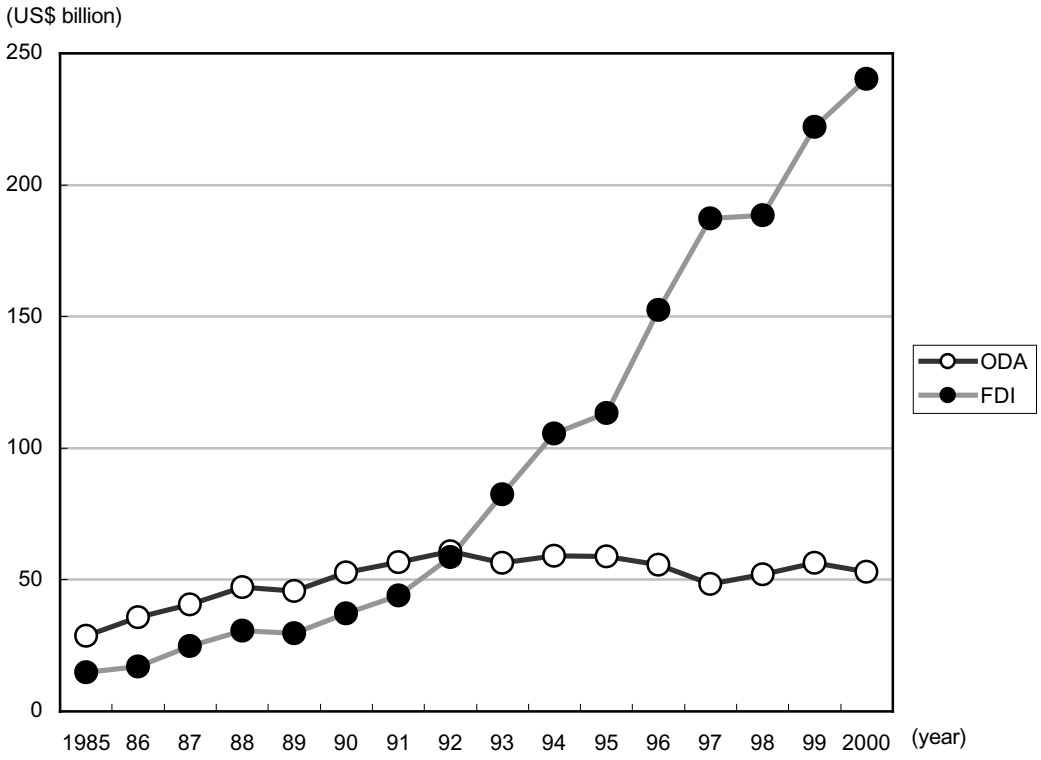
"For the improvement of capacity to monitor aspects of pollution and adopt necessary measures for creating desirable environmental conditions in developing countries, it is very important to support initiatives by developing countries themselves. In order to improve their coping capacity, Japan is working on support mainly through *Environmental Centers* as a part of efforts to strengthen environmental conservation departments of developing countries." (The Ministry of Foreign Affairs 1997, p.35)

Table 1.1 Current trends in international support

Organization	Plan	Contents
United Nations	Millennium Development Goals; MDGs (September 2000)	Adopted at the Millennium Summit of the United Nations. Indication of the 8 goals that should be achieved by 2015 and 18 targets based on the goals (including evaluation indices). 1. Eradication of severe poverty and starvation 2. Achievement of universal primary education 3. Promotion of gender equality and advancement of women 4. Reduction of infant mortality 5. Improvement of health of pregnant and parturient women 6. Prevention of epidemics of HIV/ AIDS, malaria and other diseases 7. Assurance of environmental sustainability Target 9: Reflect sustainable development principles in the policy and strategy of each country; prevent the loss of environmental resources and recover them. Target 10: Cut by half the number of people who cannot continuously use safe drinking water by 2015. Target 11: Drastically improve the life of a minimum of 100 million slum residents by 2020. 8. Promotion of global partnership for development
World Bank	Poverty Reduction Strategy Papers; PRSPs (From September 1999. The 72 countries agreed on PRSP as of July 2002.)	According to the following 6 basic principles, implement and evaluate supports based on strategic documents drafted by developing countries themselves. 1. Initiative by supported countries 2. Orientation toward results 3. Inclusiveness 4. Allocation of priorities 5. Partnership 6. Long-term activity
UNDP	Capacity 2015 (August 2002)	Through development of Capacity 21, settle and implement support programs focusing on the following aspects of capacity development. Particularly focus on the support of capacity development at the community level. 1. Capacity development of communities 2. Strategies for sustainable development 3. Capacity development for multinational environmental treaties 4. Capacity development for island countries 5. Strategic facilities for capacity development
Japanese Government	EcoISD	<Philosophy of EcoISD> 1. Security of human beings 2. Ownership and Partnership 3. Compatibility between environment and development <Basic policies of environmental cooperation> 1. Improvement of capacity to cope with environment 2. Positive thinking toward environmental aspects 3. Cooperation through total and inclusive frameworks、 As new actions: 1. Support for cultivation of human resources of five thousand people in the environmental field within five years after 2002. 2. Improve evaluation methods and enrich ex post evaluation of environmental ODA.

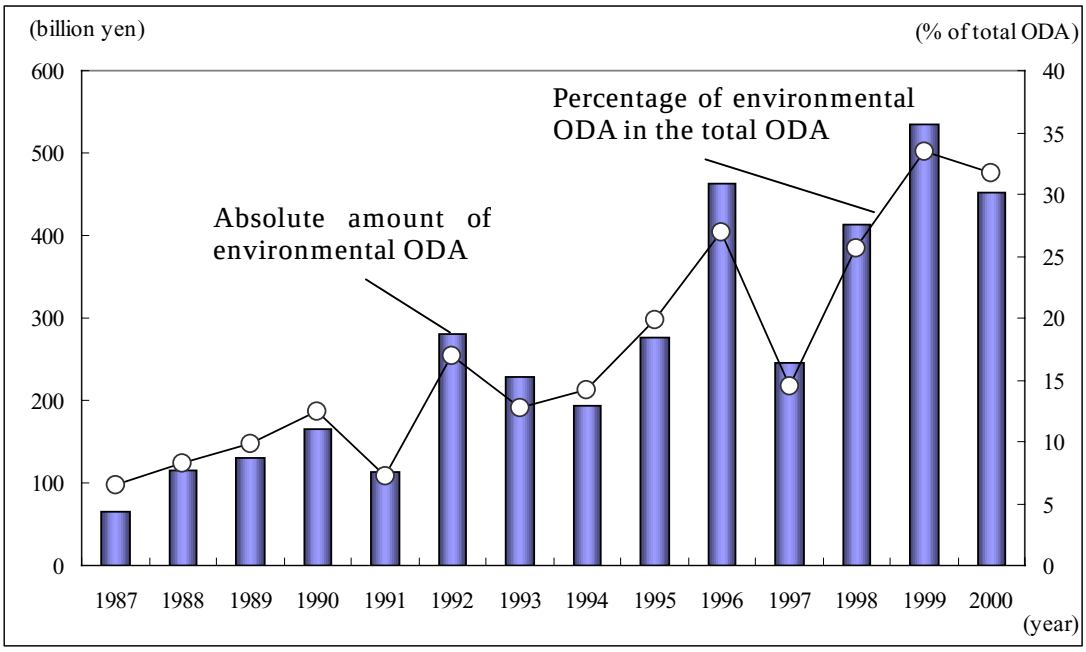
Source: Adopted from related materials from each organization.

Figure 1.1 Transition of FDI and ODA for developing countries (price in 2001)



Sources: DAC (2001), UNCTAD (2002)

Figure 1.2 Transition of Japan's environmental ODA



Source: Ministry of Foreign Affairs

The Environmental Center project started as Thailand Environmental Research and Training Center (ERTC) in April 1990 after an agreement was reached on the grant aid in 1989. After that the project was carried out in six countries, Thailand, China, Indonesia, Mexico, Chile and Egypt, for about 12 years. In addition, similar project development has been tried in such countries as Vietnam.

In order to examine the efficacy of the Environmental Center approach and the direction of environmental cooperation, it is necessary for a third party to evaluate the overall influence that the project has had on the development of the SCEM in developing countries, namely, the capacity of developing countries to deal with environmental problems by themselves. Moreover, it is necessary to clarify what possibilities for improvement and progress there are in the future cooperation.

The purpose of this evaluation is a program evaluation of the Environmental Center projects. In this report, we use the expression 'Environmental Center project' when we see the Environmental Center as a grant aid or a technical cooperation project, and use the expression 'Environmental Center approach' when we evaluate the Environmental Center from the perspective of development of SCEM, which is the overall goal. In other words, the evaluation of the Environmental Center approach is synonymous with the program evaluation of the Environmental Center projects.

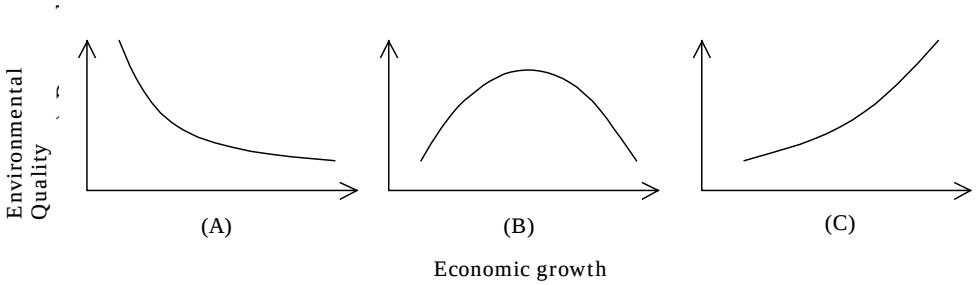
In this evaluation the overall capacity of the government, firms, and citizens to manage environmental problems in the recipient country is referred to as the *social capacity for environmental management (SCEM)*. In turn, this social capacity is defined as the *social environmental management system (SEMS)* in the systematic and institutional framework. Furthermore, the support of this system development is called an environmental cooperation program (Matsuoka and Honda 2002; Matsuoka 2003a, 2003b; Honda 2003). At the same time, from the viewpoint of program evaluation, this evaluation study analyzes how the Environmental Center projects contribute to the development of the SEMS in recipient countries. This report also evaluates other related projects and policies as the occasion arises and give suggestions for more effective and efficient environmental cooperation through Japan International Cooperation Agency (JICA).

As mentioned above, based on an official contract of an evaluation research project called 'A Thematic Evaluation: Environment' between JICA and Japan Society for International Development (JASID), the Evaluation Team on Environmental Cooperation was established, which have been working for this report (see study group record at the end of this report for details). Therefore, stated evaluations are individual opinions of the Evaluation Team members and do not represent the opinion of JASID.

1.2 Evaluation Targets

Generally, as economic growth proceeds, environmental problems in the society also develop. As shown in Figure 1.3, the poverty-related environmental problems such as access to safe drinking water and sanitary facilities are the main issues in the early stage of economic growth. This period also requires the maintenance of hard infrastructure like water and sewerage.

Figure 1.3: Economic growth and environmental problems

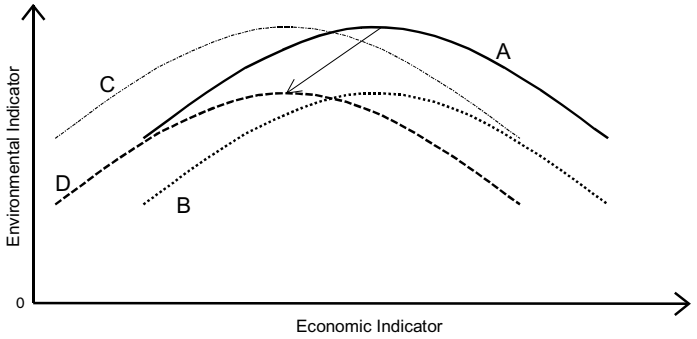


(A) Poverty-related issues: access to safe drinking water and sanitation
(B) Industrial pollution-related issues: SOx, PM_{10}
(C) Consumption-related issues: municipal wastes, CO_2

Source: Bai and Imura (2000)

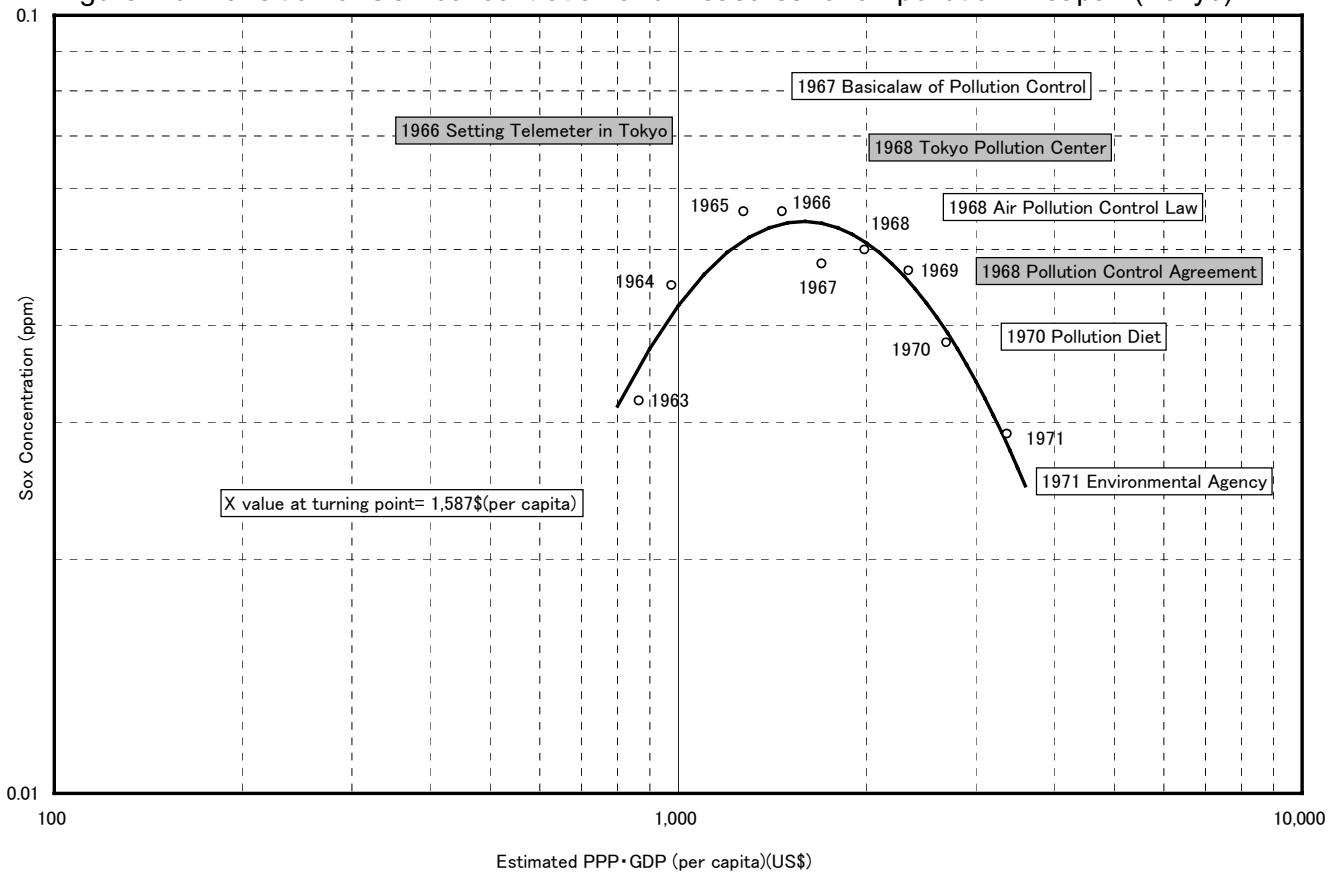
In the second stage, pollution problems such as SOx (sulfur oxide) and PM_{10} (particulate matter: diameter less than 10 micrometer [1/100mm]) caused by industrialization tend to become serious. When economic growth reaches a certain level, these environmental problems shift to a pattern of improvement. In this case, the environmental Kuznets curve (EKC) can be assumed (Matsuoka et al. 1998). It is an important question for the environmental policy of developing countries and environmental cooperation whether or not this turning point can occur in earlier stages of economic growth or at lower levels of pollution (Figure 1.4). In Figure 1.5 the EKC in Tokyo is shown. As represented in this figure, the third stage brings worsening consumption-oriented environmental problems such as municipal waste management and CO_2 emissions, which occur along with increased consumption.

Figure 1.4 Environmental Kuznets curve



Source: Matsuoka et al. (1998)

Figure 1.5 Transition of SOx concentration and measures for air pollution in Japan (Tokyo)



Note: GDP per capita on horizontal axis is converted from Metropolitan gross domestic product to dollar by annual exchange rate.

Source: Matsuoka et al. (1998)

In the developing countries that were targeted in this evaluation, mainly since the 1980s the industrial and urban pollution problems (brown issues) have worsened as a result of the rapid industrialization and urbanization. It was mostly to respond to these brown issues that the

Environmental Centers were established. Thus, this evaluation focuses on air quality management issues, especially air pollution problems such as SOx and PM_{10}, which the Environmental Centers of the developing countries approach in common.

As the countries of principle focus in this evaluation, Thailand, Indonesia, China and Mexico were selected from among the six countries (Thailand, China, Indonesia, Mexico, Chile and Egypt) where Environmental Center projects are implemented, based on such considerations as the time elapsed from the start of the project. In these four countries, field surveys were conducted, and in the other two countries, literature surveys were carried out as needed. Moreover, in Japan we conducted in-depth interview research with the individual people involved in each project (refer to the study group record at the end of this report for information about the field and domestic surveys).

In addition to the above projects, the projects implemented by JICA that are related to measures against air and water pollution are major objects of this evaluation as well. Moreover, the environment-related projects by other donor agencies are targeted as materials for comparative analysis and evaluation of collaboration between donor agencies.

1.3 Outline of Environmental Center Projects

In Table 1.2 an outline of the implementation of the six Environmental Center projects is shown. The main targets of this evaluation report are the Environmental Centers in the mentioned above four countries. In the Environmental Center projects, grant aid for the center facilities and project-type technical cooperation (currently called a technical cooperation project), where dispatch of Japanese experts, supply of equipment and counterpart training are conducted, are implemented as a set (only technical cooperation was provided in the Mexican Environmental Center).

As mentioned above, the first cooperation of the Environmental Center project was implemented at the Environmental Research and Training Center (ERTC) in Thailand from April 1990 to March 1997 (including two follow-up years). The agreement to implement support for the Sino-Japan Friendship Center for Environmental Protection was agreed upon at the time of the visit of Prime Minister Takeshita to China in 1992, in memory of the 20th anniversary of the reestablishment of diplomatic relations between Japan and China. The project started in September 1992; Phase 1: construction of the Center building and training of local counterpart staffs was implemented up to August 1995; and Phase 2: opening of the Center and full-scale

Table 1.2 Environmental Centers in 6 countries

		Sino-Japan Friendship Center for Environmental Protection, China	Environmental Research and Training Center, Thailand	Environmental Management Center, Indonesia	National Center for Environmental Research and Training, Mexico	National Center for Environment, Chile	Environmental Monitoring Training Project, Egypt
Agreement of grant aid		1992.6	1989.7	1991.12		1995.11	1997.3
Project term		Phase 1: 1992.9-1996.8 Phase 2: 1996.2-2001.1 Phase 3: 2002.4-2006.3	Phase 1: 1990.1-1995.3 Extension: 1995.4-1997.3	Phase 1: 1993.1-1997.12 Follow up: 1998.1-2000.3	Phase 1: 1995.7-1997.6 Phase 2: 1997.7-2000.6 Follow up: 2000.7-2002.6	Phase 1: 1995.6-2002.5 Follow up: 2000.6-2002.5	Phase 1: 1997.9-2002.8
Project purposes		-Collection and analysis of monitoring data -Research of the pollution control technology -Development of human resources for environmental protection	-Environmental research, training -Improvement of monitoring activities - (Contribution to improvement of environmental quality)	-To develop the capacity for environmental management through the environmental research, monitoring, environmental information system, training	-To develop the method of pollution control, and environmental management - (Development of the capacity for environmental administration)	-Environmental research, monitoring, data, and training to make and operative support the environmental policy	- To support the monitoring system of EEAA
Environmental issues targeted in the project		-Environmental monitoring -Development of the pollution control technology -Improvement of the environmental information network -Research about environmental strategic policy -Environmental education	-Water pollution -Air pollution -Noise and vibration -Solid waste -Hazardous substances	-Water pollution -Air pollution -Hazardous substances	-Air pollution -Hazardous substances	-Water pollution -Air pollution -Solid waste	-Water pollution -Air pollution -Industrial waste
Project type		Grant Aid, Technical Cooperation	Grant Aid, Technical Cooperation	Grant Aid, Technical Cooperation	Technical Cooperation	Grant Aid, Technical Cooperation	Grant Aid, Technical Cooperation
Input	Grant Aid (million yen)	10,500	2,308	2,687		1,380	915
	Grant for Equipment (million yen)	210	203	408	515	496	161
	Expat (long term)	22 persons	25 persons	32 persons	14 persons	11 persons	14 persons
	Expat (short term)	64 persons	42 persons	78 persons	19 persons	31 persons	22 persons
	C/P Training	49 persons	32 persons	40 persons	25 persons	26 persons	39 persons
Counterpart agency		NEPA/SEPA	MOSTE	BAPEDAL/ MOE	SEMARNAP/ SEMARNAT	CONAMA Chile Univ.	EEAA
Remarks		Phase 3 not included		Phase 2 (DEMS) not included			

Source: The author

support for the Center activities was implemented September 1996 to January 2001. Phase 3 has been conducted since March 2002 (scheduled to be completed in March 2006).

In Indonesia, the Environmental Management Center (EMC) project started in January 1993, and the cooperation was carried out until March 2000, including two follow-up years. The project to strengthen the decentralized environmental management system (DEMS) has been continuing since July 2002 in order to reinforce the EMC, improve the capacity of the environmental management department in Medan, North Sumatra and establish a system of collaboration aimed at strengthening the capacity of the EMC and improving the capacity of the environment control department (scheduled to be completed in July 2006). Phase 1 and Phase 2 in the National Center for Environmental Research and Training of Mexico (CENICA) were carried out during the seven years from July 1995 to June 2002 (including two follow-up years).

1.4 The Methodology

Previous reports related to this evaluation include two JICA reports 'The Report of the Assistance Study Group (Environment)' (1988) and 'The Second Report of the Assistance Study Group' (2001), where the direction of environmental cooperation is considered by focusing on technical cooperation, and the Ministry of Environment report 'The Evaluation Method Research on Environmental Cooperation Project 2000' (2001), where the Environmental Center is evaluated from a broad perspective. Moreover, evaluations conducted mainly by the Japan Society for International Development (JASID) included 'The Ex-post Evaluation of the Araballi Afforestation Project, India' (2000, included in the JBIC Ex-post Evaluation Report 2001) and 'Alleviating Regional Disparity between the Bangkok Metropolitan Area and the Northeastern Region: A Case of the Kingdom of Thailand' (evaluation by an external organization entrusted by JICA in 2000).

This evaluation is conducted on the basis of previous evaluation reports and evaluation studies of assistance projects (including Matsuoka et al. 2000). Moreover, this report analyzes the development process of social capacity in developing countries with a consistent view of development of SCEM or SEMSs and evaluates effective environmental cooperation based on this analysis.

From these viewpoints, the methodology of this program evaluation is based on the theory of development of SCEM and the OECD (Organization for Economic Co-operation and Development)/DAC (Development Assistance Committee) five evaluation criteria (effectiveness, efficiency, impact, sustainability and relevance), as explained in detail in Chapters 2 and 3. To

be more precise, an evaluation matrix and a set of evaluation indicators are developed under the specifications that the development process of the SEMS and the three stages (system-making stage, system-working stage and self-management stage) are shown on the vertical axis and the DAC's five criteria are indicated on the horizontal axis.

In this evaluation report, the institutions and organizations concerned with environmental management are investigated first. Then the structure, function and development process of the SEMS are clarified and also the SCEM is evaluated from several points of view. Finally, the Environmental Centers, the related JICA environmental cooperation projects and the environment-related projects of other assistance organizations are analyzed from the viewpoint of their impact on the development of the social environment management system.

It should be noted that in each case, through the interaction between Japan and the recipient countries in the implementation of the Environmental Center projects, not only the promotion of international exchange and understanding, but also the growth of environmental business is considered in this evaluation.

In this report, 'the program evaluation of the Environmental Center projects' and 'the evaluation of the Environmental Center approach' are used interchangeably. More precisely, the program evaluation of the Environmental Center projects aims to evaluate the projects based on its contribution to the development of social capacity for environment management in the Environmental Center projects. The Environmental Center approach is intended to support the development of social capacity for environment management. Therefore, the program evaluation of the Environmental Center projects is the evaluation of the Environmental Center approach. Furthermore, the Environmental Center project means project-type technical cooperation itself and the Environmental Center means a place where human resources and equipment come together and work with support from Japan and other financial and technical resources. Moreover, the Environmental Center approach is defined as an approach to contribute to the development of the social capacity for environment management of the country through environmental monitoring, research and training. In other words, it is an action style or support approach for the Environmental Center, which contributes to the development of the SCEM or social environment management system of the country. The sizes of these three concepts become bigger in order. As these explanations have attempted to show clearly, the social environment management system, which becomes the base of the concepts underlying the Environmental Center, is a bigger concept.

Ultimately, on the basis of this evaluation of the Environmental Center approach, this report gives recommendations for more effective environmental cooperation in the future.

1.5 The Structure of the Report

The structure of this evaluation report is divided into a main report and individual study reports. The main report is an evaluation that the study group has written about the contribution of the Environmental Center approach to the development of SCEM and improvement of future support in accordance with a consistent evaluation analysis framework. The individual study reports consists of evaluation studies for specific topics that the study group members have written about the development process of the social capacity environmental management and the role of the Environmental Center approach in that process based on their own individual viewpoints and techniques.

The structure of the main report is the following. First, in Chapter 2 the SCEM is defined and the deployment of the SEMS is evaluated in three developmental stages: the system-making stage, system-working stage and self-management stage. This evaluation analysis framework is based on the assumptions that the appropriate starting time of an Environmental Center project is the final phase of the system-making stage, and the desirable ending time of the project is the phase when the system-working stage is fully deployed. The practical evaluation study covering the four countries, China, Thailand, Indonesia and Mexico, is reported in this chapter.

In Chapter 3, the two evaluation axes of the impact on development of social environment management system and the DAC's five criteria are set up, and the contribution of the Environmental Center is evaluated at the program level. In particular, the contribution of the Environmental Center project to the development of the capacities of government, firms, citizens and local actors is analyzed and evaluated in detail. Lastly, in Chapter 4 the lessons learned from the program evaluation of the Environmental Center projects are clarified, and recommendations to improve the deployment of the future Environmental Center approach and environmental cooperation are offered. At the same time, the problem of environment cooperation supply systems in Japan is also considered.

This main report is written and compiled by Matsuoka as the leading author with Honda, a research assistant. The individual study reports (in Japanese) consist of six chapters, 'the Future Environmental Center from the Viewpoint of Assistance Coordination' (Chapter 1: Fujikura), 'the Development of 'Environmental ODA' and 'Environmental Center' (Chapter 2: Miyata), 'the Development of Regional Environment Management Capacity and the Environmental Center Approach' (Chapter 3: Mori), 'Environmental Management Capacity at Local Levels in China' (Chapter 4: Kaneko), 'the Lessons from Assistance Supply System Analysis' (Chapter 5: Kusumi), 'the Environmental Center Approach and Capacity Development of Firms and Citizens'

(Chapter 6: Kitawaki). It is advisable for the individual study reports to be read selectively, depending on reader's interest and concern. It should be noted that the evaluation results in the individual study reports might represent different positions from those of the main report.

As a means of evaluating of this report, the Evaluation Team asked researchers at universities and research organizations in the four target countries to make a research study on the social environment management system of each country, and made an effort to evaluate in this main report and in the individual study reports by introducing recipient countries' views. The background paper by the local researchers are included as separate volumes of this report for additional reference.

<Notes>

Regarding the social capacity for environment management and social environment management system used as the evaluation analysis framework in this evaluation report, the following studies are relevant:

Matsuoka, Shunji. 2003a. "Social Capacity Development for Environmental Management: International Cooperation toward Social Capacity Development for Environmental Management." Proceedings of International Workshop on Social Capacity Development for Environmental Management and International Cooperation in Asia (January 27 and 29 in Hiroshima and Tokyo). pp.3-33.

Matsuoka, Shunji. 2003b. "Social Capacity Development for Environmental Management." Matsuoka, Shunji and Kuchiki, Akifumi (eds.) *Social Capacity Development for Environmental Management in Asia: Japan's Environmental ODA after Johannesburg Summit 2002*. Institute of Developing Economies (forthcoming. In Japanese and English).

Honda, Naoko. 2003. "Evaluating Social Capacity Development for Environmental Management in Developing Countries." Matsuoka, Shunji and Kuchiki, Akifumi (eds.) *Social Capacity Development for Environmental Management in Asia: Japan's Environmental Cooperation after Johannesburg Summit 2002*. Institute of Developing Economies (forthcoming. In Japanese and English).

Matsuoka, Shunji and Honda, Naoko. 2002. "Methodology of Program Evaluation of Environmental ODA: Specifying an Evaluation Approach of Social Capacity for Environmental Management." Proceedings of the 13th Annual Conference of Japan Society for International Development. pp.322-327 (in Japanese).

Honda, Naoko. 2002 "Developing Evaluation Indicators of Social Capacity for Environmental Management." Proceedings of the 13th Annual Conference of Japan Society for International Development. pp.328-333 (in Japanese).

Matsuoka, Shunji. 2002. "International Capital Flows and Environmental Issues in Developing Countries: Sustainable Development, Foreign Direct Investment and Official Development Assistance." Morita, Tsuneyuki and Amano, Akihiro (eds.) Global Environmental Issues and Global Community. Iwanami Shoten. pp.125-155 (in Japanese).

Matsuoka, Shunji and Honda, Naoko. 2002. "Environmental Cooperation and Capacity Development: Review of the Concept of Capacity Development in Environment." Journal of International Development Studies. Vol.11. No.2. pp.149-172 (in Japanese).

Matsuoka, Shunji et al. 2002. "Evaluation of Environmental Cooperation Based on Social Environmental Management System Approach: A Case Study of the Sino-Japan Friendship Center for Environmental Protection." Proceedings of Annual Conference of Society of Environmental Economics and Policy Studies 2002. pp.146-147 (in Japanese).

Matsuoka, Shunji. 2002. "Capacity Development in Environmental Cooperation: For Social Environmental Management System." Proceedings of the 3rd Special Study Meeting of Japan Society for International Development. pp.224-229 (in Japanese).

Honda, Naoko. 2002. "Methodology of Program Evaluation of the Environmental Center Approach: The Sino-Japan Friendship Center for Environmental Protection." Proceedings of the 3rd Special Study Meeting of Japan Society for International Development. pp.230-235 (in Japanese).

Matsuoka, Shunji. 2000. "A Comparative Study on Social Capacity Development for Environmental Management in East Asia." View toward East Asia. Autumn Issue. pp.76-231 (in Japanese).

Matsuoka, Shunji, Matsuoka, Reishi, and Kochi, Ikuho. 1998. “Economic Growth and Environmental Issues in Developing Countries: Verification of Environmental Kuznets Curve.” Environmental Science. Vol.11. No.4. pp.349-362 (in Japanese).

CHAPTER 2

Development Process of Social Capacity for Environmental Management in Developing Countries

This chapter starts by defining the basic concepts for a program evaluation of the Environmental Center projects. The overall goal of the projects is to assist developing countries so that they can obtain the capacity to deal with environmental problems by themselves. This evaluation study defines a cooperation approach using environmental research, training and monitoring through Environmental Centers as an Environmental Center approach. In order to see whether or not the approach can give satisfying results, we first must know at which stage the recipient and possible recipient countries are in the development of their environmental management capacity as a society and then seek an appropriate cooperation approach depending on the development stage.

This evaluation study calls these concepts the *social capacity for environmental management (SCEM)* and the *social environmental management system (SEMS)* and, based on these concepts and related historical background, assesses the development of a country's social capacity as a system for environmental management (past, present and future forecast), and draws a picture of an appropriate cooperation approach according to the development stage in four countries, China, Thailand, Indonesia and Mexico.

First the relevant discussions relating to SCEM are presented and the concepts of SCEM and SEMS are defined in section 2.1. The next section, 2.2, discusses the development stages and benchmarks of SEMS and presents an analysis framework. Section 2.3 sets up the indicators to evaluate the development stages based on the review of previous work in the fields of international development and cooperation that has tried to integrate social and environmental indicators. These three sections are followed by case studies of SEMS development processes in the four countries in sections 2.4 through 2.7.

2.1 Social Capacity for Environmental Management and Social Environmental Management System

2.1.1 Capacity in Environment to Social Capacity for Environmental Management

The concept of social capacity for environmental management (SCEM) was developed from the lessons learned from a capacity development approach. There have been long discussions of capacity development in developing countries since the 1950s. Table 2.1 shows the major historical developments. Institutional building in the 1950s and 1960s focused mainly on the capacity of individual entities. Since the late 1980s, the concept of capacity development became popular among donor agencies, and they are now more aware of the importance of capacity development both in public and private sectors.

Capacity development also entered the field of environmental cooperation. OECD has been a keen promoter of capacity development in the environment (CDE) through the 1990s as shown in Table 2.2. It was remarkable that they tried to develop a common concept for environmental cooperation among donor agencies, but the approach has not reached a concrete and practical level.

Table2.1: Historical review of capacity development approach

	Approaches	Characteristics
1950s-1960s	Institutional building	・ Improving the capacity of the individual organizations in public sector
1960s-1970s	Institutional strengthening	・ Improving the enforcement capacity of existing organizations
1970s	Development management	・ Development plan which focuses on improvement in Basic Human Needs ・ Improving the distribution capacity in public sector ・ Improving the capacity of local group and local public sector
1980s	Institutional development	・ Strengthening relations between governmental and private sector ・ Shift to the program approach
1990s	Capacity development	・ Development of long-term endogenous structure ・ Linkage between political environment and organization
1995-1998	Capacity assessment and development	・ Comprehensive framework to measure the institutional capacity of existing organizations ・ Clear definition of system, organization, and individual capacity in the UNDP Guideline ・ Project management based on result and performance

Source: Matsuoka and Honda (2002)

Original source: OECD (1999)

Table 2.2: History of the concept of capacity development in the environment

Year	Event	Progress
1989	The Working Party on Development Assistance and Environment	Start of the argument on aid and environment
1992	The United Nations Conference on Environment and Development (UNCED) Taskforce on Capacity Development in Environment	Institutional building mentioned in Agenda 21 Established to develop a program approach of technical cooperation and analytical tools of CDE
1993	International CDE Workshop in Costa Rica	Discussed definition of "Capacity in Environment" and its basic approach
1995	*Donor Assistance to Capacity Development in Environment* (OECD 1995)	Capacity in Environment was defined as "the ability of individuals, groups, organizations and institutions in a given setting to address environmental issues as part of a range of efforts to achieve sustainable development" → Identification of capacity and capability Improvement of institutional structure Emphasis on "process"
1999	*Donor Support for Institutional Capacity Development in Environment: Lessons Learned* (OECD 1999)	The lessons from CDE cooperation summarized The ambiguous definition of CDE The importance of CDE in rural areas Development of the indicator for CDE

Source: Adopted from Matsuoka and Honda (2002)

The OECD (1999) suggests several shortcomings and future tasks for CDE. One of the biggest lessons learned was that the concept is not clear enough to attract donor and recipient countries. They do not say clearly how general concepts of 'capacity' or 'capacity development' become different and unique when they are put together in a set with another concept: 'environment.' Also, the ambiguous concept of CDE can be as broad as 'development' itself. The OECD report also emphasizes the importance of developing evaluation indicators and an evaluation monitoring system. CDE indicators are touched on later in this chapter (2.3).

The Evaluation Team has been working to develop a new framework for evaluation and implementation of international environmental cooperation based on historical development of the concepts and newly emerging approaches in the field of international cooperation, such as social capital, environmental governance, etc. as shown in Table 2.3. That is, social capacity for environmental management (SCEM) is defined as the capacity to manage environmental problems as a unified society with three main actors: the government, firms, and citizens.

Table 2.3: The trend of cooperation approach

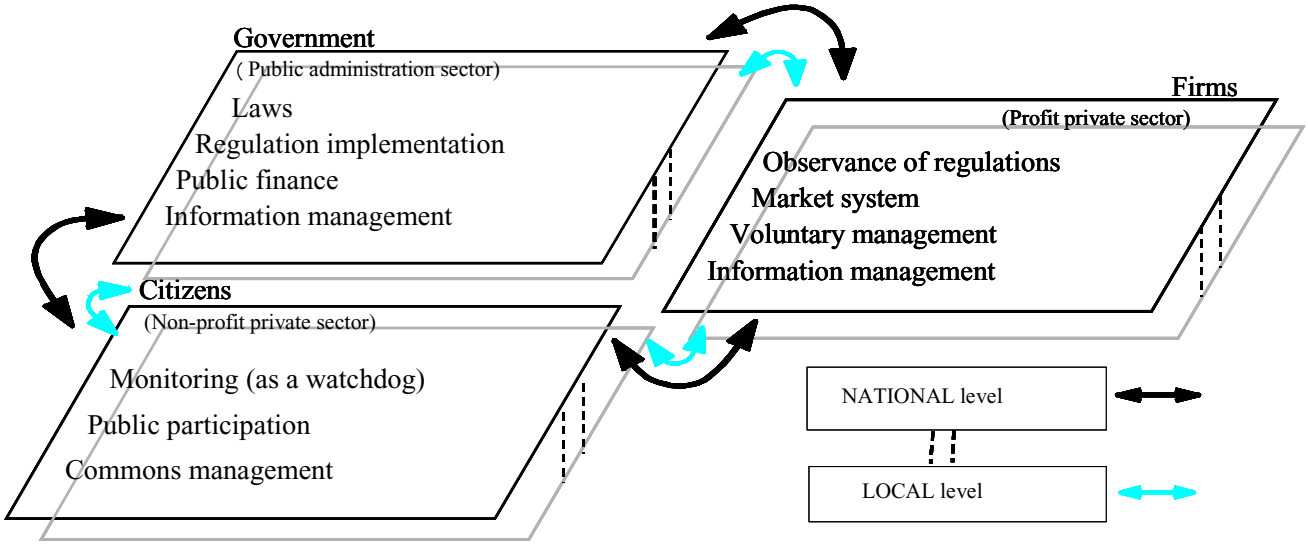
Social capital Coleman (1988), Putnam (1993). Initially used in the field of cooperation since the late 1990s.	
OECD (2001b)	Definition: Networks together with shared norms, values and understandings that facilitate co-operation within or among groups
World Bank (2003a)	Definition: Social capital refers to the institutions, relationships, and norms that shape the quality and quantity of a society's social interactions.
Environmental management system Since 1975. Improved after Rio Summit (UNCED 1992).	
UNEP & WHO (1996)	At the GEMS (Global Environmental Monitoring System) project, urban environmental management system was valued using the following indicators (ex. Air quality). ・Measure air quality ・Assess and make available data ・Estimate emissions ・Enable management
Environmental governance Taskforces in various organizations established after UNCED	
OECD (2002)	Mentioned the importance of the roles in government to achieve the sustainable development governance. Mentioned the importance at the following points. ・Horizontal (inter-ministry) and vertical (national level-rural level) integration ・Improvement of consciousness ・Participant of citizens and firms
World Bank (2003b)	The Environmental Governance component of the program focuses on building faith in the rule of law by strengthening institutional capacity for ensuring compliance with environmental laws and standards. The strategic objective of the program is to strengthen environmental governance in World Bank client countries by: ・Strengthen good governance practices, including country capacity for effective compliance with and enforcement of environmental laws and regulations ・Strengthen the role of parliamentarians in implementing environmental decisions in their legislatures ・Build global and regional networks for environmental compliance and enforcement and support existing networks ・Enhance understanding of multilateral environmental agreements, interactions with the World Trade Organization (WTO), and international rulemaking ・Promote an informed dialogue among all concerned parties, including civil society, on the participation and empowerment of the poor and women in the environmental decision-making processes
ESCAP (2002)	Pointed out the importance of public policy (governance). Components of environmental governance are: ・To establish wide objectives ・To plan concrete targets ・To make policies to achieve the concrete targets ・To chose the concrete policy method ・To built institutional mechanisms to operate the policy ・To incorporate the participation mechanism and power-grabbing of stakeholders ・To make clear the rights and obligations of stakeholders
IGES (2001)	Analysis to what kind of wnvironmental issues society deal with, from the point of view of the correlation between instituions (formal and informal) and actors (formal anfd informal). Through analysis of the environmental governance in Asian countries, they propose the following points. ・To establish environmental policy information network in the Asian region ・To reconsider existing laws, policies, organizations comprehensively to improve the policy frame ・To encourage decentralization to encourage decentralization regarding decision making and operation pf environmental policy ・To make the frame that citizens (as environmental NGOs) can participate in the process of planning and operating of area projects ・To operate the environmental impact assessment (EIA), and considering the acceptability of strategic environmental assessment (SEA) ・Special considerations for those medium and small firms and factories can comply with the environmental regulations

Source: The author

2.1.2 SEMS

Practical discussion on SCEM can start with defining the social environmental management system (SEMS). SEMS, as shown in Figure 2.1, consists of the three main actors, the government, firms and the citizens. These actors themselves and interrelations among the three form the system. Relations between the national level and local level are also of great importance in the framework. Actual problems occur at the local level and local firms and citizens have the most to do with the solutions, while overall environmental policies and laws are established at the national level. SEMS, therefore, basically consists of the three actors, two levels and the interactions between them.

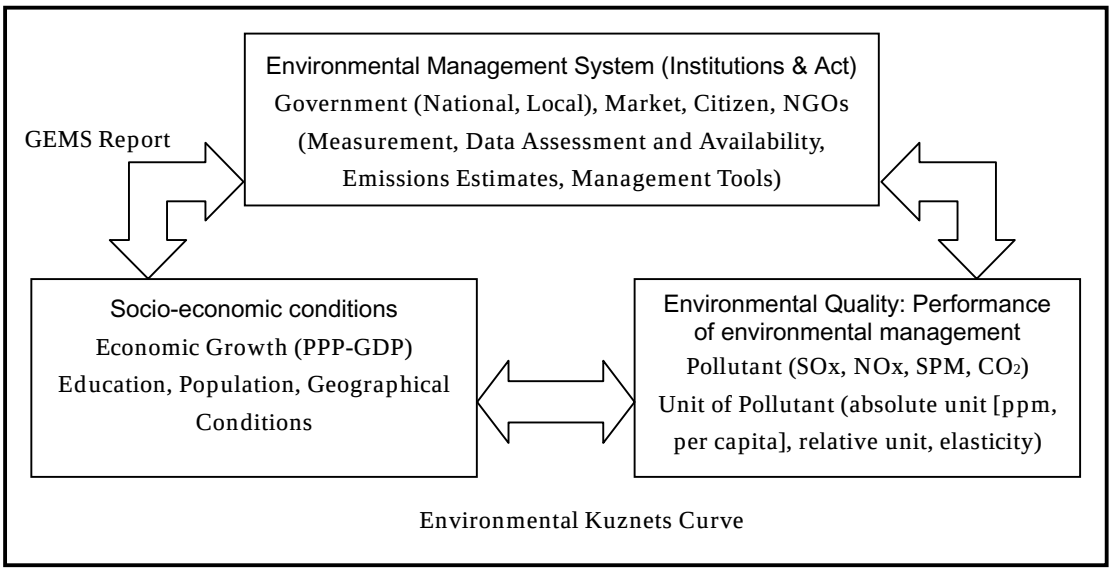
Figure 2.1: Social Environmental Management System (SEMS)



Source: Matsuoka (2002)

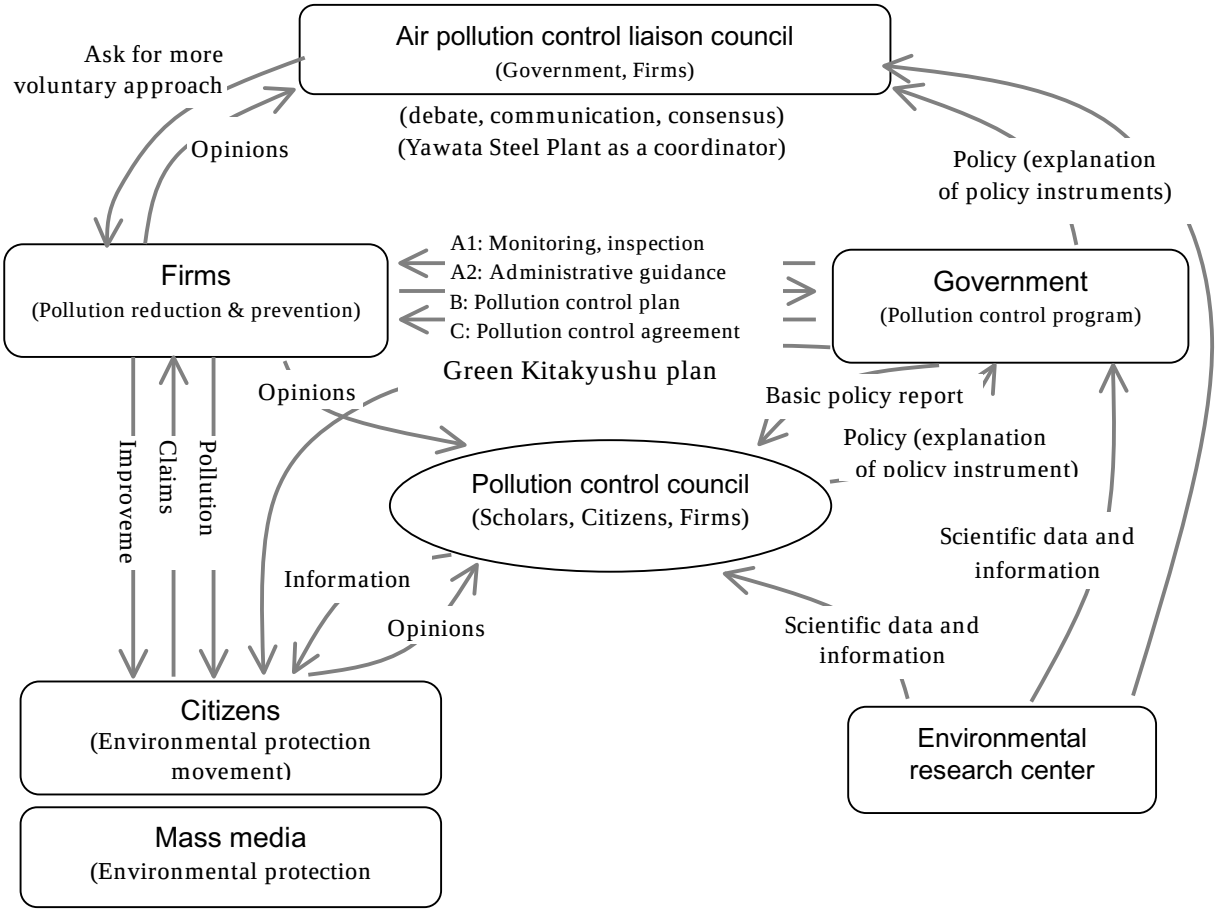
Figure 2.2 shows some interrelations, or causes and effects, of environmental quality and socio-economic situations in relations to SEMS. The SEMS in one country is prescribed by the socio-economic conditions and it appears as the level of environmental quality. Here also are the inter-prescribing relations between environmental quality and socio-economic conditions. Japan can provide a good example for this concept, that is, the Kitakyushu case during the 1960s and 1970s in which the city had serious industrial air pollution. As Figure 2.3 shows, in the Kitakyushu model, not only did the three actors (the city government, firms and factories, and

Figure 2.2: SEMS and its interrelations with environmental quality and socio-economic conditions



Source: Matsuoka et al. (2000)

Figure 2.3: Kitakyushu model



Source: Katsuhara (2000)

citizens) each make efforts on their own, but also strong cooperation worked between the local government and firms, as well as citizens through coordinating liaison committees. This indicates the importance of groups that enhance and coordinate interactions among actors as well as the actors themselves.

SEMS can be explained by comparative institutional analysis and new institutional economics. Figure 2.4 describes some concepts of comparative institutional analysis and their application to SEMS analysis. Comparative institutional analysis describes the institution as a self-sustaining system of shared beliefs concerning a salient way in which the game is repeatedly played (Aoki 2001, p.10). From this viewpoint, institutions are durable and robust.

Figure 2.4: Concepts of comparative institutional analysis and their application to SEMS

Definitions of institution from the viewpoint of game theory

Player = Institution Nelson (1994)	Institution is organization itself.
Player ≠ Rule, Institution = Rule North (1990)	Institutions are the game in a society or more formally, are the human devised constraints that shape human interaction.
Player (play) = Institution Aoki (2001)	An institution is a self-sustaining system of shared beliefs about how the game is played.

The point of view from institutional analysis

Bundle of institutions → System	"Bundle of institutions" can be defined as system.
Institutional complementarity	Institution has hierarchy, and Institutions work systematically and strongly when institutions complement each other.
Strategic complementarity	Even though substitutable action choices are available to individual agents, their actual choices may be affected by the prevailing strategy profiles in the domains in which they are active (Choice interdependencies) .
Path dependence	Once an institutional bifurcation occurs, even if two different (historically, economically) economies are exposed to the same technological and market environmental afterwards, the subsequent overall institutional arrangements of the two economies may well differ, depending on their respective interim institutional trajectories.

Application on the analysis of SEMS in developing countries and international cooperation

1. Dynamics of institutional change, and the development stages of SCEM
2. Transfer of Japan's experiences
3. Development of the international cooperation system

Source: Matsuoka and Honda (2002), Aoki (2001), Aoki and Okuno (1996)

Institutions are more than just individual entities. A bundle of institutions form a social system through their characteristics of hierarchy and complementarity. In this context, individual players tend to choose their strategies based on an existing and related social system (strategic complementarity). Moreover, institutions depend on the origin or historical path of development, and this differentiates one system from another due to the different paths (path dependency). This study analyzes the development of SEMS in Asian countries and discusses the direction for Japan's effective international cooperation.

2.2 Benchmarks and Development Stages of SCEM

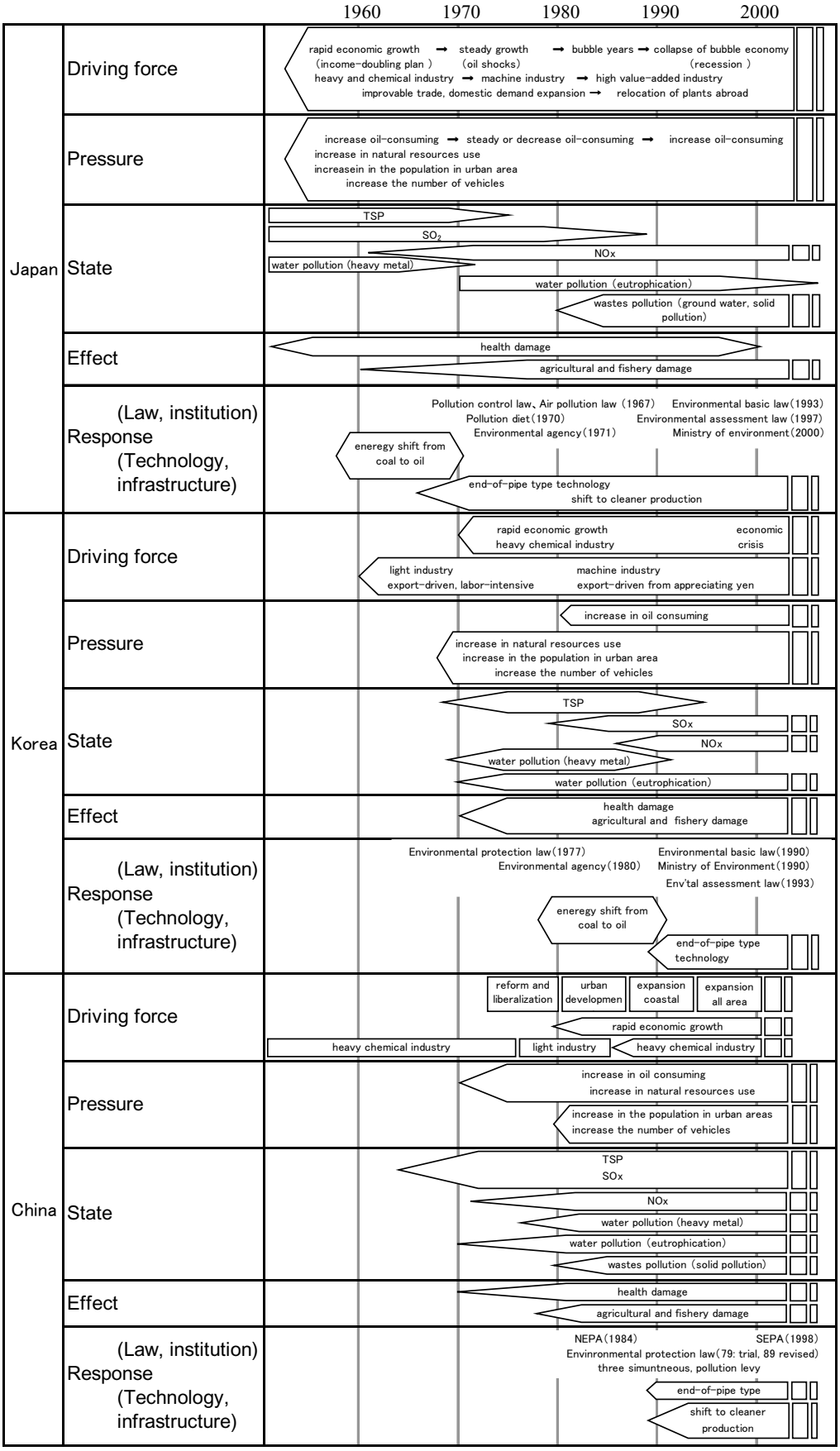
2.2.1 Economic Growth and Environmental Issues

Harashima and Morita (1998) analyzed the development periods for environmental policy or environmental management in Japan, Korea and China. They assume that there are three periods, namely, the initial period, progressive period, and consolidation period. The main conclusions are that (1) these three countries can be ranked from most to least mature in terms of environmental policy: Japan, Korea, China, (2) China has not yet reached the final period: the consolidation period, and (3) the development periods are more condensed in the case of latecomers to the process.

OECD's DPSIR (driving force, pressure, state, impact, response) model (sometimes effect is used instead of impact) tries to analyze the process of environmental issues based on causes of the issues, impact on society, and behaviors to deal with the issues [1]. Figure 2.5 shows the cases of Japan, Korea and China by Imura and Kobayashi (1999, pp.106-108), from which the reader can see differences in the process of the three countries, especially between Japan and the other two. Japan experienced and overcame problems one by one in its long history since the toxic water problem in Ashio in the 1880s. In developing countries like China and Korea, on the other hand, environmental problems, or at least their awareness, are rather new and they are condensed into a shorter period. The same trend is also observed in Harashima and Morita (1998) regarding environmental policy actions, which we can call a response in the model for the three countries.

As mentioned in Chapter 1, from the standpoint of environmental issues themselves, a general understanding is that with economic growth, the major issues shift from (1) poverty-related issues, such as access to safe water and public health, and (2) industrial pollution such as SOx from power plants and factories, to (3) consumption- related issues such as CO_2 due to consumption expansion (Bai and Imura 2000).

Figure 2.5: Comparative analysis by DPSER framework



Source: Imura and Kobayashi (1999)

2.2.2 Three Development Stages of a SEMS

SCEM in this study focuses on so-called brown issues, especially industrial pollution such as SOx in the air. This study assumes three development stages of SEMS: the system-making stage, the system-working stage, and the self-management stage. Table 2.4 indicates the stages and benchmarks of SEMS.

The system-making stage is that in which the fundamental functions of SEMS are developed. Since this stage particularly needs capacity development in the government sector, the benchmarks should be environmental law (basic law and acts for specific pollution controls), environmental administration and environmental information. In these benchmarks, environmental law is usually established first. The last benchmark is usually the establishment of the environmental monitoring network and information disclosure to the public. Moreover, it is important how the data and information is analyzed and helps policy-making. Therefore, this study selects the issue of the state of the environment as one of the important indicators. The World Resources Institute (WRI) (2002) also regards this indicator as evolution of environmental information. Weidner and Janicke (2002) survey the establishment years of environmental administration, environmental law, state of the environment and related factors for 30 countries (Table 2.5).

In the system-working stage, the system starts actually working to improve the environmental quality. A turning point of the environmental Kuznets curve should be observed in the middle of this stage. In developed countries, mostly command and control (CAC) has contributed to pollution reduction. This policy approach needs the government's capacity to grasp the real situation regarding pollution, establishing ambient and emission standards, and making polluters observe the regulations. One of the problems in developing countries is that their capacity has not been developed enough to implement CAC by themselves. Market-based instruments (MBIs) can contribute to efficient pollution reduction in developing countries (Matsuoka 2000).

The self-management stage is the stage in which the system develops sustainably through strong interrelations among the government, firms and citizens, and a comprehensive environmental policy is enforced. Firms and citizens take initiatives in environmental management by their own voluntary efforts. For example, firms are more active in taking ISO14000 and in making environmental accounting for more efficient environmental management and administration. With these achievements, they can provide consumers with sufficient information to make themselves competitive in the market. In terms of international cooperation, a developing country becomes more independent from the donor's assistance and

Table 2.4: The stages and benchmarks of SEMS

	System-making stage	System-working stage	Self-management stage
Definition	Period in which bases of SEMS, especially governmental institutions, are developed	Period in which regulations between government and firm sectors become stronger through setting the incentives for pollution abatement and industrial pollution improves after reaching its peak.	Period in which a comprehensive environmental policy is needed since new types of environmental issues come out, and firms and citizens sectors take leading roles in voluntary approaches for environmental management. Harmonious relations among government, firms and citizens accelerate efficient social environmental management.
Related Environmental issues	Poverty related issues, industrial pollution related issues	Industrial pollution related issues	Consumption-related issues
Industrial pollution related issues	Degradation	Turning point (peak of Environmental Kuznets Curve)	Improvement
The role of three actors	• Government (system making) • Firms (efforts for pollution reduction) • Citizens (pressure to government and firms, research cooperation)	• Government (pollution control regulation) • Firms (pollution reduction) • Citizens (pressure to government and firms, research cooperation)	Government（proposal of comprehensive policy） Firms (voluntary approach) Citizens (voluntary approach)
The relationship among three actors	Government－Firms Government－Citizens	Government－Firms Government－Citizens Firms － Citizens (through government)	Firms－Citizens Government－Firms Government－Citizens
Benchmarks (essential)	Environmental law Environmental administration Environmental information (monitoring data)	Regulation Reach the peak of pollution level and improve	<First phase> (In the case of developing countries) Graduation / independence from ODA <Second phase> Comprehensive environmental management
Benchmarks (important)	• Negotiation between Government-Firms, Government-Citizen Mass media	• Negotiation, adjustment, and cooperation between Firms-Citizens	Voluntary approach of Firms and Citizen (environmental accounting, environmental report, green consumption, advocacy planning)

Source: The author

Table 2.5: Institutionalization in environmental policy

Countries	Ministry of the Environment	National Environmental Agency	National Environmental Report	Environmental Framework Law	Article in the Constitution	Council of Environmental Experts	National Environmental Plan
Australia	1971/1975	1988	1980/1996	1974			1992
Austria	1972	1985	1978		1984	1971	1995
Brazil	1985/1992	1989		(1981)	1988	1984/1997	2001
Bulgaria	1990	1976	1989	1991	1968/1991	1974/1996	1988/1992
Canada	1971		1986	1988		1971	1990
Chile		1990/1994	1992	1994	1980	(1996)	1998
China		1984	1989	1979/1989		1991	1994
Costa Rica	1986	1995	1986	1995	1994	1995	1990/1996
Czech Republic	1989	1991	1990	1992	1992	1992	1992
Denmark	1971	1971	1983	1973/1991			1994
France	1971/1984	1991	1973	2001		1975	1990
Germany	1986	1974	1976		1994	1971	
UK	1970	1972/1995	1978	1974/1990		1970	1990
Hungary	1987	1974	1975	1976/1995	1972/1990	1996	1992
India	1980/1985	(1974)	1982	1986	1976/1994	1993	1993
Italy	1971/1986	(1994)	1989	1986	(1948)	(1986)	(1997)
Japan	2001	(1971)	1969	1967/1993		1967	1995
Korea	1990/1994	1977	1991	1990	1980/1987	1985	1987/1990
Mexico	1982/1994	1992	1986	1972/1988	1988	1995	1989
Morocco	(1995)					(1995)	
Netherlands	1971/1982	1984	1973	1979/1993	1983	1974	1989
New Zealand	1972/1986		1997	1986/1991		1970-88	1994
Nigeria		1988	1992	1988	(1979/1989)	1990	1988/1990
Poland	1972	1980/1991	1972	1980/2001	1976/1989/1997	1993	1992
Sweden	1986	1967	1977	1969/1998	1974	1968	1993/1998
Switzerland	(1999)	1971	1990	(1983)	1971/1999		(1997)
Taiwan		1978	1988/1993		1992	(1987)	1979/1994
USA		1970	1970	1969		1971	
USSR/Russia	1988		1988	1991	1977/1993		1993
Vietnam	1992	1993	(1995)	1994			1991

Note: Years in parentheses indicate institutions coming close to the conventional definition.

Source: Weidner and Janicke (2002)

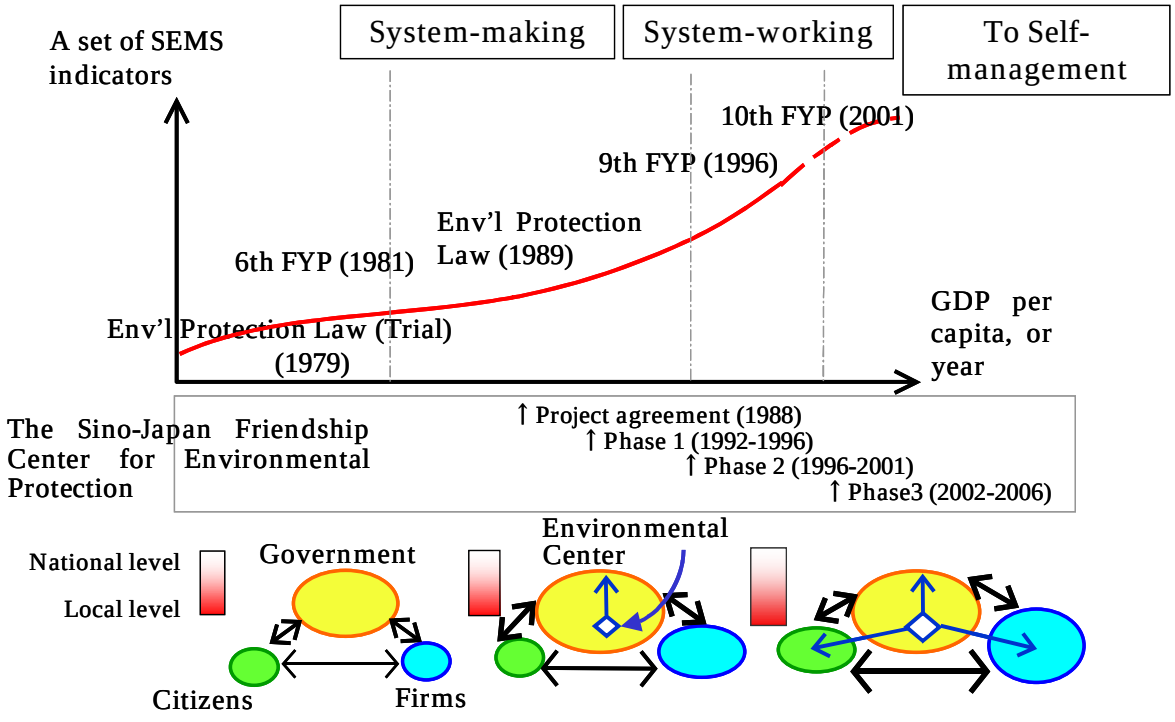
utilizes its own financial and human resources in this stage.

The roles and the relationships between the three actors also change as a country experiences the development of SEMS. The government sector plays an important role in the managing and coordinating of issues in the system-making and system-working stages, but in the self-management stage, the government is responsible for supporting firms and citizens by creating a framework for comprehensive environmental management.

2.2.3 Evaluation by Development Stages and Benchmarks

Figure 2.6 shows the evaluation image of SCEM with the stages and benchmarks as mentioned above (China's case). The horizontal axis indicates economic growth or year and the vertical axis indicates SCEM indicators (a bundle of indicators) or index. The Environmental Protection Law (trial version in 1979 and final version in 1989) is a starting point of the system-making stage and China has fully entered into the system-working stage in the Ninth Five Year Plan (1996-2000). The Tenth Five Year Plan, since 2001, and the Beijing Olympic Games to be held in 2008 and Shanghai International Exposition to be held in 2010, will accelerate the development of SCEM toward the self-management stage.

Figure 2.6: The development process of SEMS in China



Source: Matsuoka (2002)

The relationships between the three actors had substantial changes in the development of China's SEMS. As Figure 2.6 shows, in the system-making stage, the government was a predominant player in the system and, in the system-working stage, the government still has a strong authority, but at the same time firms and factories have been playing an important role in reducing pollution. Toward the self-management stage, a balanced relationship between the actors in the system will be formulated as the environmental industry and market develop.
Figure 2.6 also shows the history of the Sino-Japan Friendship Center for Environmental Protection which has been supported by the Japan International Cooperation Agency (JICA) since 1992 to the present. Chapter 3 discusses appropriate start and end timings of an Environmental Center project (entry and exit points), according to the development stages of SCEM.

2.3 Evaluation Indicators for SCEM

2.3.1 Integrating Social and Environmental Indicators

Developing indicators for SCEM starts by reviewing the existing social and environmental indicators and challenges the integration of these two. This section first reviews the achievements and shortcomings of the literature which is mostly from international cooperation agencies.

The most basic and objective indicators concerning environmental issues are the environmental quality data relating to pollutants. We can see the trend in environmental quality in one city or country by the observation of the time-series data. There are many information sources like OECD's *Environmental Indicators* and *World Resources* by WRI. OECD's *Environmental Indicators* also tries to provide a set of socio-economic indicators together with environmental indicators.

The most popular socio-economic index is the Human Development Index (HDI) by UNDP. The Human Development Report which presents the HDIs for some 150 countries has been published every year since 1990. As shown in Table 2.6, HDI is calculated from average life expectancy, education level, and income level and scored according to the balance of the highest and lowest countries (UNDP 1990). HDI is perceived as having both advantages and limitations and the report often provides a supplemental index such as the Gender Index and different poverty indices for developed and developing countries. HDI, however, does not function as a standard for one country being or not being an ODA recipient, nor does it give us concrete ideas on how donor agencies should assist a particular country.

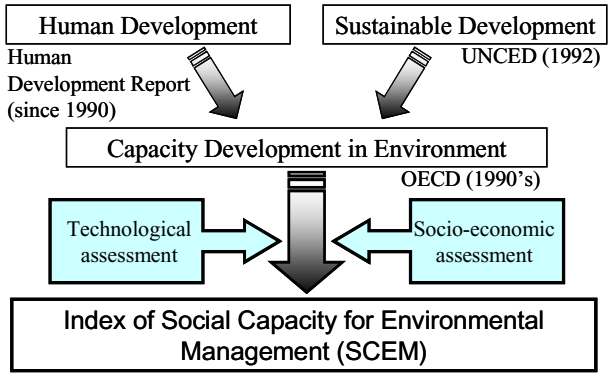
Table 2.6: Social indicators/indices developed by UNDP

Target	Index	Dimension	Indicator
Human development 1990-	Human development index (HDI)	A long healthy life	Life expectancy at birth
		Knowledge	Adult literacy rate
			Gross enrollment ratio (GER)
		A decent standard of living	GDP per capita (PPP US$)
Poverty 1997-	Human poverty index for developing countries (HPI-1)	A long healthy life	Probability at birth of not surviving to age 40
		Knowledge	Adult literacy rate
		A decent standard of living	Percentage of population not using improved water sources
			Percentage of children under five who are under weight
	Human poverty index for OECD countries (HPI-2)	A long healthy life	Probability at birth of not surviving to age 60
		Knowledge	Percentage of adults lacking functional literacy skills
		A decent standard of living	Percentage of people living below the poverty line
		Social exclusion	Long-term unemployment rate
Gender 1995-	Gender-related development index (GDI)	A long healthy life	Female life expectancy at birth
			Male life expectancy at birth
		Knowledge	Female adult literacy rate
			Female GER
			Male life expectancy at birth
			Male GER
		A decent standard of living	Female estimated earned income
			Male estimated earned income
	Gender empowerment measure (GEM)	Political participation and decision-making	Female and male shares of parliamentary seats
		Economic participation and decision-making	Female and male shares of positions as legislators, senior official and manager
			Female and male shares of professional and technical positions
		Power over economic resources	Female and male estimated earned income

Source: UNDP (2002)

Figure 2.7 describes the historical development of the integration of social and environmental indicators. As the earlier part of this chapter mentions, a lot of research has been done to develop indicators and indices in two main streams of international development: human development and sustainable development. These two concepts were taken into capacity development in the environment (CDE), which had been promoted mainly by OECD. At the International Workshop on Danish Assistance to Capacity Development in the Environment (Snekkersten in May 1998), Boesen and Lafontaine (1998) proposed a matrix of five management functions and three levels of actors in CDE and 80 indicators categorized by results and management processes. In the same period, the Global Environmental Monitoring System (GEMS), which WHO and UNEP supported, published the report *Air Quality Management Assessment Capabilities in 20 Major Cities* in 1996. This report set up four main indicator categories and several individual indicators of air quality management capability, including air quality measurement, data assessment, emission estimation, and implementation of environmental management, and gives scores (100 for a perfect score) (see Figure 2.8 and Table 2.7). GEMS's evaluation indicators focus more on the environmental management capacity in the government sector, especially on technological and technical aspects of capacity, such as monitoring, analysis and survey, which are very closely related to the capacity in the system-working stage of SEMS. Besides these sides of the environmental management capacity, the SEMS framework puts importance on the social capacity of each actor, the government, firms and citizens, and also emphasizes the importance of a single unified system.

Figure 2.7: Development of the SCEM Index

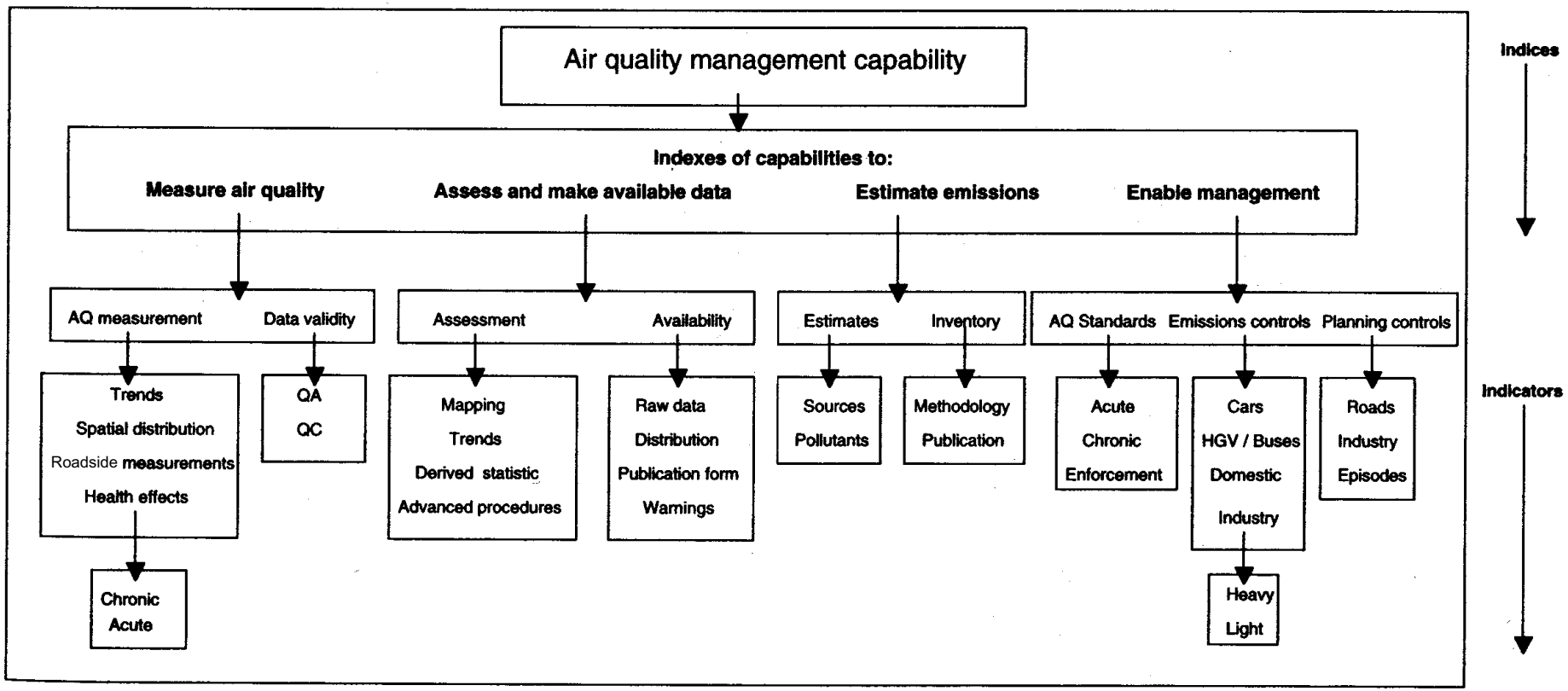


Source: The author

The United Nations Commission for Sustainable Development (UNCSD), OECD, and the Global Leaders for Tomorrow's Environment Taskforce of the World Economic Forum are trying to evolve environmental indicators together with socio-economic indicators in order to obtain an index of sustainable development: Sustainability Indicators, Environmental Indicators, and Environmental Sustainability Index (ESI), respectively (UN 2001, OECD 2001, World Economic Forum 2002).

Another example is *Dashboard* by the International Institute for Sustainable Development (IISD). As shown in Figure 2.9, Dashboard consists of the four categories of society, environment, economy and institutions, and a category index is calculated from 8 to 20 individual indicators

Figure 2.8: Factors of Environmental Monitoring System (GEMS Report Model)



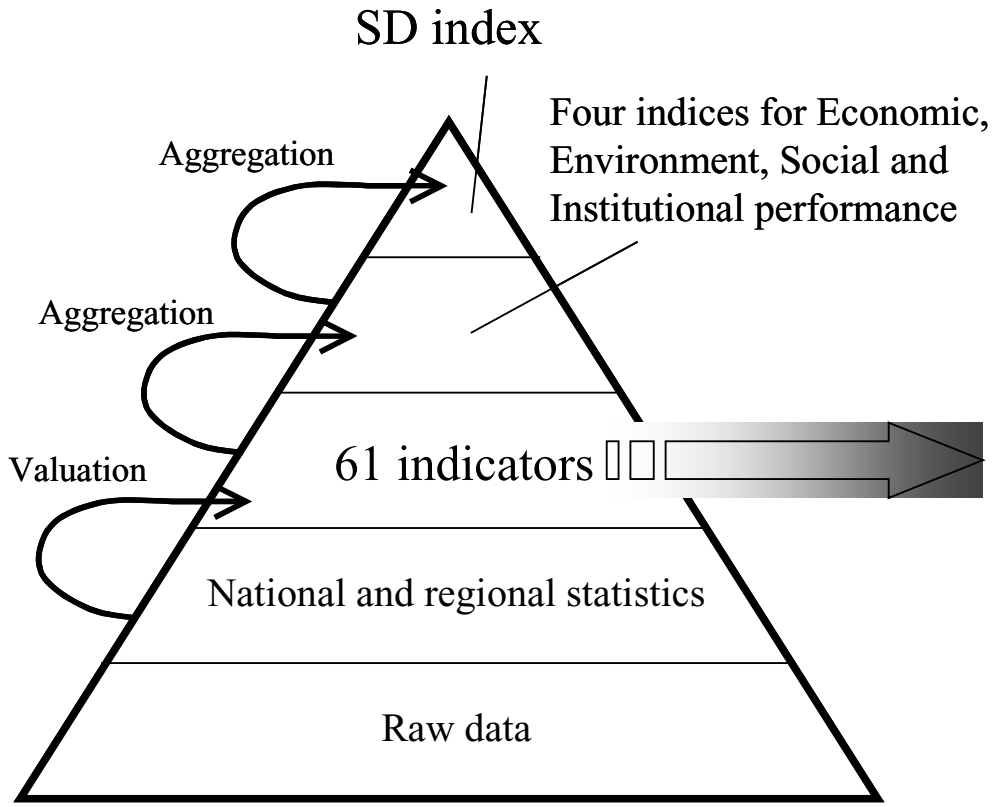
Source: UNEP & WHO (1996)

Table 2.7: Environmental indicators in GEMS report

Indicator of Air Quality Measurement Capacity (Total: 25 points)	Monitoring at least one site in a residential area with a frequency of greater than one day (more than 1 years) (each pollutant: 0.5 point)	NO_2, SO_2, Particulate matter, CO, Pb, O_3
	Monitoring at least one site in a residential area and provides daily or hourly mean values per day (more than 1 years) (each pollutant: 0.5 point)	NO_2, SO_2, Particulate matter, CO, O_3
	Measure trends (more than 5 years) (each pollutant: 0.5 point)	NO_2, SO_2, Particulate matter, CO, Pb, O_3
	Measure spatial distribution (more than 3 stations) (each pollutant: 0.5 point)	NO_2, SO_2, Particulate matter, CO, Pb, O_3
	Measure road side concentrations day (more than 1 years) (each pollutant: 0.5 point)	NO_2, SO_2, Particulate matter, CO, Pb
	Data quality (sub total 12 points)	Calibrations, Site audits, Auditing by independent body, Inter-comparison
Data Assessment and Availability (Total: 25 points)	Indicators of the capacity to analyze data (sub total 14 points)	Statistical analyze (mean, percentiles, trends, mapping), Computer use
	Indicators of data dissemination (sub total 11 points)	Newspaper, Television, Published reports, Air quality warnings
Emissions Estimates (Total: 25 points)	Source emission estimates (each source: 1 point)	Domestic, Commercial, Power-generating, Industry, Cars, Motorcycles, Others, HGV/buses
	Pollutant emissions estimates (each pollutant: 1 point)	NOx, SO_2, Particulate matter, CO, Pb, Hydrocarbons
	Accuracy of emissions estimates (sub total 9 points)	Estimates from actual measurements, Estimates from fuel consumption, Include non-combustion process, Cross check, Future inventory plan
	Availability of the emissions estimates (sub total 2 points)	Published in full: 2 points, Partially available: 1 point
Management Capability Assessment Tools (Total: 25 points)	Capacity to assess air quality acceptability (sub total 8 points)	Air quality standards, Regulations, Local standards, Future plan
	Capacity to use air quality information (sub total 17 points)	Emissions controls, Penalties, EIA in new development area, Unleaded petrol, Additional emission controls among the warning

Source: UNEP&WHO (1996)

Figure 2.9: Aggregation between environmental indicators and social indicators （IISD-Dashboard）



Social (19)	Environmental (20)	Economic (14)	Institutional (8)
poverty	CO_2	GNP	SD strategy
equity	other GHG	GDFI	SD membership
unemployment	CFCs	CAB	internet
F / M wages	urban air	external debt	telephones
child weight	crop land	ODA	R & D expenditure
child mortality	fertilizer	materials	disasters, human cost
life expectancy	pesticides	energy use	disasters, economic damage
sanitation	forest area	renewable energy	SD indicator coverage
safe water	wood harvesting	energy efficiency	
health care	deserts & arid land	municipal waste	
child immunization	squatters	hazardous waste	
contraception	phosphorus	nuclear waste	
primary school	coastal population	recycling	
secondary school	aqua culture	car use	
illiteracy	water use		
crowing	BOD		
crime	faecal coliform		
population growth	key ecosystem		
urbanization	mammals & birds		
	protected area		

Source: IISD (2002)

in each (IISD 2002). According to the Policy Performance Index (PPI) by the European Environmental Agency which is developed on the basis of a concept similar to Dashboard, the weighting of the category indices should be different from one country to another depending on the priorities set by environmental experts and citizens. OECD selects several principal criteria from 50 environmental indicators to make it easy to handle them in the evaluation and is trying to integrate environmental and socio-economic indicators through the DPSER (DPSIR) model, which is still in the trial phase (OECD 2001).

2.3.2 SCEM Indicators

A set of indicators for the SCEM is shown in Figure 2.10. These indicators are based on four processes (monitoring, analysis and evaluation, policy-making, and policy implementation) and six factors (law and policy, human resources, organizations, financial resources, infrastructure, and information, knowledge and technology for each actor. Inter-actor relationships have indicators of behaviors and effects on the other two actors. Relationships between national and local levels are evaluated through the decentralization process. Furthermore, the SCEM indicators include socio-economic indicators and environmental quality indicators asas background information. This report discusses the development of SCEM based on important selected indicators for the various stages.

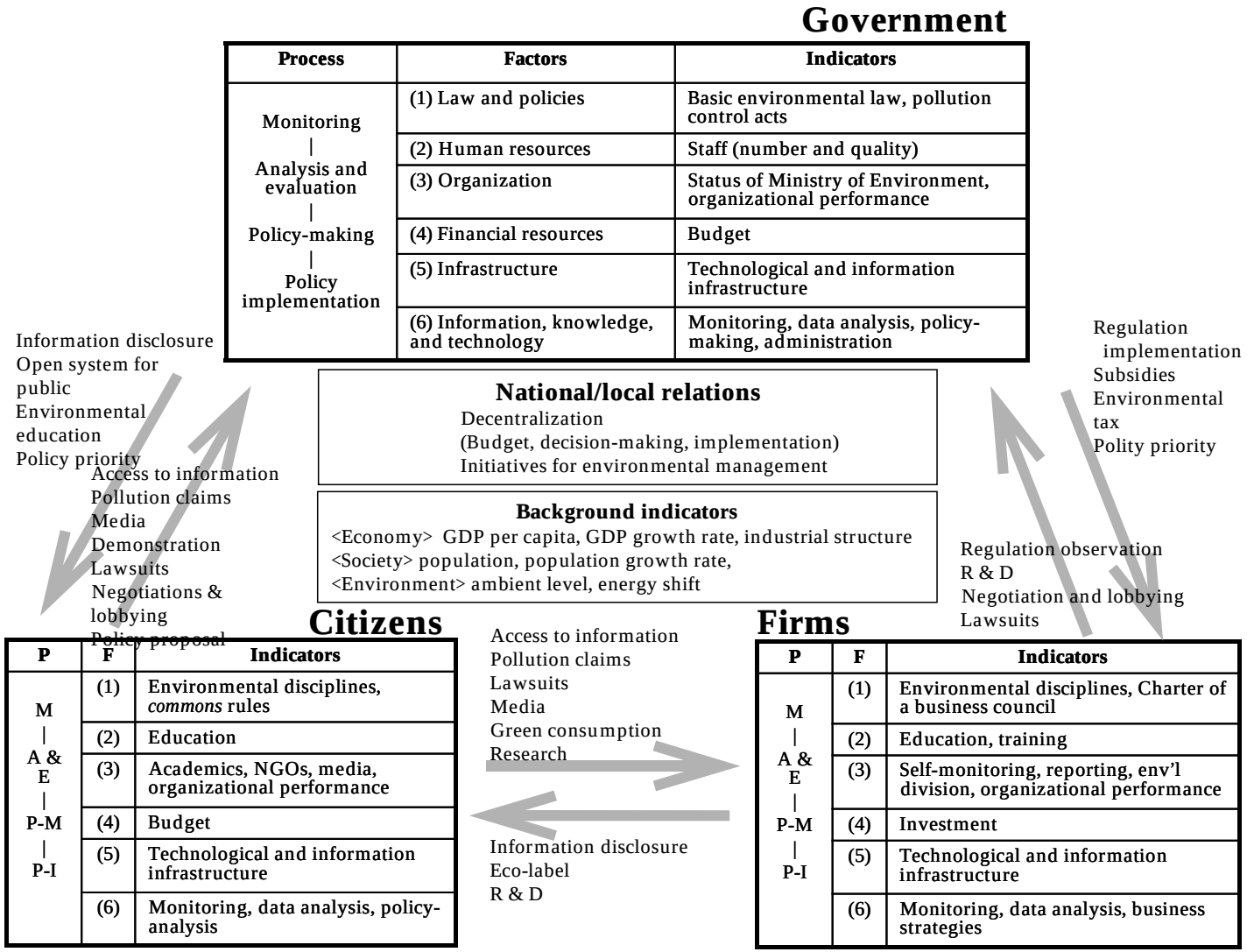
In the next section, the four countries, China, Thailand, Indonesia and Mexico are evaluated by some essential SCEM indicators with the focus especially on transition from the system-making stage to the system-working stage, which is the important period for the evaluation of Environmental Center projects in the SCEM framework. The data sources are presented in Table 2.8.

2.4 Social Capacity Development for Environmental Management in China

As mentioned earlier in this chapter, this study estimates that China is standing at the transition point from the system-working stage to the self-management stage. A detailed discussion is presented below.

Appendix (1)-1 shows the historical development of environmental policy in China. It also indicates the implementation process of the Sino-Japan Friendship Center for Environmental Protection. The First National Conference on Environmental Protection was held in 1973, and the next year, the Environmental Protection Leadership Group was established in the State

Figure 2.10: SCEM indicators



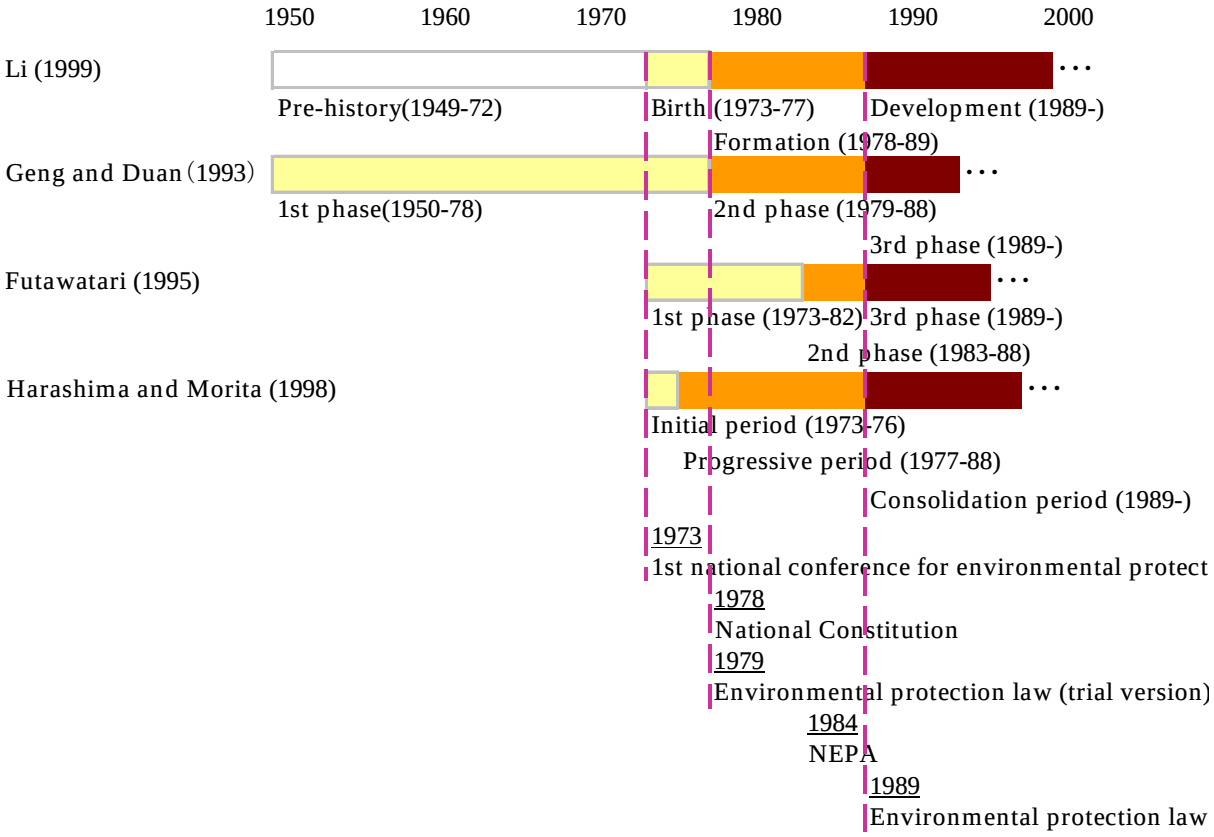
Source: The author

Table 2.8: Data source

	China	Thailand	Indonesia	Mexico
History of environmental policy	Harashima and Morita (1995) China Environmental Protection website	ADB (2001) Nicro and Apikul (1999) O'Conner (1994)	BAPEDAL website World Bank (2002) CIA website	Janetti-Diaz et al.（1995） Munoz（1997） OECD（1998） Cuidad de Mexico（1999） Environmental Law Institute（1996） Guigale et al.（2001） World Bank（1999, 2000, 2001）
Environmental law	JICA reports	Ogano (1994) Hag et al. (2002) JICA reports	Global environmental forum（1999）	JICA reports
Environmental administration	SEPA website JICA report	JICA reports MONRE website	JICA reports	SEMARNAT website JICA reports
Monitoring data	China Environment Yearbook	DOE, MOSTE PCD (1996)	World Bank (1997) OECC (2001)	Metropolitan Environmental Commission （2002）
Environmental data (SOx)	China Environment Yearbook	Streets et al. (2000)	Streets et al. (2000)	Metropolitan Environmental Commission （2002）
Environmental data (PM_{10}, TSP)	Li (1999)	BMA (2001)	World Bank (1997)	Metropolitan Environmental Commission （2002）

Source: The author

Figure 2.11: Environmental policy development in China



Sources: Li (1999), Geng and Duan (1993), Futawatari (1995), Harashima and Morita (1998)

Council. It can be said that China's SEMS gradually started forming in this period and the Environmental Protection Law (trial version) in 1979 and Environmental Protection Law (final version) were enacted in the initial phase of the system-making stage. Several previous studies also indicate these events as being epoch-making, as Figure 2.11 shows (Li 1999, Geng and Duan 1993, Futawatari 1995, Harashima and Morita 1998).

Environmental law and environmental administration was also well developed by the mid-1990s and the China Environment Yearbook, the state of the environment of China, which has been issued since 1990, has upgraded its quality since the 1994 issue. Appendices (1)-2 and (1)-3 show the environmental law system and the environmental administration system in China. From this evidence, a tentative conclusion is that China accomplished its system-making in the mid 1990s and entered its system-working stage by enforcing the Air Pollution Control Act Amendments (1995) and the Ninth Five Year Plan (1996-2000).

Table 2.9 shows the number of air quality monitoring stations in China and the other three countries. China has a very large number of stations all over its regime, compared with the other two Asian countries. An automated nationwide environmental information network of a hundred cities will be in operation soon, and the Sino-Japan Center will be the hub center.

Figure 2.12 indicates that SO_2 emissions in China reached a peak in 1996 and are decreasing. On the other hand, concentrations of total suspended particulates (TSP) also show a decline, but only around half of the cities are below the standard and others are far over the standard (300 $\mu g/m^3$ in the second grade cities) (Figure 2.13).[2]

The information above implies that China is now gradually shifting to the self-management stage. But several serious brown and green environmental problems such as TSP concentrations, NOx emissions, municipal waste management, yellow sand (*bai*), desertification and biodiversity should be seriously taken into account. SEMS, which consists of the government, firms and citizens, needs to be strengthened, especially in the sectors of firms and citizens and also in the interrelationships between the three actors. Also, developing social environmental management at the local level is crucial for the whole of SEMS, especially in the

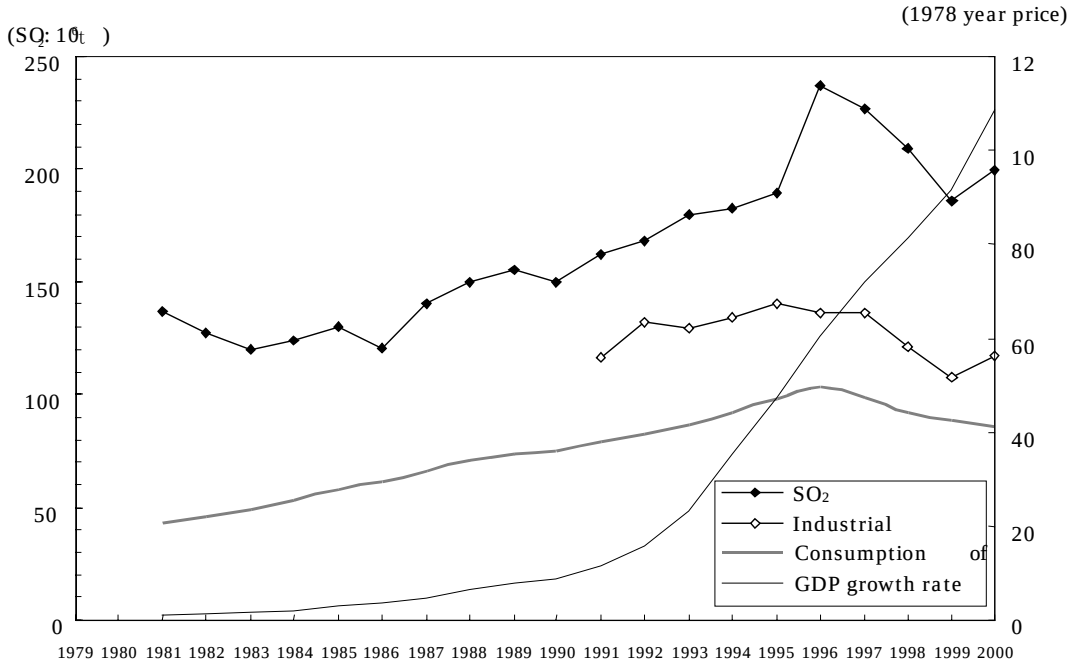
context of the on-going development plan of the western region. Comprehensive and nationwide plans for the development of SEMS are important for China in the future.

Table 2.9: The number of air monitoring stations

Year	China	Thailand	Indonesia	Mexico
1976			1	
1977		3	1	
1978		4	1	
1979		4	3	
1980		4	8	
1981		4	9	
1982		4	9	
1983		12	17	
1984		12	17	
1985		12	17	
1986		12	16	
1987		17	16	
1988		17	11	
1989		17	11	
1990		17	11	450
1991		21	17	460
1992		21	20	465
1993	2,179	21	23	545
1994	2,222	21	23	585
1995	2,155	51	23	550
1996	2,155	51	23	550
1997	2,196	51	26	560
1998	1,926	51	26	580
1999	2,203	52	n.a.	600
2000	2,552		50	620
2001	2,229		59	

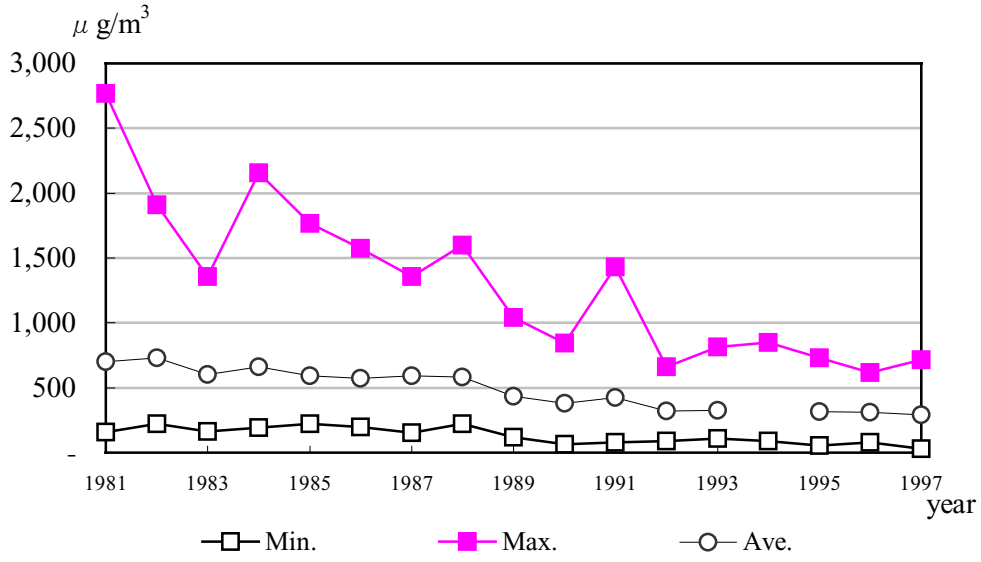
Note: n.a. (not available)
The data of Mexico indicates the number of monitoring stations of Ozone in Mexico City
Source: Matsuoka et al. (2000), Metropolitan Environmental Commission（2002）

Figure 2.12: SO_2 emissions in China



Source: Sawazu (2002)

Figure 2.13: TSP concentration in China



Source: Li (1999)

2.5 Social Capacity Development for Environmental Management in Thailand

Appendix (2)-1 shows a chronological summary of Thailand's environmental policy and the Environmental Center (Environmental Research and Training Center: ERTC) project. The National Environmental Quality Act (NEQA) was enacted and the National Environmental Board and Office of National Environmental Board (ONEB) were established in 1975. See Appendix (2)-2 for Thailand's environmental law system. From this evidence, the year 1975 can be considered as the start of Thailand's system-making stage. Big events for system-making happened in 1992, that is, the NEQA Amendments and the establishment of the Ministry of Science, Technology and Environment (MOSTE), which has three environmental-related departments: Office of Environmental Policy and Planning (OEPP), Pollution Control Department (PCD) and Department of Environmental Quality Promotion (DEQP) (see Appendix (2)-3). ERTC is located under DEQP. These are the main developments in the environmental law and administration system in Thailand. Also, the State of the Environment has been issued annually since 1995. At the present time there are 52 air quality monitoring stations under PCD (see Table 2.9).

After the financial crisis and the establishment of the new Constitution in 1997, the creation of the Ministry of Natural Resources and Environment (MONRE) was recently finalized in October 2002 (Appendix (2)-4).

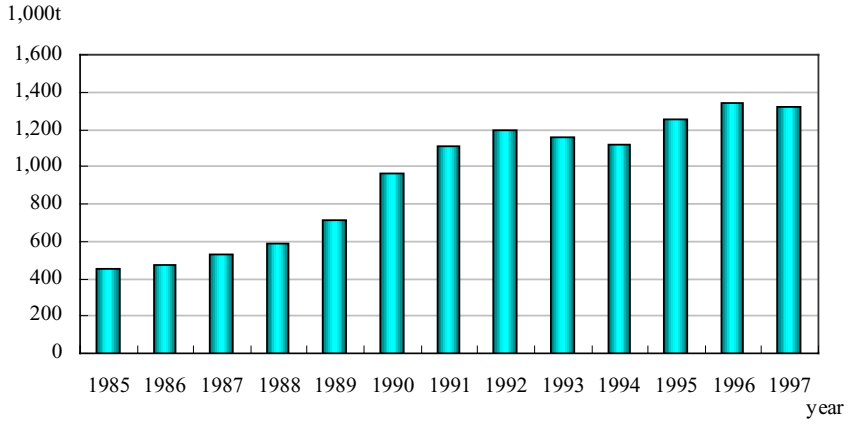
The new ministry is to manage both so-called green and brown issues, which the former ministry could not handle due to the administrative separation of issues. But the Department of Industrial Works (DIW), which has authority in factory inspection and actual regulation, still belongs to a different ministry, Ministry of Industry. Restructuring of the environmental administration still has tasks remaining in this regard.

It can be said that Thailand achieved the three benchmarks of environmental law, environmental administration and environmental information in the mid 1990s, but, due to the financial crisis in 1997 and restructuring of the ministries in 2002, it is still experiencing the final developments of the system-making stage.

Figures 2.14 and 2.15 indicate SO_2 emissions in Thailand and PM_{10} concentrations in Bangkok, respectively. An energy shift to low-sulfur (0.5%) heavy oil and natural gas in stationary sources, such as factories and power plants and introducing unleaded gasoline to vehicles may have contributed to reducing SO_2 emissions in the 1990s, but the figures do not clearly indicate the decline of emissions. As for PM_{10}, some fluctuations are observed, but it has far exceeded the environmental standard (120 μ g/m^3) through the years. This environmental quality data

also tells us that Thailand is entering the system-working stage, as well as experiencing the final phase of the system-making stage again at the same time.

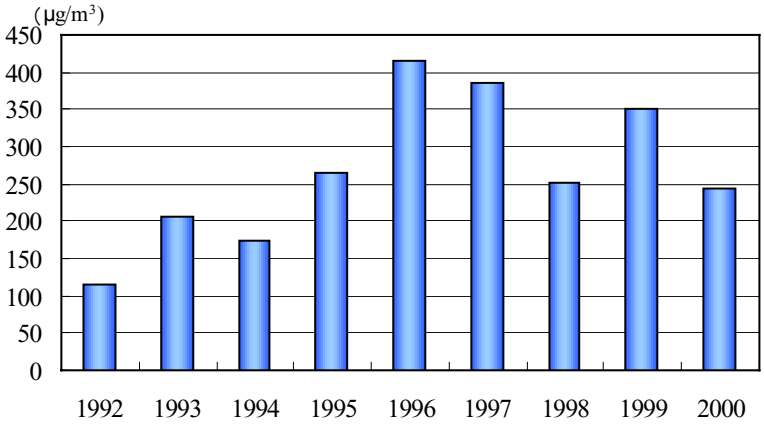
Figure 2.14: SO_2 emissions in Thailand



Source: Streets et al. (2000)

Regarding national and local relations in environmental management, decentralization, presently in transition, is the most important part of the discussion. Based on the new Constitution in 1997 and the Decentralization Plan and Process Act in 1999, most of the functions will be handed over to the provincial and local governments in around five years. Therefore, developing SCEM at local levels is now extremely important in Thailand.

Figure 2.15: PM_{10} concentration in Thailand (Bangkok)



Source: BMA (2000)

On the other hand, the environmental efforts in the firm and citizen sectors are increasing. Over 500 firms have obtained ISO14000 certifications and there are many active local environmental NGOs. One example is a regional environmental management NGO, Samut Prakarn Environmental Society (SES). This society, which has a variety of stakeholders from local firms, central and local governments, NGOs and universities, is implementing a cleaner production technology project and several environmental education programs with support from the EU and other donor agencies and through the use of their own funds. Although the SES has not yet been well established administratively and financially, it can be a good model for future development of SEMS in Thailand.

2.6 Social Capacity Development for Environmental Management in Indonesia

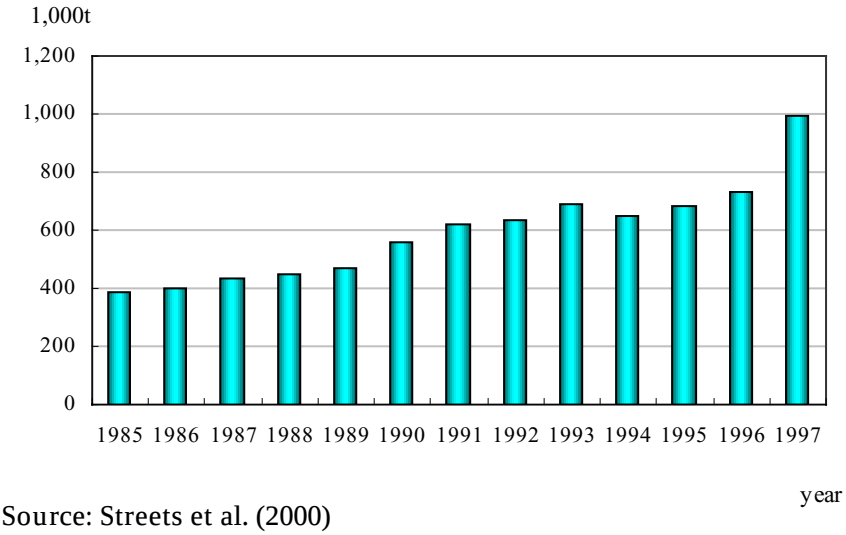
As shown in Appendix (3)-1, Indonesia's environmental law and administration was initially finalized in the late 1980s and early 1990s. After Act No.4 on the Basic Provision for Environmental Management was approved in 1982, which can be regarded as the start of Indonesia's system-making stage of SEMS, several important acts were established (Provision and Guidelines on Environmental Impact Assessment in 1986 and 1987, establishment of industrial water emission standard and air ambient standard in 1988, etc.). Appendix (3)-2 shows major environmental laws and regulations in Indonesia. The first appearance of the environmental section in a ministry was the one in the Ministry of Development Supervision and Environment in 1978, followed by the State Ministry of Population and Environment (1983), Environmental Impact Management Agency (BAPEDAL) (1990) and the State Ministry of the Environment (1993). Appendices (3)-3 and (3)-4 show the structure of BAPEDAL, which includes the Environmental Management Center (EMC), supported by JICA, and the State Ministry of the Environment.

With these institutions being developed, the Cleaner River Program (PROKASIH) was launched in 1989 for water pollution control in the major rivers running through the country, which covers 17 provinces, 80 rivers and 600 factories, and the Blue Sky Program (LANGIT BIRU) has been implemented since 1992 for air pollution control. In addition, the Clean and Green City Program for urban environmental management was enacted in the late 1980s, but all these programs are not necessarily successful due to the structure and the financial crisis which was followed by an unstable political situation.

As for environmental information, a nationwide network has not yet been established. The 59 environmental laboratories built with support by the Japan Bank for International Cooperation (JBIC) and AusAID are not on-line in a network system, except for the Austria-supported automatic monitoring network in ten other cities. One of the reasons for this is that these laboratories have belonged to three different ministries: the Ministry of Health, the Ministry of Public Works, and the Ministry of Industry and Trade. Although the Ministry of the Environment tried to keep the labs and data after the new ministry was set up in January 2002, it would take a fairly long time to establish a nationwide environmental monitoring network under one administration since the administrative transition depends upon provincial and local governments.[3] No periodical environmental data and policy report like the State of the Environment has yet been issued,[4] although Indonesia does produce annual environmental statistics, which are predominantly on forest, land use and water, with only a few pages for air

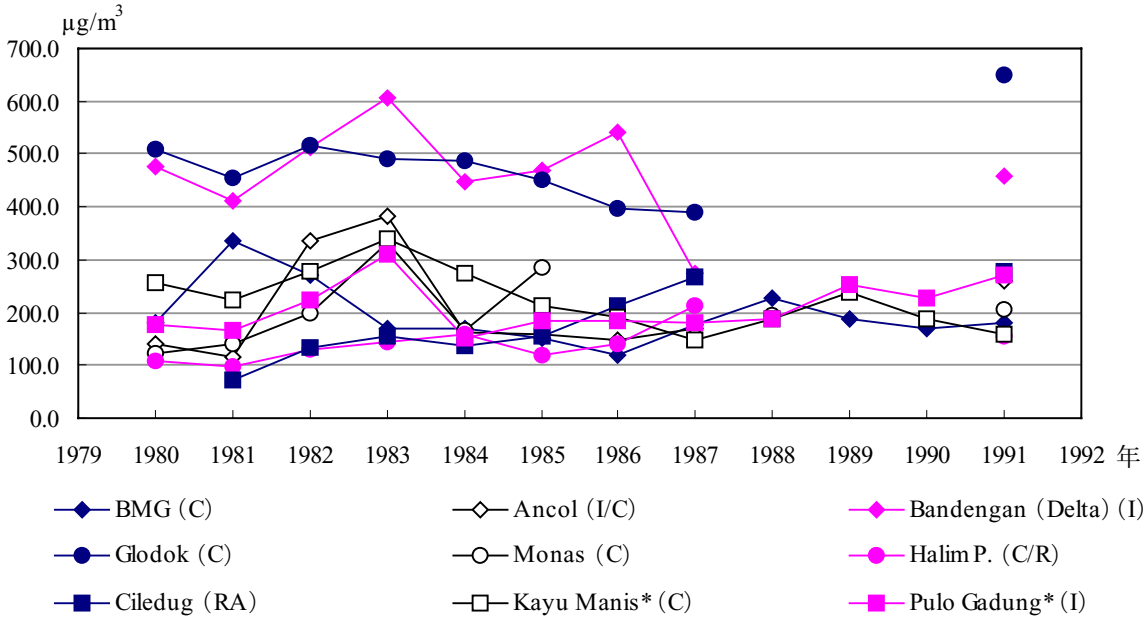
pollution. These facts imply that Indonesia is still in the final phase of the system-making stage. Environmental quality data such as SO_2 emission estimates and TSP concentration (Figures 2.16 and 2.17) also support this tentative conclusion.

Figure 2.16: SO_2 emissions in Indonesia



Source: Streets et al. (2000)

Figure 2.17: TSP concentration in Indonesia (Jakarta)



Note: (R), (I), (C) indicate living area, industrial area, and commercial area respectively.
Source: World Bank (1997)

Since the decentralization of the environmental administration in January 2001 and the establishment of the new Ministry of the Environment (see Appendix (3)-5) from the State Ministry of Environment and BAPEDAL, Indonesia's environmental administration has now entered the second phase of the system-making stage and needs a period of time, at least for the period of the National Development Plan (PROPENAS, 2001-2004) to get settled and to actually work.

The new Ministry of the Environment adopted the Strategic Plan and Work Program and PROKASIH2005 with seven priority issues, including the local government's capacity development in environmental management and environmental awareness building in civil society and the community for good environmental governance. In order to achieve this target, it is essential to develop administration capacity at both central and local levels and also to develop capacity in the firms and citizen sectors, as well as to strengthen coordination among the three actors. NGOs, including WALHI (Friends of the Earth Indonesia) can play an important role in social environmental management, especially when the government is immature and not entirely functional.

2.7 Social Capacity Development for Environmental Management in Mexico

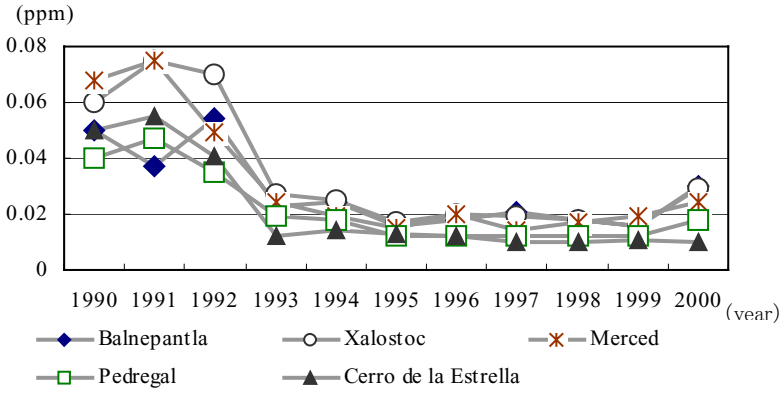
Appendix (4)-1 shows the historical development of environmental administration in Mexico. The General Law for Ecological Equilibrium and Environmental Protection (LGEEPA, 1988), developed from the Federal Law of Environmental Protection in 1982), the National Institute of Ecology (INE, 1992), the Federal Attorneyship for Environmental Protection (PROFEPA, 1992), and the Ministry of the Environment, Natural Resources and Fisheries (SEMARNAP, 1994) formed the fundamental parts of the SEMS at the Federal government level. Appendices (4)-2 and (4)-3 describe the environmental law system and the structure of the Ministry of the Environment and Natural Resources (SEMARNAT, reorganized from SEMARNAP in 2000), respectively. The air quality monitoring network in the federal district area was established in the mid 1980s (Table 2.9) and monitoring stations were expanded nationwide in 1990s. From these examples it can be seen that Mexico completed its system-making stage in the period from the 1980s to the mid 1990s.

Social capacity development for environment management at the local level, however, has not been successfully completed, except in the major cities, such as Monterey and Guadalajara. Environmental issues and problems are different from area to area, and this should be taken into consideration when SCEM in local cities is discussed.

The federal district area experienced serious air pollution in the 1980's and the Federal District Environmental Committee, which consists of the Federal Government, Mexico City and Mexico State, implemented several special programs such as the Air Pollution Control Action Plan in 1988, the Integrated Air Pollution Control Program (PICCA) from 1990-1994, and the Mexico Valley Air Quality Management Program (PROAIRE) from 1995-2000. Under these programs, unleaded gasoline for individual vehicles and LNG and CNG for trucks was introduced in 1991, and inspection of non-stationary emission sources such as vehicles became strict during this period. The programs became strict in respect to stationary emission sources, such as factories, as well, including regulating the relocation or new construction of factories and promoting the use of natural gas.

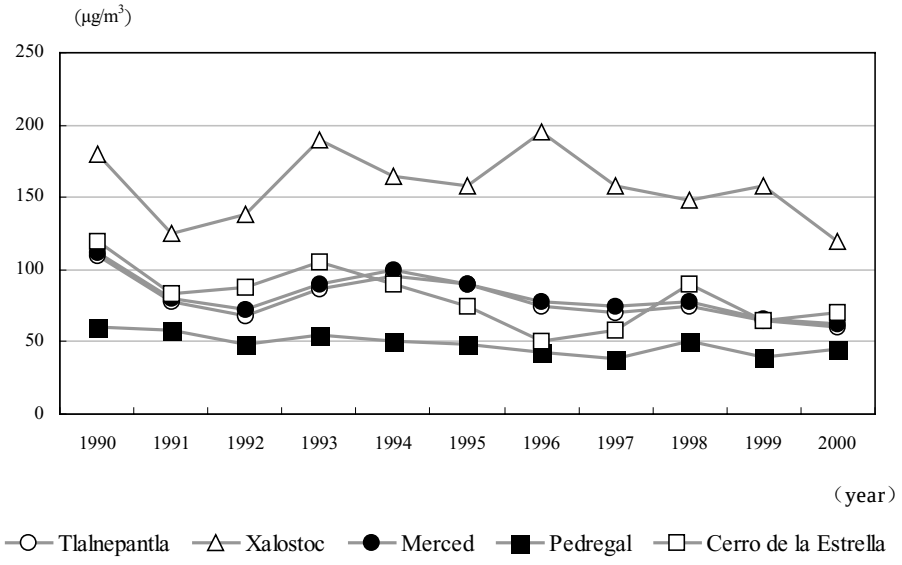
These programs contributed to the improvement of air quality (SO_2, CO and O_3) in Mexico City. As shown in Figure 2.18, SO_2 emissions have dramatically declined since 1992. Other air pollutants such as NOx and PM_{10} (Figure 2.19) are not far above the standards and more programs may be needed. Moreover, other environmental issues, such as water pollution control and solid and hazardous waste management, are also big issues in Mexico's environmental management.

Figure 2.18: SO_2 emissions in Mexico City



Source: Metropolitan Environmental Commission (2002)

Figure 2.19: PM_{10} concentration in Mexico City



Source: Metropolitan Environmental Commission (2002)

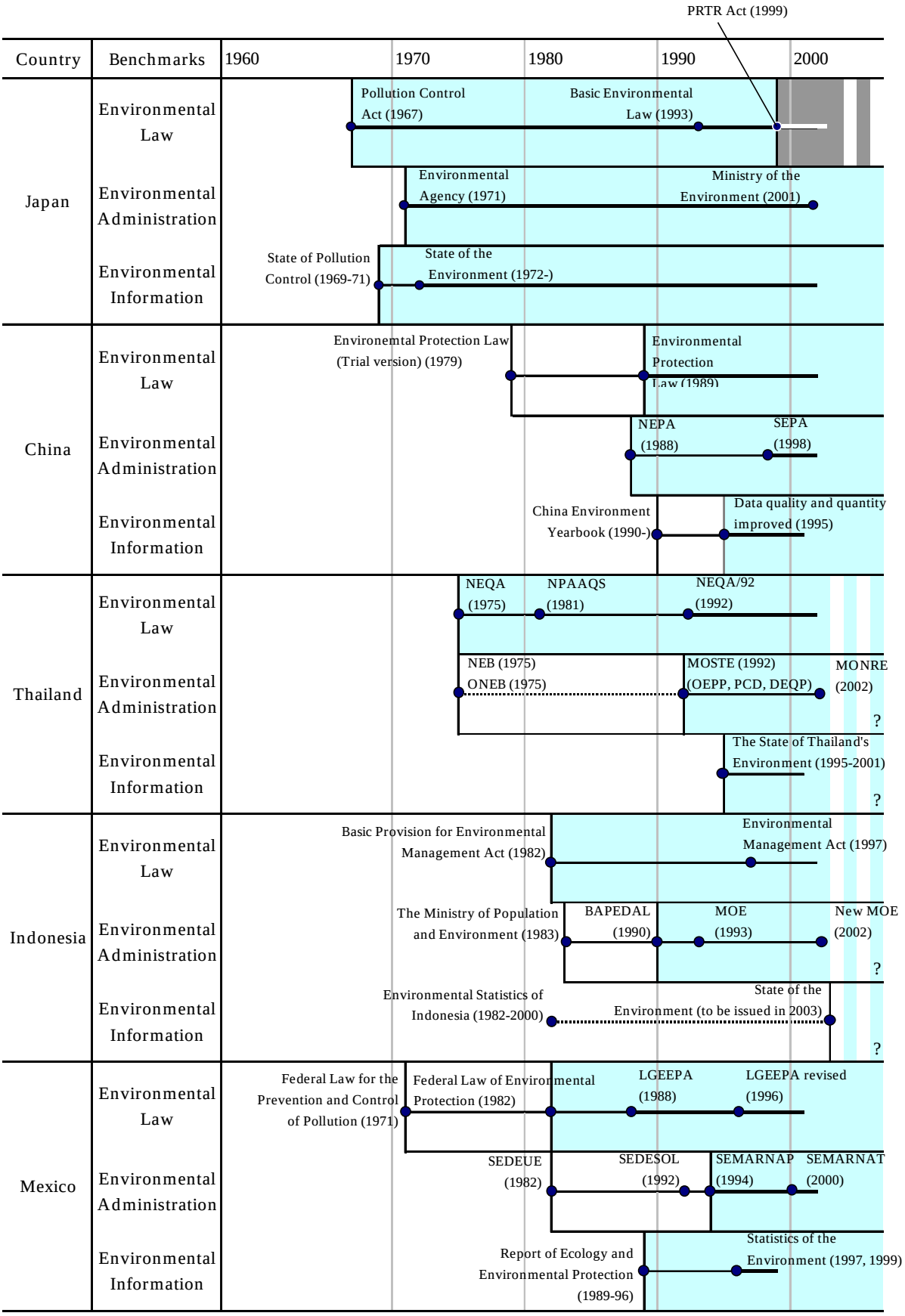
The development of SCEM in Mexico was also greatly affected by international factors

such as UNCED in 1992 and the entry into OECD and NAFTA in 1994. In particular, the free trade agreement accelerated firms to work for environmental management, attaining ISO14000 or other kinds of voluntary approaches. CESPEDES (Mexico Business Council for Sustainable Development), which our evaluation mission visited in September 2002, was established in 1994 and is very active in promoting self-support environmental management in private business firms and in proposing policy or program plans to the government.

At present Mexico is already a middle class country in terms of GDP and moving toward the self-management stage in SCEM. Now Japan must recognize these achievements and create a picture of Japan-Mexico cooperation as to how Mexico's SEMS can move forward with or without Japan's assistance in the near future. The cooperation program should also take firms and citizens as key actors for further development of SCEM.

This chapter reviewed and assessed the development stages of SCEM in the four countries. Figure 2.20 summarizes this chapter's discussion and evaluation.

Figure 2.20: System-making stage in four countries



Source: The author

<Notes>

1 Refer to Chapter 4 of the Individual Study Report for detailed discussion of DPSER.

2 TSP concentration is quite different in northern and southern China. Standard attainment in northern cities is only about 20% while that of southern cities is as high as 70-80%. The case of SO_2 also shows similar situations (Matsuoka et al. 2000).

3 So far only one laboratory in Medan has moved to the Ministry of Environment (as of August 2002) and the second phase of the EMC project is supporting it as a model city for local environmental management.

4 The first National State of the Environment report is to be published in 2003 from the Ministry of the Environment (based on interviews with ministry officials).

APENDICES of CHAPTER 2:

Chronological summary of environmental policy and the Environmental Center,

Environmental law system,

Environmental administration

(1) China

(2) Thailand

(3) Indonesia

(4) Mexico

Appendix (1)-1: Chronological summary of environmental policy and the Environmental Center in China

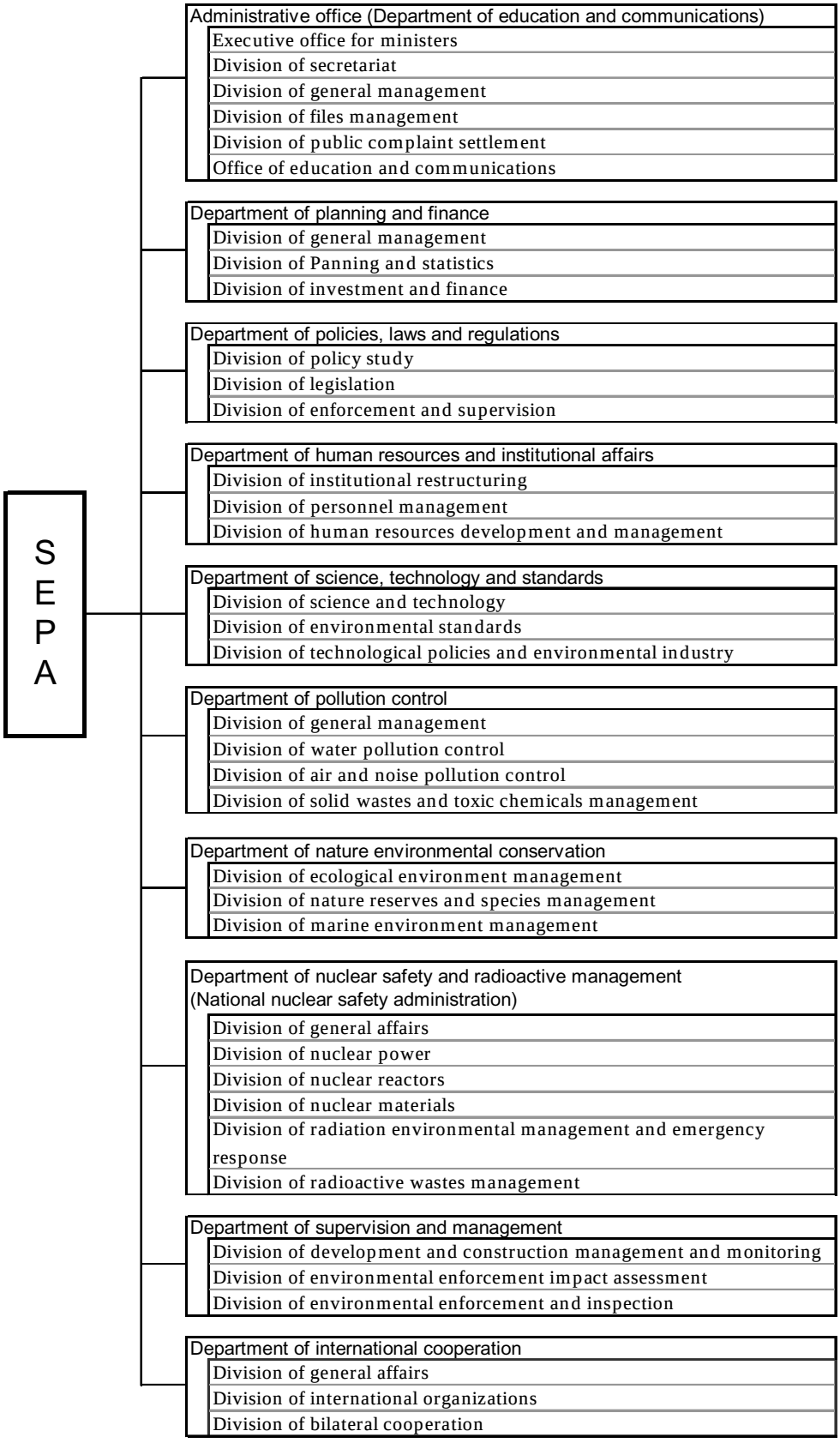
Year	Environmental laws and policies	Environmental administration	National development plans	GDP/Capita PPP (USD)	The Sino-Japan Friendship Center for Environmental Protection
1966			The Third Five Year Plan (3FYP)(1966-70)		
1971			4FYP (1971-75)	569	
1973	1st national conference for environmental protection				
1974		Environmental Protection Leading Group of the National Council			
1975				636	
1976			5FYP (1976-80)		
1979	Environmental protection law (trial version)				
1981			6FYP (1981-85)	808	
1982	Air quality standard				
1983	2nd national conference for environmental protection Aggregated regulation industrial pollution control and technical evolution				
1984	Water pollution control law	Environmental protection commission in State Council			
1985	Partly decontrolling energy prices			1,204	
1986			7FYP (1986-90)	1,287	
1987	Air pollution control law				
1988	China water law	National Environmental Protection Administration (NEPA)			Request for the project
1989	Environmental protection law 3rd national conference for environmental protection				
1990				1,612	
1991	Operational rules of air pollution control		8FYP (1991-95)	1,736	
	Water and solid protection law				
1992					Phase 1 start
1995	Waste pollution control law Air pollution control law (revised)			2,686	Phase 1 finish
1996	Water pollution control law (revised) 4th national conference for environmental protection		9FYP (1996-00)	2,917	Phase 2 start Environmental center open
1998		State Environmental Protection Administration (SEPA)			
2000	Air pollution control law (amended)				
2001	China sand erosion control law		10FYP (2001-05)		Phase 2 finish Follow-up phase start
2002					Phase 2 (FU) finish Phase 3 start (-2006)

Source: Harashima and Morita(1995), China environmental protection website, International Energy Agency

Appendix (1)-2: Environmental law system in China

Source: JICA (1999)

Appendix (1)-3: Environmental administration in China (State Environmental Protection Administration; SEPA)



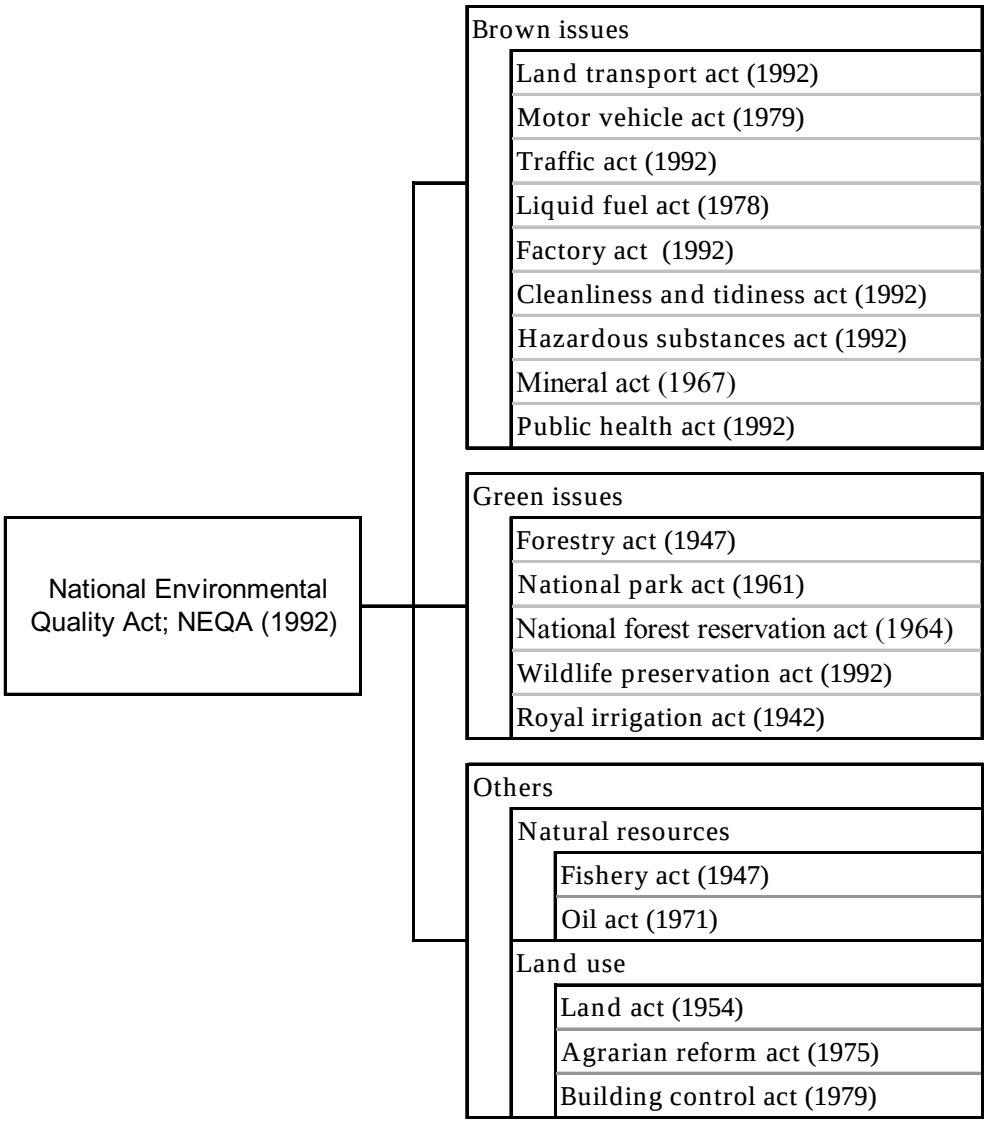
Source: SEPA website

Appendix (2)-1: Chronological summary of environmental policy and the Environmental Center in Thailand

Year	Environmental Laws and Policies	Environmental administration	National development plan and others	GDP/capita, growth rate	Environmental Research and Training Center (ERTC)
1969	The Factory Act			6.5%,	
1975	The Improvement and Conservation of National Environmental Quality Act (NEQA)	The National Environmental Board (NEB) was established. The Office of the National Environment Board (ONEB) was established		US$800, 5%	
1978	Amendment of the NEQA Road Traffic Act	The NEQA authorized the Ministry of Science, Technology and Energy (MOSTE) to initiate an EIA process	The 4th Five-year National Economic and Social Development Plan (1977-81)	US$1,120, 10%	
1981	The 1st National Ambient Air Quality Standards (NPAAQS)			Economic boom during 1980s-early1990s (1985-1995, aver. 8.4%)	
1983					Project request
1990					Project agreement (March) Project started (April)
1992	The Enhancement and Conservation of the National Environmental Quality Act (NEQA/92) Industrial Factories Act Hazardous Substance Act Public Health Act Land Transport Act Traffic Act Energy Conservation Promotion Act	Replacing the ONEB with the Office of Environmental Policy and Planning (OEPP), the Pollution Control Department (PCD) and the Department of Environmental Quality Promotion (DEQP) under MOSTE. Establishing an Environmental Fund chaired by the Permanent Secretary of MOSTE.	The 7th National Economic and Social Development Plan (1992-1996) set definite targets to improve environmental quality, involve local people in the environmental management, recognize the role of NGOs in supporting people's participation in natural resources management	Mae Moh power plant incident. US$4,850, 8.1%	
1995					Project phase completed (March) Follow-up phase started (April)
1997	The 20-year Environmental Quality Promotion Policy was prepared by the OEPP. A 5-year Environmental Quality Promotion Action		The new Constitution (Decentralization and people's participation in environmental Protection, Article 79). The 8th National Economic and Social Development Plan (1997-2001)	Financial crisis (1997-1998) US$6690, -0.4% (GNI per capita: 2,780)	Follow-up phase completed (March)
1999	Decentralization Plan and Process Act			-11%	
2000		The Civil Service Commission accepted a proposal to reorganize several major ministries.	The Cabinet approved A Decentralization Master Plan	US$6,700, 4%	
2002		A new Ministry of Natural Resources and Environment (October)	The 9th National Economic and Social Development Plan (2002-2006)	3.9% in 1st quarter	

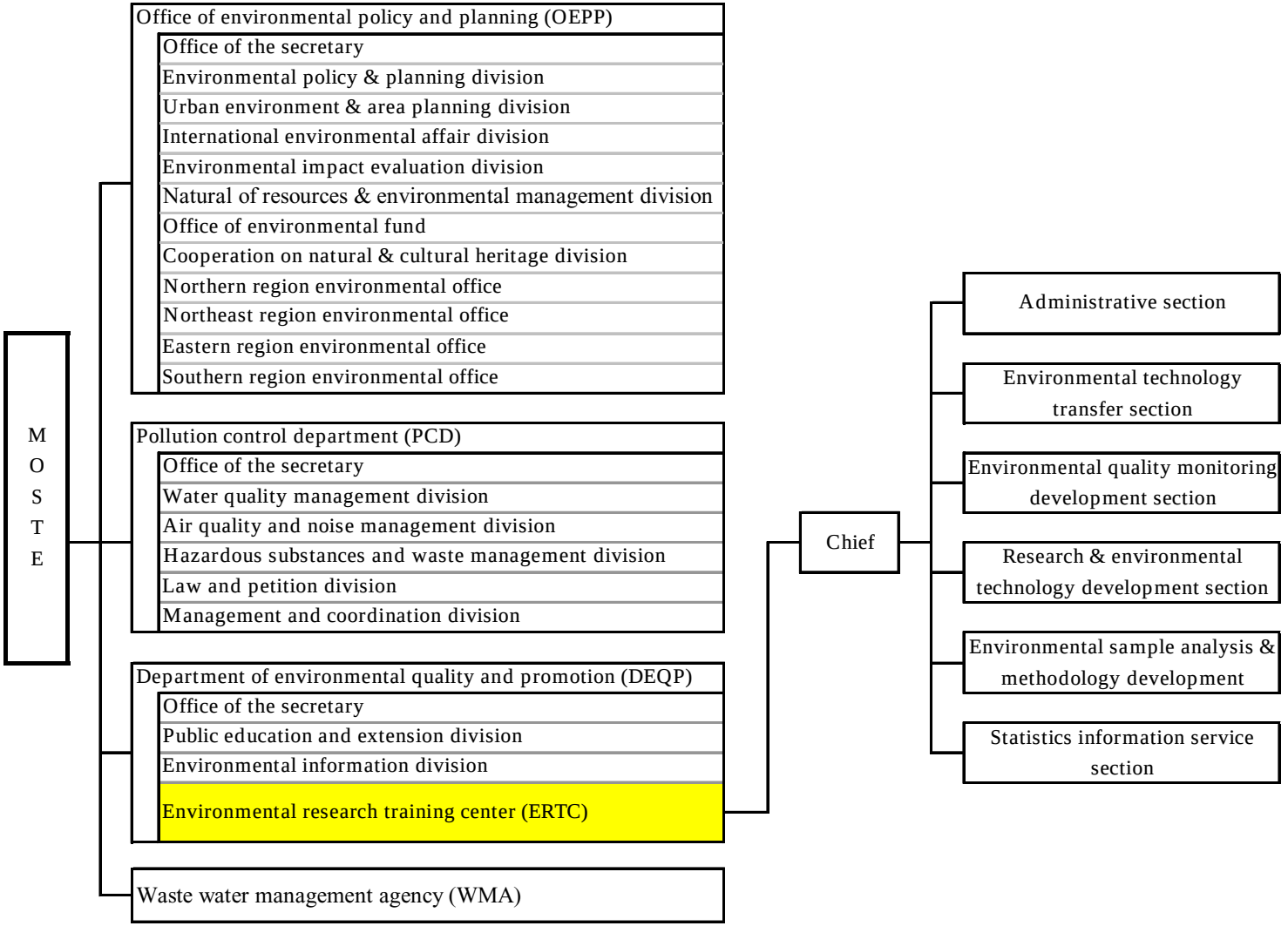
Sources: ADB (2001), Nicro and Apikul (1999), O'Conner (1994)

Appendix (2)-2: Environmental law system in Thailand



Source: Ogano (1994), JICA (1997), Hag et al. (2002)

Appendix (2)-3: Environmental administration in Thailand （Environmental departs of MOSTE）



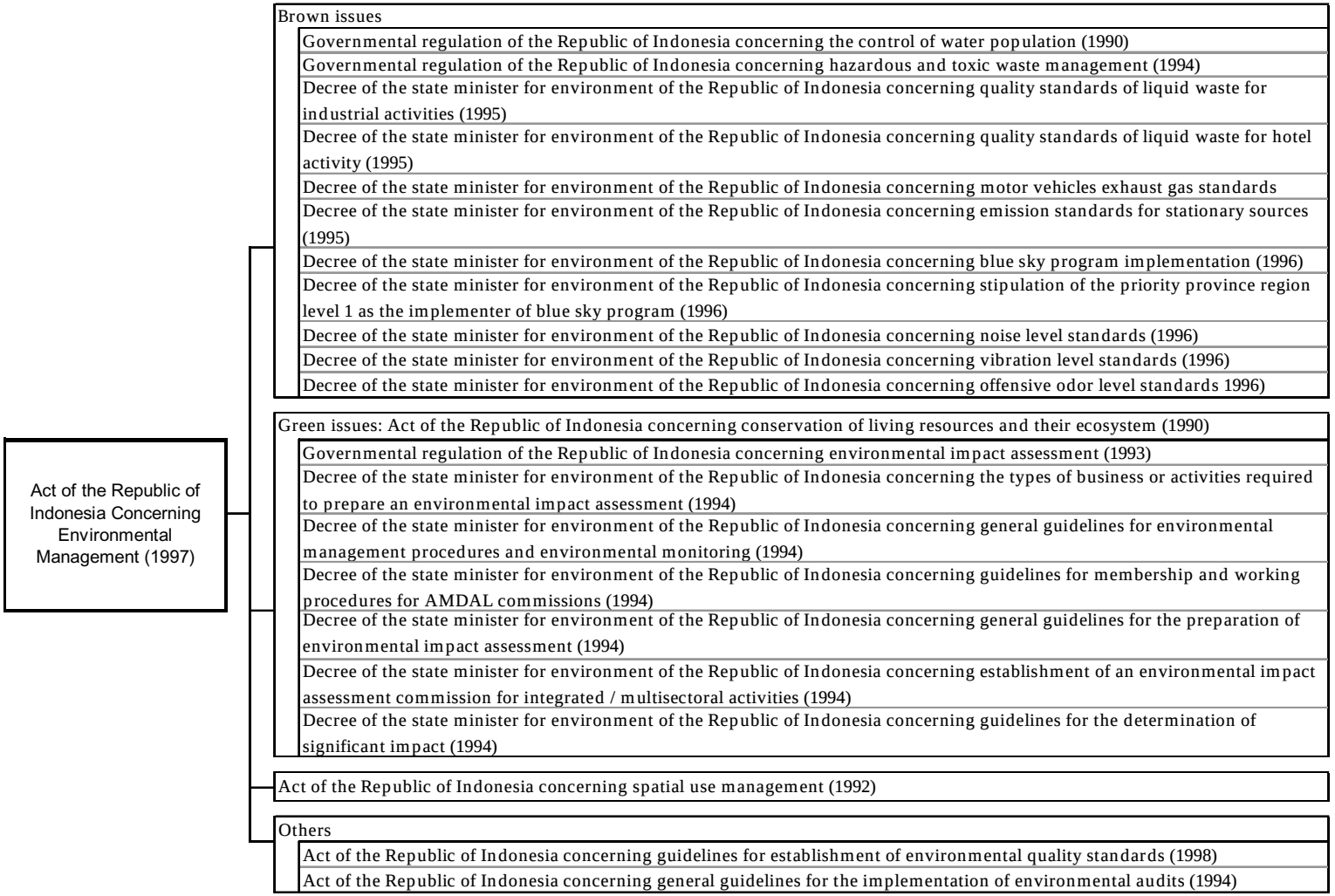
Source: JICA (1997)

Appendix (3)-1: Chronological summary of environmental policy and the Environmental Center in Indonesia

Year	Environmental laws and policies	Environmental administration	National development plans	GDP/capita (current international US$), growth rate	Environmental Management Center (EMC)
1973			The Second Five-Year Development Plan: National policy in environmental affairs (Chapter II Article 10 of the State Development Guideline)	US$480 (1974); 8.3%	
1978	Presidential Decree No. 28/1978 Presidential Decree No. 35/1978	State Ministry for Development Supervision and Environment		US$640; 9.2%	
1982	Act No. 4/1982 on the Basic Provision for Environmental Management			US$1,000; 1.1%	
1983	Presidential Decree No. 25/1983	State Ministry of Population and Environment		US$1,070; 8.4%	
1990	Presidential Decree No. 23/1990	BAPEDAL (Environmental Impact Management Agency)		US$2,070; 9.0%	
1990	Act No. 5/1990 on Natural Resources Conservation and Ecosystem				
1993			The Sixth Five-Year Development Plan (Repelita VI) focused on enhancing coordination in the environmental affairs toward sustainable development	US$2,700; 7.3%	Project started (January)
1994		State Ministry of Environment			
1997	Act No. 23/1997 on the Environmental Management			US$3,490; 4.9%	
1996	Ministerial Decree No. 07/1996	Secretariat of the National Coordination Team for Forest and Field Fires Control			
1997				Economic crisis	Project completed (December)
1998				Presidential succession, Growth rate: -13.2%	Follow-up phase started (January)
1999			The Five-Year National Development Program (Propenas) focuses on sustainable natural resources management to increase public welfare	US$2,900 in year 2000 (estimation); 1.0%	
1999	Act No. 22/1999 on Regional Autonomy (Decentralization) taking effect in 2001				
2000					Follow-up phase completed (March)
2002	Presidential Decree No.2/2002, Article 56a	The merge of the BAPEDAL into the State Ministry of Environment			Phase 2 started (July)

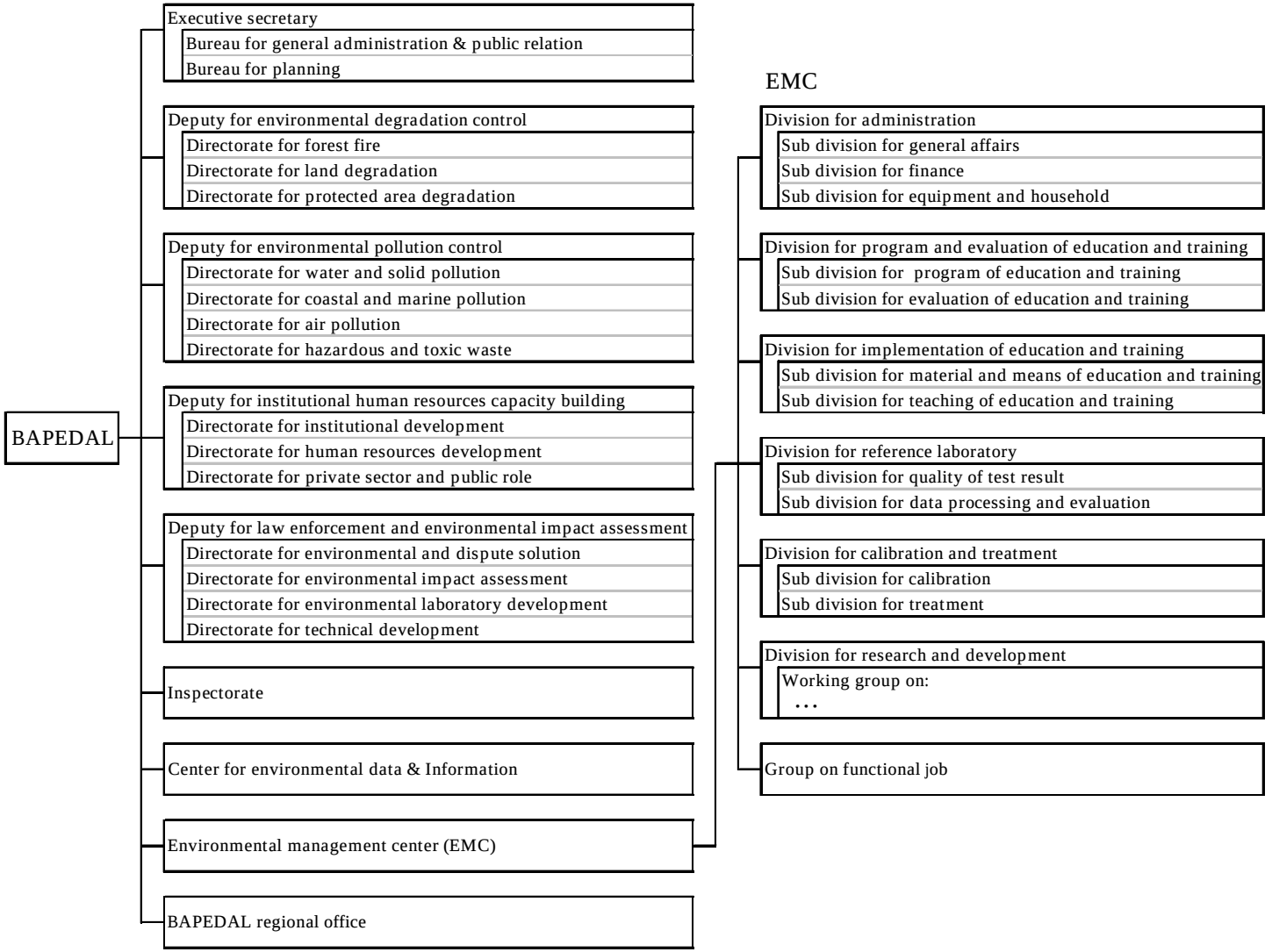
Source: BAPEDAL website, World Bank (2002), CIA website

Appendix (3)-2: Environmental law system in Indonesia



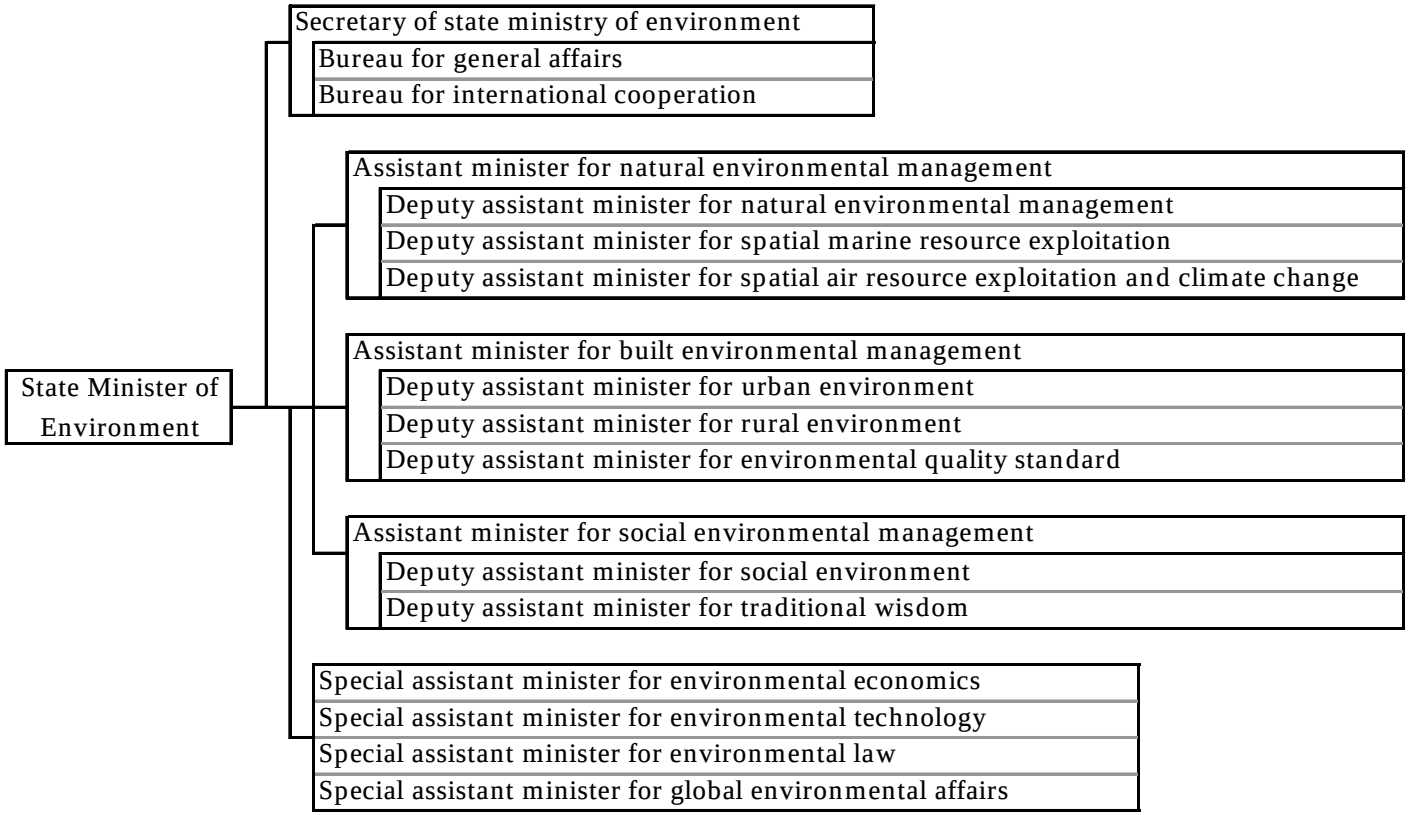
Source: Global environmental forum (1999)

Appendix (3)-3: Environmental administration in Indonesia (BAPEDAL, before 2001)



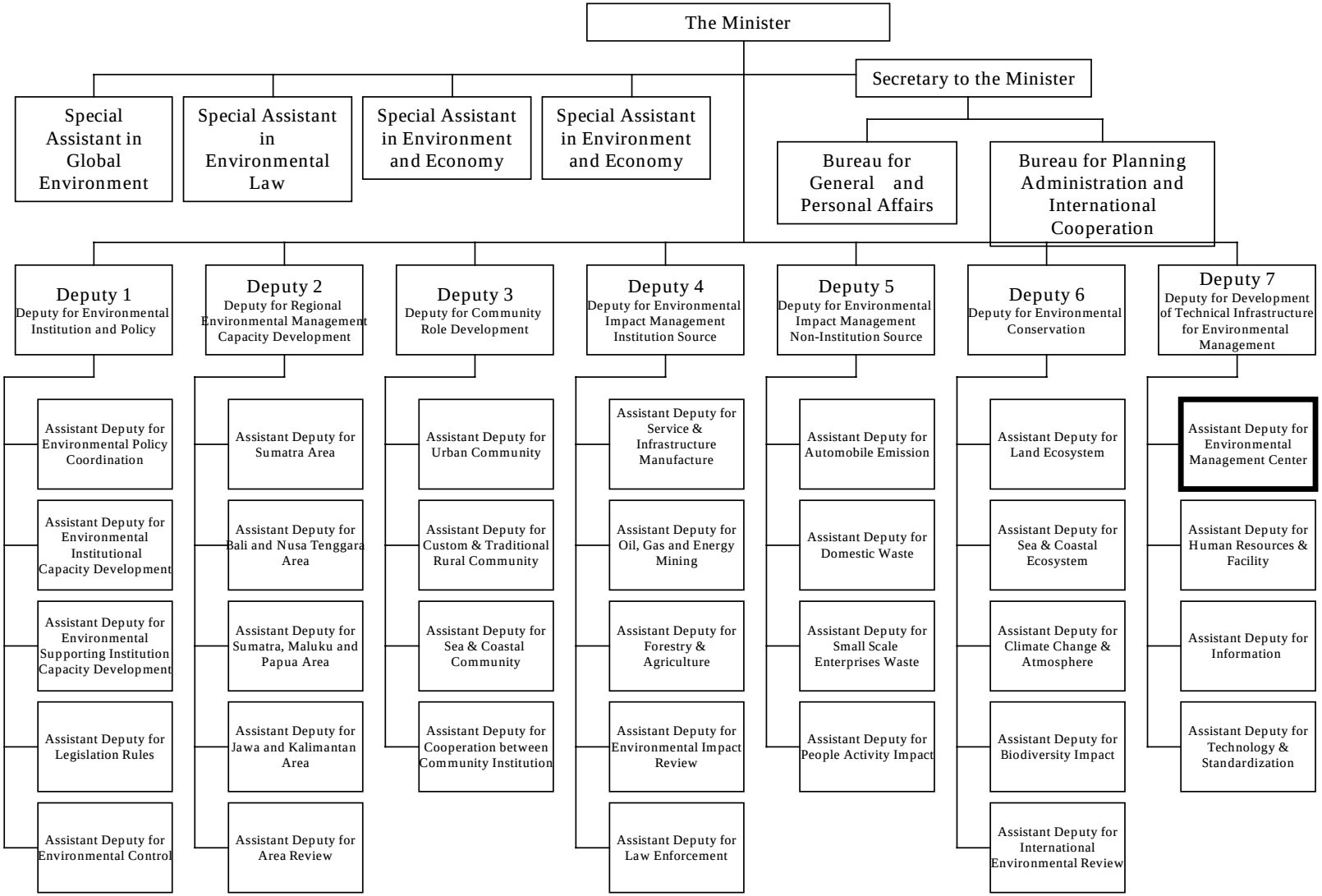
Source: JICA (2000)

Appendix (3)-4: Environmental administration in Indonesia (State Ministry of the Environment, before 2001)



Source: JICA (2000)

Appendix (3)-5: Environmental administration in Indonesia (Ministry of the Environment, since January 2002)



Source: The author

Appendix (4)-1: Chronological summary of environmental policy and the Environmental Center in Mexico

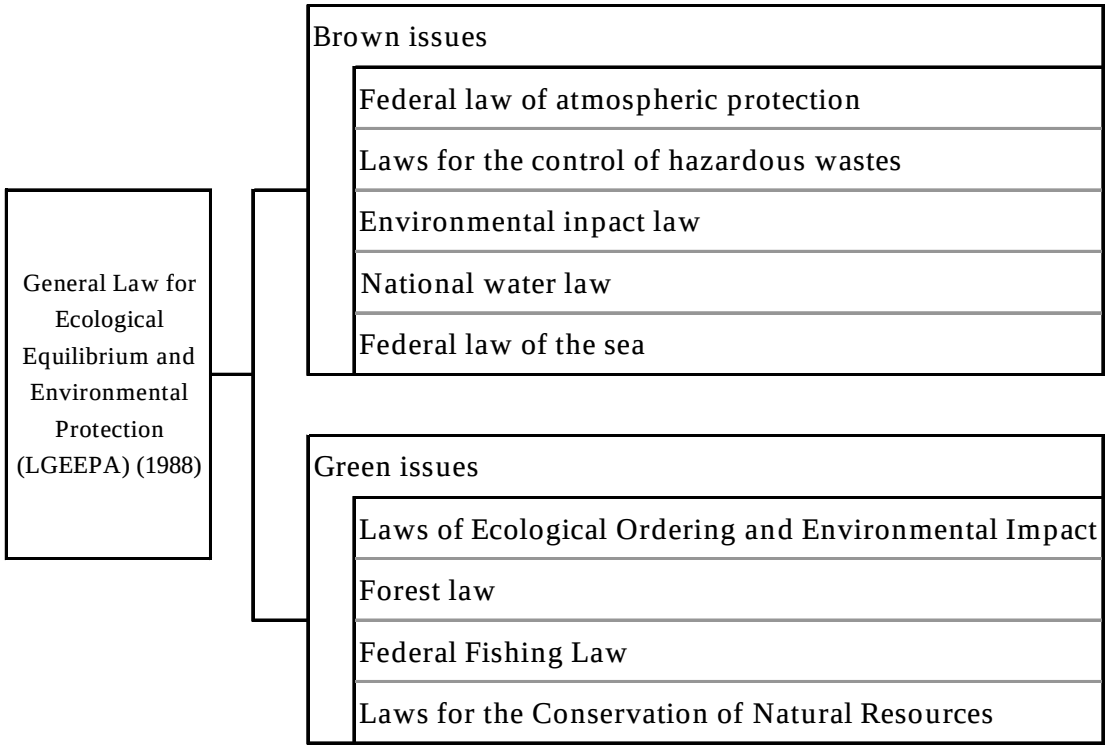
Year	Environmental Laws and Policies	Environmental administration	National development plans	GDP/capita, US$; (% growth/yr)	CENICA
1971	Federal Law for the Prevention and Control of Pollution - Provisions on air, water, and land pollution, however, because of lack of clearly defined functions and responsibilities among government units, efforts concentrated on the promotion of regulations and norms. - Environmental policy viewed from a health perspective	Secretariat of Health and Assistance (now the Secretariat of Health)			
1976	Implementation of the Air Quality Monitoring Network (Mexico City)			Ave.6%+ growth rate Luis Alvarez Presidency Discovery of major oil reserves	
1982	Federal Law of Environmental Protection - Provisions on animal, plant, land and ocean protection. - Impact evaluation of public and private work projects	Secretary of Urban Development and Ecology (SEDUE)	Environmental Issues incorporated in the National Development Plan 1983-1988	US$5,100; (-5. 86%) Jose Portillo Presidency (1976-82) Debt crisis ; Peso Devaluation	
1983			The concept of environmental protection is incorporated in Art. 25 of the Constitution	De la Madrid presidency (1982-88) Standard of living falls; Foreign debt renegotiated	
1986	Metropolitan Index of the Quality of Air (IMECA) to provide information on pollution levels in Mexico City's Metropolitan Area (MCMA) 55 Environmental Actions were proposed, among these are: - Test of emissions from vehicles - Reduction of sulfur in diesel fuel & lead in gasoline				

1988	General Law for Ecological Equilibrium and Environmental Protection (LGEEPA) also called the Federal Ecology Law - Major conceptual shift in environmental policy. - Additional regulations on water, air pollution and toxic waste. - Defined & efficient forms of coordination of govt. initiatives - Implementation process for decentralized mechanisms of cooperation among federal, state and municipal governments. Regulations on environmental impact, prevention and control of vehicular emissions in Mexico City		President Salinas adopted National Policy on Ecology	US$6,320; (2.84%) Salinas Presidency (1988-94) Major Financial crisis	
1989		National Water Commission	National Development Plan of 1989-1994	US$6,460; (4.19%)	
1990	National Program for Environmental Protection (1990-1994) Integral Program Against Atmosphere Contamination (PICCA, 1990-1995)			US$6,740; (5. 06%)	
1991				SEDUE published a directory of 216 environmental NGOs	
1992	Federal Fishing Law Federal Metrology and Standardization Law Law on National Waters	Secretary of Social Development (SEDESOL) Federal Attorneyship for Environmental Protection (PROFEPA) National Institute of Ecology (INE)		US$7,540; (3.62%) The explosion of the sewer system in Guadalajara in April 1992 due to the dumping of thousands gallons of gasoline by PEMEX brought to public attention environmental mgt. of industries INE published “Green Directory” consisting of 510 NGOs in all 31 states and the Federal district.	

1993	29 of the 31 states and the Federal District have already passed their own environmental laws.			US$7,720; (-1.95%) From 1993 lead did not exceed standard	Preparation Phase
1994		Ministry of the Environment, Natural Resources and Fisheries (SEMARNAP)		US$8,070; (4.41%)	
1995	The Program to Improve Air Quality in the Valley of Mexico City (PROAIRE, 1995-2000)		National Development Plan of 1995-2000	US$7,660; (-6.16%) Economic Recession	Phase I 1995-1997
1996	Significant amendments to LGEEPA are made to modernize environmental regulation.			US$7,990; (5.17%)	
1997				US$8,370; (6.98%)	Phase II 1997-2000
1999	Towards An Air Quality Program for the Decade of 2001-2010 for the Metropolitan Zone of the Mexico Valley			US$4,930; (3.70)% 27 Industries with ISO 14001 Certification	
2000		Reorganization of SEMARNAP, forming the new Ministry of Environment and Natural Resources (SEMARNAT).		US$5,810; (6.60%) Zedillo Presidency (1994-2000)	
2000	National Environmental Program 2001-2006		National Development Plan 2001-2006	Vicente Fox Presidency	

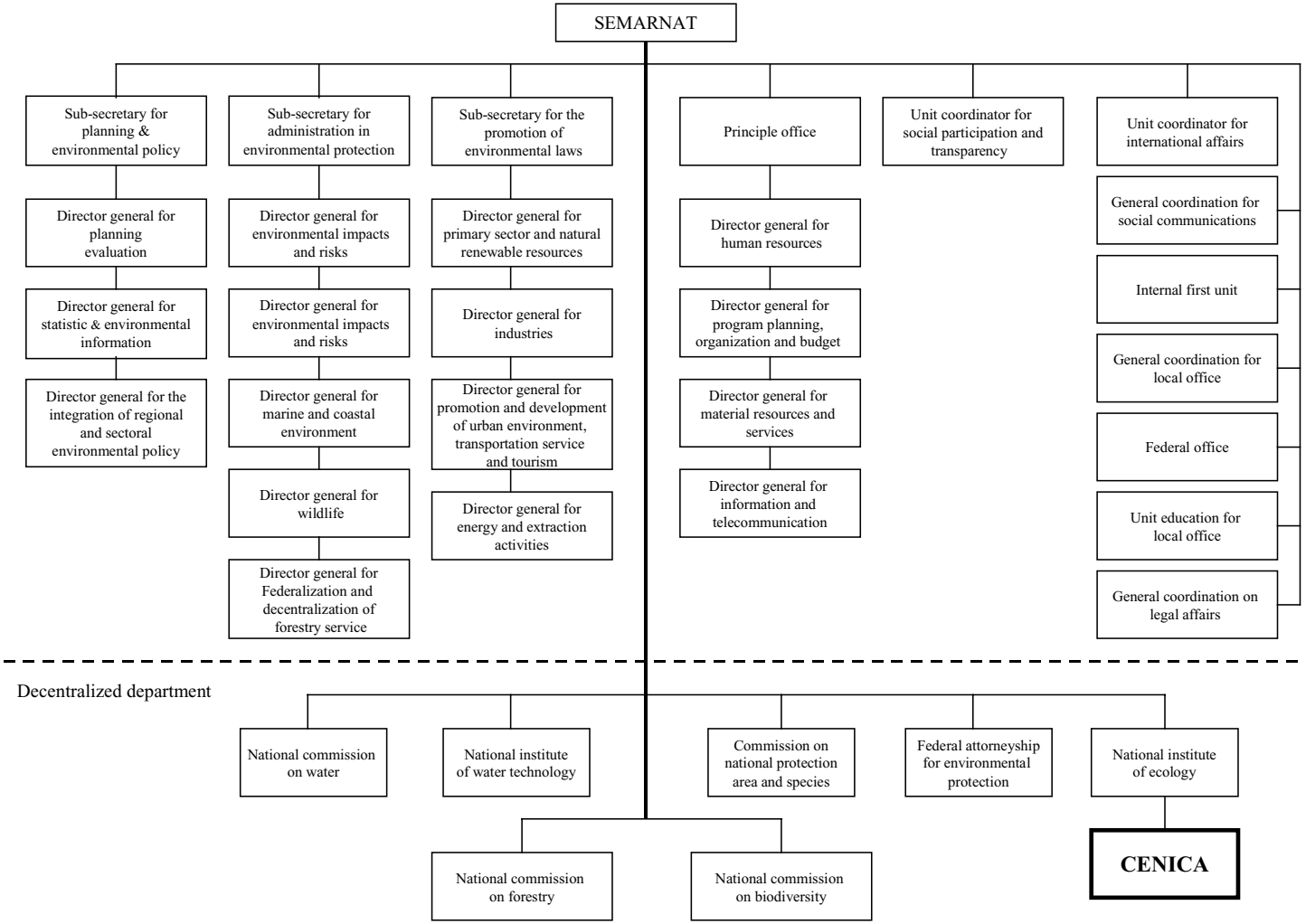
Source: Janetti-Diaz et al. (1995), Munoz (1997), OECD (1998), Cuidad de Mexico (1999), Environmental Law Institute. (1996), Guigale et al. (2001), World Bank. (1999, 2000, 2001)

Appendix (4)-2: Environmental laws of Mexico



Source: JICA (1999)

Appendix (4)-3: Environmental administration of Mexico



Source: SEMARNAT website

CHAPTER 3

Environmental Center Approach and Development of Social Capacity for Environmental Management

This chapter evaluates how the Environmental Centers have directly or indirectly contributed to the development of social capacity for environmental management (SCEM) in the recipient countries. This evaluation is based on the definition of the SCEM in chapter 2 and also on the analysis of the development stages of the SEMS in the four counterpart countries. Furthermore, it is based on the evaluation of the adequacy of the entry point to the project. The evaluation focuses on the following points: how the Environmental Centers contributed to development of the individual social capacity of the main actors (i.e. the government, firms and citizens), how the Centers acted as a catalyst to accelerate cooperation between the three actors, and how the Centers fulfilled their role to support the development of the social capacity in local areas.

This chapter consists of the following parts. In section 3.1, hypotheses are presented for the evaluation of the Environmental Center approach at the program level from the viewpoint of the development of SCEM. Then the methodology for this evaluation is discussed. Section 3.2 discusses the best entry point to the project and which Environmental Center approach will obtain better results in the development of SCEM in the recipient countries. Also, the concept of the most appropriate exit point for the Center for being self-sustaining by the recipient countries is discussed, and then the achievements of the Environmental Center projects in four countries are evaluated. In section 3.3, the Centers' contribution to capacity development in the governmental sector is examined to verify the impact of the Environmental Center approach on the development of SCEM. In section 3.4, the impact of the Environmental Center approach is discussed, regarding two private actors (firms and citizens) in the development of SCEM. Additionally, in section 3.5, the relationship between the development of SCEM in local areas and the Environmental Centers is discussed. Then, section 3.6 summarizes the evaluation of the

Environmental Center approach from the points of views form the three different actors and of the central and local levels.

3.1 Evaluation Method for the Environmental Center Approach

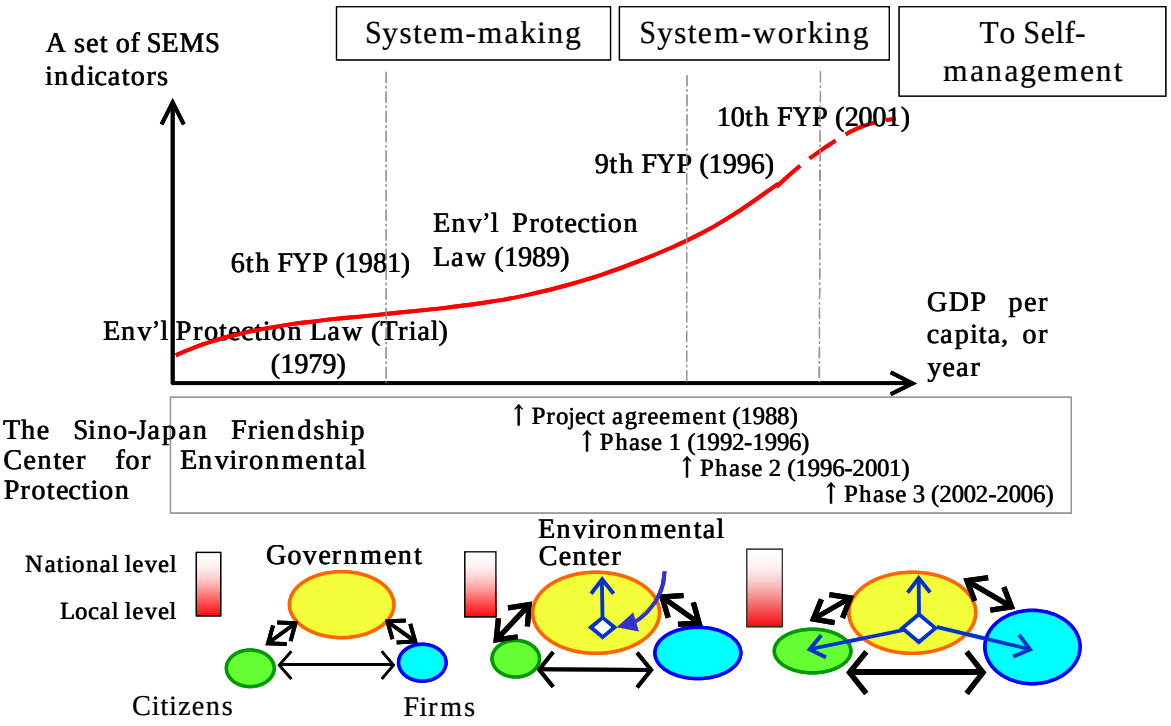
3.1.1 Hypotheses for the Program Evaluation

Regarding the function and achievements of the Environmental Centers, the following hypotheses are presented, in order to conduct a program evaluation of the Centers from the point of view of the development of SCEM.

First, the Environmental Centers can most effectively and efficiently contribute to the development of social capacity at the start of a project when the SEMS in the counterpart countries moves from the system-making stage to the system-working stage. Figure 3.1 shows the development of SCEM and the evolution of the project for the Japan-China Friendship Center for Environment Protection. As already discussed in the previous chapter, the establishment of the term of the project is important. An adequate term for a project would be that the project term would begin when the project is agreed upon and started at the final phase of the system-making stage, and the project would be terminated when the system-working stage is fully developed. This is because the SEMS of the recipient country should perform its functions at least at a critical minimum level in order to ensure the functioning of an Environmental Center which handles environmental monitoring, research and training. As already discussed in the previous chapter, the critical minimum level conditions for the system-working stage is the achievement of three benchmarks, which are an environmental law system, environmental administration, and environmental information disclosure.

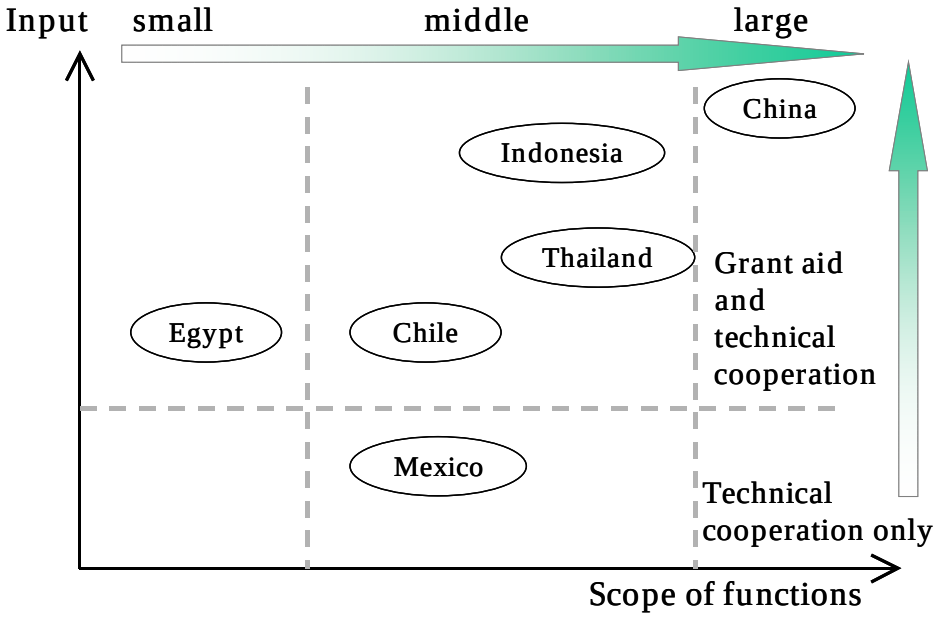
Second, the degree of the Environmental Center's contribution to the development of SCEM is deeply involved in the scope of the (potential) function which the Environmental Centers are provided during the projects formation. In Figure 3.2, six Environmental Centers are rated using as the horizontal axis the scope of function and as the vertical axis the input from Japan and their own countries. As for the scope of function, China's Environmental Center is inextricably linked in main functions with the SEPA (State Environmental Protection Administration, which was the NEPA, National Environmental Protection Agency, at the starting of the project), an existing central environmental administrative organization.

Figure 3.1 Development process for SCEM in China



Source: Matsuoka (2002)

Figure 3.2: Scope of the functions of the Environmental Centers and inputs



Source: The author

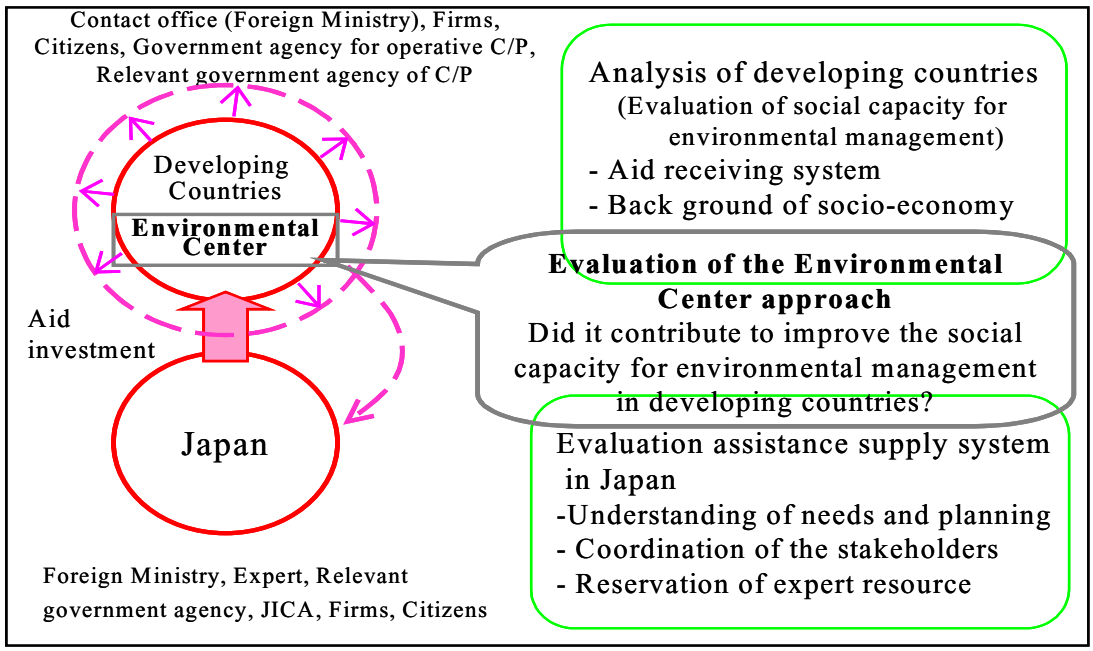
The Sino-Japan Center also has broad departments for planning and studying environmental policy. On the other hand, in Egypt, for example, the project was based on the development plan of the environmental laboratory and the function of the project was limited to monitoring and analysis of contaminated materials. Of course, the performance of the Centers depends on the scale of the input (foreign aid resources and resources in the recipient countries), but a more important matter is the position and role of the Environmental Center, which is provides support for the SEMS with respect to enviro nmental policy or other broader concepts.

3.1.2 Methodology

(1) Evaluation Based on SEMS

There are two evaluation points as shown in Figure 3.3. The first is the degree of contribution by the Environmental Centers to the development of SCEM in the developing countries. The development stages of SCEM in the four countries have been already analyzed in Chapter 3. This chapter examines the degree of development of social capacity in developing countries during and after Japan's aid was provided to the Environmental Centers. The following subjects are also discussed: the interactive impact of the Environmental Centers, including what Japan obtained from the developing countries by implementing the Environmental Center approach. In this discussion, the following wide ranging items are

Figure 3.3: Viewpoints for evaluation



Source: The author

included; promotion of more effective use of ODA, spreading nongovernmental cooperation between both countries, and increasing Japan's name recognition.

A second important point is whether Japan's assistance supply system does or does not meet the needs for operation of the Environmental Center approach. The Environmental Centers have received aid as a 'set or combination', which was called project-type technical cooperation (now called technical cooperation project), consisting of constructing of buildings and fully equipping them through grant aid (except Mexico) and by providing aid for equipment and machines, the dispatch of Japanese experts and counterpart training. Among these, the dispatch of experts and promotion of counterpart training are important in regard to the objective of the development of human resources. Actually, however, the needs of the recipient countries are not always fulfilled, due to insufficient understanding and the fact that sometimes a proper expert was not dispatched at the appropriate time.

(2) Evaluation Based on DAC Criteria

In addition to the above-mentioned evaluation from the point of view of the development stages of SCEM, the Environmental Center approach is also evaluated using five OECD/DAC criteria which are usually used for project evaluation. The definition of the DAC criteria are shown in Table 3.1. The ODA project evaluation is discussed in detail by Matsuoka and Honda (2001).

This time, in order to evaluate the project at the program level, out of the five criteria, that of *impact* is the primary focus.

Table 3.1: Five DAC Criteria

Evaluation criteria	Definitions
Relevance	The extent to which the aid activity is suited to the priorities and policies of the target group, recipient and donor.
Effectiveness	A measure of the extent to which an aid activity attains its objectives.
Efficiency	Efficiency measures the outputs -- qualitative and quantitative -- in relation to the inputs. It is an economic term which signifies that the aid uses the least costly resources possible in order to achieve the desired results.
Impact	The positive and negative changes produced by a development intervention, directly or indirectly, intended or unintended.
Sustainability	Sustainability is concerned with measuring whether the benefits of an activity are likely to continue after donor funding has been withdrawn.

Source: OECD/DAC senior meeting (Dec. 1991)

(3) Evaluation Method for the Environmental Center Approach

The evaluation method is shown as a matrix in Figure 3.4. The vertical axis is the impact on development of SCEM and the horizontal axis is the achievement in terms of the five DAC criteria. The points of view for evaluation follow three points: 'The impact of the Environmental Center approach on the development of SCEM in the recipient countries'. 'Progress of cooperation between Japan's environmental ODA and non-ODA', and their integration 'Comprehensive evaluation of the Environmental Center approach'. The first point, in concrete terms, consists of the evaluation of the government, firms, citizens, and other national/local actors. The second point is the consideration of the reactions to Japan's aid from the total, not only administrative, components of the system and also the evaluation of the Japanese domestic system for assistance supply as the Japan-side task. The total evaluation as a program of the Environmental Center projects, i.e. the evaluation of the Environmental Center approach, is discussed mainly in section 3.6.

Regarding the use of five DAC criteria, as mentioned above, some details were devised to evaluate the projects as a hypothetical program. Generally, in project evaluation, the criterion *effectiveness* evaluates how far the project achieved the project purpose within the given resources and time. But in this program evaluation, the current concept of effectiveness is not reasonable. Although the 'goal' is described as 'improvement of administrative capacity for environmental management', the goal was not clearly envisioned at the time of the project start-up. Also, the assumable goal varies depending on the purpose of evaluation and intention of the evaluator. Therefore, in this report, the effectiveness should be taken as effective achievements forward the possible target rather than literal effectiveness (degree of reaching the goal) against the defined goal.[1]

The most important factors for the program evaluation are *impact* and *sustainability*. Especially in the cases of program evaluation and of project evaluation, these two items are based on similar concepts (Matsuoka and Honda 2001). In this section, the spreading of achievement from activities by the Environmental Centers to activities by the firm and citizen sectors (even though government departments still were involved in the main parts of the programs) is analyzed. The impact of strengthened cooperation is also analyzed. Then the issue of whether the developing countries can autonomously and stably maintain the mechanisms of impact is evaluated as a 'one set' issue.

Efficiency is evaluated in conjunction with impact and sustainability. Particularly, concerning the process of increasing the total capacity of the system a very important point is the determination of the most efficient approach, such as 'what kind of input is necessary to which

Figure 3.4: Evaluation matrix

Five DAC criteria / Viewpoints for evaluation		Effectivness	Impact	Sustainability	Efficiency	Relevance
The comprehensive evaluation of the Environmntal Center approach (program evaluation)			- Development of SCEM	- the role and contribution of the Environmental Centers to the Development of SCEM	- Degree of the development of SCEM/investment (ratio) - Comparison of efficiency with other aid schemes - Public-private partnership	- "Environmental Center approach" - Planning and decision-making - Implemention timing of the project (in relation to development stages of SCEM) - "Critical minimum"
The effects of the Environmental Centers to the SCEM in the recipient countries	The government	- Improvement of capacity for environmental administration	- Effects to the administration in other sectors - Improvement of administrative capacity	- Capacity of coping with the emerging problems	- Efficiency of capacity development for environmental administration	- Acceptance of the Environmental Center approach
	Firms		- Improvement of the environmental management system in firms	- Incentives to the environmental management	- Efficiency of the improvement of the environmental management in firms	- Development of industry and economy
	Citizens		- Environmental awareness building - Implementation of environmental management	- Incentives to environmental management	- Efficiency of the Improvement the environmental management in citizens	- Public environmental awareness
	Central/Local		- Stronger relationships between the cetral and local governments for environmental management	- Decentraization - Financing to environmental administration	- The speed of decentralization	- Establishment of local environmental administration - Decentralization
	Interactions of the actors		- Stronger interactions and coordination		- Stronger interactions and coordination - Reduction of the friction among actors	
The effects to the Japan's ODA and non-governmental cooperation	Effects on the Japanese society		- Improvement of the visibility of Japan - Increment of business activities - Increment of research exchange	- Incentives for the participation from the private sector (firms and citizens)	- Partnerships between the Environmental Centers and the private sector (firms and citizens) - Utilizing non-ODA support	
	Aid supply system		- Improvement of the aid supply system	- Diverse approaches - Application to other developing countries - Aid supply system - Public-private partnership	- Coordination with relevant agencies - Donor and recipient meeting	- Expert resource and technology

Source: The author

department', in order to accelerate the dynamics to change the current institution. Therefore, the Environmental Centers, as part of the administration, are expected to act properly toward non-government institutions. In other words, efficiency is evaluated as the strengthening of cooperation between the actors and the acceleration of increasing capacity.

Relevance is evaluated regarding the following items: whether or not the Environmental Center projects are an adequate approach to the development of SCEM in the developing countries; whether the level of the SEMS in the counterpart countries was adequate at the introduction of the Environmental Center (concordance of the needs and capacity); consistency of the plan/operation.

According to the above-mentioned evaluation approach, concrete evaluation is discussed in the following sections.

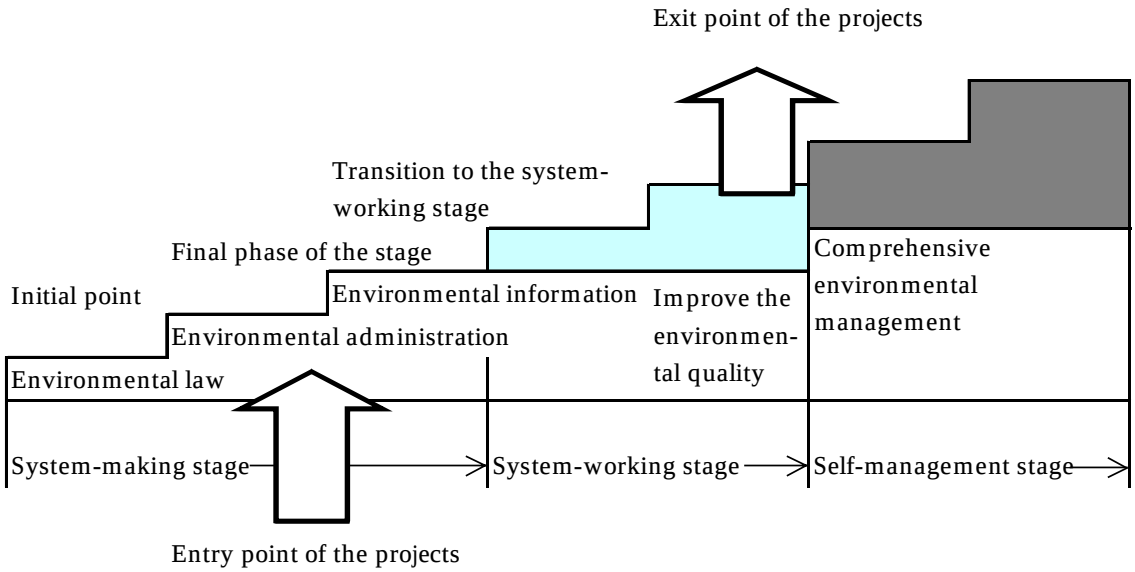
3.2 Evaluation of the Relevance of Entry/Exit Points of the Environmental Center Projects

The development stages for a SEMS (three stages: system-making stage, system-working stage and self-management stage) are explained in Chapter 2. In this section, the following items will be examined: in the developmental stages of a SEMS, the timing for when the Environmental Center project should start, and when it should move to another type of cooperative relationship. In other words, proper entry and exit points should be considered. In relation to these consideration, the achievements of the Environmental Center projects in the four counterpart countries are evaluated.

3.2.1 Development Stages of SEMS and Entry/Exit Points of Environmental Center Projects

The appropriate entry and exit points for an Environmental Center project in the development of a SEMS are shown in Figure 3.5. Three important factors in the formation of a SEMS and the benchmark for evaluation of the system are environmental law, environmental administration and environmental information, as already mentioned in Chapter 2. When any one of the three factors is completed, this is called the start of the system-making period. The period that is between the second factor being developed and the last factor being adopted, is called the final phase of the system-making stage. Generally, environmental law is established first and an environmental administration organization is established. After these

Figure3.5: Entry point and exit point of Environmental Center Approach



Source: The author

environmental policies are recognized at some level in the administration, the operations of environmental monitoring, collection/analysis/disclosure of environmental data and policy research are carried out. Therefore, in the system-making stage, the final phase of the stage, that period when the environmental administration organization is established and the environmental information is upgraded, is very important.

One of the targets of the Environmental Center project is improvement of monitoring techniques. In reference to the development of a SEMS, during the final stage of the system-making stage, in order to maximize the achievement of the project, the investment in supporting the improvement of monitoring technology of the counterpart countries is very important. In short, the optimal entry point of the Environmental Center project is in the final phase of the system-making stage. For the purpose of upgrading environmental information, the issuance of a report, including environmental data and policy analysis, such as construction of a complete in-country monitoring network and state of the environment, is indispensable. From these considerations, cooperation with scientific and technological facilities/knowledge and the support for software, such as software required for environmental management and policy research, are also important.

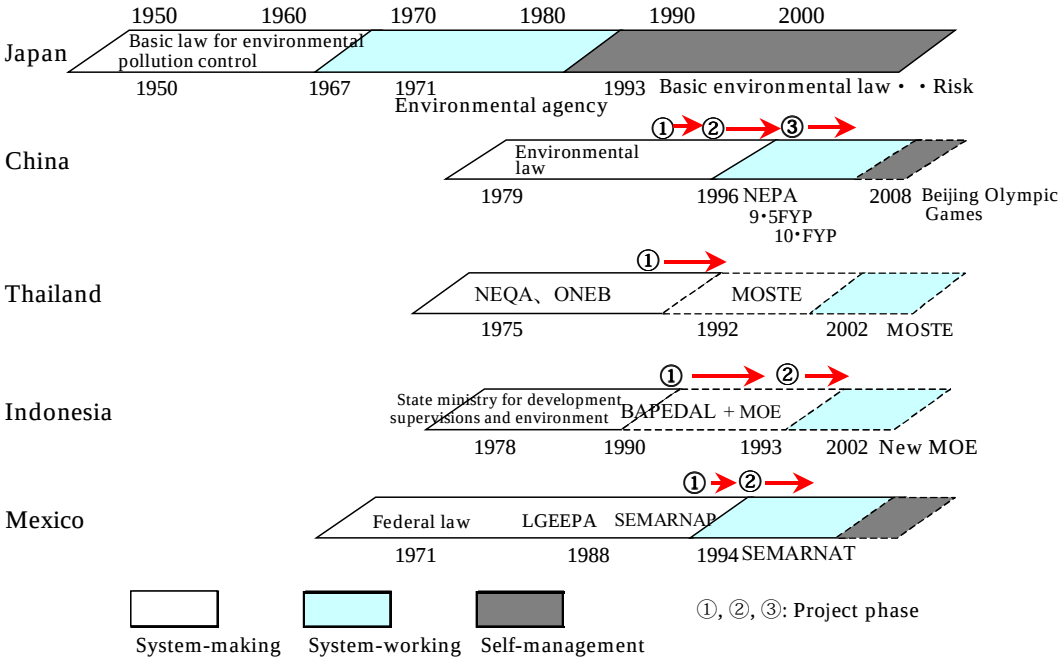
Through the upgrading of environmental information, the SEMS moves to the system-working stage from the system-making stage. One important benchmark in the system-working stage is improvement of pollution. Traditional pollution from industry, such as SOx, will be relatively easily decreased by pressure from the community, regulation by the

government and the efforts of firms. By watching for a turning point in the pollution emissions, it can be judged whether the system created by the government/firms/citizens is working or not. When this turning point is reached, the system-working stage has sufficiently unfolded. The Environmental Center projects contribute in terms of monitoring/research/training, in order for the government to set and carry out appropriate countermeasures. When the pollution is improved by government leadership, the Environmental Center has finished its immediate role. The equipment, human resources and networking which are obtained during this period can then be used to cope with any new task. During this period, the Environmental Center project, which combines grant aid and professional techniques, is not always necessary. Dispatch of an individual specialist is desirable for development of the Environmental Center and self-sustaining development of the SEMS. Also, reinforcement of various horizontal cooperative relationships through the use of cooperative resources other than ODA is desirable.

3.2.2 Evaluation of the Relevance of Entry/Exit Point in Four Countries

Based on the above-mentioned basic concept, the development stage of SCEM in the four countries observed in Chapter 2 is summarized below. The relevance of entry/exit points of the Environmental Center is evaluated. Figure 3.6 shows the evaluation summary.

Figure 3.6: Development stages of SEMS



Note: FYP indicates Five Year Plan
Source: The author

In China, the environmental law and environmental administration were prepared mainly in the 1990s, and the China Environment Yearbook, prepared as state of the environment, has been published since 1990. Its quality was improved in 1994. Therefore, the end of the system-making stage in China is considered to have begun in the latter half of the 1990s and the earlier half of the 1990s was the final phase of the system-making. By means of movements in the latter half of the 1990s, such as the Air Pollution Control Act Amendments in 1995 and the Ninth Five Year Plan in 1996, the antipollution measures have been effectively carried out. The system-working stage started at this time.

The emission levels of the industrial pollutant SO_2 passed their peak, and China's environmental Kuznets curve (EKC) appeared to have had its turning point in the later half of 1990s. Yet, further prudent examination is necessary, as there is a question about the reliability of the energy statistics, coal use rate data, etc. from China. However, the development of social capacity is generally accepted. It is assumed that the government/firms/citizen grouping will promote environmental management for the Beijing Olympics Games, opening in 2008, and the Shanghai International Exposition, to be held in 2010, and that China will move from the system-working stage to the self-management stage.

From this point of view, Figure 3.6 shows that the entry point was appropriate for the Environmental Center project in China, started in 1992 when the final phase of the system-making stage began with the input of grant aid and professional expertise. Furthermore, substantial technical cooperation and the Environmental Center activities have operated as Phase 2 since 1996. The Sino-Japan Center has operated together with the development of China's SEMS. The project was implemented with appropriate timing for contribution to the system.

On the other hand, examining the exit point, the Sino-Japan Center has worked as Phase 3 since 2002 (to be finished in 2006). China has experienced the system-working stage since the later half of the 1990s and is gradually moving into the self-management stage, since the earlier half of 2000. According to the original determinations of the Environmental Center, the necessity for further input in terms of a project in the Sino-Japan Center may not be high. However, when a new operation for the Environmental Center approach is uncovered, finding a new target or goal for the Environmental Center supported by Japan would be relevant in order to strengthen the cooperative relationship between Japan-China government/firms/citizens. Although an examination of the meaning of the support by the Environmental Center from the political viewpoint of Japan-China relations is important, a detailed analysis is not within the scope of this report.

In Thailand, the law, administration and information related to the environment were mostly prepared in the last half of the 1990s, and it is accepted that they moved from the system-making

stage to the system-working stage during this time. However, due to social and economic dislocation along with the currency crisis in 1997, more time may be necessary to set up the system-working stage of the SEMS. Furthermore, after the establishment of the new Constitution in 1997 and the decentralization act in 1999, the department was reorganized into the Ministry of Natural Resources and Environment from the Ministry of Science, Technology and Environment by the reorganization of the central ministries in October, 2002. Therefore, their stage is in the system reorganization period and at the same time, it is the early phase of the system-working stage.

From information shown in Figure 3.6, it can be agreed that the ERTC started as a project in 1990 (project agreement in 1989), which was the final phase of the system-making stage and was operated until the period shifting toward the system-working stage. Since the end of the project in 1997, the ERTC project encountered the reorganization of the administration and economy in Thailand. Because it was impossible to predict such a situation occurring in the later half of the 1980s, the entry point of the Environmental Center project in Thailand can be explained as appropriate to the circumstances at that time. Furthermore, when the ERTC project ended in 1997, the project had not yet been operating acceptably at the very early phase of the system-working stage. From this viewpoint, it seemed to be reasonable to continue to provide input to this project for some time.

In Indonesia, the environmental law and administration were set up at the end of the 1980s to the early 1990s. However, the preparation of a nationwide monitoring network was not established and the environmental information stage has been delayed with the state of the environment not being continually issued. From this perspective, it is believed that Indonesia has remained in the final stage of the system-making stage. Furthermore, there is socio-economic chaos due to the change from the Suharto administration which was accompanied by the currency crisis in 1997 and the independence movement of the East Timor. There was also the establishment of the new Ministry of Environment through the integration of the old Ministry of Environment and BAPEDAL (in January 2002), accompanied by the reorganization of central ministries and the restructuring of the entire government system by the Decentralization Act in 2001. Therefore, the final phase of the system-making stage seems to be continuing for an extended period.

According to the analysis of the developmental stages of the SEMS in Indonesia, the Indonesia Environmental Management Center (EMC) was started in the early 1990s with an agreement for grant aid in 1991 and professional expertise since 1993, and since this timing coincided with the final phase of the system-making stage, the starting time for project input was appropriate. On the other hand, regarding the completion of the project, the present conditions

of EMC are far from being self-sustaining, yet it is often pointed out that the project must be continued. From the viewpoint of the formation of a SEMS in Indonesia, it has been determined that the following are true: There are specific conditions, such as the fact that the final stage of the system-making stage continued longer than in other countries because of external factors; there is a concrete necessity to upgrade the environmental information and the human resources development; it is reasonable to say that it is appropriate to continue to input aid resources to the EMC project for some time. A decentralized environmental management project (DEMS) was started as the EMC Phase 2 beginning in July 2002. It is felt that this project contributes to the development of SCEM in Indonesia, although there is room for argument regarding the optimum linkage between environmental policy, project design and establishment of the project scope.

In Mexico, the environmental law and administration were prepared from the end of the 1980s to the middle of the 1990s (SEMARNAP, Ministry of Environment, Natural Resources and Fishery, started in 1994). Environmental information was upgraded and disclosed in this period. The system-making stage of the SEMS in Mexico was completed in the middle of the 1990s and is now considered to be moving into the self-management stage from the system-working stage. However, in Mexico City, the emissions level of SO_2 had its turning point in 1992-1993; according to this data, the system-working stage had already started in the first half of the 1990s. The atmosphere antipollution measure action program in 1988 and the Integrated Air Pollution Control Program (PICCA) in 1990 were established. Therefore, it is determined that Mexico moved into the system-working stage in the second half of the 1980s and also that the final phase of the system-making stage and early phase of the system-working stage overlapped. From this analysis, the timing for the start of Mexico's Environmental Center CENICA in 1992 was a little late.

The project ended in June 2002, finishing a follow-up period of two years. When it is seen from the viewpoint of the development of the SCEM, the project of CENICA started from the early stage of the system-working stage, and the project input could have been terminated before 2002, because Mexico had the technology for environmental management and the policy study of an adequate level. Unlike the case of China, whose Environmental Center has now established new and broader scope of functions, CENICA does not seem to have a clear and newly developed target to achieve. CENICA should have been given an opportunity to search for a fresher approach to development of the Environmental Center at an earlier stage of consideration of the development of its SEMS. Therefore, it was possible for Japan to offer different assistance other than the prior Environmental Center project.

3.3 Environmental Center Approach and Capacity Development for Environmental Management in the Government

3.3.1 The Role of the Government in the System-making Stage

As mentioned earlier, the role of the government in the system-making stage is very important, particularly, monitoring the situation of pollution is indispensable. In Chapter 2 (2.3), the GEMS report by WHO and UNEP suggested three main items for monitoring in atmospheric air quality management: air quality monitoring, data evaluation and analysis, and examination of emission sources.

3.3.2 The Contribution of the Environmental Center through Monitoring/Research/Training

What kind of contribution has the Environmental Center provided to the capacity development for environmental management in the government sector? In this section, the Environmental Center approach is evaluated with a focus on the following points: monitoring, which is particularly important in the system-making stage, and information preparation or policy research for the issuance of state of the environment.

Since it contains the department which oversees monitoring data for the entire country and will operate the server for the 100-city monitoring network for environmental information, China's Environment Center is closely related to the collection and analysis of the monitoring information. Also, the Policy Research Center for Environment and Economy performs practical policy studies and contributes in the field of study of policy development for industrial pollutant reduction, such as the regulation of total emissions of SOx. Besides this, it actively releases research reports at SEPA's request concerning China's internal policy for the environment in the international framework such as global warming and WTO accession. Furthermore, the Sino-Japan Center performs practical training for central administrative officers and technocrats. From these actions, the Sino-Japan Center is believed to contribute sufficiently to the capacity development for environmental management of the government through monitoring, research and training.

Some of the Thailand ERTC's monitoring data has been submitted to the PCD (Pollution Control Department) as reference material and the ERTC carried out extensive monitoring for environmental research. Its technical level is sufficiently high. Also, since the ERTC has performed various environmental studies, such as investigation into air pollution, noise and

vibration issues and acid rain, its study level is believed to be high. The Thailand ERTC, however, could not perform the governmental monitoring and could not become an integrative organization. This is because, during the reorganization of the administration in 1992, it came to belong to the Department of Environmental Quality Promoting (DEQP) which is a supporting organization for the PCD, not to the PCD itself, which exercises jurisdiction over monitoring. As one of ERTC's future tasks, it is important to gain a position which forms a practical environmental policy plan, while it cooperates effectively with the other environmental departments (OEPP, PCD) and other relevant administration departments. Since the ERTC was planned to turn into an independent administrative agency (a plan as of August 2002), it is expected that it will have the opportunity to increase advice on environmental policy from a neutral stance (even though this goes beyond the border of individual administration), as in cooperation with the Department of Industrial Management (DIW), which is in charge of the environmental regulations to firms.

In Indonesia, as mentioned in Chapter 2, the EMC's contribution to monitoring has been limited. This is because the authority for monitoring in local areas does not belong to the Ministry of Environment and the nationwide monitoring network is not yet established. However, the EMC performs technical support and training for environmental monitoring which is under the jurisdiction of the Ministry of Environment. On the other hand, it has few opportunities to use its analysis technology at a practical level. It should make every effort to apply its analysis technology to policy study in order to emphasis the significance of the EMC activity for environmental policy.

In Mexico, the contributions from monitoring or policy study was limited, because, as mentioned in 3.2, regarding air pollution, the project got a slow start in relation to the expansion of pollution. Regarding training, it achieved some positive results by taking in many administrative officers.

3.3.3 The Impact of the Environmental Centers on the Capacity Development of the Government

When the impact of the Environmental Centers on the capacity development for environmental management in the government sector is examined, the degree of the contribution of the Environmental Centers should be evaluated depending on individual environmental issues. In this evaluation, the development of capacity for environmental management for mainly brown issues in the air has been focused on. Regarding the administration capacity for

air quality management, UNEP-WHO point out and also evaluate the following four items: air quality monitoring, evaluation and verification of the data, examination of emission sources, and implementation of environmental management. The capacities for monitoring air quality and data analysis by the Environmental Centers are considered to be developed in most cases. However, regarding how the Environmental Center should support the capacity for evaluation of emission sources, planning and operation of stochastic research and measures for pollution control, it does not seem that there was sufficient impact in many cases, except China. The Sino-Japan Center has a policy study division which has the authority to participate directly in policy enforcement. A staff member of the EMC in Indonesia confessed to the Evaluation Team inquiry commission in an interview that she had doubt how her analysis would be useful for policy planning and the process of policy enforcement, and she could not find the significance of her duties. This opinion suggested the following possibilities: there is no commitment from the environmental policy that the staff's achievements will be used in the emission source survey and planning of countermeasures; there is no organic linkage to the policy; or the Environmental Center does not hold a significant position in the policy cycle. When the contribution of the Environmental Center to the government capacity for environmental management is evaluated, the position of the Environmental Center in the administrative system for environmental management should be investigated. The positioning of the Environmental Center is important when considering the significance of a project when it is requested, and this positioning may be strongly influenced by reorganization of the administration or changes of policy

3.4 Environmental Center Approach and Firms/Citizen's Capacity Development for Environmental Management

In this section, the impact brought to the capacity development of firms/citizens in the social environmental management through the current activities of the Environmental Centers is examined. The potential for the future is also analyzed. First, in section 3.4.1, the evaluation method for the role and capacity development of firms and citizens in the SEMS is defined once again, and the main evaluation indicators which are used in this section are presented. In 3.4.2, the situation of capacity development of firms and citizens in China, Thailand, Indonesia and Mexico is evaluated. Also the impact of the Environmental Centers in those countries is assessed.

3.4.1 The Role of Firms and Citizens in the SEMS and Evaluation Indicators

(1) SEMS and Capacity Development

As mentioned in Chapter 2 (2.1.2), firms and the citizens the are main actors in SEMS (Figure 2.1). Through compliance with the stages of formation of the SEMS, the capacity of firms and citizens is improved and their role increases in importance (Figure 2.6). In the system-making stage, the capacity of the firms and citizens is relatively small in comparison with that of the government, so the preparation of fundamental systems for environmental management are carried out through government leadership. In the system-working stage, according to the enforcement of environmental policy by the government, the industrial sector makes an effort to reduce pollutants; thus, they contribute practically to the improvement of the environment in the society. During the system-making stage and system-working stage, citizens fulfill the role to accelerate anti-pollution efforts through campaigns against pollutants from firms.

The formation of the relationship between the three actors (the government/firms/citizens) in the first two stages of the system is formed ad-hoc, while a coordinating committee may be established under the pressure of the necessity to treat the problems. In the case of Kitakyushu City (Figure 2.3), the place for discussions between the city, the firms which discharged the pollutants, and citizens was established in order to solve a specific social problem, such as a health hazard from air pollution by SO_2. Accordingly, the 'ad-hoc' correspondence style was a problem between the actors and was arranged by the administration.

As the SEMS develops to the final phase in the self-management stage, the relationships between the leading actor and the other actors change. Namely through the maturity of the voluntary approach, the firms and citizens begin to establish an environmental management plan by themselves, not depending on the compulsion or guidance of the government. The relationship between the firms and citizens becomes more direct and interactive. The circumstance is that consumers evaluate the business organizations as they relate to environmental conservation through the market. Also the government treats the overall environmental management policy that deals with plural environmental problems with various viewpoints in place of an environmental policy for single cases, 'one by one.' There may be comprehensive management of the green and brown issues and any conversion of plans utilizing the initiative and self-regulation of actors in the society as as opposed to excessive government-controlled environmental management.

As mentioned above, firms and citizens increase their importance along with the maturing of the SEMS. Especially in the case of the developing countries, the administrative capacity of the government is not always firm and the development of the capacity of the individual actors

should be sufficiently considered beginning from the system-making stage. Also, firms and citizens are the sectors that receive greater influence from international movements; therefore, along with the internationalization of the economic activities and environmental problems, the development of their capacity progresses in ways different from the backward and forward movement of the system-making stage in advanced countries.

(2) Capacity Development of Firms/Citizens and Evaluation Indicators

Figure 2.10 is suitable to evaluate the capacity of firms and citizens and the development of their mutual relationship. First, for firms, a number ISO certificates acquired from industry is popularly used for the evaluation. Since the ISO specified the same standard level all over the world, the capacity of firms can be compared internationally. Also, currently, an environmental report and environmental accounting are useful indicators for the evaluation of the capacity for environmental management or improvement of the environmental consciousness of firms. However, in developing countries, those activities are not yet established; except for foreign capital corporations, an overall numerical value is not available. Therefore, the number based on the ISO acquisition is treated as one of the guidelines for evaluation in developing countries. In addition, the cases of a voluntary approach in industrial divisions are introduced as one of the indicators.

Regarding the capacity development of citizens in the SEMS, it is possible to make an evaluation at some level based on the number of NGOs and the level of the academic research. Even the improvement of the environmental consciousness of the citizens and changes of consumers' patterns also become important guidelines for evaluation. However, in a country where the collection of nationwide data is difficult, other criteria are used for a qualitative evaluation. Regarding evaluation of the mutual relationship between the actors, the degree of information disclosure, the number of court cases (and lawsuits won), the establishment of an adjustment council, the exchange of research, and the practice of using a voluntary approach are used. Since the overall comprehension of these is difficult, some cases are introduced for reference.

3.4.3 Capacity Development of the Firms/Citizens and Impact of the Environmental Centers

The capacity development of the firms/citizens and the impact of the Environmental Centers are evaluated country-by-country. Items focused on are: the number of ISO certificates, the cases of a voluntary approach, the growth of environmental business (for firms), the number of NGOs, the activity of environmental NGOs, and the improvement of the environmental consciousness (for citizens). Also, the impact of the Environmental Center activities on the firms/citizens is evaluated from the following items: the training for citizens (NGOs), the ISO certificate authority, and information disclosure (issuing of an annual report, website, announcement of research papers).

Below, the implications of firms/citizens in environmental management and their potential and the impact of the Environmental Centers in the four countries are mentioned together with the background papers issued by local researchers. Furthermore, the impact of the Environmental Centers to the firms/citizens is summarized in Table 3.2.

Table 3.2: Impact of the activity of the Environmental Centers on firms/citizens

	Training to the private sector	ISO certificate authority	Annual report	Website	Research Paper, etc.
China	NGOs	Certification organization for ISO14001	Issued every year	zhb.gov.cn	*Report of Strategy for Sustainable Development in China* published every year.
Thailand	Enterprises, NGOs	Partial certification organization (by 2003 end)	Report (1992-1999), Annual report 2001	ertc.deqp.go.th	34 academic journal papers. Presentations at academic conferences and seminars.
Indonesia	None	None	Issued annually in the first phase of the project. To be issued 2003.	To be re-established in 2003.	Presentations at academic conferences and seminars.
Mexico	Enterprises	None	Annual reports	ine.gob.mx/cenica/ index.html	3 academic journal papers. 3 presentations at academic conferences. (numbers in 2002)

Note: The website addresses are valid as of February 17, 2003.

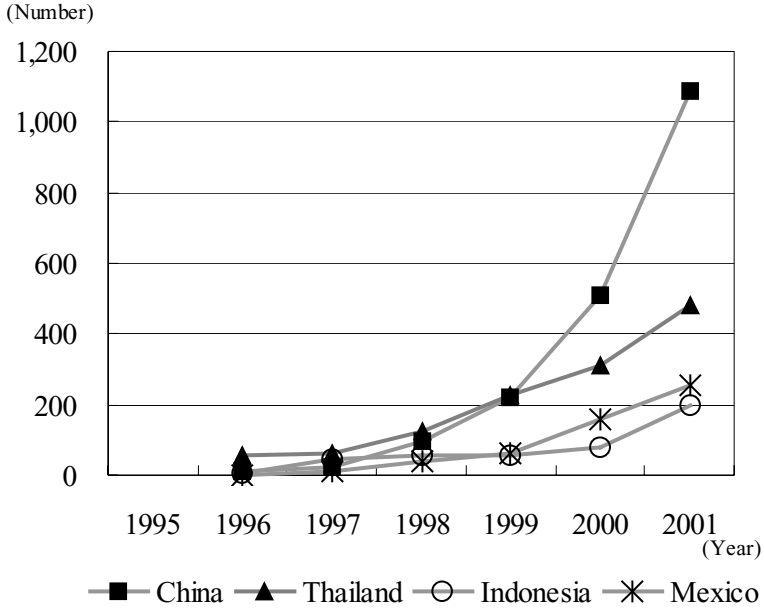
Source: Field survey data.

(1) China

(i) The Role and Capacity Development of the Firms

At this time, the number of firms concerned with environmental protection in China is approximately 18,000 (10,000 in 1997). They are called the 'Sunrise industry' which means prosperous industry. Most of them are non-state private firms. Water treatment firms make up the majority of them. Next is firms dealing with countermeasures for air pollution, and the management of solid radioactive waste follows after that.

Figure 3.7: Transition of ISO 14000 acquisition numbers in four countries



Source: ISO website

In China, the China Association of Environmental Protection Industry controls the domestic environmental protection industries. Since the association is an organization which is under direct control of SEPA (it is also an aggregate foundation), more than 20 administrative officers are dispatched to permanent departments, such as the International Division. The research committee for individual tasks establishes the actual organizations in local cities according to the content of the task. Also, there are local environmental protection industry associations in every local city and the association performs as a facilitator. The association is also a window for entry into environmental business. From an interview within the association, the following comments were obtained: German technology and products are traditionally strong in China, but recently, U.S. firms have actively penetrated into China with the support of the US government; even though individual Japanese firms come to build up the market, their presence is not significant without the Japanese government's support.

Furthermore, as mentioned before, the number of ISO 14000 certificates has rapidly increased since 2000, and 1,085 enterprises obtained certificates in 2001. In Figure 3.7, the number of ISO certificates in four countries including China is shown.

(ii) Role and Capacity Development of Citizens

According to the NGO Research Center for Public Policy and Management at Tshinghua University (2002), there were 136,000 civil society organizations (CSOs), including NGOs, in China as of 2001. Furthermore there are 93,000 civilian non-enterprise units registered.[2] There are many environmental NGOs, of which the Global Village Beijing and the China Environmental Protection Foundation are well-known. The main purposes of the activities of these groups are environmental education, environmental awareness building in the community, and the improvement of the citizens' lifestyles.

Next, the access to environmental information and citizen's environmental consciousness and movements are considered. Since 1989, the Chinese government has issued the China Environment Yearbook, and is accumulating information. As information disclosure to the general citizens, the government issues annual environmental performance reports for 600 cities, and daily air pollution level reports in 46 main cities. This data is also reported in newspapers.

The mass media has taken the first steps in reporting recent environmental issues, while environmental educational programs and newspaper reports tend to be increasing. According to a joint inquiry from SEPA and the Education Administration, 79% of the citizens obtained some kind of information about environmental issues through TV or radio programs. In particular, improvement of the environmental consciousness of the citizens in the cities and younger citizens has been observed.[3]

On the other hand, only 8.9% of the people actively deal with environmental problems and 65% of the people do not take any actions for environmental protection or they have a negative impression toward it. Furthermore, in China, since information disclosure and reports are restricted by the government's absolute and unspoken control, it is difficult to say that all information relating to environmental affairs and related judicial trials reaches the citizens.

Even though the citizens have knowledge of environmental issues, the reasons why citizens do not translate the knowledge into action can be understood from the above mentioned situation. However, as discussed in the research results of Kuribayashi and Aoyagi (2002), it is true that the environmental consciousness and the consumption behavior of citizens in urban areas in China are changing. In the future, along with economic growth, it may be possible that the wave of consumer consciousness will be the driving force to raise the voluntary environmental standards of the whole market.

(iii) Impact of the Sino-Japan Friendship Center for Environmental Protection on Capacity Development of the Firms/Citizens

The Sino-Japan Center performs training intended for local NGOs, free of charge or for a very small fee. Also, since the Center became an ISO 14000 certificate authority organization, it is supposed to perform active training regarding environmental management of firms concerned with the environment in the future.

Furthermore, the Sino-Japan Center has published collected papers titled 'The Environment and Sustainable Development' in every year at least since 1998. These papers are produced mainly by the Policy Research Center for Environment and Economy, which is in charge of research and planning for environmental policy in SEPA. The Center has prepared more than 1,000 research papers and many reports for use in policy planning. The center has also established many joint projects together with universities/research organizations at home and abroad. Besides this cooperation with non-government entities, the Sino-Japan Center has prepared environmental education videotapes and brochures, so the impact on the citizens is understood on some level.

As mentioned in (1), the Sino-Japan Center was approved by the government in 2002 as an ISO 14000 certificate authority organization. The relationship with these enterprises will be strengthened through actual actions and training in the future. Since the operating budget of the center has had to be financially self-sufficient up to now, those activities are important to maintain financial support.

(2) Thailand

(i) Role and Capacity Development of Firms

One of the tools for reduction of pollution is the voluntary approach, where the firms/citizens come into play voluntarily to improve environmental issues using market mechanisms. The movements of three voluntary approaches in Thailand are briefly described below.

First, regarding the ISO, the first authentication in Thailand was given in 1996. In 2002, there were 628 groups receiving attestation. Yet, the significance of the current situation regarding environmental management accompanied by ISO 14000 attestation is not sufficiently recognized systematically, and information and technology/management exchanges within/between the organizations are not very active.

EU member nations (especially the U.K.) are in the process of setting a new environmental standard 'site assessment' for foreign trade. Although a little confusion is probably

unavoidable at first, the improvement of the self-management standard accompanied by external expansion of economic activities contributes to improvement of the environmental management capacity of the entire corporate sector. This has become one of the viewpoints for enterprise evaluation by the government/citizens.

Even green label authorization is carried out in the industry of Thailand. The products which have a lesser environmental impact are authorized to use a green label for the purpose of being the standard for consumer's judgment. The Thailand Business Council for Sustainable Development (TBCSD)[4] started to authorize the label in 1993. The TBCSD planned this action with the cooperation of the Thai Industrial Standards Institute and the member enterprises. It was not determined through regulations, but depended on voluntary work by the production divisions. At present, 30 products are receiving label authorization. Yet, only 29 companies of TBCSD are participating. It will be necessary to observe the situation for a while longer to determine whether or not this action will spread to the all manufacturing industries and is acknowledged as the standard of the consumer.

Cleaner production is an effective means to establish an efficient manufacturing process which produces a smaller environmental load. Yet, there are not many cases in Thailand. The following three points are presented as the main reasons for this.

- Since management does not sufficiently understand the necessity for cleaner production, the decision to take action is not easy.

- Even when the decision to take action is decided upon, participation from production divisions is lacking and this makes it difficult to implement proposed actions.

- Technical and management knowledge is not yet established, because cases are few and concrete information is not commonly available.

(ii) The Role and Capacity Development of Citizens

There are many NGOs in Thailand and many organizations are involved in environmental research. The Thailand Environment Institute (TEI), which the Evaluation Team asked for a field survey for this evaluation, is one such environmental NGO.

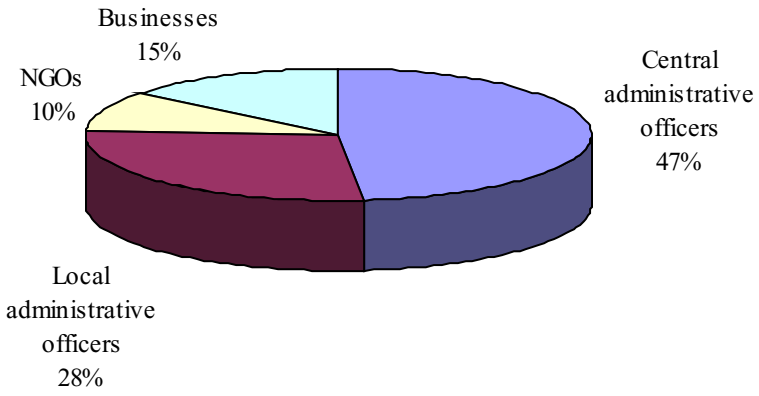
The mutual relationship between individual actors in the SEMS is a very important factor for the development and operation of the system. As civic actions by the consumer influencing the market in Thailand, the following actions are listed:

- Hygienic Meat
- Hazardous-substance-free Vegetable
- No.5 Power Saving Appliances
- Energy Knowledge Campaign

(iii) Impact of the Environmental Research and Training Center (ERTC) on Capacity Development of the Firms/Citizens

The proportions of trainees by category who attended ERTC's training course are shown in Figure 3.8. Central and local administrative officers constituted 75% of the total, yet there is constant participation from businesses and NGOs. Accompanying the reorganization of the central ministries in Oct. 2002, the ERTC is seeking a way to become an independent corporation and the offer of training intended for the non-government sector has become one main source of income. Regarding this point, to some extent the ERTC has experience and can utilize their existing connections to obtain trainees.

Figure 3.8: Categories of trainees who attended the ERTC's training sessions (1992-1996)



Source: JICA (1996)

The ERTC has issued a yearly activity report for the center since 1999, and a general review of the research and training is possible. ERTC has also published 34 academic papers and academy/seminar reports (August 2002). Among these, Japanese specialists/researchers gave support for 13 books, including those prepared after project completion. Some of the reports have appeared in well-known international academic journals (such as *Atmospheric Environment*). Yet, a direct relationship with the general citizen and business sectors has not been observed, so it is not possible to say that this research is contributing to the capacity development of the citizens/firms.

Furthermore, the ERTC is scheduled to acquire the authority for attestation of several ISO items by end of 2003. Depending on the transition to the independent administrative corporation, which is being examined after reorganization of administrations since October 2002, the coordination with firms through consignment research and training will become more important for their independent operation.[5]

(3) Indonesia

(i) Role and Capacity Development of Firms

In the environmental industry, there are many environmental consultation companies related to civil engineering/construction. But regarding consulting software, there are only two foreign capital based companies (American based Core Lab and Australian based ASL). The number of enterprises acquiring ISO numbers has increased rapidly since 2000, and that of 2001 was about 200. The voluntary activity of the industrial circle for the environmental management is not very positive.

(ii) Role and Capacity Development of Citizen

Many NGOs exist in Indonesia. The main environmental NGO is WALHI (Friend of the Earth Indonesia). WALHI is a federation which has many of the environmental NGOs in Indonesia under its wing, and it relates actively to environmental policy through policy proposals.

(iii) Impact of Environmental Management Center on Capacity Development of Firms/Citizens

The EMC has not performed the training intended for firms/citizens. According to an interview in January 2003 of representative Johnny Tjea of the comprehensive environmental division of Core Lab, Core Lab has experience with technical support through seminars and training. Common information about the EMC that was obtained through our interview was as follows: although the analysis technology of the EMC is not bad, regarding its movement, the EMC lacks the mentality to create an impact on the other governmental organizations/enterprises/citizens, while disclosing its achievements outside of the center. This is the main point that differs largely from the Environmental Centers of China, Thailand and Mexico. Although various reasons can be considered as the cause for this, the main reason appears to be that its scope is very narrow and its activity system is estranged from the basic steps of environmental management, which consist of the following steps: finding the issue, investigating the causes, and studying/executing of countermeasures.

Information disclosure on EMC's activities has not yet established since the second phase of the project (DEMS support project) has just started in July 2002. The website and annual report will be available within 2003 (according to a Japanese expert at EMC).

(4) Mexico

(i) Role and Capacity Development of Firms

The individual sections of the chambers of industry, commerce, agriculture, and finance have each established their own environmental section and the main multi-national corporations in Mexico have joined the Business Council for Sustainable Development of Mexico (CESPEDAS). The number of ISO 14000 acquisitions has certainly increased (254 cases in 2001) and voluntary efforts are continuing to be established. Although the environmental industry was delayed in the 1990s, an environmental infrastructure demand of 23 billion dollars (infrastructure investment: 14 billion 500 million, operation expense; 8 billion 600 million) is expected in the next 10 years.[6]

(ii) Role and Capacity Development of Citizens

There are more than 500 environmental NGOs with the central focus of natural environmental conservation and environmental education in Mexico (JICA 2002). They sometimes have a huge influence in the mass media and on their political leaders.

In Mexico City, which experienced serious air pollution in the 1980s, the main pollution levels in the air are published in the newspaper every day and the concern of the mass media/citizens is very high.

(iii) Impact of Environmental Research and Training Center (CENICA) on Capacity Development of Firms/Citizens

CENICA has provided training sessions on harzardous waste management not only to govermental officials but also to people from private enterprises. Some courses are also open for academicians. Three scientific papers are accepted by academic journals (two papers by Atmospheric Environment) and CENICA researchers have given presentations at academic conferences. They provide annual report on their activities and the outline of CENICA is also avaiable at their website.

3.5 Environmental Center Approach and Capacity Development for Environmental Management at the Local Level

From the viewpoint of the administrative sectors, the local capacity for environmental management in developing countries varies largely depending on the country, because of their backgrounds and the degrees of decentralization of authority and other regional characteristics. For example, in China, the nation's land area is vast and the history of local administrations is long. The local governments supervise the concrete implementations of the environmental administration, such as regulation enforcement. Even though the decisive power for the main policies belongs to the central government, local governments are able to independently set up severe environmental standards (Environmental Protection Law in 1989). So the capacity for environmental management resides, to some extent, at the level of local government. On the other hand, there are big regional differences in the capacity for environmental management depending on regional characteristics and economic advantages. In Thailand and Indonesia, as mentioned in Chapter 2, large scale decentralization has begun since 2000. However, the question remains whether or not decentralization is sufficient regarding the technical/institutional capacity for environmental administration at the local government

environmental offices. Especially in Indonesia, a nationwide monitoring network has not yet been built. While decentralization is progressing rapidly, it will require time to prepare the system for maintenance/accumulation of basic information that the central Ministry of Environment should comprehend. Also, the training for capacity development of the local government administrative officers is becoming more important.

3.5.1 Impact of the Environmental Center on the Social Capacity Development for Environmental Management at the Local Level

The Sino-Japan Center has carried out training intended for the local environmental administration bureau directors or staff and has become the representative organization for the training of environmental administrative officers and the government technology agency, including local representatives. The Center connects on line to the local monitoring station and data is being exchanged. Through the system of operation of the environmental network connecting 100 cities with the main server located in the Center, upgrading of local monitoring data in the central core is becoming easier, which will help strengthen the relationship between the central and local levels.

Under restrictions from the executive level of government, the ERTC in Thailand has performed some research of environmental issues. The research results from the ERTC did not accomplish a direct contribution to the improvement of environmental management at the local level, although correspondence from the central government, which tries to solve local environmental problems, is sent to the local level. Regarding training, the number of trainees was 5,027 (not including the mobile training) during the 10 years after the ERTC opened in 1992. Since approximately 35% of the attendees are local public service workers, the ERTC is able to be evaluated highly as having an impact on the local level. Accompany the decentralization since 2000, the need to train local public workers in such areas as the planning capacity improvement course for prefectural environmental management has risen.

The EMC in Indonesia has surveyed the actual conditions of river pollution at the request of the local authorities. However, the survey results did not always satisfy the client. Also, the knowledge of how to do the monitoring did not spread to the local staff through the survey. Although the EMC has performed interior and exterior training intended for local staff (412 attendees from 1994-1999), the scale is smaller compared to that of Thailand. Listed among the reasons for this are the scope of the function/authority of the EMC itself and competition with other public/private laboratories. Even in Indonesia, along with decentralization, the need for

training directed at local staff is increasing. However, the local authorities perform training independently. Furthermore, the training intended for local staff is under the jurisdiction of another department of the Ministry of Environment. Therefore, it is necessary to watch the situation for a while longer to see how the EMC can contribute to local environmental management in the future. In the project for the development of capacity for local environmental management (started in July 2002), the EMC has selected Medan in North Sumatra as its target area for support. But practically this project is a kind of second phase for the EMC itself. In addition, Medan is an area which has particular circumstances.[7] Therefore, some more time is necessary to see how EMC's input to Medan fit its purpose for the improvement of local environmental management.

Regarding CENICA in Mexico, since its training is intended mainly for administrative officers or government technology agencies in metropolitan Mexico, its general impact on the capacity for local environmental management is small.

3.6 Environmental Center Approach and the Mutual Understanding/Exchange between Japan and the Developing Countries

In this section, concerning the overall effect of the Environmental Centers, the following items will be discussed with examples given: the actor's positive involvement in the SEMS in both Japan, from the input-side, and the counterpart countries; the actions taken for improvement of the social capacity; and the development of mutual cooperative networks between recipient Environmental Centers, including South-South cooperation.

3.6.1 Environmental Cooperation Network between Government/Firms/ Citizens

China is presented here as an model for the development of a two-way environmental cooperation network with Japan. Since its inception, the Sino-Japan Center has been aiming at and performing in practice the role of a window on environmental cooperation between Japan and China. Many Japanese, not only from the aid-supplying organizations but also research organizations such as universities, private firms and local authorities, have visited the Environmental Center. Many domestic/international conferences have been held and information regarding environmental issues in China and information regarding Japan-China environmental protection cooperation has accumulated. As a result of requests for such

information, human exchanges and the human network are expanding. The Environmental Center can be called a good example of the effect, not only of environmental cooperation, but also international cooperation by Japan. However, as mentioned later in this report there are tasks, that need future attention, such as the construction of a network for coordination with other styles of aid and also the accumulation of information that is aimed at creating a closer link between Japan-China environmental businesses.

In the Environmental Centers in Mexico and Thailand there are several cases of research exchanges with Japan. The voluntary movement to expand the network begins with those reports.

3.6.2 Mutual Cooperative Network between the Environmental Centers in the Recipient Countries

CENICA in Mexico established a mutual cooperation agreement with CENMA, the Environmental Center in Chile, and has a plan to hold an international conference every other year (the first conference is to be hold in 2003). This arrangement was formed through the intermediation of the South American secretariat (CEPIS) of the World Health Organization (WHO). This sort of cooperation is beneficial for sharing information and clarification of the roles of the Environmental Centers in neighboring countries. The idea of coordination between the Environmental Centers in the same area should be introduced at the time of initiation of these Centers. JICA was not actively involved in the stage when the accord between the countries was agreed upon in the case of the CENICA-CENMA agreement. When the strategy of aid from Japan is considered from the viewpoint of the environmental sector or country/area, it is necessary to examine mid-to-long term development and effective utilization of the Japanese side's expertise, as the input side, in the stages of planning and enforcement, especially regarding projects which have similar purpose/structure.

At the present time, in the East and Southeast Asian areas where there are three Environmental Centers, there is an on-going operation called the Acid Deposition Monitoring Network in East Asia (EANET) which is advanced by the leadership of Japan. At the first government-to-government meeting in March, 1998, it was decided that the participation of ten countries from East Asia would be approved for trial operations (substantial operations started in January 2001).[8] Among the three Environmental Centers, the Sino-Japan Center and the Indonesian EMC became a participant organization. Any situation where the Environmental Centers can mutually exchange information by other methods is beneficial for managing the

Environmental Centers. The mutual exchange of information is also important in forming Japan's aid network. Thailand is included among the EANET participating nations with the PCD (Pollution Control Department) acting as its window into the project. Although the ERTC has done acid rain research and also participated unofficially in the PCD acid rain monitoring program, it has not officially been assigned a position in the project. Concerning the positioning of the Environmental Centers which Japan has supported to this point, there may be a necessity for further discussions.

<Notes>

1 According to the JICA project evaluation guidelines (2002), the word 'effectiveness' in the five DAC criteria at the project level was changed to the former definition which this report presented for the program evaluation.

2 This survey was requested by JBIC to the research center at Tsinghua University in order to seek the possibility of business support at the grass roots level. The society includes many private nonprofit organizations. The main groups among them are three social organizations, civilian non-enterprise units, and grass-roots organizations. The civilian non-enterprise units means those organizations which perform nonprofit society service activities using non-government funds and are registered in accordance with the civilian non-enterprise unit registration ordinance.

3 The reasons why the environmental consciousness of people in urban areas is higher in comparison with that of the business areas is conceivably related to the difference in the amount of information, the difference in the quality of environmental issues, and the difference of income/education standards. Even in the realm of city-to-city comparison, there is a difference in environmental consciousness. For example, according to the results of a questionnaire by Cheng (in 2002) regarding the importance of environmental protection, 80% of Beijing citizens replied 'very important, while Shanghai citizens were at 53%. This difference must be related to the serious environmental problems in Beijing, such as the yellow sand and automobile air pollution.

4 The TBSCD is Thai organization of the World Business Council for Sustainable Development (WBSCD), which was proposed at the Rio Summit in 1992. The office is located in the Thailand Environment Institute.

5 This is a quote from the interview with the Director of ERTC, Dr.Yuwaree In-na in a field survey in August 2002.

6 The breakdown of capital investment for infrastructure is as follows; the largest is US$5,550 million for urban waste water treatment; US$3,370 million for general waste disposal; US$2,000 million for industrial waste disposal; and US$370 million is expected for the facilities for air pollution reduction.

7 After the Decentralization Act in 1999, there has been a movement to restructure the authority for local monitoring that had been dispersed to offices other than the Ministry of the Environment (MOE). Yet coordination was to be integrated by MOE. The adjustment is tough since the local governments have the right to decide which ministry the authority should be handed over to. Within these circumstances, Medan is the only local area to hand over the authority of monitoring to MOE. (in August 2002)

8 The participating countries are China, Indonesia, Japan, Malaysia, Mongolia, the Philippines, Korea, Russia, Thailand and Vietnam. See the detailed information about EANET on the Acid Rain Research Center's home page. http://adoroc.gr.jp/jpn/index.html

CHAPTER 4

Further Development of the Environmental Center Approach and Environmental Cooperation: Lessons and Recommendations

This chapter summarizes the previous two chapters and presents lessons and recommendations for further development of the Environmental Center approach, both existing and to-be-established cases, and environmental cooperation.

Recommendations presented in this chapter can be regarded at two different levels. One is for JICA and other relevant agencies that are directly involved in the implementation of Environmental Center projects and other environmental cooperation projects (4.1, 4.2, 4.3). Section 4.1 presents recommendations from the viewpoint of the development of social capacity for environmental management (SCEM), which has been taken as a principal analysis methodology in this study. Section 4.2 suggests Environmental Center's roles in transforming Japan's cooperation from a vertical relationship to a horizontal one, building partnerships between Japan and developing countries. Section 4.3 introduces some cases of partnerships among the Environmental Centers and presents future directions for Japan's environmental cooperation and Environmental Centers in this regard.

Another level of recommendations is presented for wider or higher-level stakeholders in terms of the development of SCEM in developing countries and also the improvement of Japan's international environmental cooperation system (4.4). This involves overall decision-making for Japan's international cooperation with, not only governmental offices, such as the Ministry of Foreign Affaires, but also external organizations, such as universities, research institutes and other private sector enterprises, being expected to join these kinds of discussions. This level of recommendations may not be achieved only by JICA, but they should seek for stronger coordination with these external actors in international cooperation in the long run.

4.1 Environmental Centers: Contributing to the Social Capacity Development for Environmental Management in Developing Countries

(1) Administrative Status of the Environmental Center and Contribution to Social Capacity Development

As discussed in Chapter 3, the Environmental Centers have contributed to the technical side of capacity development, such as environmental monitoring and data analysis, but were not necessarily regarded in the right position in the environmental administration, which caused some limitations in the Environmental Centers' contribution to policy or the social side of capacity development for environmental management. Moreover, the contribution to social capacity development in the firms and citizen sectors is mostly limited to providing training courses and environmental information in some Environmental Centers.

In order to find the future direction for the existing Environmental Centers and the development of new Centers, it is important to make clear what kind of position and role the Environmental Centers are given in social capacity development for environmental management. Especially, the scope of functions and administrative position of Environmental Centers in the government should be properly defined. In establishing new Environmental Centers, the first important thing is to place the Center in the right position so that it can have an impact on environmental policy.

As in the cases of Thailand and Indonesia, administrative structures are often dramatically reorganized through socio-economic development in the society. A donor country should recognize in preliminary surveys this possibility and conditions and agree that an Environmental Center should not support a specific technical part of environmental administration, but should be part of an overall environmental policy-making system. In this regard, this study's three stage model (system-making, system-working and self-management stages) and entry and exit points for Environmental Centers are helpful in project planning.

(2) Environmental Center's Contribution to Firms and Citizens

The Environmental Center's contribution to firms and citizens is very difference in each case, i.e., a full-set type of project in China and an issue-specified type of project in Mexico. But it is true that Environmental Centers can contribute substantially in building partnerships between firms and citizens and helping maximize the actors' capacities. The contribution can be made in the form of basic functions, such as providing environmental information and environmental

education, and also higher level functions, such as environmental expert training in the firms and citizen sectors. Since the existing Environmental Centers already have ten years of experience and they are now in the self-support period as an organization, and especially since there are discussions in their countries of making the Centers independent agencies, a stronger channel between firms and citizens will be important for the future role of Environmental Centers.

(3) Environmental Centers in Decentralization

Decentralization is one of the key issues in the development of SEMS and international cooperation. To date the Sino-Japan Center and the Thailand's ERTC have provided many training courses to environmental administration staff in local governments. Indonesia's EMC has also implemented training courses for local government staff as needed. It is expected that more need for training courses for local actors (government/firms/NGOs and universities) will appear to the Environmental Centers.

Each country is in a different situation: Indonesia is experiencing dramatic decentralization; Thailand is slowly moving toward full decentralization; China has originally given more authority to local governments, and Mexico has a federal system, but it is obvious that social capacity development for environmental management at the local level is becoming more and more important. It is also true that most of the local cities, except major ones, have not obtained enough social capacity and have some problems in environmental management. Environmental Centers, as a national center, should strengthen their function in supporting local environmental laboratories and Environmental Centers. The two cases of the Sino-Japan Center (support for local environmental protection bureaus and environmental research centers) and Indonesia's EMC (support for a decentralized environmental management system) may be good models of support for decentralization in environmental management.

(4) Further Quality Improvement of Environmental Centers

As mentioned above, it is imperative for the Environmental Centers to improve their staff member's capacity for contribution to the development of SCEM. Although pieces of important research have been done in the Environmental Centers, in terms of doctoral degrees, there are only 16 in China (about 20% of the total number of researchers in the Center), five in Thailand (about 10%) and none in Indonesia. They do not need to match the case of developed countries

(about 90% of researchers at Japan's National Institute of Environmental Studies are doctoral degree holders), but in order to become a leading research center for environmental studies in and outside of the country, at least one third to one half of the researchers should hold a doctoral degrees and efforts to increase the number of research workers who have a degree is necessary. Japan's study support schemes, such as Japanese government scholarships, the international student grant aid system, JICAs long-term training course, and JBICs two-step loans can be utilized in supporting Environmental Center researchers to obtain Ph.D. degrees in Japan. This is also good in terms of building human resource development and network development between Japan and developing countries. Moreover, it is also important to locate local policy analysis experts in Environmental Centers to lend substantial influence on environmental policy.

4.2 Environmental Partnerships between Japan and Developing Countries through Environmental Centers

Environmental Centers do not only visually exist, but have built human trust, or social capital between Japan and developing countries and within the country. Japan should utilize this physical and social capital (Coleman 1988 and Putnam 1993, etc.) and develop further trust relationships and environmental partnerships with developing countries in the three actors of government, firms and citizens, and also at the national and local levels. Sometimes Environmental Centers have difficulties in transforming experiences in the Center to common knowledge for the country. Various transformation channels are beneficial for the development of environmental research both in Japan and in developing countries.

The Sino-Japan Center is currently working as a kind of liaison organization of Japan-China environmental cooperation for firms and citizens, as well as, the government. Many researchers from Japanese universities have visited the Center for research exchanges. This function not only provides Japanese tax payers with information about the Center, but also has some impact on people in China to make them aware of Japan's assistance for environmental management in their country. Also, active non-ODA research exchanges can be a good stimulation or inspiration to Chinese counterparts.

This kind of information and research exchange will upgrade the ODA-based vertical cooperation relations to non-ODA horizontal relations.

4.3 Partnerships among Environmental Centers

Experience exchange and joint research among Environmental Centers is very important to capacity development and the establishment of new Environmental Centers. There are several cases in existing Centers. Mexico's Environmental Center CENICA and Chile's CENMA concluded an environmental cooperation agreement and are now planning an international conference. The Sino-Japan Center and Indonesia EMC currently have joined the Acid Deposition Monitoring Network in East Asia (EANET) and Thailand's ERTC may also become a member of the organization in the future.

As of March 2003, there are three centers in East Asia, two in Latin America, one in the Middle East and Africa, and these centers can work more effectively in the framework of regional partnerships. One way of building regional partnerships would be for JICA to set up a training program for Asian Environmental Center countries and other possible countries for the project of promoting experience exchanges and policy-making capacity.

South-South cooperation is also a key issue for a new direction for Environmental Centers. Mexico's CENICA conducted a training course for environmental officials from surrounding countries in January to February 2003, and the Sino-Japan Center is to implement a similar course for Asian countries. Thailand's ERTC has a similar plan. Environmental Center-based South-South cooperation contributes to the Center's capacity development and it can be one of the processes where recipient countries become emerging donors and independent from ODA.

South-South cooperation, however, sometimes is not successful since it largely depends on government policy. Mexico's South-South cooperation policy is substantially declining since the Fox Administration (2000-). It is good, in Mexico's case, that CENICA recognizes training needs from surrounding countries, such as Peru, and will continue to be involved in South-South cooperation regardless of policy decline. A strong plan and framework should be established in the earlier phases of the Environmental Center.

4.4 Japan's Environmental Cooperation in the Future

(1) Assistance Programs and Coordination

Japan's environmental cooperation needs to establish programs for capacity development for the environmental field as a whole, or for social capacity development of environmental management. Several program schemes, such as Country Assistance Plan and Country Assistance Implementation Plan, have been made, but assistance programs in the environmental field have not been established well enough. Current environmental programs are actually

project-based without a clear definition and methodology for the program. Furthermore, necessary surveys are not implemented for causes and effects of environmental problems and their background and development standards, stages and characteristics for SCEM. The following three levels of viewpoints are important in developing environmental cooperation programs: (1) the coordination between brown and green issues, (2) the linkage between brown and green environmental programs and global environmental issues, (3) the coordination between environmental programs and other major issues. As for the third point, the linkage with poverty is especially important to break the vicious circle of poverty and environment degradation as seen in the World Bank's Poverty Reduction Strategy Papers (PRSPs) and the United Nation's Millennium Development Goals (MDGs).

One of the most basic and important viewpoints in environmental cooperation programs is to coordinate brown and green environmental issues. There is one discussion which suggests that ODA should focus on green issues as developing countries obtain the technical and financial capacity to deal with brown issues through economic growth. This kind of discussion on resource allocation is important, but it is more important to establish a comprehensive environmental cooperation program which takes into consideration the interrelationships between brown and green issues.

From this point of view and from the viewpoint of the coordination of issue-specific projects and institutional building programs, environmental programs in major countries such as China, Thailand and Indonesia are not well designed. It is necessary to develop environmental programs in the framework of social capacity development for environmental management based on the linkage and coordination between pollution control (brown issues) and forest conservation (green issues) and also with global environmental issues, such as global warming, desertification, and biodiversity conservation. Especially, a provoking cooperation approach for global warming, Clean Development Mechanism (CDM) which aims at environmental problem solution and CO_2 emission reduction, which includes both brown issues, such as efficient power generation, and green issues, such as afforestation, is necessary. Promoting this kind of mechanism is good for both developing countries and Japan, and ODA should also be concerned with this issue, even though there are several critical conditions for implementation.

(2) Economic Globalization and Environmental Cooperation

Economic and environmental globalization should be taken into consideration in making a fundamental framework of international relations and environmental cooperation. Now,

globalization has direct effects on domestic issues, such as trade and economy, poverty, and environment, which also affect each other. Besides the fact that the World Trade Organization discusses the effects of trade on environment, it is also an effective way to include environmental factors, like the establishment of an environmental committee, environmental cooperation, and original environmental standards, in bilateral or multilateral free trade agreements. The North American Free Trade Agreement is one example and it put positive pressure on Mexico to adopt higher standards of environmental management to join the Agreement. Japan has concluded a free trade agreement with Singapore and is now under negotiations with Mexico and ASEAN.

Involving environmental issues, including cooperation principles into economic agreements, helps both Japan and partner countries integrate the issues of trade and economy, environment and other relevant issues.

(3) Assistance Supply System and Impacts of Environmental Cooperation

In order to achieve the future directions proposed above, Japan's assistance supply system needs to be substantially innovated.

Japan's environmental cooperation has provided expert knowledge and human resources mostly from the Ministry of the Environment and other central and local government organizations. Recent administration reorganization and financial restructuring, however, creates some difficulties for this cooperation system both at the central and local levels.

Moreover, only providing experts from the government sector is not sufficient for social capacity development for environmental management in developing countries. Japan should promote more technology, knowledge and experts from the private sector (firms and citizens). In this regard, high level expert training at graduate schools for international cooperation or environmental studies should be emphasized more. The academic societies, such as the Japan Society for International Development (JASID), should play an important role in proposing and implementing human resource development in this field.

References

CHAPTER 1

Bai and Imura. 2000. “A Comparative Study of Urban Environment in East Asia: Stage Model of Urban Environmental Evolution.” International Review for Environmental Strategies. Vol.1. No.1. pp. 135-158.

DAC. 2001. Net ODA Flows (in current U.S. dollars) from 1950 to 1999. OECD. http://www1.oecd.org/dac/htm/dacstats.htm (March 30, 2002).

Honda, Naoko. 2003. “Evaluating Social Capacity Development for Environmental Management in Developing Countries.” Matsuoka, Shunji and Kuchiki, Akifumi (eds.) Social Capacity Development for Environmental Management in Asia: Japan’s Environmental Cooperation after Johannesburg Summit 2002. Institute of Developing Economies (forthcoming).

JICA. The Second Report of the Assistance Study Group (Environment). 2001 (in Japanese).

JICA. The Report of the Assistance Study Group (Environment). 1998 (in Japanese).

Ministry of the Environment. 2001. The Evaluation Method Research on Environmental Cooperation Project 2000 (in Japanese).

Matsuoka, Shunji. 2000. “A Comparative Study on Social Capacity Development for Environmental Management in East Asia.” View toward East Asia. Autumn Issue. pp.76-231 (in Japanese).

Matsuoka, Shunji. 2003a. “Social Capacity Development for Environmental Management: International Cooperation toward Social Capacity Development for Environmental Management.” Proceedings of International Workshop on Social Capacity Development for Environmental Management and International Cooperation in Asia (January 27 and 29 in Hiroshima and Tokyo). pp.3-33.

Matsuoka, Shunji. 2003b. “Social Capacity Development for Environmental Management.” Matsuoka, Shunji and Kuchiki, Akifumi (eds.) Social Capacity Development for Environmental Management in Asia: Japan’s Environmental Cooperation after Johannesburg Summit 2002. Institute of Developing Economies (forthcoming).

Matsuoka, Shunji and Honda, Naoko. 2002. “Environmental Cooperation and Capacity Development: Review of the Concept of Capacity Development in Environment.” Journal of International Development Studies. Vol.11. No.2. pp.149-172 (in Japanese).

Matsuoka, Shunji, Matsuoka, Reishi, and Kochi, Ikuho. 1998. “Economic Growth and Environmental Issues in Developing Countries: Verification of Environmental Kuznets Curve.” Environmental Science. Vol.11. No.4. pp.349-362 (in Japanese).

Ministry of Foreign Affaires, each year, Japan’s Official Development Assistance (ODA White Paper).

OECD-DAC. 2002. http://www.oecd.org/EN/home/0,,EN-home-notheme-2-no-no--no,00.html (March 31, 2002).

United Nations Conference on Trade and Development (UNCTAD). 2002. http://stats.unctad.org/fdi/eng/ReportFolders/Rfview/Explorerp.asp?CS_referer= (August 12, 2002).

CHAPTER 2

ADB. 2001. “Thailand: Country Environmental Policy Integration Analysis Report, ADB document.” http://www.adb.org/environment/aeo/pub/documents/thailand.doc (January 19, 2003).
Aoki, Masahiko. 2001. Toward a Comparative Institutional Analysis. NTT Press (in Japanese).
Aoki, Masahiko. 2001. Toward a Comparative Institutional Analysis. MIT Press: Massachusetts.
Aoki, Masahiko and Okuno (Fujiwara) Masahiro (eds.) 1996. A Comparative Institutional Analysis of Economic Systems. Tokyo University Press (in Japanese).
Bangkok Metropolitan Administration. 2001. Bangkok State of the Environment 2001.
Boesen, Jannik and Lafontaine, Alain. 1998. “The Planning and Monitoring of Capacity Development in Environment Initiatives.” CIDA. http://www.acdi-cida.gc.ca/INET/IMAGES.NSF/vLUImages/CapacityDevelopment/$file/Alain Finalm&e-E.PDF (April 4, 2002).
China Environmental Protection Network, www.zhb.gov.cn (January 19, 2003).
China Environment Yearbook. all issues.
The CIA. http://www.odci.gov/cia/publications/factbook/ (January 19, 2003).
Coleman, James, S. 1988, “Social Capital in the Creation of Human Capital.” American Journal of Sociology. Vol.94. pp.S95-S120.
Cuidad de Mexico. 1999. Towards An Air Quality Program for the Decade 2001-2010: For the Metropolitan Zone of the Mexico Valley.
DOE, MOSTE. issues in 1990-1997. Environmental Quality Report.
EEA. 1999. “Indicators for Decision-Making.” http://esl.jrc.it/envind/idm/idm_e_.htm (January 15, 2003).
ESCAP. 2002. “Environmental Governance for Sustainable Development in Asia and the Pacific.” http://www.unescap.org/enrd/environment/publications/sdap/sdap.pdf (January 19, 2003).
Environmental Law Institute. 1996. “Decentralization of Environmental Protection in Mexico: An Overview of State and Local Institutions.” ELI, Washington, DC. www.eli.org/research (July 3, 2002).
Geng, Shun and Duan, Kuang [1993] “Environmental Laws and Administration in China”, Nomura, Yoshihiro and Sakumoto, Naoyuki (eds.) Environmental Laws in Developing Countries: East Asia, Institute of Developing Economies.
Global Environmental Forum. 1996. Survey Report on Environmental Awareness and Actions of Overseas Japanese Enterprises. http://www.env.go.jp/earth/coop/oemjc/h7.htm (March 31, 2002).
Guigale, Marcelo M, Lafourcade, Olivier and Nguyen, Vinh (Eds.). 2001. Mexico: A Comprehensive Development Agenda for the New Era. Washington, DC: World Bank.
Hag, G., Han, W. J. and Kim, C. 2002. “Urban Air Pollution Management and Practice in Major and Mega Cities of Asia (Prepared a published in the framework of the APMA Project). Korea Environmental Institute. www.asiairnet.org (February 22, 2003).
Harashima, Yohei and Morita, Tsuneyuki. 1998. “A Comparative Study on Environmental Policy Development Processes in the Three East Asian Countries: Japan, Korea, and China.” Environmental Economics and Policy Studies. Vol.1. pp. 39-67.
Harashima, Yohei and Morita, Tsuneyuki. 1995. “A Comparative Study on Environmental Policy Development Process in East Asian Countries.” Planning Administration. Vol.18. No.3. (in Japanese).
IGES. 2001. Environmental Governance in Asia: Synthesis Report on Community Studies. Kanagawa: IGES. 596p.
IISD. http://www.iisd.org/default.asp (December 21, 2002).
Imura, Hidefumi and Kobayashi, Shuhei. 1999. “A Historical Review of Environmental Issues in East Asia: Comparison of Japan, Korea and China.” Imura, Hidefumi et al. “Urbanization and

Environmental Issues in East Asia: Effectiveness and Applicability of Kitakyushu Model." Vision Toward East Asia. Spring Issue, pp.98-110 (in Japanese).
Imura, Hidefumi and Matsuoka, Shunji [2002] Social Capacity Development for Environmental Management in China and the Role of Sino-Japan Friendship Center for Environmental Protection, China-Japan Environmental Forum (October 8 and 9, 2002), (in Japanese and Chinese).
Janetti-Diaz, Maria Emilia et al. 1995. National Environmental Policy and Programs in Mexico in Dwivedi, O.P. and Vajpeyi, Dhirendra (eds), Environmental Policies in the Third World: A Comparative Analysis. Westport CT, USA: Greenwood Press.
Katsuhara, Ken. 2000. "Kitakyushu Model for Overcoming Industrial Pollution and its Applicability in Developing Countries." Imura, Hidefumi et al. "Urbanization and Environmental Issues in East Asia: Effectiveness and Applicability of Kitakyushu Model.",Vision Toward East Asia. Autumn Issue. pp.45-58 (in Japanese).
Li, Zhidong. 1999. China's Environmental Protection System. Toyo Economic Publisher (in Japanese).
Matsuoka, Shunji. 2002. "International Capital Flows and Environmental Issues in Developing Countries: Sustainable Development, Foreign Direct Investment and Official Development Assistance." Morita, Tsuneyuki and Amano, Akihiro (eds.) Global Environmental Issues and Global Community. Iwanami Shoten. pp.125-155 (in Japanese).
Matsuoka, Shunji. 2000. "Environmental Policy in the Developing Countries: Instruments and Efficiency of Regulations." Journal of International Development Studies. Vol.9. No.2. pp. 17-37.
Matsuoka, Shunji et al. 2000. "A Comparative Study on Social Capacity Development for Environmental Management in East Asia." View toward East Asia. Autumn Issue. pp.76-231 (in Japanese).
Matsuoka, Shunji and Honda, Naoko. 2002. "Environmental Cooperation and Capacity Development: Review of the Concept of Capacity Development in Environment." Journal of International Development Studies. Vol.11. No.2. pp.149-172 (in Japanese).
Munoz, Carlos Pina. 1997. Green Plans for Developing Countries, Resource Renewal Institute.
Nelson, Richard. 1994. "The Co-evolution of Technology, Industrial Structure, and Supporting Institutions." Industrial and Corporate Change. Vol.3. pp.47-63.
Nicro, S. and Apikul, C. 1999. "Environmental Governance in Thailand," in Harashima, Y. (ed.) Environmental Governance in Four Asian Countries, Kanagawa, Japan: IGES.
North, C. Douglass. 1990. Institutions, Institutional Change and Economic Performance. New York: Cambridge University Press.
O'Conner, D. 1994. "Managing The Environment With Rapid Industrialization Lessons From The East Asian Experience." Development Center of the OECD, Paris.
www.cia.gov/cia/publications/factbook/geos/th.html (December 10, 2003).
Overseas Environmental Cooperation Center (OECC). 2001. Survey Report on Present Situations and Issues of Administration of Environmental Monitoring in Indonesia (in Japanese and English).
OECD. 2002. Governance for Sustainable Development: Five OECD Case Studies. Paris: OECD. 348p.
OECD. 2001. OECD Environmental Indicators: Towards Sustainable Development. Paris: OECD. 155p.
OECD. 2001. The Well-being of Nations: The Role of Human and Social Capital. Paris: OECD. 118p.
OECD. 1998. Environmental Performance Reviews: Mexico. Paris: OECD.
Ogano, Shoichi. 1994. "Environmental Laws and Administration in Thailand, " in Nomura,

Yoshihiro and Sakumoto, Naoyuki (eds.) Environmental Laws in Developing Countries: Southeast
and South Asia, IDE.
PCD, MOSTE. 1996. Pollution Thailand 1995.
Putnam, Robert. 1993. Making Democracy Work. Princeton: Princeton University Press.
Sawazu, Naoya. 2002. Economic Evaluaion of China's Environmental Policy. Master Thesis. Graduate School for International Development and Cooperation. Hiroshima University (July 2002) (in Japanese).
Secretaria de Medio Ambiente, Gobierno del Distrito Federal. 2002. Programa para Majorar la Calidad del Aire de la Zona Metropolitana del Valle de Mexico 2002-2010.
Streets et al. 2000. "Sulfur dioxide emissions in Asia in the period 1985-1997." Atmospheric Environment. Vol. 34. pp. 4413-4424.
UNCSD. 2001. "Indicators of Sustainable Development: Guidelines and Methodologies." http://www.un.org/esa/sustdev/natlinfo/indicators/indisd/indisd-mg2001.pdf (December 8, 2002)
UNDP. 2002. Human Development Report 2002: Deepening Democracy in a Fragmented World. New York: Oxford University Press.
UNEP & WHO. 1996. Air Quality Management and Assessment Capability in 20 Major Cities, MARC (the Monitoring and Assessment Research Center). London.
Weidner, H. and Janicke, M. (eds.). 2002. Capacity Building in National Environmental Policy: A Comparative Study of 17 Countries. Berlin: Springer.
World Bank. 2003a. "Social Capital Home." http://www.worldbank.org/poverty/scapital/ (January 19, 2003).
World Bank. 2003b. "WBI Programs: Environmental Governance." http://www.worldbank.org/wbi/sdenvgovernance/ (January 10).
World Bank. 2002. World Development Indicator. Washington, DC.
World Bank. 2001. Mexico: Country Assistance Evaluation, Report No. 22498. Washington, DC: World Bank.
World Bank. 2000. Greening Industry: New Roles for Communities, Markets, and Governments, A World Bank Policy Research Report. New York: Oxford University Press.
World Bank. 1997. Urban Air Quality Management Strategy in Asia, Jakarta Report.
http://www.worldbank.org/wbi/sdenvgovernance/ (January 19, 2003).
World Economic Forum. 2002. "2002 Environmental Sustainability Index." http://www.ciesin.columbia.edu/indicators/ESI/ESI2002_21MAR02tot.pdf (December 8, 2002).
WRI. 2002. "Closing the Gap: Information, Participation and Justice in Decision-making for the Environment." http://www.accessinitiative.org (January 19, 2003).
WRI. World Resources. Issued every two years. Washington, D.C.: WRI.

CHAPTER 3

Imura, Hidefumi and Matsuoka, Shunji [2002] Social Capacity Development for Environmental Management in China and the Role of Sino-Japan Friendship Center for Environmental Protection, China-Japan Environmental Forum (October 8 and 9, 2002), (in Japanese and Chinese).
ISO. 2002. "The ISO Survey of ISO 9000 and ISO 14000 Certificates: Eleventh Cycle (up to and including 31 December 2001)."
http://www.iso.ch/iso/en/prods-services/otherpubs/pdf/survey11thcycle.pdf (February 15, 2003).

JICA. 2002. Project Evaluation Guideline (in Japanese).
JICA. 1999. Survey Report on Environmental Information in Mexico (in Japanese).
Kuribayashi, Atsuko and Aoyagi, Midori. 2002. “Green Consumer Prospect in China: Do Chinese Follow Japanese?” Proceedings of the Annual Conference of Society of Environmental Economics and Policy Studies 2002. pp.74-75 (in Japanese).
Matsuoka, Shunji. 2002. “International Capital Flows and Environmental Issues in Developing Countries: Sustainable Development, Foreign Direct Investment and Official Development Assistance.” Morita, Tsuneyuki and Amano, Akihiro (eds.) Global Environmental Issues and Global Community. Iwanami Shoten. pp.125-155 (in Japanese).
Matsuoka, Shunji and Honda, Naoko. 2001. “ODA Project Evaluation and the OECD-DAC’s Five Criteria.” Journal of International Development Studies. pp.49-70 (in Japanese).
NGO Research Center of School of Public Policy and Management, Tshinghua University. 2002. Future Partnership between Local Civil Society Organizations and Japan Bank for International Cooperation in the People’s Republic of China. Beijing.
Zheng, Yuejun. 2002. “Comparative Studies on Attitudes toward Environmental Issues in China and Japan.” Proceedings of the Annual Conference of Society of Environmental Economics and Policy Studies 2002. pp.72-73 (in Japanese).

CHAPTER 4

Coleman, James, S. 1988, “Social Capital in the Creation of Human Capital.” American Journal of Sociology. Vol.94. pp.S95-S120.
Putnam, Robert. 1993. Making Democracy Work. Princeton: Princeton University Press.

Activity Record

2001	
December	1st Preliminary Meeting for Study Committee (Dec. 02)
	2nd Preliminary Meeting for Study Committee (Dec. 25)
2002	
January	1st Study Committee * (Jan. 29)
February	2nd Study Committee * (Feb. 20)
March	3rd Study Committee * (Mar. 04)
	4th Study Committee * (Mar. 20)
April	Contract with JICA (Evaluation Team on Environmental Cooperation, JASID established)
May	Domestic interview survey (Long-term experts to Thailand and China) (May 16, 17)
	1st Meeting of Evaluation Team on Environmental Cooperation * (May 22)
	Preliminary survey to China (May 29-June 01)
June	Domestic interview survey (Long-term experts to Thailand, Indonesia and Mexico, etc.) (June 13, 14)
	Domestic interview survey (Environmental Bureau, Hiroshima City) (June 18)
	2nd Meeting of Evaluation Team on Environmental Cooperation (June 28)
July	Main survey to China (July 03-13)
	3rd Meeting of Evaluation Team on Environmental Cooperation * (July 19)
August	Main survey to Indonesia and Thailand (Aug. 04-23)
September	Main survey to Mexico (Sep. 08-15)
	4th Meeting of Evaluation Team on Environmental Cooperation (Sep. 30)
October	Domestic interview survey (Support Committee for China's Environmental Center Project) (Oct. 22)
	Domestic interview survey (Long-term experts to Chile and Egypt) (Oct. 24)
	5th Meeting of Evaluation Team on Environmental Cooperation * (Oct. 31)
	Domestic interview survey (the Ministry of Economy, Trade and Industry) (Oct. 31)
November	Survey to China (Nov.14-18)
December	6th Meeting of Evaluation Team on Environmental Cooperation (Dec. 16)
2003	
January	Follow-up survey to China (Jan. 05-07)
	Follow-up survey to Indonesia and Thailand (Jan. 12-16)
	7th Meeting of Evaluation Team on Environmental Cooperation (Jan. 20)
February	Follow-up survey to Mexico (Feb. 05-09)
March	8th Meeting of Evaluation Team on Environmental Cooperation * (Mar. 04)

Note: Observers from related agencies joined committees and meetings with <*>.