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# Social Capacity Development for Environmental Management in Asian Countries

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## 1. Social Capacity for Environmental Management and Social Environmental Management System

This study aims to develop the framework of environmental cooperation by analyzing the society's development based on the concept of Social Capacity for Environmental Management (SCEM) and Social Environmental Management System (SEMS). The focus is put on Environmental Center approach by Japan International Cooperation Agency (JICA). Environmental Center projects have pretty long history since the first case in Thailand (1990-1997). This approach usually consists of grants for the building and facilities and technical support by Japanese experts both in a counterpart country and Japan. To present this type of project is implemented in Thailand, China, Indonesia, Mexico, Chile and Egypt.

### 1.1 Social Capacity for Environmental Management (SCEM)

There have been long discussions on capacity development of developing countries since 1950's. Table 1 shows major development of the discussions. Institutional building in 1950's and 1960's focused mainly on the capacity of individual entities. Since the late 1980's the concept of capacity development has become popular among donor agencies and they are more aware of the importance of capacity development both in public and private sectors.

Organization for Economic Cooperation and Development (OECD) had been a best promoter of capacity development in environment (CDE) through 1990's as shown in table 2.

Although it was remarkable that environmental cooperation was discussed from the viewpoint of capacity or capacity development in this concept, the approach has not reached to the concrete and practical level.

Our research 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 provoking approaches in the field of international cooperation such as social capital, environmental governance, etc. That is, Social Capacity for Environmental Management (SCEM), which is defined as capacity to manage environmental problems by a whole society of the main three actors; government, firms, and citizens.

## 1.2 Social Environmental Management System (SEMS)

Practical discussion on SCEM can start with defining Social Environmental Management System (SEMS). SEMS, as shown in figure 1, consists of the three main actors, government, firms and citizens. These actors themselves and interrelations among the three form SEMS. And also the relations between national level and local level are much of importance in the framework since actual problems occur at local level and local firms and citizens have most things to do with the solutions while overall environmental policies and laws are established at national level. SEMS, therefore, basically consists of the three actors, two levels and in-between interactions.

Figure 2 shows cause and effect of environmental quality and socio-economic situations toward SEMS. 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 has a good example for this concept, that is, Kitakyushu case during 1960's and 1970's in which the City had a serious industrial pollution. As figure 3 shows, in Kitakyushu model, not only the three actors of city government, firms and factories, and citizens had made effort for their own but also a strong cooperation had worked between the government and firms, and government and citizens by coordinating liaison committees. This indicates the importance of the bodies that enhance and coordinate the interactions among actors as well as the actors themselves.

SEMS can be explained by comparative institutional analysis and new institutional economics. Figure 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 about a salient way in which the game is repeatedly played (Aoki 2001). From this viewpoint, institutions have durability and robustness.

Institutions are more than just individual ones. 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 of Japan's effective international cooperation.

## 2. Development of SCEM

This section tries to give answers and ideas to the following questions.

- How does SCEM develop?
- How can the development process be analyzed?
- What are the essential benchmarks in the development of SCEM?
- What kind of indicators are needed for the analysis?

### 2.1 Benchmarks and Stages of the Development of SCEM

Harashima and Morita (1998) analyze development periods of environmental policy or environmental management in Japan, Korea and China. They assume the three periods, namely, initial period, progressive period, consolidation period. The main conclusions come to that (1) environmental policy is more matured in order of Japan, Korea, and China, (2) China has not reached yet to the final period; consolidation period, (3) the development periods are more condensed in the case of latecomers.

OECD's DPSEIR (Driving force - Pressure - State - Effects - Response) model tries to analyze the process of environmental issues from causes of the issues, impact to the society, and to behaviors to deal with the issues. Figure 5 shows the cases of Japan, Korea and China by Imura and Kobayashi (1999), from which the reader can find the difference in the process of the three countries, especially Japan and the other two.

From the standpoint of environmental issues themselves, a general understanding is that with the economic growth the major issues shift from (1) poverty-related issues such as access to safe water and public health, (2) industrial pollution such as SO<sub>x</sub> from power plants and factories, and to (3) consumption-related issues such as CO<sub>2</sub> due to consumption expansion (Bai and Imura 2000).

SCEM in this study focuses on so-called brown issues such as air and water pollution, especially SO<sub>x</sub>. This study assumes three development stages of SCEM; system-making stage, system-working stage, and self-management stage. Table 4 indicates SCEM stages and benchmarks.

System-making stage is in which the fundamental functions of SEMS are developed. Since this stage especially needs capacity development in government sector, the benchmarks should be environmental law (basic law and acts for specific pollution controls), environmental administration, and environmental information. The last benchmark is to evaluate environmental quality monitoring network and the information disclosure to

public. Moreover, it is important how the data and information is analyzed and help policy-making. Therefore this study selects issue of state of the environment as one of the important indicators. WRI (2002) also takes this indicator as evolution of environmental information. Weidner and Janicke (2002) survey the starting years of environmental administration, state of the environment, environmental law and so on for 30 countries (table 5).

In system-working stage, the system starts to actually working to improve the environmental quality. A turning point of so-called environmental Kuznets curve should be observed in the midst of the stage. In this analysis, the focus is on the reduction in SO<sub>x</sub> emissions followed by regulation implementation.

Self-management stage is the stage in which the system develops sustainably through strong interrelations among government, firms and citizens, and comprehensive environmental policy is set enforced. Firms and citizens take initiatives in environmental management by their voluntary efforts. In the aspect of international cooperation, a developing country becomes more independent from donor's assistance and utilizes its own financial and human resources in this stage as a sign of its initial period.

Roles and relations of the three actors also change as one country experiences the development of SEMS. Government sector plays an important role to manage and coordinate the issues in system-making and system-working stages but in self-management stage, it is responsible for supporting firms and citizens by making a framework for comprehensive environmental management.

Figure 6 shows the evaluation image of SCEM with the stages and benchmarks above-mentioned (China's case). This figure also indicates the history of Japan-China Friendship Center for Environmental Protection which has been supported by Japan International Cooperation Agency (JICA) since 1992 to present.

## 2.2 SCEM Indicators

Developing indicators of SCEM starts with reviewing the existing environmental and social indicators and challenges of integrating these two. The most basic and objective indicators about environmental issues are environmental quality data of the pollutants. We can see the trend of environmental quality in one city or country from the observation of time-series data. There are quite a few information sources like OECD's Environmental Indicators and World Resources by World Resources Institute (WRI). OECD's Environmental Indicators also tries to have a set of socio-economic indicators together with environmental indicators.

The most popular socio-economic index is Human Development Index (HDI) by UNDP. Human Development Report which has HDIs for some 150 countries has been published every year since 1990. As shown in table 6, HDI is calculated from average life expectancy, education level, and income level and scored by the balance of the highest and lowest countries. HDI has received a lot of pros and cons and the Report often gives

supplemental index such as Gender Index and different poverty indices for developed and developing countries. HDI, however, does not mean to work as a standard of one country being or not being ODA recipient nor give us the concrete ideas how donor agencies should assist one country.

United Nations Commission for Sustainable Development (UNCSD), OECD, and Global Leaders of Tomorrow Environment Taskforce are trying to evolve environmental indicators together with socio-economic indicators in order to obtain index of sustainable development; Sustainability Indicators, Environmental Indicators, Environmental Sustainability Index (ESI) respectively.

One more example is Dashboard by International Institute for Sustainable Development (IISD). As shown in figure 7, Dashboard consists of four categories of society, environment, economy and institutions and category index is calculated from 8 to 20 individual indicators in each. According to Policy Performance Index (PPI) by European Environmental Agency which is developed in a similar concept, weighting the category indices should be different from one country to another depending on the priority setting by environmental experts and citizens. OECD, in its report in 2001, selects several principal ones from 50 environmental indicators to make it easy to handle them in the evaluation and is trying to integrate environmental and socio-economic indicators by DPSEIR (DPSIR) model. Though, it has not yet developed an index.

Indicators of Social Capacity for Environmental Management (SCEM) are shown in figure 8. 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) in each actor. Inter-actor relations have indicators of behaviors and effects of the two actors. Relations of national and local levels are evaluated through decentralization process. Furthermore, SCEM indicators include socio-economic indicators and environmental quality indicators as background information. This report discusses the development of SCEM based on selected important indicators for the stages.

### 3. Development Process of SCEM in Three Asian Countries

This section applies the analysis framework of Social Capacity for Environmental Management (SCEM) in the selected Asian countries of China, Thailand and Indonesia, and evaluates in which stage they are standing and what kind of support can be done for further development. Information and data have been taken from various sources as shown in table 7.

#### 3.1 China

Table 8 shows historical development of environmental policy in China. It also indicates implementation process of Japan-China Friendship Center for Environmental

Protection. The First National Conference on Environmental Protection was held in 1973 and the next year Environmental Protection Leading Group was established in the State Council. It can be said that China's Social Environmental Management System (SEMS) started its formation in this period gradually and Environmental Protection Law (trial version) in 1979 and Environmental Protection Law (final version) were enacted in the midst of the system-making stage. Several previous studies also indicate these events as epoch-making as figure 9 shows.

Environmental law and environmental administration developed well by the mid 1990's and also China Environmental Yearbook which has been issued since 1990 upgrade its quality since 1994 issue. Figure 10 and 11 show environmental law system and environmental administration system in China. From these evidences, a tentative evolution is that China accomplished its system-making in the mid 1990's and entered its system-making stage by enforcing Air Pollution Control Act Amendments (1995) and the Ninth Five Year Plan (1996-2000). And the Tenth Five Year Plan (2001) has just started.

Table 9 shows the number of air pollution monitoring stations in the three countries. China has very large number of the stations all over the nation, compared with the other two. The Environmental Center project is having automatic environmental information network of a hundred cities and will be in force soon. Figures 12 indicates that SO<sub>2</sub> emissions in China reached its peak in 1996 and are decreasing. On the other hand, Total Suspended Particulates (TSP) also shows declining but are far over the standard (300 µg/m<sup>3</sup> in the 2nd graded cities)(figure 13).

The information above implies that China is now gradually shifting to self-management stage. But several serious brown and green environmental problems such as TSP concentration, NO<sub>x</sub> emissions, municipal waste management, yellow sand (bai), desertification and biodiversity should be taken into account earnestly. SEMS, which consists of government, firms and citizens, needs to be strengthened especially in the sectors of firms and citizens and also in the interrelations among three actors. Also, developing social environmental management at the local level is crucial for the whole SEMS especially in the context of the undergoing development plan of the west region. Comprehensive and nationwide plan for the development of SEMS is important for China.

### 3.2 Thailand

Table 10 shows chronological summary of Thailand's environmental policy and the Environmental Center (Environmental Research and Training Center; ERTC) project. National Environmental Quality Act (NEQA) was enacted and National Environmental Board and Office of National Environmental Board (ONEB) were established followingly in 1975. See figure 14 for Thailand's law system. This year 1975 can be evaluated as the start of system-making stage. Big events for the system-making happened in 1992, that is, NEQA Amendments and establishment of Ministry of Science, Technology and Environment (MOSTE), which has three department in the environmental section; Office of

Environmental Policy and Planning (OEPP), Pollution Control Department (PCD) and Department of Environmental Quality Promotion (DEQP) (see figure 15(a)). ERTC is located under DEQP. These are the main development of environmental law and administration system in Thailand. Also, State of the Environment has been issued since 1995. There are 52 air pollution monitoring stations under PCD at present.

After the financial crisis in 1997 and the establishment of the new Constitution in 2000, Ministry of Natural Resources and Environment has just been settled in October 2002 (figure 15(b)). The new ministry is to manage both green and brown issues, which the former ministry could not due to the administrative separation by issues, but Department of Industrial Works (DIW) which is responsible for factory inspection and actual regulation still belongs to different ministry. Restructuring of the environmental administration still has remaining tasks in this regard.

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

Figure 16 and 17 indicate SO<sub>2</sub> emissions in Thailand and PM<sub>10</sub> concentration in Bangkok Metropolitan Area respectively. 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 contribute to reducing SO<sub>2</sub> emissions in 1990's but the estimation in the figure does not clearly indicate the decline of emission. As for PM<sub>10</sub>, some fluctuations are observed but it far exceeds the environmental standard (120µg/m<sup>3</sup>) through the years. The financial crisis has also affected the environmental quality.

Decentralization of environmental management is presently in transition. Based on the new Constitution in 1997 and 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 level is urgently important in Thailand. On the other hand, the environmental efforts in firm and citizen sectors are getting larger. Over 500 firms have obtained ISO14000 series certifications and there are a lot of active local environmental NGOs. One example is a regional environmental management NGO, Samut Prakarn Environmental Society (SES). The society, which has a variety of stakeholders from local firms, central and local governments, NGOs and universities, implements a cleaner production technology project and several environmental education programs. Although SES has administrative and financial problems, it can be a hint for future SEMS in Thailand.

### 3.3 Indonesia

As shown in table 11, Indonesia's environmental law and administration had been settled in the late 1980's and early 1990's. After Act No.4 on the Basic Provision for Environmental Management was approved in 1982, several important acts were set in force (Provision and Guidelines on Environmental Impact Assessment in 1986 and 1987,

establishment of industrial water emission standard and air ambient standard in 1988, etc.). Figure 18 shows major environmental laws and regulations in Indonesia. The first appearance of environmental section in the ministry is 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 Environment (1993). Figure 19(a-1) and (a-2) show the structure of BAPEDAL, which has Environmental Management Center (EMC) supported JICA, and then Ministry of Environment.

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

As for environmental information, a nationwide network has not yet been developed. The 59 environmental laboratories built with support by Japan Bank for International Cooperation (JBIC) and AusAID are not on-line by a networking system except for Austria-supported automatic monitoring network in another ten cities. One of the reasons is that these laboratories belong to three different ministries; Ministry of Public Health, Ministry of Public Affairs, and Ministry of Industry. Although Ministry of Environment is trying to hold the labs and data after the new ministry was set up in January 2002, it would take pretty long time to establish the nationwide environmental monitoring network under one administration since the administrative transition depends upon provincial and local governments. Any periodical environmental data and policy report like State of the Environment has not yet been issued though Indonesia has annual issue of environmental statistics. These facts imply that Indonesia is still in the final stage of system-making stage presently. Environmental quality data such as SO<sub>2</sub> emission estimate and TSP concentration (figure 20 and 21) also support the tentative conclusion.

Indonesia's environmental administration now entered the second phase of system-working stage since decentralization of environmental administration since January 2001 and establishment of the new Ministry of Environment (see figure 19(b)) from State Ministry of Environment and BAPEDAL need some period of time, at least for the period of National Development Plan (PROPENAS, 2001-2004), to be settled and to actually work.

The new Ministry of Environment adopted Strategic Plan and Work Program and PROKASIH2005 with seven priority issues such as local government's capacity development in environmental management and environmental awareness building in civil society and 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 firm and citizen sectors as well as to strengthen the coordination among three actors. NGOs can play an important role in social environmental management especially

when the government is immature and not so functional. WALHI (Friend of the Earth, Indonesia) is a good example.

#### 4. Conclusions

The evaluation summary of Social Environmental Management System (SEMS) in three countries is shown in figure 22 and 23. China completed its system-making stage and entered system-working stage around in 1994. Now it started shifting toward self-management stage. China's social environmental management will be accelerate toward the Beijing Olympic Games which will be held in 2008.

Thailand was once ready for the system-working stage around in 1995 but some more time is needed to finalize its system-working. Thailand is also experiencing the restructuring of the system and system-working stage at the same time. Indonesia does not have enough environmental information system and, same as Thailand, the financial crisis and recent administration restructure give the country some difficulties for functional environmental management.

Table 1: Historical review of Capacity Development Approach

	Approaches	Characteristics
1950's - 1960's	Institutional building	<ul style="list-style-type: none"> <li>Improving the capacity of the individual organizations in public sector</li> </ul>
1960's - 1970's	Institutional strengthening	<ul style="list-style-type: none"> <li>Improving the enforcement capacity of existing organizations</li> </ul>
1970's	Development management	<ul style="list-style-type: none"> <li>Development plan which focuses on improvement in Basic Human Needs</li> <li>Improving the distribution capacity in public sector</li> <li>Improving the capacity of local group and local public sector</li> </ul>
1980's	Institutional development	<ul style="list-style-type: none"> <li>Strengthening relations between governmental and private sector</li> <li>Shift to the program approach</li> </ul>
1990's	Capacity development	<ul style="list-style-type: none"> <li>Development of long-term endogenous structure</li> <li>Linkage between political environment and organization</li> </ul>
1995 - 1998	Capacity assessment and development	<ul style="list-style-type: none"> <li>Comprehensive framework to measure the institutional capacity of existing organizations</li> <li>Clear definition of system, organization, and individual capacity in the UNDP Guideline</li> <li>Project management based on result and performance</li> </ul>

Source: Matsuoka and Honda (2002)

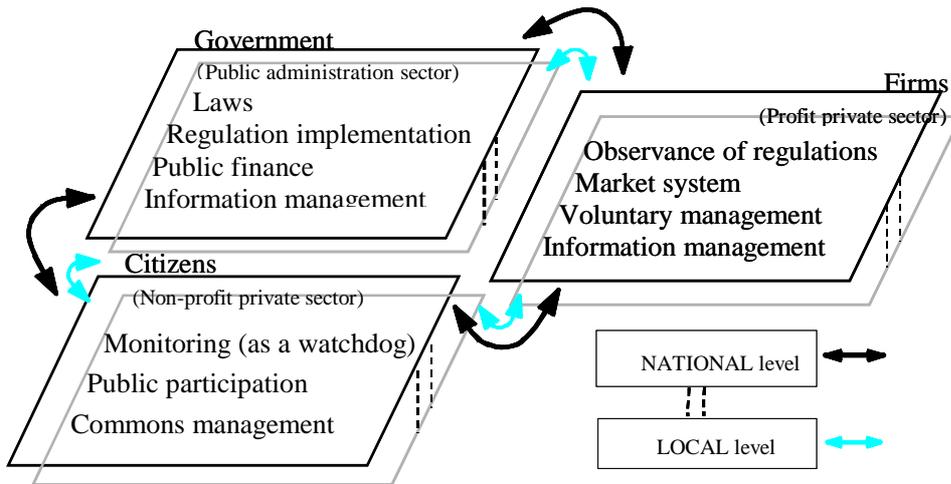
Original source: OECD DAC (1999)

Table 2: History of the concept of Capacity Development in 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 on definition of "Capacity in Environment" and its basic approach
1995	<i>Donor Assistance to Capacity Development in Environment</i>	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" <ul style="list-style-type: none"> <li>Identification of capacity and capability</li> <li>Improvement of institutional structure</li> <li>Emphasis on "process"</li> </ul>
1999	<i>Donor Support for Institutional Capacity Development in Environment: Lessons Learned</i>	The lessons from CDE cooperation summarized <ul style="list-style-type: none"> <li>The ambiguous definition of CDE</li> <li>The importance of CDE in rural areas</li> <li>Development of the indicator for CDE</li> </ul>

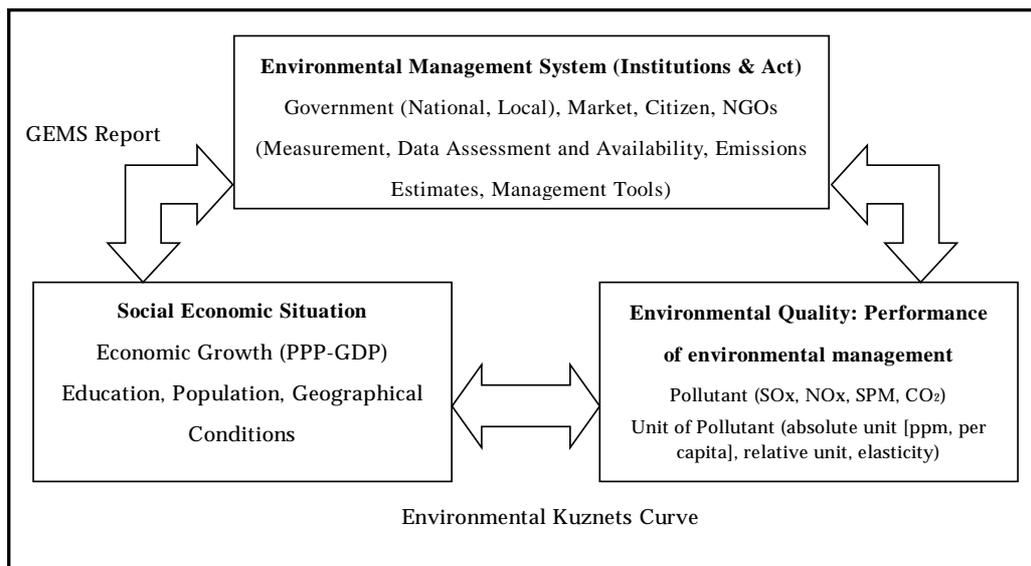
Source: Matsuoka and Honda (2002)

Figure 1: Social Environmental Management System (SEMS)



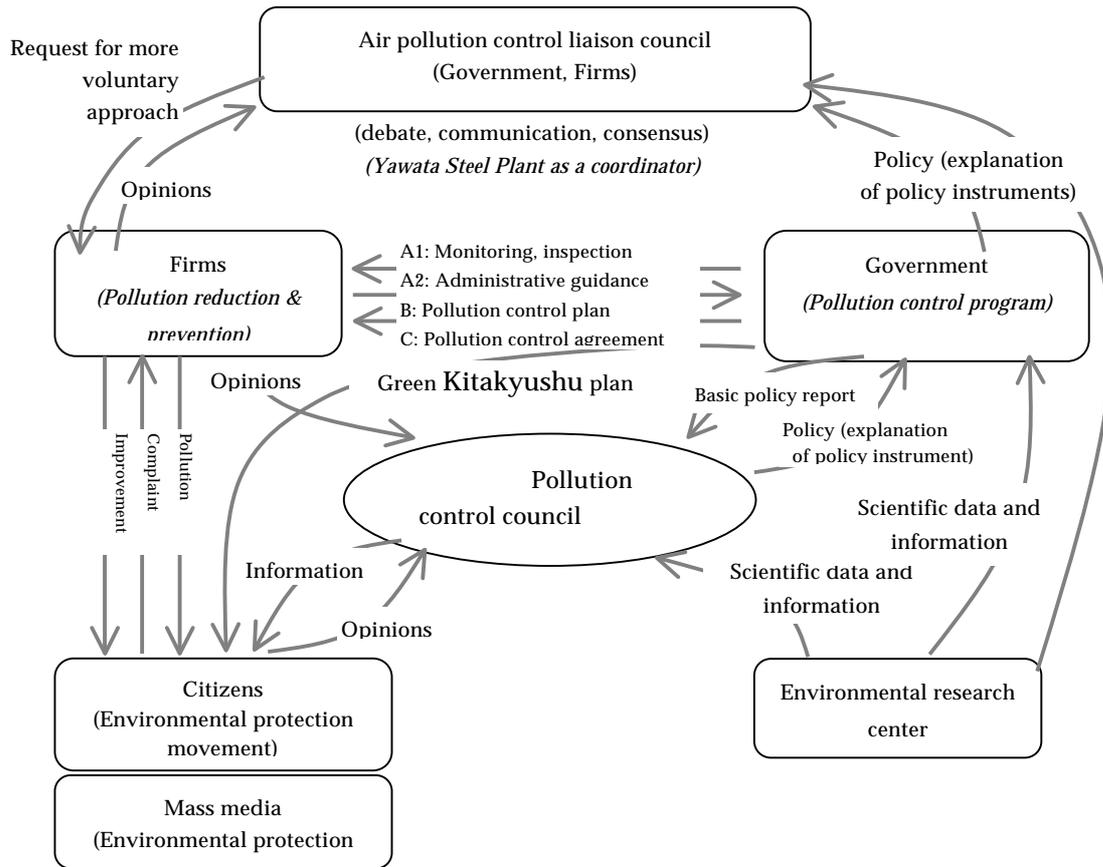
Source: Imura and Matsuoka (2002)

Figure 2: SEMS and its interrelations with environmental quality and social economic condition



Source: Matsuoka et al. (2000)

Figure 3: Liaison council of Kitakyushu model



Source: Katsuhara (2000)

Figure 4: Concepts of comparative institutional analysis and its 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 constrains 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

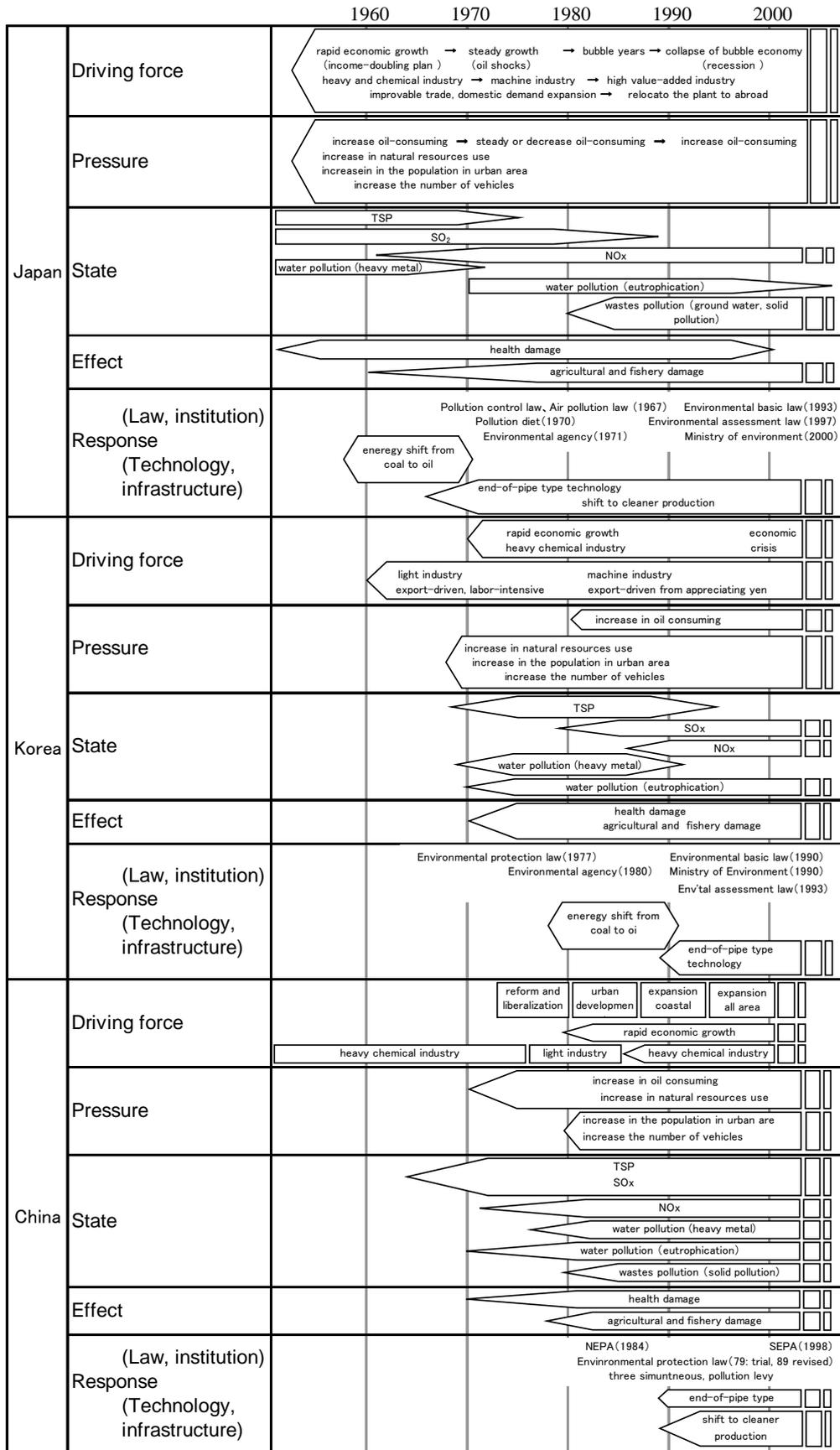
Bundle of institutions System	“Bundle of institutions” can be defined as system.
Institutional complementarity	Institution has hierarchy, and Institutions work systematically and strongly when institutions complement each other.
Strategic complementarity	Even though substitutable action choices are available 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 dependance	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

- Dynamics of institutional change, and the development stages of SCEM
- Transfer of Japan’s experiences
- Development of the international cooperation system

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

Figure 5: Comparative analysis using DPSER framework



Source: Imura and Kobayashi (1999)

Table 4: The stages and benchmarks of Social Environmental Management System (SEMS)

	System-making stage	System-working stage	Self-management stage
Definition	<i>Period in which bases of SEMS, especially governmental institutions, are developed</i>	<i>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.</i>	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	<ul style="list-style-type: none"> <li>• Government (system making)</li> <li>• Firms (efforts for pollution reduction)</li> <li>• Citizens (pressure to government and firms, research cooperation)</li> </ul>	<ul style="list-style-type: none"> <li>• Government (pollution control regulation)</li> <li>• Firms (pollution reduction)</li> <li>• Citizens (pressure to government and firms, research cooperation)</li> </ul>	<ul style="list-style-type: none"> <li>• Government ( proposal of comprehensive policy )</li> <li>• Firms (voluntary approach)</li> <li>• Citizens (voluntary approach)</li> </ul>
The relationship among three actors	<ul style="list-style-type: none"> <li>• Government - Firms</li> <li>• Government - Citizens</li> </ul>	<ul style="list-style-type: none"> <li>• Government - Firms</li> <li>• Government - Citizens</li> <li>• Firms - Citizens (through government)</li> </ul>	<ul style="list-style-type: none"> <li>• Firms - Citizens</li> <li>• Government - Firms</li> <li>• Government - Citizens</li> </ul>
Benchmarks (essential)	<ul style="list-style-type: none"> <li>• Environmental law</li> <li>• Environmental administration</li> <li>• Environmental information (monitoring data)</li> </ul>	<ul style="list-style-type: none"> <li>• Regulation</li> <li>• Reach the peak of pollution level and improve</li> </ul>	<p>&lt;First phase&gt; (In the case of developing countries)</p> <ul style="list-style-type: none"> <li>• Graduation / independence from ODA</li> </ul> <p>&lt;Second phase&gt;</p> <ul style="list-style-type: none"> <li>• Comprehensive environmental management</li> </ul>
Benchmarks (important)	<ul style="list-style-type: none"> <li>• Negotiation between Government-Firms, Government-Citizen</li> <li>• Mass media</li> </ul>	<ul style="list-style-type: none"> <li>• Negotiation, adjustment, and cooperation between Firms-Citizens</li> </ul>	Voluntary approach of Firms and Citizen (environmental accounting, environmental report, green consumption, advocacy planning)

Source: The authors

Table 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.

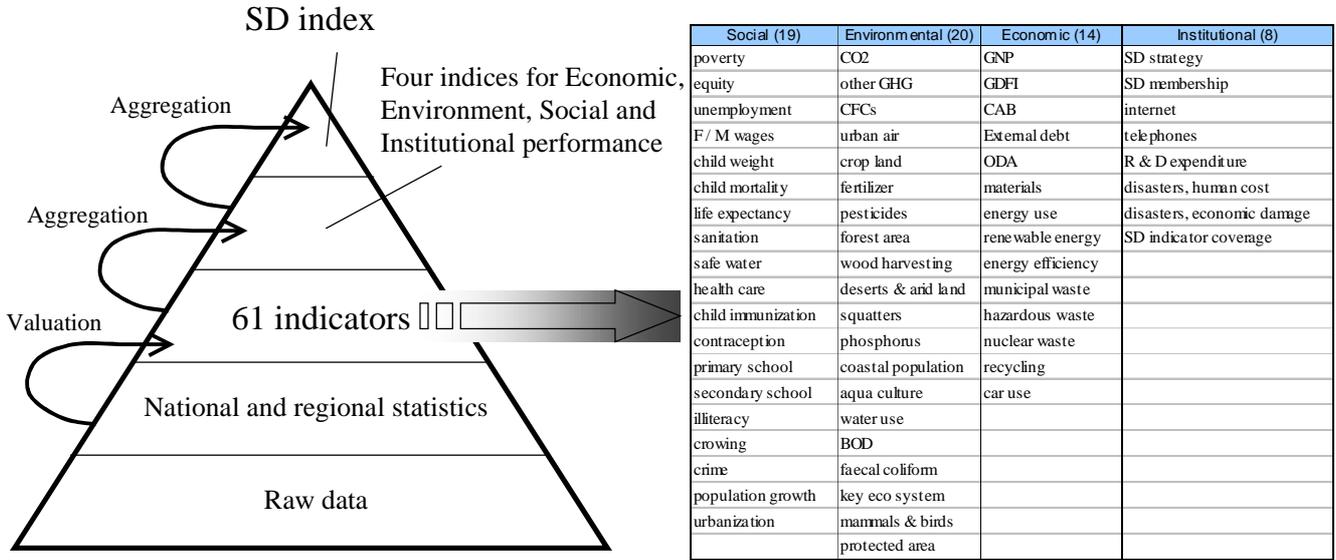
Source: Weider, Janicke & Jorgens (2001)

Table 6: Social index

Target	Index	Dimension	Indicator
Human development 1990-	Human development index (HDI)	A long health life	Life expectancy at birth
		Knowledge	Adult literacy rate
			Gross enrolment ratio (GER)
		A decent standard of living	GDP per capita (PPP US\$)
Poverty 1997-	Human poverty index for developing countries (HPI-1)	A long health life	Probability at birth of not surviving to age 40
		Knowledge	Adult literacy rate
			A decent standard of living
	Human poverty index for OECD countries (HPI-2)	A long health 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 health 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 7: Aggregation between environmental indicators and social indicators (IISD-Dashhboard)



Source: IISD website

Figure 8: SEMS indicators

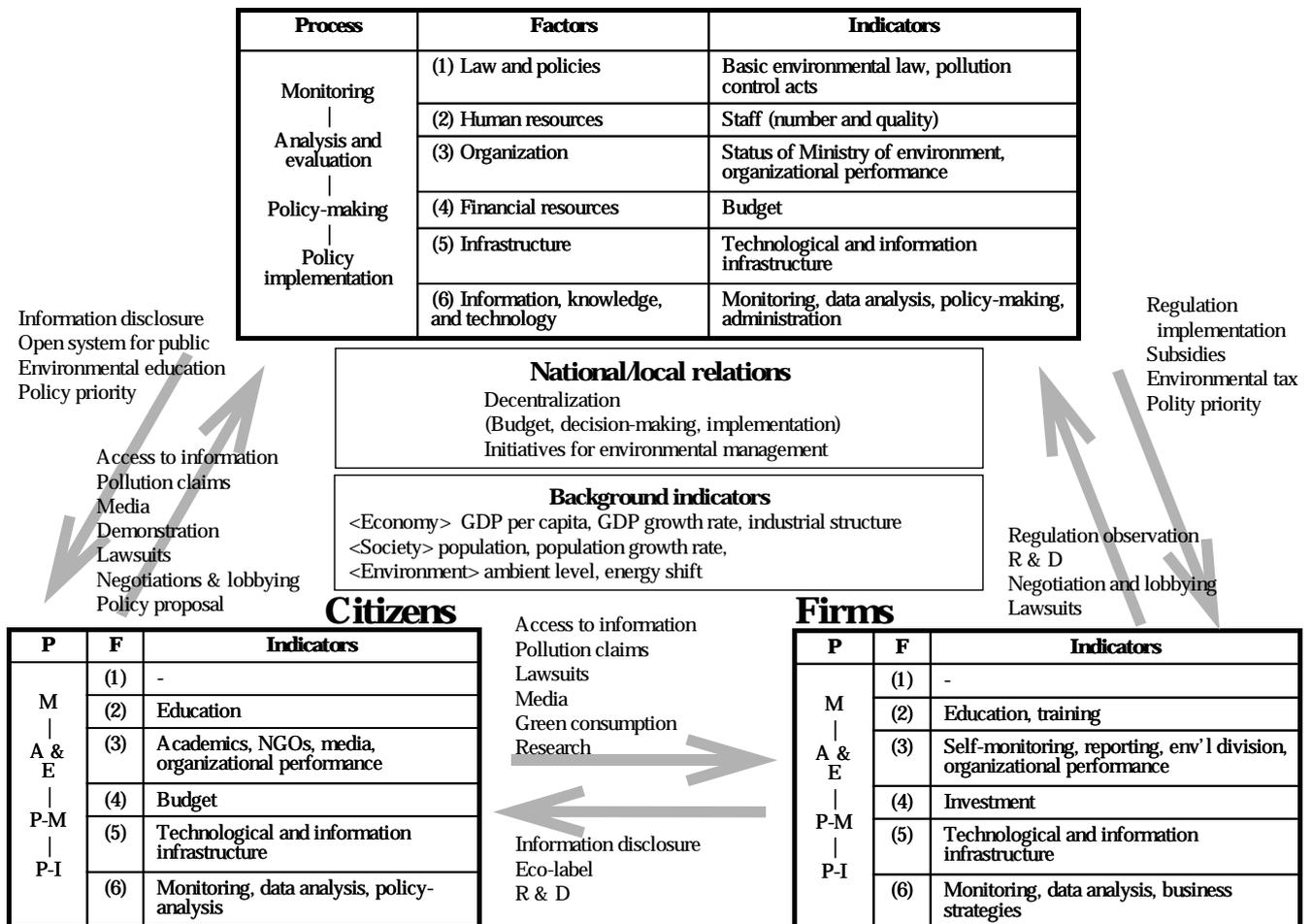


Table 7: Data source

	China	Thailand	Indonesia
History of environmental policy	Harashima and Morita (1995) China Environmental Protection website International Energy Agency	ADB (2001) Nicro and Apikul (1999) O'Conner (1994)	BAPEDAL website World Bank (2002) CIA website
Environmental law	JICA (1999)	Ogano (1994)	Global environmental forum ( 1999 )
Environmental administration	SEPA website	JICA (1993?) MONRE website	JICA (?)
Monitoring data	China environmental yearbook	DOE, MOSTE MOSTE, PCD (1996)	World Bank (1997) OECC (2001)
Environmental data (SOx)	China environmental yearbook	Streets et al. (2000)	Streets et al. (2000)
Environmental data (PM <sub>10</sub> , TSP)	Li (1999)	BMA (2000)	World Bank (1997)

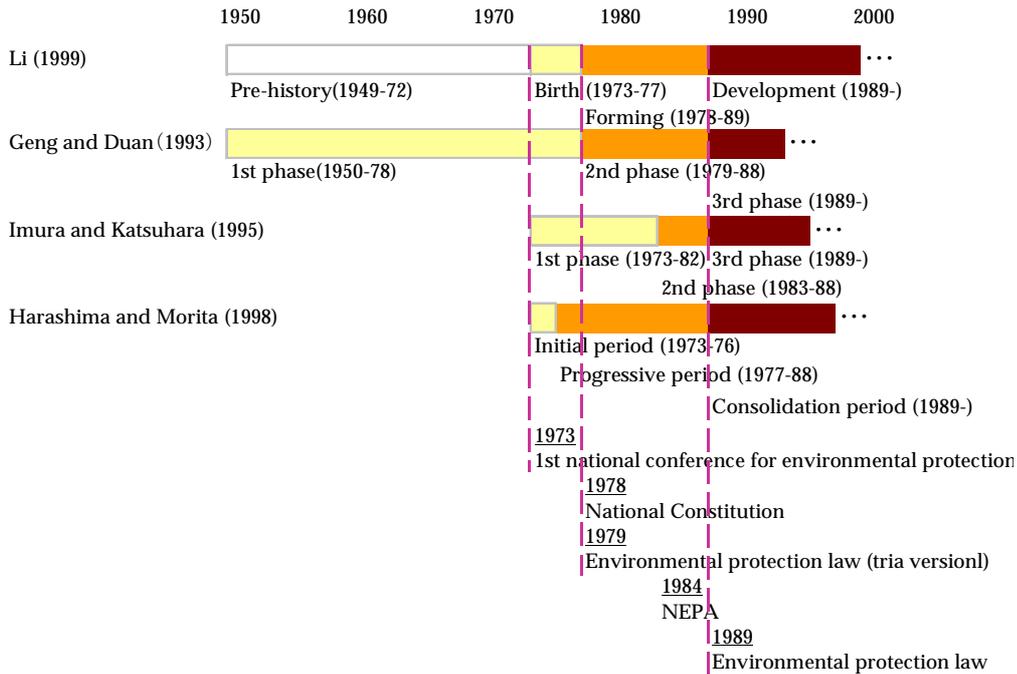
Source: The authors

Table 8: Chronological summary of environmental policy and the Environmental Center in China

Year	Environmental law	Administration	National development plan	GDP/Capita PPP (USD)	Environmental Center
1966			The Third Five Year Plan (3FYP)(1966-70)		
1971			4FYP (1971-75)	569	
1973	1 <sup>st</sup> 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	2 <sup>nd</sup> 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				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 3 <sup>rd</sup> 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) 4 <sup>th</sup> 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)

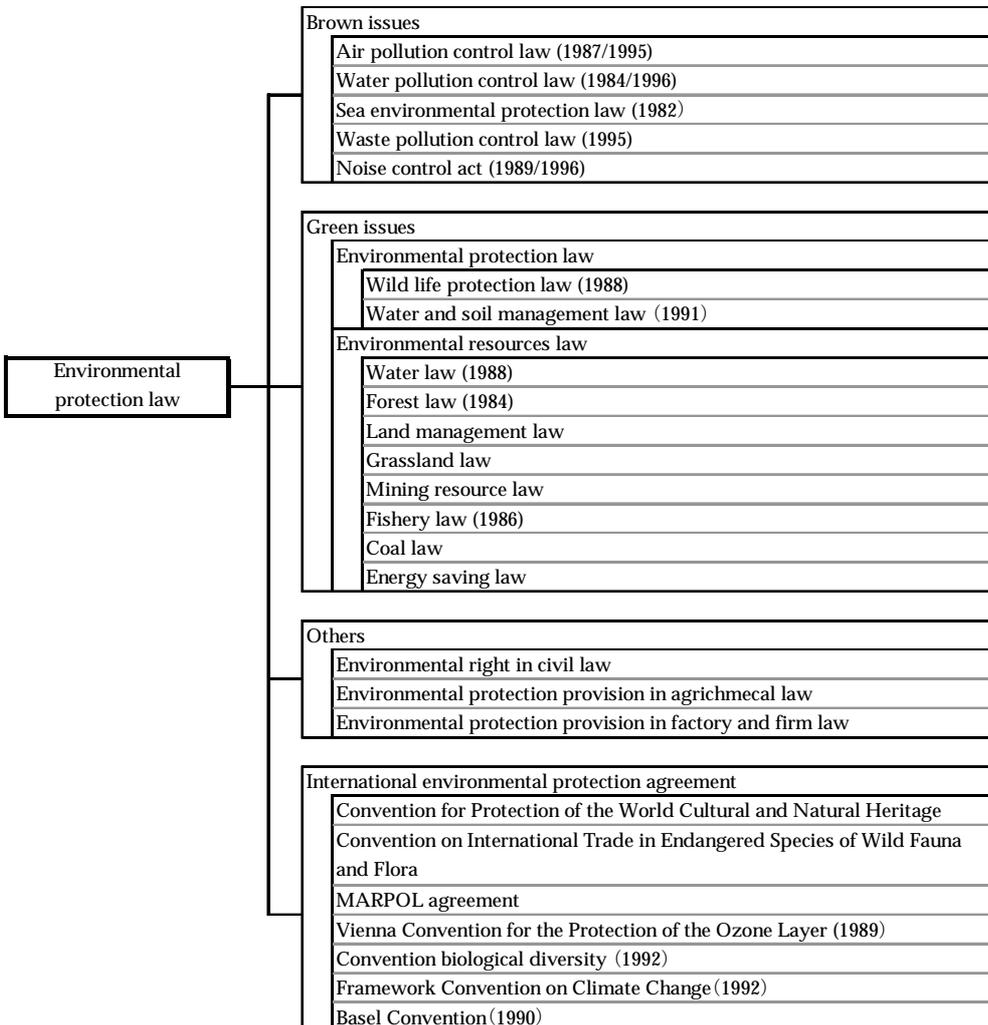
Source: Harashima and Morita(1995), China environmental protection website, International Energy Agency

Figure 9: Environmental policy development in China



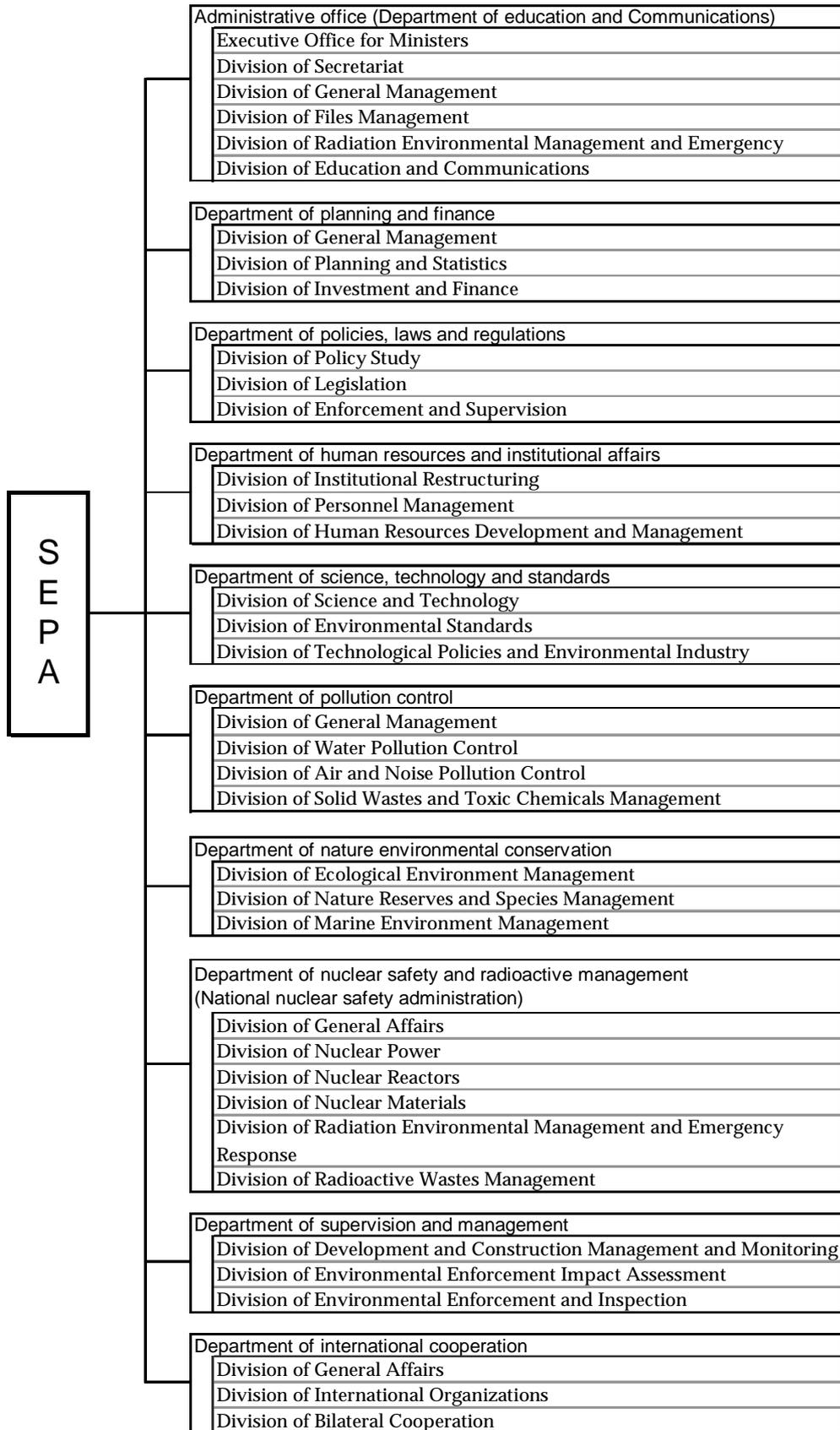
Source: Li (1999), Geng and Duan (1993), Imura and Katsuhara (1995), Harashima and Morita (1998)

Figure 10: Environmental law system in China



Source: JICA (1999)

Figure 11: Environmental administration in China (State Environmental Protection Administration; SEPA)



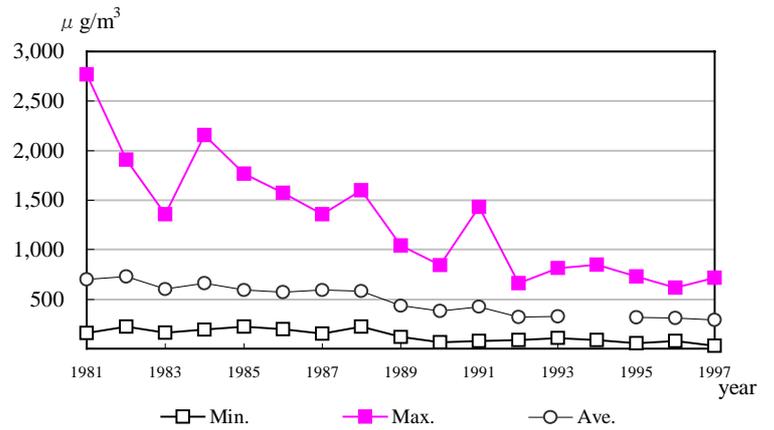
Source: SEPA website

Table 9: Number of air monitoring station

Year	China	Thailand	Indonesia
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
1991		21	17
1992		21	20
1993	2,179	21	23
1994	2,222	21	23
1995	2,155	51	23
1996	2,155	51	23
1997	2,196	51	26
1998	1,926	51	26
1999	2,203	111	
2000	2,552		50
2001	2,229		59

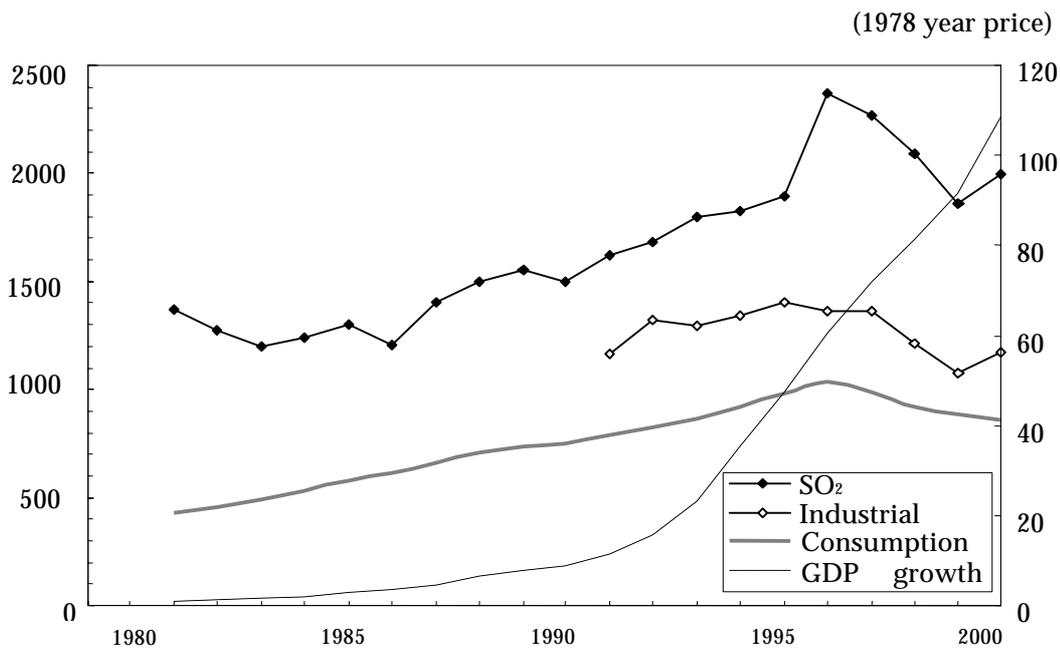
Source: Matsuoka et al. (2000)

Figure 13: TSP concentration in China



Source: Li (1999)

Figure 12. SO<sub>2</sub> emission in China



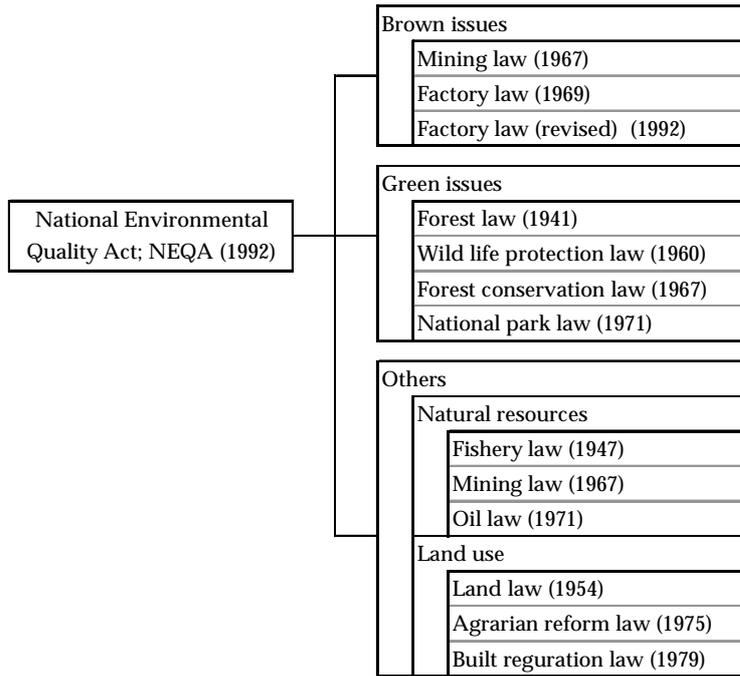
Source: China environmental yearbook

Table 10: Chronological summary of environmental policy and Environmental Center in Thailand

Year	Environmental Laws and Policies	Institution	Development Plan and Others	Environmental Research and Training Center (ERTC)	GDP/capita, growth rate
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 4 <sup>th</sup> Five-year National Economic and Social Development Plan (1977-81)		US\$1,120, 10%
1981	The 1 <sup>st</sup> 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 7 <sup>th</sup> 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 8 <sup>th</sup> National Economic and Social Development Plan (1997-2001)	Follow-up phase completed (March)	Financial crisis (1997-1998) US\$6690, -0.4% (GNI per capita: 2,780)
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 9 <sup>th</sup> National Economic and Social Development Plan (2002-2006)		3.9% in 1 <sup>st</sup> quarter

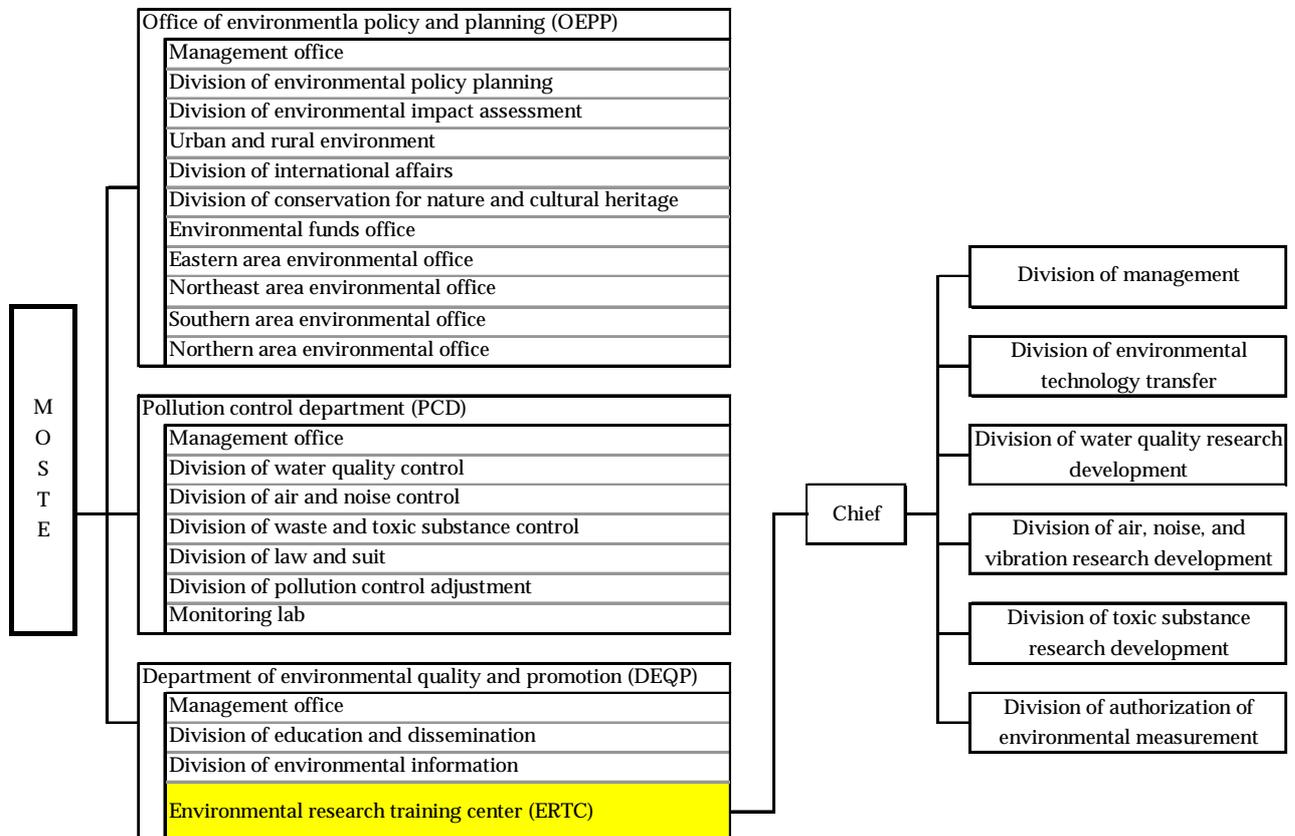
Sources: ADB (2001), Nicro and Apikul (1999), O'Conner (1994)

Figure 14: Environmental law system in Thailand



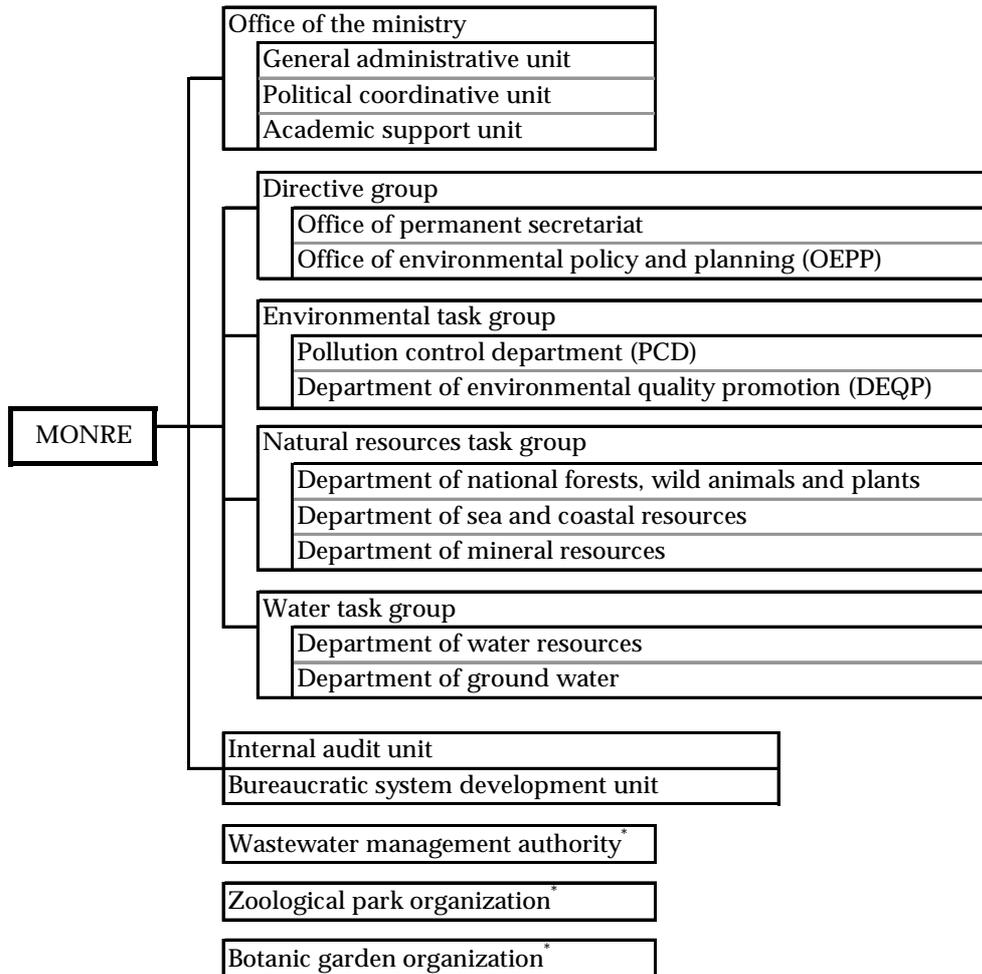
Source: Ogano (1994)

Figure 15(a): Environmental administration in Thailand (Ministry of Science, Technology and Environment; MOSTE)



Source: JICA (1993)

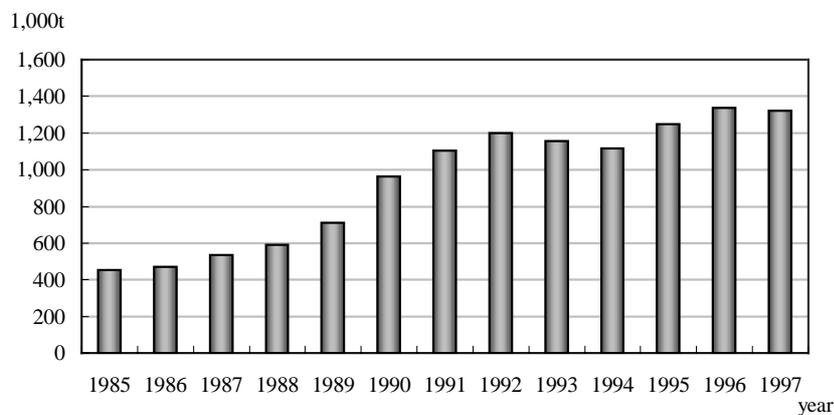
Figure 15(b): Environmental administration in Thailand (Ministry of Natural Resources and Environment; MONRE)



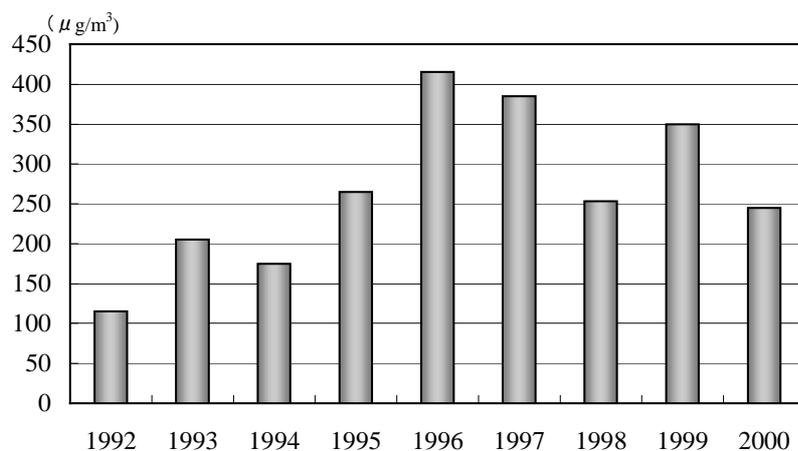
Note: \* government enterprise

Source: MONRE website

Figure 16: SO<sub>2</sub> emissions in Thailand



Source: Streets et al. (2000)

Figure 17: PM<sub>10</sub> concentration in Thailand (Bangkok)

Source: BMA (2000)

Table 11: Chronological summary of environmental policy and the Environmental Center in Indonesia

Year	Environmenta laws and policies	Institutions	Development Plan	GDP/capita (current international US\$), growth rate	Environmental Management Center (EMC)
1973			The Second Five-Years 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 jo. Presidential Decree No. 35/1978	The 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	The State Ministry of Population and Environment		US\$1,070; 8.4%	
1990	Presidential Decree No. 23/1990	BAPEDAL (Environmental Impact Mangement Agency) establishment		US\$2,070; 9.0%	
1990	Act No. 5/1990 on Natural Resources Conservation and Ecosystem				
1993			The Sixth Five-Years Development Plan (Repelita VI) focused on enhancing coordination in the environmental affairs toward sustainable development	US\$2,700; 7.3%	Project started (January)
1993		The State Ministry of Environment			
1997	Act No. 23/1997 on the Environmental Management			US\$3,490; 4.9%	
1996	Ministrial Decree No. 07/1996	Secretariat of the National Coordination Team for Forest and Field			
1997				Economic crisis	Project completed (December)
1998				Presidential succession, Growth rate: -13.2%	Follow-up phase started (January)
1999			The Five-Years National Development Program (Propenas) focuses on sustainable natural resources management to increase public	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)

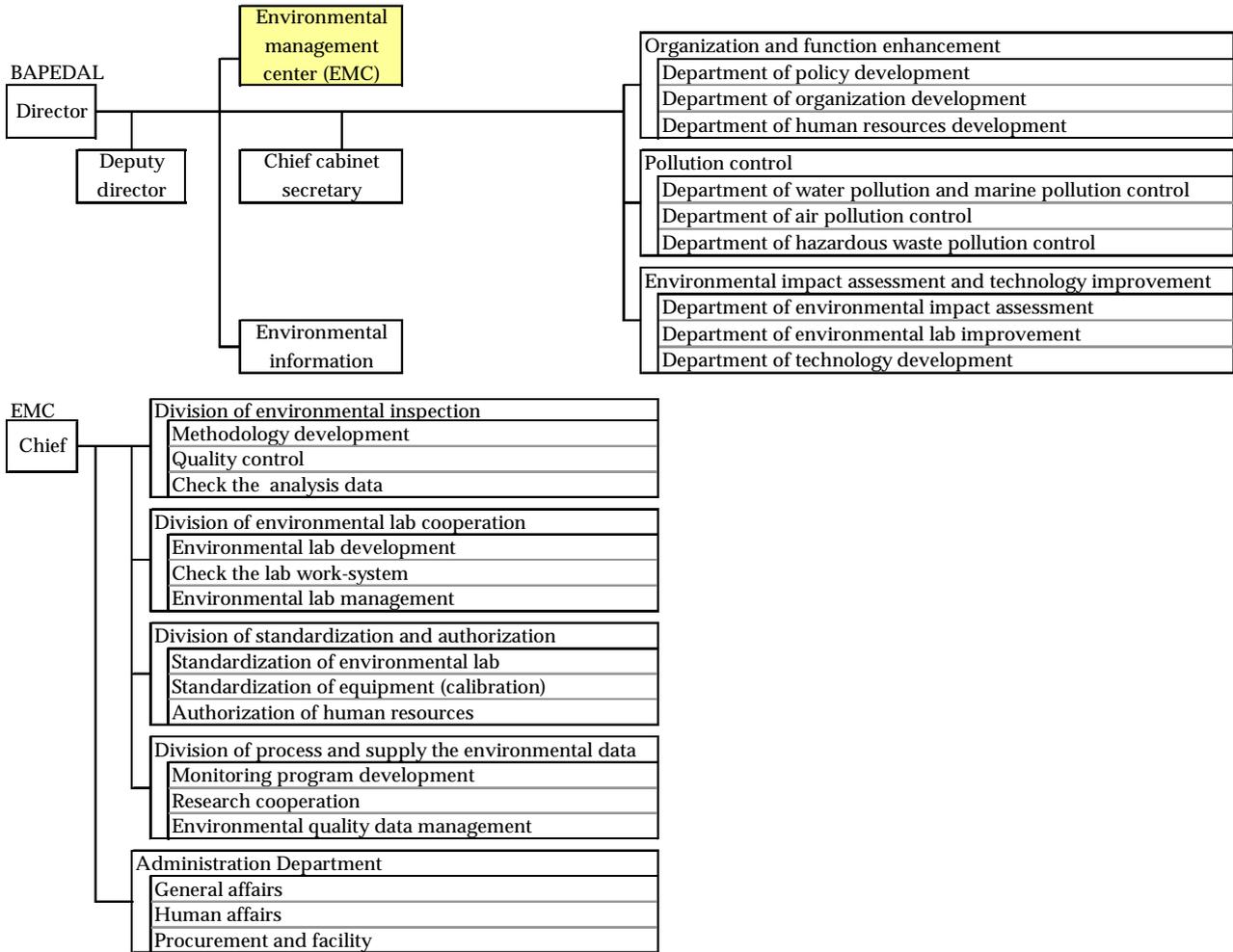
Source: BAPEDAL website, World Bank (2002), CIA website

Figure 18: Environmental law system in Indonesia

<p>Act of the Republic of Indonesia Concerning Environmental Management (1997)</p>	<p>Brown issues</p> <p>Governmental regulation of the Republic of Indonesia concerning the control of water pollution (1990)</p> <p>Governmental regulation of the Republic of Indonesia concerning hazardous and toxic waste management (1994)</p> <p>Decree of the state minister for environment of the Republic of Indonesia concerning quality standards of liquid waste for industry activities (1995)</p> <p>Decree of the state minister for environment of the Republic of Indonesia concerning quality standards of liquid waste for hotel activity (1995)</p> <p>Decree of the state minister for environment of the Republic of Indonesia concerning motor vehicles exhaust gas standards</p> <p>Decree of the state minister for environment of the Republic of Indonesia concerning emission standards for stationary sources (1995)</p> <p>Decree of the state minister for environment of the Republic of Indonesia concerning blue sky program implementation (1996)</p> <p>Decree of the state minister for environment of the Republic of Indonesia concerning stipulation of the priority province region level 1 as the implementer of blue sky program (1996)</p> <p>Decree of the state minister for environment of the Republic of Indonesia concerning noise level standards (1996)</p> <p>Decree of the state minister for environment of the Republic of Indonesia concerning vibration level standards (1996)</p> <p>Decree of the state minister for environment of the Republic of Indonesia concerning offensive odor level standards 1996)</p>
	<p>Green issues: Act of the Republic of Indonesia concerning conservation of living resources and their ecosystem (1990)</p> <p>Governmental regulation of the Republic of Indonesia concerning environmental impact assessment (1993)</p> <p>Decree of the state minister for environment of the Republic of Indonesia concerning the types of business or activities required to prepare an environmental impact assessment (1994)</p> <p>Decree of the state minister for environment of the Republic of Indonesia concerning general guidelines for environmental management procedures and environmental monitoring (1994)</p> <p>Decree of the state minister for environment of the Republic of Indonesia concerning guidelines for membership and working procedures for AMDAL commissions (1994)</p> <p>Decree of the state minister for environment of the Republic of Indonesia concerning general guidelines for the preparation of environmental impact assessment (1994)</p> <p>Decree of the state minister for environment of the Republic of Indonesia concerning establishment of an environmental impact assessment commission for integrated / multisectoral activities (1994)</p> <p>Decree of the state minister for environment of the Republic of Indonesia concerning guidelines for the determination of significant impact (1994)</p>
	<p>Act of the Republic of Indonesia concerning spatial use management (1992)</p>
	<p>Others</p> <p>Act of the Republic of Indonesia concerning guidelines for establishment of environmental quality standards (1998)</p> <p>Act of the Republic of Indonesia concerning general guidelines for the implementation of environmental audits (1994)</p>

Source: Global environmental forum (1999)

Figure 19-a-1: Environmental administration in Indonesia (BAPEDAL)



Source: JICA (1996, 2001)

Figure 19-a-2: Environmental administration in Indonesia (Ministry of Environment)

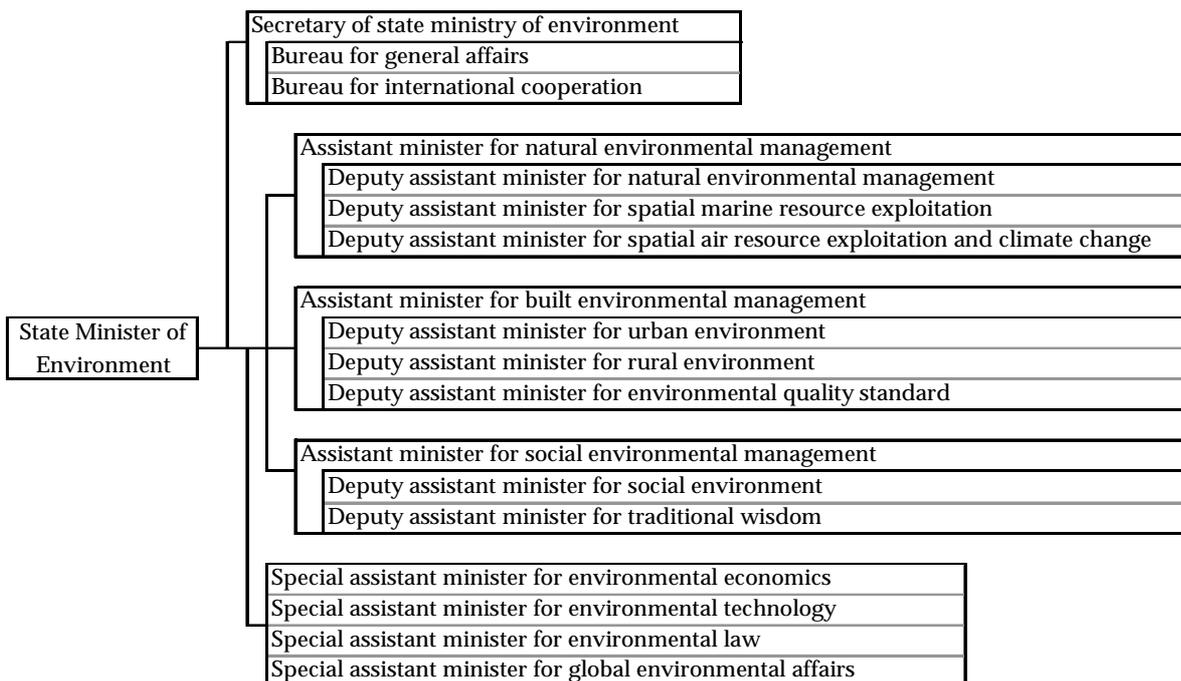


Figure 19-b: Environmental administration in Indonesia (new Ministry of Environment)

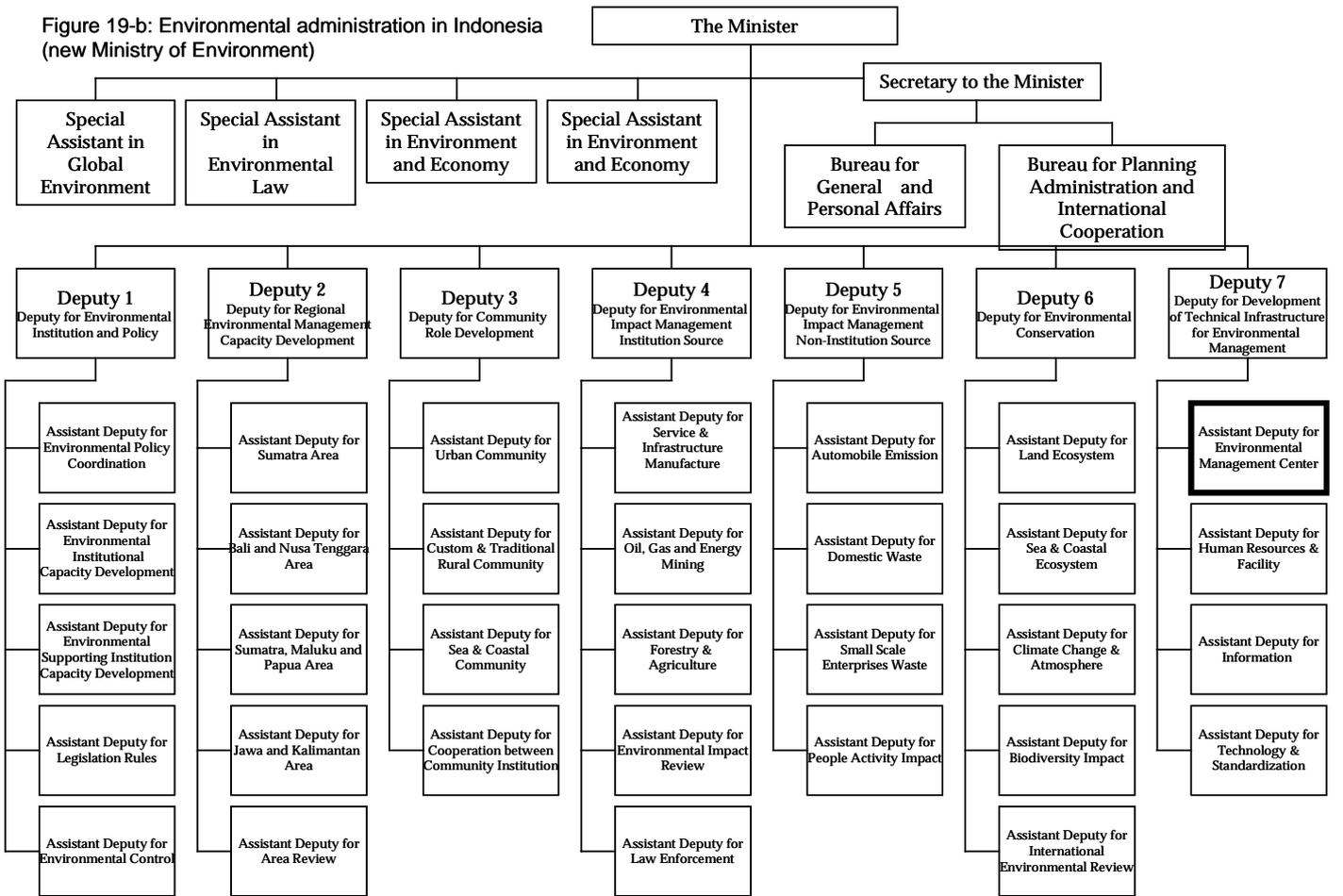
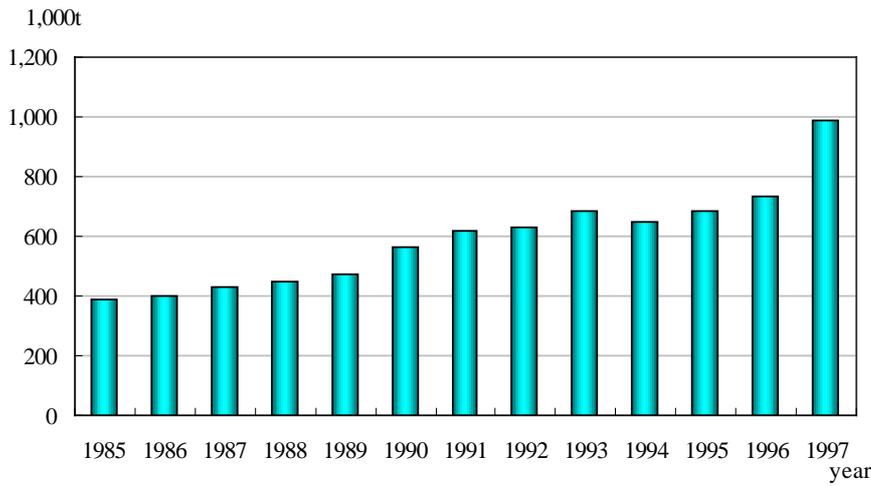
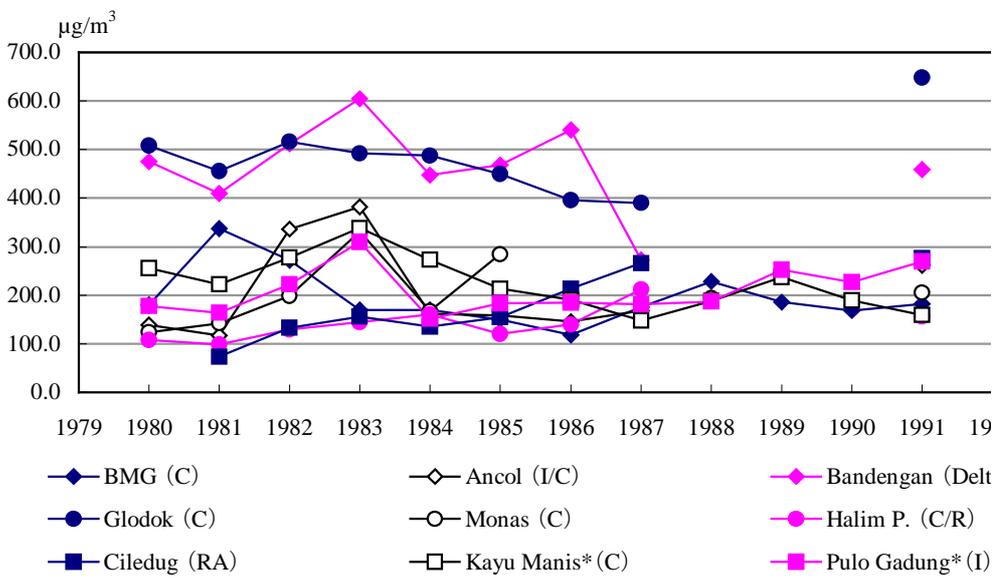


Figure 20: SO<sub>2</sub> emissions in Indonesia



Source: Streets et al. (2000)

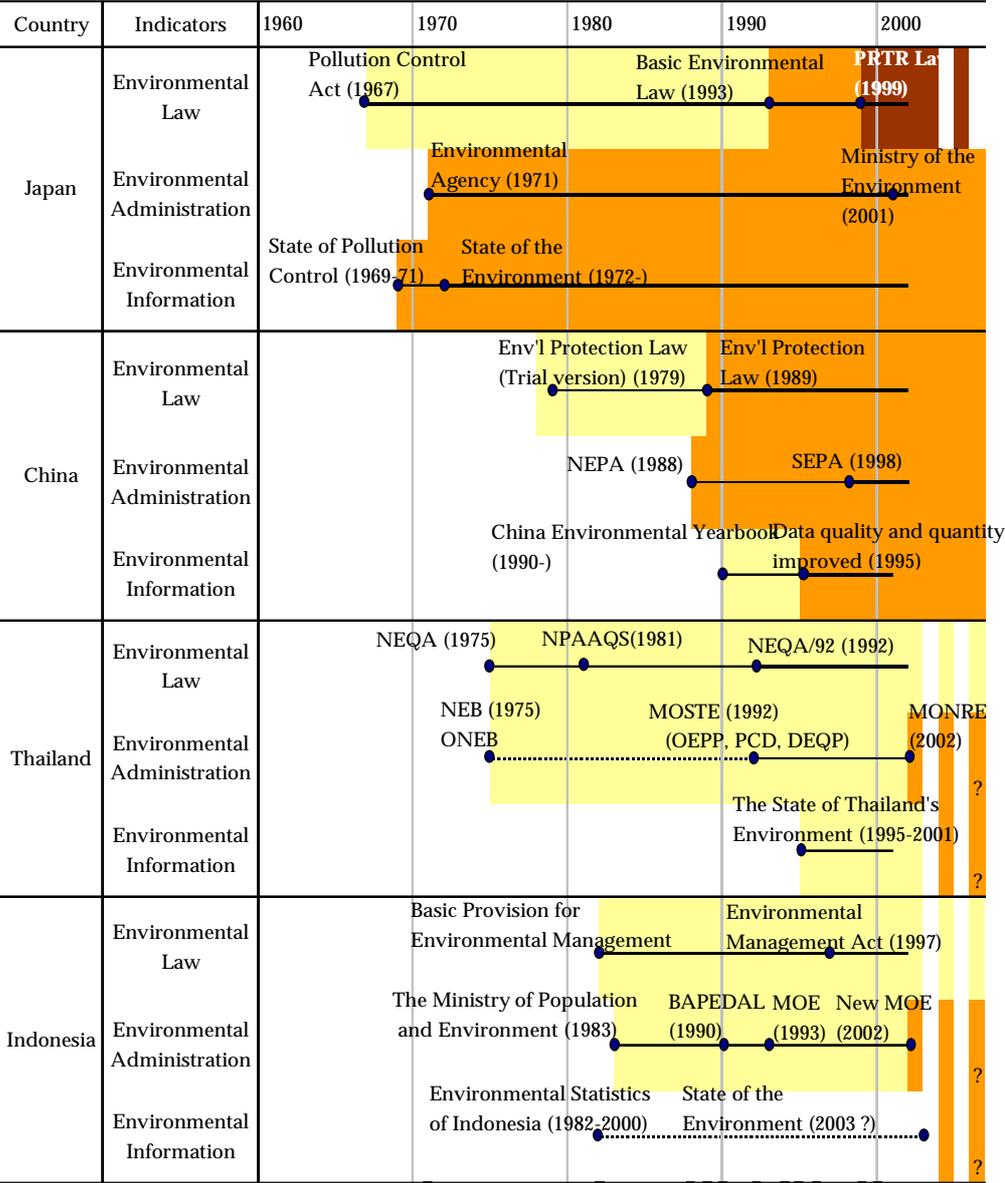
Figure 21: TSP concentration in Indonesia (Jakarta)



Note: (R), (I), (c) indicate living area, industrial area, and commercial area respectively.

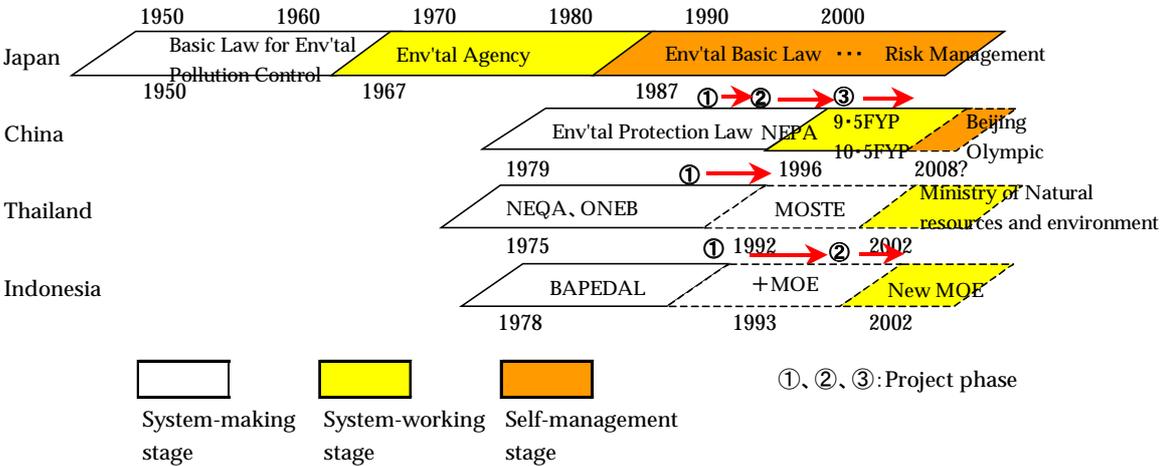
Source: World Bank (1997)

Figure 22: System-making stage in four countries



Source: The author

Figure 23: Development stages of Social Environmental Management System (SEMS)



Source: The author

## &lt;References&gt;

- Asian Development Bank [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] *Towards Comparative Institutional Analysis*, Oxford University Press.
- [2001] *Towards Comparative Institutional Analysis*, NTT Publications (in Japanese).
- Aoki, Masahiko and Okuno (Fujiwara), Masahiro (eds.) [1996] *Comparative Institutional Analysis of Economic Systems*, University of Tokyo Press (in Japanese).
- Bangkok Metropolitan Administration [2001] *Bangkok State of the Environment 2001*.
- DOE, MOSTE [1990-1997] *Environmental Quality Report*.
- 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).
- 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.
- 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*, Vol1, No.1, pp. 39-67.
- Harashima, Yohei and Morita, Tsuneyuki [1995] "A Comparative Study on Environmental Policy Development Process in East Asian Countries", *Planning Administration* (in Japanese).
- Institute for Global Environmental Strategies [2001] *Environmental Governance in Asia: Synthesis Report on Community Studies*, IGES, Kanagawa, 596p.
- International Institute for Sustainable Development, <http://www.iisd.org/default.asp>, (December 21, 2002).
- 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).
- 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", *Higashi Asia heno Shiten*, Spring Issue, pp.98-110 (in Japanese).
- 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", *Higashi Asia heno Shiten*, Autumn Issue, pp.45-58 (in Japanese).
- Li, Zhidong[1999] *China's Environmental Protection System*, Toyo Economic Publisher, \*\*p (in Japanese).
- Matsuoka, Shunji and Honda, Naoko [2002] "What is Capacity Development in Environmental Cooperation?: A Review of Capacity Development in Environment", *International Development Studies*, Vol.11, No.2, pp.149-173 (in Japanese).
- Matsuoka, Shunji et al. [2000] "A Comparative Study on Social Capacity Development for Environmental Management in East Asia," *Higashi Asia heno Shiten*, Autumn Issue, pp. 76-231 (in Japanese).
- Pollution Control Department, [1996] *Pollution Thailand 1995*.
- Nicro, S. and Apikul, C. [1999] "Environmental Governance in Thailand," Harashima, Y. (ed.) *Environmental Governance in Four Asian Countries*, Institute for Global Environmental Strategy, Kanagawa.
- O'Conner, David [1994] *Managing The Environment with Rapid Industrialization: Lessons From the East Asian Experience*, OECD, Paris, [www.cia.gov/cia/publications/factbook/geos/th.html](http://www.cia.gov/cia/publications/factbook/geos/th.html).
- OECD [2002] *Governance for Sustainable Development: Five OECD Case Studies*, OECD, Paris, 348p.
- OECD [2001] *OECD Environmental Indicators: Towards Sustainable Development*, OECD, Paris, 155p.

- OECD [2001] *The Well-being of Nations: The Role of Human and Social Capital*, OECD, Paris, 118p.
- OECD [1998] *Environmental Performance Reviews: Mexico*, OECD, Paris.
- 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.
- Streets et al. [2000] "Sulfur Dioxide Emissions in Asia in the Period 1985-1997," *Atmospheric Environment*, Vol. 34. pp. 4413-4424.
- Central Information Agency, <http://www.odci.gov/cia/publications/factbook/> (January 19, 2003).
- Global Environmental Forum [1996] *Environmental Activities of Japanese Enterprises in the World*, <http://www.env.go.jp/earth/coop/oemjc/h7.htm> (March 31, 2002).
- China Environmental Protection Network*, [www.zhb.gov.cn](http://www.zhb.gov.cn) (January 19, 2003).
- China Environmental Statistical Yearbook*, 1990 to 2003.
- State Environmental Protection Administration of China, <http://www.zhb.gov.cn/english/> (January 19, 2003).
- UNDP [2002] *Human Development Report 2002: Deepening Democracy in a Fragmented World*, Oxford University Press, New York, 277p.
- 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*, Springer, Berlin, 448p.
- World Bank, *Social Capital Home*, <http://www.worldbank.org/poverty/scapital/> (January 19, 2003).
- World Bank [2002] *World Development Indicator*, Washington, DC..
- World Bank [2000] *Greening Industry: New Roles for Communities, Markets, and Governments*, Oxford University Press, New York.
- World Bank [1997] *Urban Air Quality Management Strategy in Asia: Jakarta Report*.
- World Bank, *WBI Programs: Environmental Governance*, <http://www.worldbank.org/wbi/sdenvgovernance/> (January 19, 2003).
- World Resources Institute [2002] *Closing the Gap: Information, Participation and Justice in Decision-making for the Environment*, <http://www.accessinitiative.org> (January 19, 2003).