PART II: The Challenges of Urban Environmental Management in Asia
Urban Environmental Challenge in Asia: Current Situation and Management Strategies
Forward

Urbanization is a dominant trend all over the world. Cities cover only about 1% of the earth's surface, but the majority of humans in industrialized countries live in cities and the urban population is also increasing at a rapid pace in developing countries. Most of the environmental problems are local in nature. Even global issues such as climatic changes have their causes in local activities of individuals. It is therefore no exaggeration to state that the fate of cities will determine, more and more, not only the fate of nations but also of our planet (IHDP Report No.12).

The last few decades in the 20th century, in particular, witnessed the rapid urbanization and industrialization in East Asia including Japan, Korea, China, and ASEAN countries. The scale and speed of economic growth, urban population increase, transformation of society and their impact on the environment in the region have been drastic, only comparable to the changes that took place in Europe and North America at the time of the Industrial Revolution. The economic growth and increasing industrial production brought about material affluence in Asian cities, but at the same time caused air and water pollution and other environmental problems. How to improve environmental management of cities is therefore the key to address not only local but global environmental issues. This is why IGES launched the Project on Urban Environmental Management as one of the research projects in its Phase I activity from April 1998 to March 2001. With this in mind, the project at its start identified four study items: (i) Comparative study on the past experiences, current situations, and mechanisms of urbanization and environmental problems in Asian cities, (ii) Cities in industrial transformation: past experiences and new models for urban development and environment in Japan, (iii) Strategies for improving urban infrastructure: mass transportation, sewerage, waste management, and water and electricity supply, (iv) Strategies for improving governance in urban environmental management.

An international study team was formed to implement the project with the participation of IGES in-house researchers and researchers from universities and other institutions in Japan, Korea, China, Indonesia and other countries. Case studies were conducted in selected cities and case study teams were organized with the participation of researchers who were familiar with the local issues. Researchers of the IGES Urban Environment Project also identified their research topics and carried out studies including the comparative analysis of case studies undertaken by local study teams. Separate reports of case studies were prepared and various authors submitted papers on special topics. Finally all major findings from these exercises have been synthesized for publication in a comprehensive report. Thus this project report presents only a summary of the research output on the selected topics.

The project had to cover diverse issues in cities placed under different economic, social and natural conditions. Therefore, the project had to adopt two different approaches. Firstly, the project made efforts to collect information and data on cities placed under different conditions in order to understand their real situation and depict an overall picture of the urban environmental issues in East Asia. Then the project tried to identify the commonalities and specialties of the findings in order to draw lessons which will have a general applicability to many cities. We must confess that the project has dealt with
only a part of the whole issues. However, the project proved to be an important first step for researchers from institutions in different countries to form an international study team and work together. We believe that the continuation of such efforts will contribute to the cooperation of researchers, administrators, citizens, businesses and NGOs in the region to work on common environmental issues.

The undertaking of this project has already contributed to the advancement of international and domestic efforts for improving urban environmental management in Asia. The study findings were reported at the ECO-ASIA (The Environmental Congress for Asia and the Pacific) and other international workshops. Our recommendations that local environmental initiatives and inter-city cooperation beyond national borders should be strengthened was taken up at the United Nations ESCAP (Economic and Social Commission of Asia and the Pacific) 4th Ministerial Conference on Environment and Development in Asia and the Pacific held in September 2000 in Kitakyushu City at which the “Kitakyushu Initiative for a Clean Environment” was endorsed. In response to a request from ESCAP, the Japanese Government and the City of Kitakyushu, IGES (Urban Environment Unit and IGES Kitakyushu Office) was assigned to work in the implementation and promotion of this Initiative.

March 2001

Hidefumi Imura

Project Leader, Urban Environmental Management Project
Institute for Global Environmental Strategies

Professor, Nagoya University
Outline of the Project

1. Project Name: Urban Environmental Management Project
3. Project Members
   Project Leader: Prof. Hidefumi IMURA
   Research Staff Members:
   Research Fellow: Dr. Xuemei BAI (1998.4-2001.3)
                   Dr. Yong REN (1998.11-2000.12)
   Research Associates: Dr. Shinji KANEKO (1999.4-2001.3)
                        Dr. Masato NAKAYAMA (1998.4-2001.2)
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Prof. Peijun SHI, Beijing Normal University, China (Leader)
Prof. Myui KANG, Beijing Normal University, China
Dr. Wei GU, Beijing Normal University, China

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4. Summary of the Report

Phase I of the IGES Project on Urban Environmental Management was conducted during the three-year period from April 1998 to March 2001. Extensive studies were carried out in-house in addition to the contributions made by numerous outside collaborators. Studies were conducted by various methods including literature surveys, statistical data collection and analysis, field visits, interviews and expert workshops.

Case studies were also conducted in ten cities in Japan, Korea, China and Indonesia. Major findings of all these studies are being compiled into one report. The project covered a wide range of topics; this project report presents a summary of the entire activity, focusing on the following topics: (a) Current situation, process and mechanism of urban environmental transformation, (b) Comparative studies of urban environmental management practices in selected cities, (c) Japanese experience in environmental management and its implications for other Asian countries, (d) Financing for urban environmental infrastructure, (e) Urban transportation focusing on four mega-cities, i.e., Tokyo, Seoul, Beijing and Shanghai, (f) Municipal solid waste management and a (g) Comparative study of urban environmental governance in East Asia.

5. Keywords:

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Part II: The Challenges of Urban Environmental Management in Asia
1 Current Status, Evolutionary Mechanisms and Future Perspectives of Urban Environment in Asia
A Comparative Study of Urban Environment in East Asia: Stage Model of Urban Environmental Evolution

Xuemei Bai
Institute for Global Environmental Strategies
and
Hidefumi Imura
Nagoya University

1. Introduction

Rapidly growing urban populations and the important roles cities play in national and global economies have drawn much attention in recent years. Urban issues, including urban environmental problems, are becoming more immediate and are greatly affecting the lives of the majority of human beings, considering that about 55% of world’s population will be urban dwellers by 2015 (UN 1996). In East Asian developing countries, a rapid urbanization process is often coupled with rapid industrialization and economic development. Therefore, cities in this region, while acting as the economic growth centers of regions and countries, have become places where the most intensive and acute environmental problems occur. The diversity and complexity of urban environmental problems make it more difficult for municipalities to tackle effectively this situation.

One possible approach to deal with this diversity and complexity is to grasp the current status of the issues in the context of longitudinal dynamics (e.g., the historical process and future trends), and also in the context of horizontal varieties by carrying out a comparative study with other cities. It is the purpose of this study to examine the current status and process of urban environmental change in relation to economic development, to extract a common pattern of evolution, if any, and to find out what drives the process.

Many studies have been done on environmental problems in East Asia. Kojima (1993) analyzed the characteristics of the economic development stage in East Asia in relation to environmental problems. The conclusion drawn from this analysis was that all of the five examined factors—rapid economic growth, high industrialization ratio, rapid urbanization, mass consumption and energy efficiency—would lead the region to face more deterioration in its environment. O’Connor (1994) pointed out that the “telescoping of industrialization”, which characterizes the development path in this region, has brought a more complex and diverse set of environmental problems. While some suggest there may exist the “advantage of latecomers” (Fujisaki 1994; Hayami 1995) in dealing with environmental problems in this region, others argue that lack of institutional capacity may in fact cause more disadvantage (Nogami 1998). These existing studies recognize the magnitude, scale and complexity of environmental issues confronting the region, and warn of a deteriorating trend.
While the region's rapid economic growth is considered the driving force behind these deteriorating environmental conditions, there is also evidence showing that some of the environmental problems tend to become less serious as the economy develops. For example, Grossman and Kruger (1995) examined a broad set of environmental indicators to investigate the relationship between the scale of economic activity and environmental quality, and found little evidence that environmental quality deteriorates steadily with economic growth. Rather, they found for most indicators environmental degradation and income has an inverted U-shaped relationship, which is often referred to as the "Environmental Kuznets Curve". This was originally derived by Kuznets to show the relationship between income disparity and economic development, and became very popular after the World Bank Development Report (1992) presented evidence on the same kind of relationship between environmental quality and levels of national GDP. Many other studies (Hilton and Hank 1998; Rock 1998; Sugiyama 1997) also provide positive evidence of this relationship.

Three observations are drawn from reviewing the existing research. First, most of the research is based on comparisons at the national level, not the city level. A more focused discussion and analysis is indispensable if the ultimate purpose is to find a solution for urban managers. Second, the environmental issues addressed are mainly pollution-related, ignoring other issues such as lifestyle-related issues, and most attention is paid to environmental problems within the city, while little attention is paid to their impacts outside. Types of issues should be defined based on common causes and similar impacts, and it might be necessary to examine further the issues caused by the pattern of consumption in cities. Third, the actual evolution of environmental problems itself is seldom mentioned. While it is important to address the changes in a certain set of environmental problems in chronological order and in relation to economic development, recognition of the structural changes in major environmental issues occurring in cities is of equal or even more importance. This is because with economic development, new types of environmental issues may occur while existing problems become less severe.

This article addresses the dynamics of structural change in urban environmental issues in accordance with economic development and tries to develop a theoretical stage model of urban environmental evolution for this region. With this overall goal in mind, the authors explore the following questions: (1) How many dimensions exist to the major environmental problems confronting cities in East Asia? (2) What is the behavior of each type of problem over time and in relation to economic development? (3) Is there a common pattern in the evolution of these problems, and if yes, what is it? The following Part introduces the methodology adopted in this study. Part 3 identifies dimensions within diverse and complex urban environmental issues, and examines their behavior over time. Part 4 compares the current urban environmental status in East Asia using selected indicators. Part 5 studies the stage model of urban environmental issues based on evidence from eight case studies in the region and
discusses drives, evolving scenarios and policy implications of the proposed stage model. Part 6 discusses the features and limitations of the model and concludes with the major findings of the study.

2. Methodological Issues

The aim of this article is to present a theoretical model addressing the structural change or evolution of urban environmental issues, and to discuss the possible policy applications of this theoretical model. Though the model concept finds support from actual data indicated below, the presented model is not based on a rigorous data analysis at this time, but rather presents a theoretical basis for doing subsequent statistical data analysis. Applied to individual cities, this generalized theoretical model should take shape when based on actual data from cities.

The basic assumption underlying this approach is that development and structural changes in the economy may bring different sets of environmental problems. The methodological goal is to find evidence showing that structural changes do exist in urban environmental evolution in relation to economic development, and to present a model for this generalized trend. A three-step approach is adopted in developing this model. First, complex urban environmental issues are divided into different groups by defining dimensions of causes and effects behind the problems. Second, the behavior of each group of issues is studied in relation to economic development. By doing so, more focus is placed on the driving forces, effects and mechanisms of urban environmental issues, and they are analyzed separately rather than as a unit. Third, a current status overview of the environment is presented to show the relationship between economic development and changing environment issues; this is done by examining the cross-country differences in the urban environment during the same period of time. Chronological changes of urban environmental issues are also examined to show the dynamics of these problems within the same city; this is done through an analysis of the chronological change of issues within the case study cities. Finally, a theoretical stage model of urban environmental evolution is presented by summarizing the findings of these approaches.

3. Defining Dimensions

3.1. Types of urban environmental issues

Traditionally, urban environmental issues are divided into sectors, such as water pollution, air pollution, waste treatment and noise. By focusing on sectors of phenomena, it is easier to understand and more convenient for taking countermeasures within each sector. Therefore, this classification system is widely accepted by urban municipalities. However, this approach focuses on environmental pollution, and thus may overlook some other environmental impacts cities may cause in addition to local pollution. In addition, a sectoral approach misses opportunities for synergistic actions to reduce
environmental impacts. A focus on air pollution may overlook greenhouse gas emission issues, but a focus on transportation and energy would recognize these two issues as interlinked. Focusing on the different driving forces behind these problems, the World Resources Institute et al. (1996-1997) has divided urban environmental issues into two groups which often coexist within the same city: one associated with poverty and the other associated with economic growth or wealth. Recently, the importance of addressing the impact from consumption activities as well as the impact from production-oriented environmental problems has been recognized, and relevant studies have examined the different features of these two kinds of issues (Rothman 1998; Duchin 1998). In an attempt to highlight how the nature and relative importance of environmental problems change in cities, David Satterthwaite (1997) divided urban environmental issues into five categories, namely environmental hazards within the human environment, high levels of use of those renewable resources that are only renewable within finite limits, high levels of use of non-renewable resources, high levels of generation of non biodegradable wastes, and over-use of the renewable sink capacity.

<table>
<thead>
<tr>
<th>Type</th>
<th>Typical Issues</th>
<th>Causes</th>
<th>Major Impacts</th>
<th>Spatial Extent of Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type I: Poverty-related</td>
<td>Low access to safe water, lack of sanitation facilities, organic pollution of water bodies.</td>
<td>Low infrastructure, rapid urbanization, income disparity.</td>
<td>Sanitation-related health impacts such as diarrhea, infections.</td>
<td>Local.</td>
</tr>
<tr>
<td>Type II: Rapid-growth related issues</td>
<td>Air pollution (SOx, particulates), water pollution (heavy metallic subjects, BOD, COD), industrial solid waste pollution.</td>
<td>Rapid industrialization, low rates of emission treatment, lack of effective management.</td>
<td>Typical industrial pollution disasters, Minamata disease, Otsu disease, deterioration of regional ecosystems.</td>
<td>Local and regional.</td>
</tr>
<tr>
<td>Type III: Wealthy lifestyle-related issues</td>
<td>CO₂ emissions, NOx concentration, municipal wastes, dioxin.</td>
<td>High consumption lifestyles, low local incentives for improvement.</td>
<td>Global warming, chemical ingredient and dioxin-caused abnormalities in infants, over-extraction of resources.</td>
<td>Regional and global.</td>
</tr>
</tbody>
</table>
Type I includes poverty-related urban environmental issues such as low access to clean water supplies and sanitation facilities. Low per-capita income levels, income disparities and rapid migrations of the rural population into cities may result in city slums, where people live in small houses without proper access to water supplies and sanitation. These people are the most vulnerable to infectious diseases caused by poor environmental conditions. This type of environmental problem often occurs in cities within developing countries. The driving forces behind these types of issues are often associated with poverty, such as insufficient investment in basic urban infrastructure, rural-to-urban migrations which overwhelm the ability of cities to provide basic services, and income disparities among residents in the city. Human health impacts are the most serious problem associated with this type of problem. The impacts of this type of problem are usually local and internal in nature, and often limited within the city or even to a particular section of the population within the city.

Type II includes industrial production-associated issues. Typical production oriented-environmental pollution such as air pollution by SOX and particulates, water pollution by heavy metallic substances, and industrial solid waste pollution are categorized into this type. In East Asian countries, cities are acting as the engines of economic growth, with most of the countries’ industries located within cities. Therefore this type of urban environmental pollution is significant. The driving forces behind this type of issue can be identified as rapid industrialization and urbanization, inadequate treatment of emissions, outmoded or obsolete technology, and lack of strict regulations and effective management. The most typical impact of this type of urban environment issue is the industrial pollution disaster. Minamata disease, which occurred in Minamata City in Japan, and Onsan disease in Onsan Industrial City in Korea are two typical examples. The spatial range of impacts of this type of problem (for example, river pollution by cities and acid precipitation and deposition) can be regional as well as local.

Type III includes consumption and lifestyle-related issues. Cities need significant amounts of input from outside in order to function on a daily basis, and, as a result, also create large outputs. Inputs consist of energy, food and other materials, and outputs include pollution, wastes, goods and services. Current lifestyles are characterized by mass production, mass consumption and mass disposal, which means that the amount of both inputs and outputs usually far exceeds the environmental capacity of the city. Because of this metabolism, these environmental impacts are not restricted to the city itself, but become regional or even global. These impacts include overconsumption of resources, loss of biodiversity, increased amounts and treatment of municipal waste and increased CO₂ emissions. Unlike the two former types, this third type of problem is often invisible to local residents, and thus in many cases is not recognized as a problem. In wealthy cities of developed countries, the first two types of traditional environmental issues are not significant any longer, but the third type of problem is much more significant in cities in developed countries than in developing countries. In addition to the high-consumption lifestyle, the driving forces behind this type of urban environmental issue include low
local incentives for improvement because these problems are relatively easy to externalize and are often perceived as costly to control (Rothman 1998).

These three types of urban environmental issues occur at different stages of urban development, often sequentially, but not necessarily. Different types may occur simultaneously, for example Type I and Type II; Type II and Type III; or even Type I, Type II and Type III. The occurrence of different types of issues at different stages of urban development will be discussed in more detail later in this article.

3.2. Behavior of typical issues in relation to economic development

Evidence shows that poverty-related urban environmental issues (Type I) tend to improve as the economy develops and income grows (Figure 1.a). This trend continues until the levels reach a significant low. This positive synergy between economic growth and environmental quality is possible because growing incomes at any level may provide additional resources and capacity to improve public services; further, the nature of these problems displays greater visibility than other types of issues (World Bank 1992).

Figure 1. Behavior of each type of urban environmental issue in relation with economic growth

![Diagram showing severity of problems vs. economic growth](image)

Note: (a) poverty-related issues (population without safe water, population without adequate sanitation), (b) industrial pollution-related issues (urban concentration of particulate matter, urban concentration of sulfur dioxide), (c) consumption-related issues (municipal wastes per capita, carbon dioxide emissions per capita) (World Bank 1992, p11).

Most production-related pollution (Type II) follows the pattern of initially worsening but then improving as incomes rise (Figure 1.b). This pattern is often referred to as the Environmental Kuznets Curve (EKC). Results from studies of urban air concentrations of sulfur dioxide, suspended particles, lead and carbon monoxide and water quality as indicated by biological oxygen demand (BOD), chemical oxygen demand (COD), pathogenic contamination and heavy metals contamination support this hypothesis (Grossman and Kruger 1995; Hilton 1998; World Bank 1992; Seldon and Song 1992).
Grossman and Kruger’s (1995) study indicates that in most cases the turning points for the different pollutants occur before a country reaches a per capita GDP of U.S.$ 8000. Interpretation of this inverted-U shaped pattern varies, encompassing environmental regulation, structural changes in the economy, technological improvement, energy efficiency and trade.

Consumption-related urban environmental issues (Type III) have a tendency to worsen, or at least not improve like production-related issues, as incomes grow (Figure 1.c). This trend is observed in cases of municipal waste per capita, carbon dioxide emissions per capita, energy demand, fuel and power use per capita and many other indicators for environmental impacts of consumption (World Bank 1992; Rothman 1998; Agras and Chapman 1999; de Bruyn and Opschoor 1997; Suri and Chapman 1998). Several reasons may exist for this worsening pattern, such as: (1) these problems usually cause no visible local harm, or their negative impacts are limited to a small group of people; (2) the impacts can easily be externalized; and (3) municipal government and industries have few incentives to take countermeasures. The future trend of this type of issue is uncertain; it is unknown if it will continue increasing, stabilize at a certain level, or decrease after reaching a certain level. In the latter two cases, the income level corresponding to a stabilizing level or turning point is not clear. However, it seems far beyond the income level of today’s richest cities, considering the fact that there is no evidence showing a turn in growing consumption and lifestyle in any cities to date, despite various government initiatives to change the consumption pattern (OECD 1998).

4. Current Urban Environmental Issues in East Asia

In order to identify the cross-country differences between major current environmental issues faced by East Asian cities, this study compares features of the urban environments in three countries: Japan, Korea and China. Four sets of indicators have been selected to describe three types of urban environmental issues, including background information.

Data used for the following comparison consists of country-level data, average values for all or major cities in the country, and individual city-level data. Some country-level data are used out of necessity to provide a general picture of the social economic situation of each city. Average values of cities are used partly because of lack of individual city data, and partly because the purpose of this section is to show the differences in general trends in the urban environment in the three mentioned countries rather than differences among individual cities. A major obstacle in conducting this cross-country comparison was lack of complete data at the city level and the comparability of the available data. Due to the limited availability of data, not all the listed indicators are compared.
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<td>Population</td>
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<td>Population growth ratio</td>
</tr>
<tr>
<td>Industrialization level</td>
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<td>Economic indices</td>
<td>Economic composition ratio</td>
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<td>Average wage</td>
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<td>Health</td>
<td>Gini coefficient</td>
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<td>Calories per capita per day</td>
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<td>Infant mortality</td>
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<td>Incidence and death from infectious diseases</td>
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<td>Welfare</td>
<td>Per capita medical expense</td>
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<tr>
<td></td>
<td>Amount and ratio of subsidies or relief funds</td>
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<td></td>
<td>Illiteracy ratio</td>
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<tr>
<td>Infrastructure</td>
<td>Access ratio to water supply</td>
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<td>GDP growth rate</td>
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<td>Industrial composition</td>
<td>Industrial product growth rate</td>
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<td>Environmental pollution</td>
<td>Share of each industry</td>
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<td>SOx concentration</td>
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<td>Water</td>
<td>Suspended particulates concentration</td>
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<tr>
<td></td>
<td>BOD</td>
</tr>
<tr>
<td></td>
<td>COD</td>
</tr>
<tr>
<td></td>
<td>Heavy metals</td>
</tr>
<tr>
<td>Solid waste</td>
<td>Total amount of industrial solid waste</td>
</tr>
<tr>
<td>Pollution treatment</td>
<td>SOx elimination facilities ratio</td>
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<td></td>
<td>Industrial waste water treatment</td>
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<td></td>
<td>Industrial solid waste treatment</td>
</tr>
<tr>
<td>Resource use by industries</td>
<td>Water extraction by industries</td>
</tr>
<tr>
<td></td>
<td>Energy use by industries</td>
</tr>
<tr>
<td></td>
<td>Material use by industries</td>
</tr>
<tr>
<td>Health impacts</td>
<td>Incidence of pollution related diseases</td>
</tr>
<tr>
<td></td>
<td>Incidence of pollution related disasters</td>
</tr>
</tbody>
</table>

| **Consumption-related** | |
| Resource consumption | Per capita energy consumption |
| | Per capita water consumption |
| | Per capita food consumption |
| | Ecological footprint |
| Waste discharge | Per capita municipal waste |
| Lifestyle index | Automobile population ratio |
| Pollution | Possession of electric devices |
| | NOx concentration in air and water bodies |
| | Air, water and soil pollution by chemical substances such as dioxin |

4.1. Selection of indicators

Four sets of indicators were defined to compare the characteristics of the current urban environmental situation. Table 2 shows the major items included in each set and their indicators.

The first set of indicators provides background information at the country level for this comparison. This background information is important because cities influence and are influenced by surrounding areas of the country. This set of indicators mainly consists of data on urbanization, industrialization, economic development and education. Indicators for each of these aspects are the urbanization ratio, economic composition and per capita income.

The second set mainly consists of indicators for poverty-associated urban environmental (Type I) issues. The following indices and indicators are included in this group: (1) Income level and its distribution among urban dwellers, with detailed indicators such as per capita income, income distribution patterns and Gini coefficients; (2) nutrition, public health and welfare, with detailed indicators such as nutritional conditions, daily calorie intake per capita, drinking water quality
indicators, infectious disease incidence rates, infant mortality ratios, and per capita medical expenses; and (3) basic infrastructure, such as the percentage of the population with access to water supply and sanitation. This group of indicators reflects the basic living conditions and services available to citizens. A city facing typical poverty-associated environmental issues will have indicators showing low levels of income, welfare and basic infrastructure.

The third set of indicators mainly reflects urban environmental issues caused by rapid economic growth and industrialization (Type II). Indicators include: (1) growth ratio of economy, such as incremental ratio of GDP and incremental ratio of industrial outcome; (2) ambient environmental pollution, such as air pollution, water pollution and industrial solid waste pollution; (3) pollution treatment, such as sewage water treatment ratio, municipal waste treatment ratio and industrial waste water and solid waste treatment ratio; and (4) the health impact caused by pollution, such as the occurrence of environmental accidents and typical environmental diseases. If indicators show a city has high economic growth, high industrial pollution and a low pollution treatment level, as well as significant environment-related health impacts, then it means the city is confronting typical industrial production-related environmental issues.

The fourth set is the measure of consumption by urban dwellers (Type III). It mainly includes per capita resource and material consumption, such as per capita energy consumption, per capita water resource consumption and per capita food consumption and associated emissions such as CO₂ and municipal waste discharge. Indirect indicators such as car ownership ratios can also be used. Wealthy cities in developed countries show much higher levels for these indicators than cities in developing countries.

4.2. Comparative study on current urban environmental status in East Asia

Using the above indicators, current urban environmental situations in three East Asian countries—Japan, Korea and China—are compared as follows.

Table 3. Comparison of background indicators

<table>
<thead>
<tr>
<th></th>
<th>China</th>
<th>Korea</th>
<th>Japan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urbanization Ratio</td>
<td>31.02%</td>
<td>82.28%</td>
<td>78.26%</td>
</tr>
<tr>
<td>Per capita GDP</td>
<td>U.S.$ 671</td>
<td>U.S.$ 10,644</td>
<td>U.S.$ 36,575</td>
</tr>
<tr>
<td>Per capita GDP (ppp)</td>
<td>U.S.$ 2,546</td>
<td>U.S.$ 9,976</td>
<td>U.S.$ 17,519</td>
</tr>
<tr>
<td>Take-off Time of Economy</td>
<td>The early 1980s</td>
<td>The late 1960s</td>
<td>The mid-1950s</td>
</tr>
</tbody>
</table>

Table 3 shows a comparison of country-level background indicators. Both the urbanization ratio and per capita GDP of China are far below that of Korea and Japan, though the income disparity is reduced if measured in terms of purchasing power. The economic composition of Korea and Japan shows a similar pattern, while in China there is a large agriculture sector and a much smaller service sector. It should be noted that the production industry in China has a 48% share of the GDP, which is even higher than Korea’s 43% and Japan’s 41%. This indicates the importance of the production industry in the Chinese economy. The start of the high-growth era in these three countries vary: Japan in the middle of the 1950s, Korea in the end of 1960s and China in the beginning of 1980s. Through these comparisons it can be seen that Japan was the first to enter the high-growth era and has the most advanced economic structure and highest per capita income, while China comes last and Korea is located in between.

Figure 2. Comparison of poverty-related urban environmental indicators

- a: Infant mortality (per 10,000 people)
- b: Mortality of children under five (per 10,000 people)
- c: Urban population receiving subsidies from government (per 10,000 people)
- d: Access to water supply (%)
- e: Sewage treatment ratio (%)

Note: Data for China are mostly average values for 34 cities; data for Korea are average values of 6 to 7 major cities; data for Japan are average values for 13 major cities. Water supply and sewage treatment ratio data for China and Korea are average values for all cities (Urban Statistical Yearbook of China 1998; China Environmental Statistics 1998; China Population Statistics Yearbook 1997; Municipal Yearbook of Korea 1997; Korea Statistical Yearbook 1997; Homepage of Ministry of Construction in Japan <http://www.moe.go.jp/city/newpage/information/b10tuku990903.htm> (19 June 2000); Comparative Statistics Yearbook of Large Cities in Japan 1998).

Figure 2 shows indicators of poverty-associated urban environmental issues. Compared to China, urban dwellers in Korea and Japan enjoy a much higher level of welfare and health care, as indicated by low infant mortality and young child mortality. The percentage of urban dwellers receiving subsidies and relief funds is much lower than that of Japan and Korea. Considering the much lower income level of cities in China than in Korea and Japan, this low ratio of subsidy should be interpreted
as resulting from a lack of social welfare rather than a low ratio of urban population suffering from poverty. Regarding access to urban infrastructure, Chinese cities have relatively high rates of access to water supplies, but very low levels of sewage treatment. The actual water supply situation in Chinese cities may be not as good as the numbers indicate because periodic water shortages are very common. This happens because water is becoming a very scarce resource due to natural constraints, water pollution and, to some extent, mismanagement. Cities in China still have some poverty-associated problems, while there is hardly any such evidence of this for cities in Korea and Japan.

Figure 3. Indicators show speed of economic growth and urbanization

![Graph showing GDP Growth Rate, Urbanization Rate, and Industrial Value Added Growth Ratio for China, Korea, and Japan.]


Figure 3 compares indicators showing the speed of economic growth. Out of all three countries, China has the highest growth rate of a GDP over 10.7%, an urbanization rate of 3.7% and an industrial production incremental rate of 14.1%. A relatively high rate of economic growth is also indicated for Korea with a GDP growth ratio of 8.98%, an urbanization rate of 2.4% and an industrial production incremental rate of 10%. Japan has a very slow growth rate compared with the other two, which may indicate that it has a relatively mature economy.

A comparison of ambient air pollution in the capital cities of China, Korea and Japan (Figure 4) shows Beijing has the worst air quality among the three. The total suspended particulates in Beijing is 370 μg/m³, which is 4.4 times higher than Seoul’s level and 7.7 times higher than Tokyo’s level, far beyond the WHO Guidelines (60-90 μg/m³). Sulfur dioxide follows a similar pattern, with Beijing’s

1 WHO guidelines for annual average sulfur dioxide are 40 to 60 μg/m³.
level at 94 μg/m³, Seoul’s at 48.6 μg/m³, and Tokyo’s at 20 μg/m³. Even NOx concentrations are much higher in Beijing than in Seoul and Tokyo.

![Figure 4. Ambient air pollution in typical cities](image)


<table>
<thead>
<tr>
<th></th>
<th>China¹</th>
<th>South Korea²</th>
<th>Japan³</th>
</tr>
</thead>
<tbody>
<tr>
<td>SO₂ (µg/m³)</td>
<td>126.6</td>
<td>41</td>
<td>15.6</td>
</tr>
<tr>
<td>NOx (µg/m³)</td>
<td>69.6</td>
<td>51.66</td>
<td>48.2</td>
</tr>
<tr>
<td>TSP (µg/m³)</td>
<td>410</td>
<td>75.6</td>
<td>35.9</td>
</tr>
</tbody>
</table>

Notes:  
¹ Data for China is the average of the values for 30 cities, and selection of cities may vary for each indicator (China Environmental Statistics 1998).  
² Data for South Korea is average of the values for 6 to 7 major cities (Korea Environment Agency 1998).  
³ Data for Japan is average of the values for 13 major cities (Comparative Statistic Yearbook of Large Cities 1997).  
⁴ NOx data for China, and NO₂ data for Korea and Japan.

Table 4 shows the average air quality for cities in China, South Korea and Japan. From the table it can be seen that the average air quality in the three countries follows the pattern of that of their capital cities for two indicators out of three. NOx concentration is not directly comparable for all three countries, but Japan’s number is lower than that of Korea. According to Environmental Statistic Yearbook ‘97, environmental pollution has become one of four major factors affecting health and
mortality in China (China State Statistical Bureau 1997). In 1996 alone, 65 pollution-related accidents occurred in China, causing typhoid, dysentery, viral hepatitis, and other intestinal infectious diseases. Survey results on the causes of these accidents show that 41.5% are caused by municipal sewage discharge and 33.8% by industrial pollution (China State Statistical Bureau 1997).

Figure 5. Average air pollution trends for 6 major Korean cities

![Graph showing average air pollution trends for 6 major Korean cities.](image)

Source: Korea Environment Agency (1998)

Figure 5 shows the chronological changes in average SO₂ and TSP concentrations in major Korean cities, which indicates the air quality in Korean cities has greatly improved since the early 1990s. Through the comparison of these indicators, it can be presumed that China is undergoing a high-growth and high pollution course of development, with significant environmental impacts. Korea maintained a high-growth ratio until the Asian crisis and is still in the course of economic development, but its urban environmental condition has improved greatly. At least from examined indicators, Japan has the best urban environmental status of the three countries, which may mean it has overcome production-related urban environmental pollution problems.

Consumption-related indicators are compared in Figure 6. All the three compared indicators show the lowest levels in the case of China, with the highest values recorded for Japan and Korea. Per capita electricity consumption in China is 1/2 that of Korea and 1/5 that of Japan. Per capita municipal water consumption in China is a little more than half that of Korea. Car ownership in China is growing quickly but is still very low. Major indicators for Korea are located in between China and Japan, and Korea still has some areas to grow in terms of consumption. Some coastal cities in China are also facing typical consumption-related issues, such as NOX concentration due to the rapid growth of
private car ownership. Japan's indicators have high values, showing that Japanese cities are facing typical consumption-related urban environmental issues.

Figure 6. Average consumption-related indicators in cities

- Electricity consumption (10kwh/household)
- Municipal water consumption (l/day/capita)
- Car possession in Beijing, Seoul and Tokyo (number of cars/1000 people)

Note: Data for China are average values of 45 major cities; data for Korea are average values of 6 major cities; and data for Japan are average values of 13 major cities (Comparative Statistic Yearbook of Large Cities 1997; Municipal Yearbook of Korea 1997; Urban Statistical Yearbook of China 1998; Statistical Yearbook of China 1997).

Through the above comparison, the cities of the three compared East Asian countries face the following urban environmental issues:

(1) The major urban environmental issues confronting cities in China are industrial production-associated issues. Many indicators show that these problems show no signs of improvement; rather, they tend to be worsening (SEPA 1998). Chinese cities also have poverty-associated issues, and in some coastal cities, consumption-related problems have begun to occur.

(2) Cities in Korea have experienced and passed through the most serious period of production-associated urban environmental problems, with typical pollution being controlled. Urban environmental issues in Korean cities are transitioning from pollution-dominated production-associated issues towards consumption-related issues.

(3) Japanese cities are confronting typical consumption-related urban environmental issues, having overcome poverty-associated issues and most production-associated pollution problems. Recently, many municipalities in Japan are making efforts to deal with consumption-related environmental issues.
issues and have started to explore the idea of a recycling-based eco-city (Kitakyushu Environmental Bureau 1996), though few signs show these efforts have led to concrete results.

Two points need attention concerning the above comparison. First, poverty-associated issues in Chinese cities are not significant considering its low per capita income, which is a phenomenon observed in other studies as well (Mathur 1994). The reasons for this are thought to be the following two: (1) under the socialist political system and planned economy, the Chinese government paid more attention to improving the basic living conditions of urban dwellers than rural dwellers, and (2) there are still very large population gaps between cities and rural areas in China. A recent study shows that income in cities can be 3 times higher than income in rural areas, and that China's strict registry system prevents the rural poor from pouring into cities, which in turn prevents poverty moving from rural areas to the cities (Yi 1999). Once this strict control is loosened, cities will face the tremendous pressure of migration from rural areas, and thus will face the challenge of increasing urban poverty-associated issues. Recent research shows that there is a large transient population in cities in China, but little is known about its current status (Huang 1999). Some of this transient population are registered and have a temporary residential cards, and others are unregistered. This unregistered urban transient population is the most vulnerable to poverty-associated urban environmental issues because these people usually live in substandard makeshift housing without water supplies and sanitation and have no access to social welfare.

Secondly, it can be observed that the current urban environmental issues facing cities in Japan have rather simple causes related to consumption, and they become more complicated in Korea and much more so in China. Though the most challenging issues in Chinese cities are worsening production-associated industrial pollution problems, some poverty-associated issues still remain and consumption-related issues still continue to burgeon in some coastal cities. Thus, cities in China are facing much more complex environmental issues at a stage of low per-capita income, which makes it much more difficult to solve these problems.

5. Chronological Analysis: Stage Model

This Part examines the chronological evolution of environmental issues in selected case study cities in East Asia. Based on these examinations, a stage model of urban environmental issues is proposed, and a possible future trend from this stage model is indicated.

5.1. Evidence from case studies

As part of the ongoing case studies conducted by the Urban Environmental Management project at the Institute for Global Environmental Strategies, 8 case study cities—3 from China (Shenzhen, Jiangyin and Dalian), 2 from Korea (Ulsan and Ansan), 1 from Indonesia (Tangerang) and 2 from Japan
(Kitakyushu and Ube)—were selected and examined in this study. The dynamics of urban environmental change in each of the cities were studied by local case study teams, and based on their findings, the phases of urban environmental change in each city were defined. Some modifications to the definition of phases were made after further personal communication with local case study team members.

Only three typical cities, one city each from China, Korea and Japan, are selected and described in detail. This is partly due to space limitations, and more importantly because of the similarities in the evolutionary process of major urban environmental issues among cities in the same country. For example, Ube City's process of environmental change is similar to that of Kitakyushu, while Shenzhen and Dalian are more or less similar to Jiangyin. However, the observations drawn below are based on a comparison of all case studies. Further details can be found in case study reports presented by local case study teams (Wang et al. 1999; Shi et al. 1999; Xia et al. 1999; Soerjani et al. 1999; Kim et al. 1999; Katsuhara et al. 1999; Ukita et al. 1999).

a. Kitakyushu City, Japan

Phase I (1955 to 1970). Driven by economic growth and heavy industrialization, the urban environment in Kitakyushu deteriorated rapidly. Coal dust and SO₂ concentration in the air reached levels hazardous to health, while water pollution caused by industrial wastewater discharge earned the rivers and gulf water of Kitakyushu the nickname Sea of Death.

Phase II (1970 to 1985). During this phase, production-associated air pollution such as dust and SO₂ concentration was reduced significantly, and water pollution was reduced owing to strict industrial discharge control and the construction of basic urban infrastructures like the sewage system. Also during this period, the number of cars in use increased, and associated problems such as NO₂ arose.

Phase III (1985 to 1990). Raw material industries, which were the engine of Kitakyushu's economic growth, tended to decline in this phase, while assembly industries and service industries increased. Car ownership continued to increase, and the municipal government drew up a Car Pollution Control Plan. Major urban environmental issues were living-environment related, such as noise, vibration, odor, ozone and NO₂, which remained high. Attention was now directed towards deteriorating urban amenities and away from production-associated urban environmental issues.

Phase IV (1990 to present). While traditional pollution problems caused by industrial production and lack of urban infrastructure are no longer significant, new kinds of environmental problems have

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<sup>2</sup> The definitions of phases for each city are based on the discussion materials presented by case study team leaders during the second project meeting, and are partly modified through subsequent personal communications with the authors. Contributors are as follows: Ruzong Wang (Jiangyin City), Peijun Shi (Shenzhen City), Guang Xia (Dalian City), Hoetsong Jeong (Ulsan and Ansan City), Ken Katsuhara (Kitakyushu City) and Masao Ukita (Ube City).

<sup>3</sup> Note that the phase number here does not correspond to all cities, and is different from the later stage numbers.
emerged. A consumer lifestyle leading to increasing waste incineration has become the major source of toxic chemical substances such as dioxins. These chemicals pollute water and soil, and the effects on human health, such as endocrine disruption, have been observed. In order to tackle these new types of urban environmental problems, the Kitakyushu municipality is determined to achieve a recycling-based society, and among various efforts, started the construction of an eco-town project aimed at reducing municipal and industrial waste.

b. Ulsan and Ansan City, Korea

*Phase I (before 1963).* Until 1963, Korea was a traditional agricultural society with few industries. The major target of society was combating poverty, and no severe environmental pollution occurred in cities.

*Phase II (1963 to mid-1970s).* An industrialization and urbanization process started during this period with the introduction of polluting heavy industries in Ulsan City. Though the number of polluting heavy industries was still small at this stage, air and water pollution began to occur. Fisheries production decreased partly because of sea pollution.

*Phase III (mid-1970s to mid-1980s).* A large number of heavy industries gathered in Ulsan, and due to metropolitan industrial relocation implemented by Seoul, polluting industries were relocated to Ansan City. Worsening air and water pollution caused acute pollution-related diseases, and many fisheries were forced to close. Public awareness of urban environmental issues increased.

*Phase IV (mid-1980s to mid-1990s).* Pollution was still cumulating, and urban municipal waste increased. The number of cars increased rapidly, with the construction of huge apartment complexes and development of urban sprawl. Ulsan dwellers close to industrial plants were relocated, and pollution-related acute diseases decreased. Stricter regulations on industrial pollutant discharge were introduced, which contributed to improvement of the environment.

*Phase V (mid-1990s to present).* Traditional environmental pollution has improved greatly, and along with entering a mass consumption society, Ulsan and Ansan City faced new types of urban environmental issues such as NO₂ concentration and endocrine disruption by environmental hormones. Efforts such as eco-city construction have been made by municipalities to tackle these new types of urban environmental issues.

c. Jiangyin City, China

*Phase I (1950 to 1965).* Occurring shortly after the establishment of the People’s Republic of China, this period was devoted to economic recovery. The industrialization level was very low, and the
productivity of the few existing industries was also low. The major environmental problem during this period was the degradation of the natural ecosystem, such as deforestation and soil erosion due to inadequate rural development. There was no significant pollution problem.

**Phase II (1966 to 1978).** This period corresponds to the Cultural Revolution in China. Major urban environmental problems were poverty-related ones, such as a shortage of food, infrastructure and housing. Urbanization was slow under a policy that strictly controlled the urban population. Small industries started to develop in the city.

**Phase III (1978 to 1991).** Jiangyin was upgraded from a county into a city during this period. The city experienced a rapid growth of the Township and Village Enterprises (TVEs), including polluting heavy industries. While the prosperous TVEs improved living standards for those in the city, they also brought serious urban environmental problems such as water and air pollution. These production-related environmental issues caused many pollution accidents, and complaints from citizens rose. Ecosystem deterioration, acid rain and deforestation also occurred on a large scale.

**Phase IV (1992 to 1996).** With the accelerating economic development and rapid growth of the city, large scale industrial development projects and infrastructure construction such as sewage treatment plants were carried out during this period. In addition to industrial discharge, municipal wastewater also became a source of water pollution. Other typical urban environmental issues, such as air, noise and solid waste pollution, were also worsening. A deteriorating urban environment resulted in eutrophication of lakes, environment-related diseases and the weakening of ecosystem services. Various environment-related legislation and regulations were established, and efforts were made to introduce cleaner production technology into the city’s industry.

**Phase V (1997 to present).** Huge investments were put into the building of an environmental infrastructure during this period. At the same time, various countermeasures were taken to improve the city’s environment, such as strict execution of environmental legislation, institutional reform of TVEs and the introduction and implementation of ISO 14000. As a result of these efforts, the city’s environmental quality has improved greatly and now meets national standards. The deteriorated ecosystem has been partly restored. The municipality is now eager to introduce environmentally sound eco-industries, and is determined to change the city into an eco-city. The city is cited by the central government as a model Eco-culture City.

The following are major observations made after comparing the urban environmental evolutionary process in the case study cities:

1. There are great similarities between urban environmental evolutionary patterns among cities of the same country. For example, in all three Chinese cities—Shenzhen, Dalian and Jiangyin—the dominant urban environment issues before 1978 were poverty-associated issues, such as lack of urban infrastructure, housing and food supplies; while from 1980 to the present they are related to industrial
urban environmental pollution, with the occurrence of consumption-related issues in some wealthy cities. In the two Korean case study cities, up to the mid-1960s the major problems were poverty-associated. From the mid-1960s to the mid-1990s production-related issues worsened, peaked and then improved; and from the mid-1990s both cities encountered consumption-related issues such as increasing car ownership and municipal waste problems. In the two Japanese case study cities, Kitakyushu and Ube, the only major urban environmental issues before 1955 were poverty-associated issues, which greatly improved by the 1970s, and from 1955 to 1985 the major issues were production-associated pollution problems. From 1985, both cities entered the mass consumption era and faced similar new types of urban environmental issues such as chemical toxins from municipal solid waste incineration. Since the mid-1990s, both Japanese case study cities started efforts to realize a recycling-based sustainable eco-city.

(2) Two chronological phenomena can be observed. The first one is that the same problems occurred in Japanese cities first, then in Korean cities, and lastly in Chinese cities. For instance, production-related pollution problem in cities of the three countries began in the 1950s, 1965 and 1980 respectively; while the time at which consumption-related issues became a major urban environmental problem is 1980 in Japan and the 1990s in Korea. This corresponds with observations made by researchers who record the same evidence of a “flying geese pattern” of industrial development among these three countries (Ezaki 1994). Second, within the same city, different types of major urban environmental issues occur chronologically, following the pattern of poverty-associated issues first, then production-associated issues, and finally consumption-related issues. This sequential characteristic appears more clearly in the case of Japanese cities than in Chinese cities.

(3) The dominant time period of production-related urban environmental issues tends to be shortening, and problems confronting cities today tend to be more complex than in previous decades. For example, while Japanese cities are facing consumption-related urban environmental issues today, Chinese cities are facing lack of infrastructure, production-associated issues, and some consumption-related issues simultaneously. This is partly because Chinese cities started their urbanization and industrialization process with a much weaker economic base compared with that of Japan, a phenomenon sometimes referred to as the “telescoping of industrialization” (O’Connor 1994).

(4) Current major urban environmental problems confronting all three Chinese case study cities are production-associated pollution problems, with some remaining poverty-associated issues and newer occurrence of consumption-related issues. Korean cities started to overcome major production-associated issues such as water and air pollution recently, and are now facing consumption-related issues. The Japanese cities are confronting typical consumption-related issues, and both municipalities are making efforts to overcome these problems by changing their society into a more recycling-based, zero-emission urban society.
5.2. Stage model of urban environmental evolution

As discussed above, major environmental problems confronting cities are different at different stages of urban development, and there exists some common features in the evolutionary pattern of these changes in East Asian cities. This Part presents a stage model representing current urban environmental evolutionary paths in East Asia, and tries to indicate potential alternative scenarios in urban environmental evolution.

a. Description of stage model

As described in Section 3, urban environmental issues can be divided into three groups—poverty-associated issues, production-associated issues and consumption-related issues—each of which presents different behavior in the course of economic development. Given a particular city and a particular time period, one of these three types of issues usually becomes the dominant problem, and shifts in order of prominence sequentially over time.

Many cities experienced the evolution of urban environmental issues sequentially from poverty-associated issues to production-associated issues, and then to consumption-related issues. From the viewpoint of environmental impacts and sustainability, the final and ideal stage of a city is one that has neither poverty-related environmental problems nor production-related problems, and with minimal external environmental impacts caused by consumption. According to the above discussions, four stages can be defined in urban environmental evolution:

Stage I: Poverty stage
Stage II: Industrial pollution stage
Stage III: Consumption stage
Stage IV: Sustainable eco-city stage

Figure 7 shows a typical stage model in relation to major urban environmental problems. This model conceptualizes the evolutionary process experienced by cities in developed countries such as Japan. As indicated in the figure, parts of Stage III and Stage IV are only predicted trends and assume that as eco-efficiency improves, citizens will change their lifestyles and develop greater environmental consciousness, and that currently growing environmental impacts of consumption-related issues will not surpass the limitations of the earth’s natural ecosystem.
Cities in China, Korea and Japan are at different economic development stages and are facing different urban environmental issues. This is illustrated by Figure 8, which shows the current stages of urban environmental evolution for cities in the three countries.
b. Driving forces of evolution and alternative evolutionary scenarios

Many cities in developing countries are at relatively early stages of evolution and so the possibility of taking a different evolutionary path from the one illustrated in Figure 7 is still open. Ideally, there could be four different scenarios of urban environmental evolution:

Scenario 1: Stage I → Stage II → Stage III → Stage IV
Scenario 2: Stage I → Stage II → Stage IV
Scenario 3: Stage I → Stage III → Stage IV
Scenario 4: Stage I → Stage IV

There is a possibility that all four evolutionary scenarios may stop at a certain stage or even retreat back down the ladder. This may happen due to catastrophic events when the environmental impacts of cities exceed the limit of the natural ecosystem, and the capacity of the ecosystem is reduced or even destroyed. Discussions hereafter are based on the assumption that at each stage, the environmental impact does not exceed this critical level and thus the evolutionary scenario may continue.

The overall vector of driving forces defines the actual choice of scenario, which is the sum of internal driving forces and external pressures. Internal driving forces can be the city's ability and will to take a certain path of evolution, which may involve economic development, environmental consciousness and industrial and environmental policy. A strong internal driving force towards evolution may result in the shortening or avoidance of a certain stage, and subsequent direct entry into the next stage. Internal driving forces make this kind of artificial choice possible. For example, a city can avoid the second stage, which is characterized by severe industrial pollution, and enter the third stage directly. This is equivalent to Scenario 3. The case of Shenzhen follows this scenario. Cited as the first open city and special economic zone in China, the city enjoyed rapid economic growth and higher levels of income along with many other privileges. This relative predominance together with the strong will of the municipality to prevent industrial pollution made it possible for the city to eliminate polluting industries. Thus, the city was in Stage II for only a very short period of time. The city also established its long-term development strategies to prevent severe pollution problems within the city. These strategies include attracting more high technology industries and developing tertiary industries instead of developing polluting secondary industries. This suggests the importance of the institutional role in urban environmental management. Lessons from previous examples of cities in developed countries provided the choice of options for Shenzhen. For example, knowing that energy conversion from coal to oil and natural gas played an important role in combating air pollution in many developed country
cities, Shenzhen municipalities decided to introduce natural gas instead of using coal. These choices of options therefore can be considered advantages for latecomers.

On the other hand, pressures from outside the city may also influence which scenarios will occur next. These external pressures include constraints on natural conditions and resources of the city, and increasing environmental consciousness and international regulations concerning the global environment. Strong external pressures can affect and even change the path of evolution. For example, the limited reserve of natural resources such as fossil fuel and fresh water means that not all cities can enjoy the same consumption level as today’s American cities do. Therefore, some cities at Stage I or Stage II cannot enter the third mass consumption stage as today’s wealthy cities have, and should seek the path to Stage IV directly, which follows Scenario 2. At least currently, this kind of choice is not a voluntary one, but rather a forced one, in the sense that it requires more effort for the improvement of environmental conditions while trying to improve living standards. From the viewpoint of resource constraints and global environmental regulations, cities in developing countries are facing a latecomer’s disadvantage.

5.3. Policy implications of the stage model

What are the policy implications of the stage model? It addresses the need to evaluate current situations and future trends for certain issues and to take policy measures to prevent their undesirable effects. It is not a rare case that an urban municipality is overwhelmed by the complexity and difficulty of the urban environmental issues it faces, and is busy dealing with problems in a haphazard way. The stage model can help municipalities identify their most important urban environmental issues and their current stage, based on a long-term perspective of urban environmental change, and take counter measures as appropriate. For example, a city at stage II needs to make more efforts to control pollution, promote cleaner production, reduce negative health impacts and decouple the link between economic development and negative environmental impacts through legal, administrative, economic and technological measures. It can also help predict upcoming urban environmental issues from the experiences of cities at higher stages of evolution and allow cities to take preventative measures. Municipalities can play a vital role in improving the urban environment. As described in Section 5.2, with strong leadership and planning, a city can even take an alternative evolutionary path by skipping some stages that are harmful to its citizens, learning from previous evolutionary paths and identifying its relative strengths and constraints. This model provides a strong tool for municipalities, because it can help identify challenges to long-term urban environmental planning with a view towards economic development, which is often lacking but of vital importance for successful urban environmental management.
6. Concluding Remarks

This article examined the current status and historical change of urban environmental problems faced by East Asian cities and presented a stage model of urban environmental evolution. The major conclusions are as follows: (1) Focusing on different driving forces and impacts, urban environmental problems can be divided into three groups: poverty-associated issues, production-associated issues and consumption-related issues. Within each group, the problems show a similar pattern in relation to economic growth. (2) Current major environmental problems confronting East Asian cities are different depending on the country. Major urban environmental problems identified in cities in China are industrial-pollution problems. In Korean cities they are a combination of industrial-pollution issues and consumption-related problems, and in Japanese cities they are typically consumption-related issues. (3) An examination of the urban environmental change processes in the case study cities determined that these types of environmental problems occur sequentially. The most common sequence of occurrence is poverty-associated issues followed by industrial pollution, and then by consumption-related problems. (4) A stage model of urban environmental evolution in East Asian cities was presented. The model consists of four stages: Poverty stage → Industrial pollution stage → Consumption stage → Eco-city stage. The future scenarios for the evolutionary path of cities are defined by a combination of internal drives and external pressures, differing from city to city.

The stage model presented in this article is based on the analysis of East Asian cities. It sheds light on the different causes and drives of various urban environmental problems, and identifies a typical evolutionary path for these problems. It can also be used as an effective tool for urban policy makers as discussed in Section 5.3.

The following points are limitations to this model at present, as well as areas for future improvement. First, in practice it is difficult to define quantitatively thresholds between stages. Typical events, such as government announcements and results and termination of certain environment-related trials, could be used to determine thresholds. To conduct a quantitative analysis, it is necessary to develop an environmental impact assessment methodology using the four sets of indicators presented in Section 3.1. Second, because this model was developed by analyzing a limited number of cities in the East Asian region only, more evidence must be gathered by examining more cities both within the region and in other regions. Future research topics will include rigorous data-based analyses, such as quantitative cross-country analyses and chronological analyses of more cities; the application of the model to actual cases, such as an application of the evolutionary mechanism to case studies; and the presentation of policy recommendations based on these analyses.
References


2 Environmental Governance in East Asia
Urban Environmental Governance in East Asia

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1. Introduction

1.1 Concepts of environmental governance

Governance refers to the exercise of power. It looks at how issues are regulated, management styles, and institutional arrangements. Environmental governance is about how societies deal with environmental problems. It is concerned with the interactions among formal and informal institutions and the actors within society that influence how environmental problems are identified and framed. It also relates to how environmental issues reach the political agenda, policies are formulated, and programs implemented (IGES, 1999:11). Accordingly, the relevant institutions, actors, and their interactions are fundamental elements to understanding how environmental governance works in different settings. In the new institutional economics, institutions are viewed as rules. Rules can be formal, taking the shape of constitutions, laws, regulations and contracts. Or they can be informal, like values and social norms. Institutions simultaneously enable and constrain the actions of individuals or organizations.

The actors involved in environmental governance normally include regulators at the local and national level (politician and governmental administrations), polluters (industries and organizations engaged in socioeconomic activities that bring about negative impacts on environment), and the marginal parties—citizens and civil societies. In a broad sense, regulator or government is normally regarded as consisting of three distinct sets of powers, each with its assigned role.

One is the legislature, whose role is to make the law. The second is the executive (sometimes referred to as "the government"), which is responsible for implementation of the law. And the third is the judiciary, which is responsible for interpreting and applying the law. The reasons that citizens and civil societies are in the position of the marginal parties are because their roles and responsibilities have characteristics of regulators and regulated party as well as actor beyond both of them. Citizens are regulated in the areas of environmental problems related to lifestyle such as household effluent management while often being victims of industrial pollution. At the same time, they also can foster regulatory control over others, and
moreover they often act as monitor to both regulators and regulated parties. Civil societies compromise all actors outside the public sector—grassroots organizations, unions, universities, philanthropic foundations, user groups, non-governmental organizations (NGOs), and neighborhood associations. Its concept may vary depending on different socioeconomic and political regimes. But environmental NGOs now are increasingly recognized as an important actor in promoting environmental governance by most countries.

1.2 Motivations and objectives

The past lesson suggests that a successful environmental management be attributed to not only effective environmental laws and regulations and the availability of environmental technology but also effective mechanism and high capacity of environmental governance. It are rather such factors as the insufficient involvement of all stakeholders and the absence of relevant institutional backups of both formal and informal than environmental policy itself that cause the ineffective implementation of environmental policy in Asian developing countries. As a consequence, those factors lead to poor environmental performance. Moreover, the increasing complexity of environmental problems nowadays makes environmental management need much stronger institutional supports than before. Hence effective governance mechanism, full involvement of all actors, and actor’s partnership become a foundation to the successfully environmental management. The critical to take the shape of the foundation are rules for the entrance of actors, in particular citizens, into policymaking, policy implementation, and performance monitoring; and rules for the roles actors ought to play and the cooperative and collective actions by actors. The critical also includes environmental awareness and values as well as cultural. To date, however, environmental governance structure, mechanism, and relevant institutional aspects, have been attracted less attention by academia and managerial practice.

Urbanization is an integral part of modern development. Yet, rapid urbanization can create great strains on the environment due to the high density of population and economic activity in a limited space. Sustained economic growth is a major challenge for urban areas and one that must be addressed since globalization appears to be further enforcing the trend toward urbanization. Twenty-five years ago less than 40 percent of the world’s population lived in urban areas; now this share is 47 percent; and 25 years in the future it could reach nearly 60 percent. Of the urban dwellers of the future, nearly 90 percent will be living in developing countries, Asia particular. Urban sustainable development, therefore, is a central concern for the quality of human life and the future of the natural environment. Achieving sustainable development will require innovations in urban environmental governance.

Accordingly these two respects-the past lessons in environmental governance and the strains on sustainable development by urbanization are the motivation for this comparative study on urban environmental governance in East Asia. The East Asia countries discussed here include China, Japan, South Korea, the Philippines, and Thailand. These five countries are selected in consideration of both
their characteristics of environmental governance and the availability of relevant data. The paper begins with a briefly comparison of these five countries in national profiles, illustrating background underlying their urban environmental governance. The following two sections attempt to figure out the commonality and unique between five countries through dating back their revolutions of environmental governance and examining their frameworks of environmental policy at both national and local levels. The final section identifies some successful stories in each country, and then draws some strategic implications from the stories for cross-societal learning about good governance of urban environment. Urban area is a central element on the agenda of environmental governance in almost all countries, especially in environmental pollution. Hence in many respects this paper discusses urban environmental governance through examining a number of relevance at national level.

2. Socioeconomic Backgrounds and Their Implications for Environmental Governance in Five East Asian Countries

Environmental governance interweaves with political-economic structures, economic development stages, and social norms and cultural values, as well as the surfacing and severity of environmental problems. This interaction complex determines the national approach to response to the dilemma of environment and economy, and thereby takes the shape of environmental administrative structure, governance mechanism, and their evolutionary process and direction. This part will briefly examine the commonalities and unique between five East Asian countries—China, Japan, South Korea, Thailand, and the Philippines in socioeconomic contexts including geography and demography too. The implications of these backgrounds for environmental governance are also discussed. Table 1 shows both differences and similarities between five East Asian countries in socioeconomic context and environmental governance as well as environmental performance.

2.1 Geographic, demographic and cultural dimensions

In terms of the sizes of territory and population, China is far beyond comparison to others. The world largest population of China greatly pressures its environment and resources. In particular, the pressure not only does exert influence on the present generations but will maintain for several future generations as well. Nevertheless, the population strains on per unit of environment and resources are much more higher in Korea and Japan due to the high densities of population and economic activity in limited space. Totally, the situation in the Philippines seems comfortable. But looking at inside the country, more than 50 percent of the population live in the coastal areas of the Philippines, bringing about similar problems of population-related to other countries.
Two demographic factors may significantly affect people's philosophy of how to utilize and conserve environment and natural resources; one is the illiteracy and the other, the poverty. Illiteracy implies that people are not aware of rationally using natural resources and conserving environment, whereas, poverty normally means no initiatives to do.

Among the five countries, China has the highest rate of adult illiteracy of 34 percent and about 22.2 percent of population below the international poverty line in 1995—one US$ a day in PPP (purchasing-power parity). In contrast, the Philippines has lower adult illiteracy rate but the highest ratio of 26.9 percent of population below the same line of poverty in 1994 (World Development Report-1999/2000, 2000:237). In the 1991 distribution of the Philippines, the lowest 50 percent had only 18.9 percent of income. Hence the share below poverty line in fact reaches as high as 68 percent in the rural areas of the Philippines (Merlin M. Magallona, Ben S. Maluyang, 2000:106). These two issues are unproblematic in Thailand, and in Korea and Japan particular.

The diversities in regional geographic conditions and indigenous groups determine homogeneity of environment and culture. Unified policy instrument and governance pattern normally can't be workable in all regions of a country with large variations in natural environment and social norms as well as cultural values. In this case, it needs more flexible policy guideline and decentralized governance. China owns very diverse regions with different natural and socioeconomic conditions and Han people plus 54 minorities. Likewise the Philippines is rich in 7,100 islands and more than a hundred of indigenous people groups. In this sense, China and the Philippines need more flexible policy and diverse governance patterns adapting to their regions inside countries in environmental protection as compared to Japan, South Korea, and Thailand.

2.2 Socioeconomic context

East Asia has had a remarkable record of high and sustained economic growth. From the 1960s to the mid-1990s, a wave of rapid growth swept over East Asia, beginning with Japan, then to South Korea and Taiwan, then to Thailand, Malaysia, and Indonesia, and finally to China. Three characteristics have been emerging in conjunction with this wave, accelerated industrialization, explosive urban growth, and mass consumption society. Since the time of England's Industrial Revolution, the nations of European and America have experienced 200 years of history in industrialization, and Japan's history of industrialization can be traced back 100 years ago to the Meiji Restoration period. But for newly industrializing economies, the process seems to be further shortened in several decades. This process comparison, however, mostly considers GDP growth rate and the transformation speed of industrial structure. Actually there exist large gaps in GDP per capita, and production technology and management quality between forerunners like Japan and latecomers like China. The gaps imply quite differently in environmental management. The booming of some newly industrializing countries now is still depending
on labor or capital-intensive economy. Dramatic transformation of industrial structure brings the latecomers accelerated pollution but not sufficient capacities of technology and finance yet. For example, in the past Japanese companies also polluted badly, but the cause was to a large extent insufficient investment in abatement facilities, not poor production technology and management. On the contrary, China is facing serious shortages in funds and environmental technology to abate pollution at the end-of-pipe while low efficiency of energy and resources in production process makes pollutants increase in generation. In terms of industrial structure, heavy chemical industry, also a heavy polluted industry, was a core engine to economy in Japan and now it is in Korea and China particular. In contrast, the pollution burdens from heavy chemical industry are generally low in Thailand and the Philippines, whose industrial structures are to some extent processing and assembling oriented.

Another two chain-effects to accelerated industrialization are explosive urban sprawl and joining the mass consumption society. During the 20 years from 1950 to 1970 in Japan the urbanization ratio jumped from 50.3% to 71.2%, then slowed down somewhat. But urbanization in South Korea has proceeded even faster than in Japan, increasing from 21.4% in 1950 to 40.7% in 1970, and then after another nearly three decades to 83% in 1997 (The State of the Environment in Asia--1990/2000, 2000:6). Even in Thailand and China where on the whole are still at relatively low urbanization levels, the excessive concentration of population in megacities like Bangkok, Beijing and Shanghai, and the rate of urbanization there, are truly explosive. On the other hand, more and more Asian cities and Asian countries are changing to mass consumption lifestyle. Kojima Reietsu argues that Japan joined the mass consumption society at the end of the 1950s and was close behind the U.S. a decade later. Other economies made their entries at subsequent times: Hong Kong at the beginning of the 60s, Taiwan at the end of the 60s, South Korea in the early 70s, and China's major coastal cities at the beginning of the 80s (The State of the Environment in Asia--1990/2000, 2000:7). In other words, East Asians have become full-fledged members of the energy-intensive, mass-consumption, and mass-refuse society.

To sum up, accelerated industrialization, explosive urbanization, and joining the mass-consumption society are primary challenges to environmental governance behind the rapid growth of East Asia's economy. In other words, they have caused compound issues of environmental governance in most East Asian countries except for Japan, and will make them more serious in the future. The compound issues include the combined industrial and urban pollution, the combined domestic and global issues, the dilemma of poverty (growth) and environment, and conflicts of governance demands and capacities. In comparison, four challenges are more complicated and difficult in China and the Philippines than in Korea and Thailand.
Table 1 Brief Profiles of East Asian Countries in Social Economy and Environmental Governance

<table>
<thead>
<tr>
<th>Socioeconomic Profiles</th>
<th>Japan</th>
<th>China</th>
<th>Korea</th>
<th>Thailand</th>
<th>Philippines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface area (1,000 sq. km 1996)</td>
<td>378</td>
<td>9,597</td>
<td>99</td>
<td>513</td>
<td>300</td>
</tr>
<tr>
<td>Population (Millions 1998)</td>
<td>126</td>
<td>1,239</td>
<td>46</td>
<td>61</td>
<td>75</td>
</tr>
<tr>
<td>Population density (people per sq. km 1998)</td>
<td>335</td>
<td>133</td>
<td>470</td>
<td>120</td>
<td>19</td>
</tr>
<tr>
<td>Adult illiteracy rate (% of people 15 and above 1997)</td>
<td>Males 9</td>
<td>1</td>
<td>3</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>females 25</td>
<td>4</td>
<td>7</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>GDP Per capita (dollars 1998)</td>
<td>32,380</td>
<td>750</td>
<td>7,970</td>
<td>2,200</td>
<td>1,050</td>
</tr>
<tr>
<td>GDP per capita, ppp (current international $, 1996)</td>
<td>23,158</td>
<td>3,363</td>
<td>13,193</td>
<td>6,873</td>
<td>3,415</td>
</tr>
<tr>
<td>GDP growth rate (% 1990-1996)</td>
<td>2.2</td>
<td>11.6</td>
<td>7.7</td>
<td>8.6</td>
<td>2.8</td>
</tr>
<tr>
<td>Structure of output: value added as a % of GDP, 1998</td>
<td>Industry 38 (1995)</td>
<td>49</td>
<td>43</td>
<td>40</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>Services 60 (1995)</td>
<td>33</td>
<td>51</td>
<td>49</td>
<td>52</td>
</tr>
<tr>
<td>GDP per unit of energy use (1995 $ per kg, 1996)</td>
<td>10.5</td>
<td>0.7</td>
<td>3.0</td>
<td>2.2</td>
<td>2.1</td>
</tr>
<tr>
<td>Decentralization of subnational elections (% 1999)</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Intermediate Localb</td>
<td>37.8 (1990)</td>
<td>51.4</td>
<td>21.7 (1996)</td>
<td>5.5</td>
</tr>
<tr>
<td>Role of government in the economy: subsidies and other current transfers--% of total expenditure (1997)</td>
<td>52 (1980)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>7</td>
</tr>
<tr>
<td>Urban population (% of the total)</td>
<td>1997</td>
<td>78</td>
<td>32</td>
<td>83</td>
<td>21</td>
</tr>
<tr>
<td>2010 (project)</td>
<td>80.6</td>
<td>43</td>
<td>91.4</td>
<td>27.4</td>
<td></td>
</tr>
</tbody>
</table>

Environmental Governance-related Profiles

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>The first (workably) national environmental legislation</td>
<td>1949</td>
<td>No evidence before the early 1980s</td>
<td>No evidence before 1995</td>
<td>No evidence</td>
<td></td>
</tr>
<tr>
<td>The first local environmental regulation (Tokyo)</td>
<td>Environmental Performance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental Performance</td>
<td>87</td>
<td>100</td>
<td>98</td>
<td>93</td>
<td></td>
</tr>
<tr>
<td>Access to sanitation in urban areas (% of urban population, 1995)</td>
<td>Seoul</td>
<td>Bangkok</td>
<td>Manila</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental quality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TSP</td>
<td>C</td>
<td>E</td>
<td>B</td>
<td>E</td>
<td>E</td>
</tr>
<tr>
<td>SO2</td>
<td>A</td>
<td>C</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>CO</td>
<td>A</td>
<td>D</td>
<td>A</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>NO2</td>
<td>C</td>
<td>D</td>
<td>C</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>O3</td>
<td>C</td>
<td>C</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Pb</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

Note: 1. State, province, region, department, or other elected entity between the local and the national government. b. Municipality or equivalent.
2. Atmospheric concentrations of pollutants are relative to WHO standards. A: under half; B: within standards; C: under twice standards; D: under three times standards; E: over three times standards. Pb levels are roadside, all others are ambient air.

On political and governance side, Japan since post-war, Korea and the Philippines both since the end of 1980s have enjoyed democracies, characterized by both national and local elections. In contrast, China and Thailand enjoy a more centralized political regime. But the finance distribution in China notably is more localized since the 1980s. The local shares in both the total public expenditure and total tax revenue in China are the highest ones in East Asia countries, 55.6% and 51.4% in 1997 respectively (table 1). Totally, the central governments in East Asia have strong abilities to control over local governments by legislation, political influences, national development plan, and financial distribution. In other words, on the whole local capabilities and initiatives still much depend on the central government in many respects of governance, including environmental facet, although decentralization becomes an increasingly concern currently.

3. Urban Environmental Governance in East Asia

To some extent the approach and evolutionary process of how environmental problems were responded by societies in the past took the shape of many aspects of national and local environmental governance at present, including environmental policymaking process, stakeholders’ roles and their relationships, framework of environmental policy, and environmental performance. The approach and its evolutionary process in fact are results of interaction complex by all factors, covering political, socioeconomic and cultural context and environmental problems themselves. For these reasons, this part will examine commonality and unique of urban environmental governance between five East Asians through reviewing their evolutionary processes at national level in an abroad view.

3.1 Initial responses to environmental governance

In East Asian history, it saw two approaches of initial responses to environmental problems, bottom-up as Japan experienced and top-down as most of other East Asians followed. In Japan the strong environmental protests launched by pollution victims in the 1960s and early 1970s exerted very much pressures on the ruling party, industries, and bureaucratic ministries—three elite group of Japanese politics and economy at that time (it is also called the Ruling Triad). The movements significantly restructured local political patterns of some prefectures and municipalities. With movement help, members of opposite Parties won the offices of mayor and even governors in Tokyo, Osaka, Kyoto and other big cities. Complaints about less and ineffective responses to industrial pollution by the national
government threatened the comfortable position of the ruling party in the Diet (Yong Ren, 2000). Industrial pollution hence became a big political issue at that time in Japan. The movements also formed the disruptive potential to industrial production, looming large on beliefs of business leaders about growth priority (Yong Ren, 2000). As a result, the Ruling Triad of Japan finally had to start its intensive actions nationwide to pollution control in the late 1960s and the beginning of 1970s. Of course, the international concerns and voices about environment also facilitated Japan’s responses, but not the driving forces. It is noteworthy that Japanese local governments played a vital role in both responses to local pollution problems and fostering the unified actions of the national government.

In contrast, the past experiences showed that formal responses to environmental problems in China, South Korea, Thailand, the Philippines and even other East Asian countries were generally initiated by top-down approach. In other words, the national governments first launched environmental conservation under the both domestic elite initiatives and the influences of international concerns about environment. Among multiple international voices for environmental protection, of particular significance have been the 1972 Stockholm Conference of Human and Environment and the 1992 Earth Summit of Rio on Environment and Development. After these two events, initial or intensive actions to environmental protection successively appeared in East Asia (Table 1, and details in section 3.3).

3.2 Implications of top-down and bottom-up approaches for environmental governance and shift of the approaches

3.2.1 The implications of top-down and bottom-up approaches for environmental governance

Japanese bottom-up response to industrial pollution in the 1970s was a two-edged sword. Japan did pay very high post-costs for its late responses. But on the other side, Japan’s formal environmental institutions were built in accord with the real needs of social members such as the ruling party, governments, and business as well as citizens. Relatively there were small tensions between regulators and regulated parties, which improved the effectiveness of environmental performance. In other words, consensus behind pollution control was achieved although the national response originated from social pressure. This is one of reason of supporting for formation of cooperative and effective mechanism of environmental governance that are built upon the joint efforts of different governmental sectors, national and local governments, and business. Moreover, the mid-1970s peak timing of Japanese industrial investment in pollution was more over two decades after the Japanese start of fast economic growth. And even now, another 25 years later, none of other Asian countries reaches the size of economy of Japan in the mid-1970s, 13,824 dollars (in 1987 price) of GDP per capita in Japan of 1975 (World Development Indicator, 1998, World Bank, CD-Rom), for example. In other words, “growth first” in Japan, which others absolutely must not follow, provided its “Clean up later” with strong economic and technological powers on one side of a coin, however.
On the contrary, top-down approach shapes environmental governance in the form of rather government-led-action than social-driven-action. The actual demands of society for environment often lag behind the supplies of formal environmental policies by government. Similar to the description of Maslow’s need hierarchy, ordinary people and even government in particular at the early development stage may be eager to pursue rather riches than sound environment and sustained use of resources. In other words, the dilemma of poverty (or growth) and environment all long bewilders intrinsic values in people’s minds about environmental conservation. As result, the institutional tension is high between environmental regulator and regulated parties, further leading to poor environmental performance. On the other hand, it often sees week institutional capacities including manpower resources, technical expertise, policy know-how, and monitoring equipment as well as financial abilities in country with top-down approach to environmental governance. These two limitations—the low social needs for environment protection and the poor institutional capacities of government are of the biggest difficulties, which many East Asian countries, China and the Philippines particular are facing nowadays. These also constitute the reasons why even industrial pollution has not been harnessed in some nations through over two decades efforts since the 1970s, but it was resolved by Japan in a decade from the late 1960s through the late of 1970s.

3.2.2 Shift of the approaches

Since the late 1980s and the 1990s particular, however, the mix of top-down and bottom-up approaches to environmental governance has being emerged in South Korea, Thailand, the Philippines, and China too. This new shift is attributed to such factors as the raising of environmental awareness in ordinary people’s minds, political democratization, growth of NGOs, and environment worsening as well. The voices from citizens and NGOs are increasingly exerting an influence on environmental policymaking and policy implementation. The cooperation between government, NGOs and business are also gradually formulating toward partnership. A number of East Asian countries have institutionalized the participation of citizens and NGOs in environmental governance. All these new changes towards collective actions by all stakeholders are still at very early stage in East Asia, but have to some extent improved environmental performances, and particularly have facilitated the intensive responses to environmental problems or policy inaugurations by national and local governments.

In Korea, environmental movements were not allowed officially, and even were viewed as anti-governmental behaviors before the Democracy Movement of 1987. In 1980, only 33 NGOs were active, and most of them had not legal foundations. In 1996, the number increased up to 339, most of which had legally registered with relevant governmental sectors. With the increase in the number of environmental NGOs, the government has realized that cooperation between environmental sector and NGOs is extremely helpful in achieving more efficient and effective policy implementation. The Government of Korea launched several programs to improve the relationship between the public and private sectors.
Environmental NGOs, which used to focus on anti-government movements, realized that other alternatives would be more effective in conserving the environment. Hence, the relationship between environmental NGOs and the government has changed a lot since the mid-1990s (Hoi-Seong Jeong and Hoe-Seog Cheong, 2000:65).

In Thailand, the number of protest demonstrations reached 7543 in 1994, and the frequency is apparently on the rise. Nearly 40 per cent of these movements were triggered by such environment-related issues as resource management, garbage disposal or large-scale public works projects. The civil society movement, in response to the persisting dissatisfaction of government’s development planning; together with government’s realization that the current development model is unsustainable, has led to a shift in the development discourse. As a result, the 1992 Environment Act, a landmark of Thailand environmental policy, recognizes certain rights and duties of citizens in relation to environmental protection. After economic crisis particular, the participation of civil society is increasingly being recognized as crucial to the “balance of power” and the “strengthening of democracy”, especially to hold the government and business sectors accountable. The philosophy of good governance is changing to treat the public participation as necessary to control corruption and mismanagement. The recent Thailand’s Eight National Economic and Social Development Plan (1997-2001) is the first national plan that calls for the participation of people in the decision-making process at the sub-district, district and provincial levels in Thailand (Somrudee Nicro, 2000:95-96).

Community or Family approach to forest conservation in Philippines, in which NGOs also involved, may date back in the 1970s. Yet NGOs related to pollution matters have not prominently increased their presence until mid-1980s. After 1986, NGOs networks and alliances on environmental concerns have gradually formulated. On the government side, the Philippine Strategy for Sustainable Development issued in 1989 gives emphasis on the approach that NGOs will be enjoined to mobilize the citizenry and make them actively participation in environmental management. The Department of Environment and Natural Resources maintains an NGO desk, which has been established to provide information on government plans and programs concerning environmental management. In 1992, the President created the Philippine Council for Sustainable Development in which NGOs and people’s organizations work with the government sectors (Merlin M. Magallona and Ben S. Malayang, 2000:114). Owing to a large population below poverty line, the general awareness of environment in the Philippines is still low and the real needs for environmental protection are far below the formal requirements by environmental policy and social elite initiatives including NGOs. Consequently, in practice the effects of bottom-up approach in the Philippines are not as evident as in Japan, South Korea and Thailand.

In comparison, environmental NGOs in China are very week in terms of the number and membership as well as the roles NGOs play in environmental management. Yet since the 1990s environmental NGOs have increased their presence, particularly in big cities like Beijing. Most active NGOs are those organizations affiliated to universities, research institutes, and societies of science and technology, and a
few are purely organized by volunteers. The number of environmental NGOs in China is about 1600, in which only about 100 are nationwide organizations (D. F. Feng, G. Xia, 2000:19). Governmental-organized campaigns in China, in which volunteers participate, are unique activities with the characteristics of mix of top-down and bottom-up initiatives. “Sweeping White Garbage Along the Railways” campaigns, for example, which are launched by the State Environmental Protection Administration and the Ministry of Railway, have involved 200 thousands the youth volunteers and swept 23 million tons of garbage along the railways (D. F. Feng, G. Xia, 2000:19). Notably, Chinese mass media have played an increasingly role in spreading environmental information and knowledge, surfacing environmental problems and mismanagement, and monitoring environmental performances by industries and governments.

The Program of “Century Travel for Chinese Environmental Protection”, for example, is designed for surfacing environmental problems and monitoring implementations of environmental policy and programs, jointly organized by the National People Congress and some governmental ministries. Since 1993, 750 media agencies from the national and local, 6,000 journalists have participated in the program. In fact, all successes of any big national programs, actions, and campaigns in China now see the presence of mass media as a necessitated actor and supportive agent. On the public side, environmental awareness and knowledge related are gradually increasing. A questionnaire survey made by Chinese Environmental Foundation in 1995 shows that a half people surveyed agree to giving the priority rather to environmental protection than to economic growth when conflict exists (Chinese Environmental Foundation, 1998:11). This figure symbols the balance point of how the ordinary people think about the dilemma of growth and environment. It implies that environmental protection may become an overwhelming atmosphere in Chinese society in near future. Totally the environmental governance in China now is still characterized by top-down approach however.

3.3 Development process of environmental governance

3.3.1 Intensive legislation and governance of environment

In Japan, the local initiatives to pollution problems started in the 1950s. The first local environmental regulation was the Tokyo Prefectural Ordinance for Factory Pollution Control in 1949, and soon afterwards, several other large cities such as Osaka, Yokohama and Fukuoka also enacted local ordinances for pollution control. Particularly, owing to lack of workable national environmental legislation to follow, Yokohama City government concluded the first Pollution Control Agreement with Tokyo electric Power Company in 1964, which was soon popularized nationwide and viewed as a Japanese unique instrument. But the national government of Japan did noting special until 1967 when the Basic Law for Environmental Pollution Control was enacted. Particularly, the “Pollution Diet” of 1970, which enacted and amended 14 laws related to environmental pollution control, laid the historic landmark
of Japan's environmental legislation and governance. Moreover, in the following year, 1971, Japan established the Environment Agency at cabinet level, with the mandate to govern environmental pollution control, including some aspects of natural conservation, which previously had been scattered among many governmental ministries and agencies.

In contrast, Chinese local governments did nothing special in environmental governance until the early 1980s. Instead, the national government of China initiated environmental protection activities since the early 1970s. In 1973, next year of the UN Human and Environment Summit held in Stockholm, China convened the first National Conference of Environmental Protection, which symbolized the starting of national environmental protection efforts. In the following years, Chinese national government enacted a number of environmental regulations and standards and launched several pollution surveys and actions focusing on abatement and comprehensive utilization of industrial “three wastes”. Environmental administrative organizations and research institutions were gradually established. The Environmental Protection Bureau under the Ministry of Construction and Environmental Protection was born in 1982. It then was elevated as the National Environmental Protection Agency in 1988 and again as the State Environmental Protection Administration in 1998, both under the State Council but later at ministry level. For environmental legislation, the landmark is the 1979 Environmental Protection Law and the 1978 Constitution of the People's Republic of China in which the State's responsibility for conserving natural resources and environment and controlling pollution and other public hazards was first introduced. After that time, a number of laws concerning specific environmental problems and resources conservation have been enacted successively. Therefore, the intense period of Chinese environmental legislation and governance started at the beginning of 1980s.

Similarly, the Korean local governments did nothing particular before the national government started to respond environmental pollution problems through legislation and institutions building, even before the introduction of local autonomy in 1995. Korea national government once enacted the Garbage Clean-up Act in 1961 and the Pollution Prevention Act (PCA) in 1963. But these laws were little concern for environmental quality and were not enforced properly. Until 1977, fourteen years later, the PCA was replaced with the Environment Conservation Act (ECA). It extended the legal dimensions of environmental policy to cover most environmental issues including the nature conservation and pollution control. Another remarkable policy event is that the Korean Constitution first introduced environment rights as a basic human right in 1980 (Deokho Cho, H. Jeong, 2000:12). For the development of environmental administrative organizations, Korea established the pollution control section under the Ministry of Public Health and Social Affairs in 1967 and upgraded to the pollution control division under the same Ministry in 1970. Following the ECA, the Division was upgraded again to the Environment Administration as a subcabinet agency but still under the same Ministry in 1980, and finally the Ministry of Environment was established in 1990 (Hoi-Seong Jeong, 2000). Therefore, the intense timing of national environmental legislation and governance in Korean was from the late of 1970s or the beginning
of 1980s. It was close to China, although Korean rapid industrialization started at the early 1960s, almost 20 years earlier than the start of Chinese experience at the late of 1970s.

Owing to colony history, the Philippines shares a long experience in environmental legislation. It may date back to the late 19th century—Law of Water applied by the Spanish colonizer and then to the 1930s—Common Wealth Act enacted to punish dumping of waste matters into any rivers by US colonial administration. After the postwar period following the country's political independence, several laws related industrial pollution control and forest conservation have been enacted. However, the real mark of a significant change in environmental policymaking and management was the Philippine Environmental Policy Decree promulgated in 1977. This Law departs from what it calls "the piecemeal-approach concept of environmental protection". In place of this approach, it provides for "an intensive and integrated program of an environmental protection". On the institutional side, the Philippines established the National Pollution Control Commission in the mid-1960s. In response to the 1977 Law, the National Environmental Protection Council was established. Chaired by the President, the Council took charge of rationalizing the functions of various government agencies into an integrated system of environmental governance. In 1997, the Philippines reorganized its national environmental administration into Department of Environment and Natural Resource as it stands now (M. Magallona, Ben S. Malayang III, 2000).

During the late 1970s, Thailand gradually recognized that its natural resources were at risk. Together with growing international pressure to solve the world's environmental problems, Thailand first showed a commitment to environmental protection in its 4th National Plan (1977-1981) and stipulated its first formal environmental legislation—the Environment Act in 1975. But the intensive and effective environmental protection has brought about by the 1992 Environment Act, amendment of the 1975 version. Following the Act, three of departments were established in the Ministry of Science, Technology and Environment, constituting a central body overseeing the national environmental management (Somludee Nocro, 2000).

In a summary, the initial responses to environmental issues by the central government date back to the late 1960s in Japan and the early 1970s in China, Korea, and Thailand. The formal national legislation of environment started in the late 1960s in Japan and the late 1970s in China, Korea, and Thailand. Following the formal legislation, environmental governance in all countries is gradually institutionalized. In comparison, the timing gaps between Japan and other three countries are about a decade in terms of both initial responses and formal legislation. When examining the period of intensive actions or the booming of environmental legislation, however, the gaps expanded to from a decade and more through two decades and less. In other words, Japan saw that period in the 1970s, whereas Korea, China, and Thailand generally did in the late 1980s and the early 1990s. Owing to its unique history, experience of environmental legislation in the Philippines seems to be longer than any other East Asian countries. But
its period of intensive responses and actions to environmental protection generally resembles other East Asian developing countries.

3.3.2 Development stages of environmental governance

In comparison, the stages of environmental governance in Japan are more distinct than in Korea and particularly in China, Thailand and the Philippines.

- The development process of Japanese environmental governance can be evidently viewed as three stages: industrial pollution control from the late of 1960s through the 1970s; urban environmental management since the late of 1970s; and the new era since the 1990s. In the period of industrial pollution control, as the OECD 1977 Report on Review of Environmental Policies in Japan argued, the most outstanding characteristic of Japan's policy was its "non-economic approach" concerning technological solutions to environmental pollution problems. Under the pressure of victims' protests and citizens' complaints about pollution, the anti-pollution miracle was mainly attributed to the cooperation and joint-effort among administrative sectors and between governments and industries. The leading role of local governments in the 1960s was more innovative in the formulation of local policies and measures such as Pollution Control Agreement, whereas it was more active in implementation of local measures under the framework of national environmental policy in the 1970s. Since the late 1970s, the causes for environmental degradation have shifted from the manufacturing industries to public works projects in Japan. Household effluent, traffic pollution and water pollution by organic materials became central issues. However, environmental policy and governance during this period were nothing particular in general. To copy with household effluent, public sectors invested huge funds in urban environmental infrastructure construction. A large amount of infrastructure constructed in the 1980s and 1990s has improved Japanese urban environment very much. Entering the 1990s, Japan changed much in political and economical context. Deregulation, consumer-oriented policies and decentralization have been advocated in Japanese society. Under this changing, Japanese environmental policy also has been revitalized. Actually since the end of the 1980s, global environmental issues started to gradually appear in many ordinary people's mind and reach the policy agenda. Meanwhile, effluent lifestyle and other urban environmental problems challenge environmental policy framework developed in the 1970s. The Basic Environment Law and the Basic Environment Plan, enacted in 1993 and 1994, respectively, symbolize the coming of new era of Japanese environmental policy and governance. In the strategic sense, Japanese environmental policy and governance are attempting to realize several shifts. They include the shifts from coping with individual environmental problems to pursuing entire improvements toward sustainable development; from regulatory instruments to deregulated guidelines; from command-and-control
approach to the mixture of policy instruments; from remedial policy to integration of development and environment; and toward full involvement of all parties related. In a word, Japan has experienced three distinct periods in environmental policy and governance and has resolved industrial pollution and been resolving urban environmental problems, and global ones step by step, which occurred gradually by longer timing gap.

In contrast, the evolution of environmental policy and governance in other East Asian countries tend to be a compressed process, unlike Japan experienced stage by stage. It is characterized by both the compound environmental issues they are facing and the holistic strategies and measures they need. Urban environmental problems such as household effluents and traffic pollution started to attack almost all East Asian countries since the late 1980s when they have been striving against industrial pollution. Meanwhile, global environmental issues including global warming, ozone protection, and biodiversity conservation also reached their policy agenda. In a word, East Asian developing countries are facing the combined industrial and urban pollution and the combined domestic and global issues at the same time. On the other hand, the conflict between poverty and environment and the gaps between governance demands and poor capacity both exert a negative influence on environmental governance and performance in some countries like China and Philippines particular. For this sophisticated situation, the response strategies and policies in these countries tend to be multiple and comprehensive. After the 1992 Earth Summit, the philosophy of sustainable development and global environmental concerns reached the political agenda of East Asians and became the principles and guidelines of environmental governance. Chinese government, for example, took the lead in issuing the Agenda 21—White Book for Population, Environment and Development of the 21st Century in 1994 and the Agenda 21 for Chinese Environmental Protection in 1995. Korea government approved Korea's Green Vision 21 in 1995. Even as early as 1992, the Philippines established the Philippine Council for Sustainable Development, and then the Council published the Philippine Agenda 21. Thailand introduced a lot of innovative and integrated strategies and policies in its Eighth National Plan (1997-2001) and its Policy and Prospective Plan for Enhancement and Conservation of National Environmental Quality—1997-2016. Hence environmental strategies and policies in most of East Asian developing countries have also moved to a new era since the 1990s based on the philosophy of sustainable development as the revitalization in Japan’s policy paradigm.

Therefore, as Y. Harashima argues the similar conclusions (Y. Harashima, 1998:64), the tempo of environmental policy development in China and Korea has been faster than that of their economic growth as compared to Japan, and environmental policies and governance in the three countries have been converging in long run. In fact it is also true when comprising the cases of other East Asian countries such as Thailand and the Philippines. This situation mostly results from the "lattercomer's advantage" in terms of science knowledge availability, technological capacity, and practical
experience from the forerunner. In the sense of developing tempo and converging trend of environmental policy and governance, therefore, the development process in China, Korea, Thailand, and even other East Asian nations seems to follow the flying-geese pattern as industrialization does. Yet considering the differences in the quality of policy arrangements, institutional capacity, policy implementation, and environmental performance between East Asian developing countries and Japan, there are still insufficient grounds to prove this conclusion.

3.3.3 Unique domestic political-economic moves and theirs impacts on environmental governance: deregulation and decentralization

Since the 1980s and 1990s, it has seen considerable changes in politics and economy of East Asia. Transition to market economy in China, deregulation and decentralization in Japan, democratization and localization in Korea, the Philippines and Thailand are the most prominent moves in East Asia. The moves in turn have brought about some innovations and challenges as well to environmental governance of each country.

Since the post-war, Japan’s political-economic structure had been in the prime of “Ruling Triad”—the Liberal Democratic Party (LDP), the bureaucratic ministries and the big business interest groups. Nevertheless the political reforms in 1993 broke the LDP grip on the Japanese government and a coalition government with opposition parties was formed. This political move has provided a space for social and economic reforms. On the other hand, Japan has been suffering from the procrastinating post-effects of bubble economy since the 1990s and economic restructuring has become a central policy issue. Government planning and interventions were the proper policy when Japanese industries were in their infancy (H. Imura 2000:246). But under new political-economic atmosphere and the influence of economic globalization, the dilemma of governmental role and force of market mechanism has become prominent in business circles. Deregulation, consumer-oriented policies and decentralization have been advocated in Japanese society. Although Japan still has a long road to achieve these social needs, the political-economic reforms have exerted a distinct influence on the evolutionary direction of environmental policy and governance since the 1990s. For such problems as effluent lifestyle and automobile exhaust emission caused by a considerable number of household and car owners, and even for CO2 reduction and other global environmental issues, it is of a big challenge to Japan to continue adopting the command-and-control approach to resolve them. Consequently the new paradigm of Japanese environmental policy and governance now is very much advocating deregulated guidelines of government, voluntary actions, economic instruments, and the full involvement of all stakeholders.

China initiated the open and reform policy in 1978. It has greatly promotes environmental management while booming Chinese economy. Basic frameworks of environmental administration and policy were formulated after that time. A number of administrative powers and responsibilities as well as a part of tax
revenues have devolved upon metropolitan and provincial governments. The local shares in both the total public expenditure and the total tax revenue in China are the highest ones in East Asia (Table 1). For environmental governance, local governments also play an increasingly role and take all responsibilities for both implementing national policies and launching local actions. Particularly in 1997 the central government issued two national strategies for future socioeconomic development: prospering the country by science and education, and carrying out strategy of sustainable development. Following these two vital strategies, the State is attempting to realize two crucial transformations: transforming economic growth from traditional pattern to modern one in terms of efficiency and structure; and transforming planned economy to market system. These transformations are gradually restructuring economy and administration of the whole society. Transformation of growth pattern provides opportunities for China to reduce pollutants in the production process by technological improvements and also to integrate environmental consideration in economic policies.

In contrast, the transition to market economy challenges Chinese environmental policy and governance. Those environmental laws and instruments formulated under planned economic system needs renewal or amendment to be adapted to market system. Reducing considerable administrative regulations while strengthening environmental legislation and introducing market-based instruments becomes a central concern for policy reforms. For environmental governance, there is an increasing voice in decentralization of power and responsibility and in local capacity building. Formal institutional arrangements to encourage public participation also become a pressing governance issue. All these new issues and challenges will be aggravated after China joins WTO in near future.

In South Korea, the big political events were the democratic reform and the introduction of local autonomy system, which started in 1987 and 1995, respectively. They have exerted an overall impact on South Korea environmental policy and governance. The first direct outcomes of the impacts are the public voice in environmental affairs, the increasing of NGOs in the number and roles, and the improvement in the relationship between governments and NGOs as described in section 3.2. In this respect South Korea may outperform other East Asia. Second, before the 1995 local autonomy, Korean local governments had very limited initiatives for local environmental management, as compared to Japan and China. After that, Metropolitan cities, provinces, municipalities and counties in South Korea have their own assemblies and can enact ordinances in accordance with national laws. Yet how to properly devolve the responsibilities and functions from the national government to local ones in environmental governance, and how to encourage local initiatives are still big challenges to South Korea.

Earlier than Korea, the Philippines enacted its Local Government Code in 1991. The Code restructures the system of administrative implementation of laws by decentralization of relevant powers and functions. It also becomes a watershed in environmental governance. Before 1991, local governments in the Philippines environmental management almost could do nothing in terms of powers and functions as well as local initiatives themselves. According to the Code, the central government devolved certain powers,
authority, functions, and programs to local governmental units encompassing activities in forest management, protected areas and wildlife, environmental management (including solid waste and sewage disposals and noise abatement), mines and geosciences development, and land management (Rannon Jesus P. Paje, 1999:378-389). In parallel with the devolution, the Philippines central government also dispatched a number of officials to local governments, provided training for local officials, and particularly redistributed tax revenues between the local and the national, so as to increase local capacities. The local share in the total tax revenues increased up to 16.4% in 1997 from 4.0% in 1990. In several respects decentralization in the Philippines has produced good effects on environmental governance. It encourages local governments to take responsibilities and play active roles in local environmental and resource conservation. The community-based forest management program, for example, proves a good decentralized approach to effectively manage local natural resources in the Philippines.

However, two obstacles—poverty and low institutional capacities threaten the Philippines decentralization in environmental governance. More than a half of rural population now is surviving below the national poverty line. It naturally causes low needs for environment and resources conservation. In democratic regime, local government often hardly makes decisions and launches activities against the real needs of the public. For example, some municipalities have initiatives to introduce charge system in solid or sewage management, but it can't be made public owing to the opposition from constituency. Moreover, in reality the priority of local policy often is given to rather development than environment and resource conservation. On the other hand, the raising of local institutional capacity-building, including man resources, policy know-how, technical expertise, monitoring equipment, and financial power, takes time, in particular needs a strong backup of economic power. But in consideration of rich diversities in geographic conditions and demographic characters, decentralization is an inevitably transition in governance.

For environmental governance, therefore, centralization and decentralization in the Philippines seems to become a dilemma now. Actually many other developing countries in East Asia also face the same dilemma, which should be carefully balanced. Chinese experience shows that the local actual performance of environment depends to a large extent on the priority of environmental protection given by local governments, which differs by regions. Normally, well-developed areas like coastal cities in China attach a more importance to environmental protection as compared to others. Hence decentralization in environmental governance needs to be treated differently by regions even inside a country.

In Thailand, the particular political-economic events, which exert a significant impact on environmental governance, are the enactment of the new Constitution of the Kingdom of Thailand and Asian financial crisis. The 1991 Constitution renews the State responsibilities for environmental protection. Accordingly, a landmark of basic environmental law—the Environment Act followed in 1992, which results in notable
improvements in environmental governance of Thailand in the 1990s. The Constitution also calls on devolving certain powers, functions and authority from the central to locals. The current regime limits the local governments in environmental governance to the implementation of some national policies and carrying out the activities delegated from the central government. Yet Thailand plans to implement concrete devolution in environmental governance in four years later according to the Constitution. Asian financial crisis has hurt Thailand economy and led to the reduction in environmental investment in recent years too. But on the other side of a coin, it has generated numerous discussions about good governance, and in turn provided an opportunity for public to loudly voice their opinions about and to participate in policy making and implementation, including environmental governance as discussed in section 3.2.

In a summary, many East Asian countries are experiencing their own political and economic moves. But as international trend, globalization (including marketization) and localization may be recognized as common characteristics underlying these unique moves. They in turn bring about some convergent innovations in environmental governance such as deregulation and decentralization. For environmental policy and governance, a number of new ideas such as soft guidelines, market-based instruments, voluntary actions, and full involvement of all stakeholders have been advocated. Yet some of these innovative philosophy and trends just indicate the good directions that should be pursued, and do not yet mean that they already have become a workable mainstream in reality. Soft guidelines and voluntary actions need sufficient atmosphere of environmental awareness and culture to support their introduction and application. For most developing countries in East Asia, regulatory cooperation needs to be first established. In other words, environmental governance is still suffering from the shortages of environmental laws and regulations and the problem of non-compliance. The formulation of cooperation between regulators and regulated parties or among all stakeholders calls for formal external constraints before environmental awareness and culture raise to the sufficient extent to take the shape of voluntary actions by polluters and other stakeholders.

For decentralization in environmental governance, several warnings may be drawn from the current experience. First, decentralization in environmental governance differs from in economic management. Market mechanism may guide economic activities in a desirable way to a large extent. But in environmental governance government should all long play a dominant role due to both market and policy failures. Second, one of the most important objectives of decentralization in environmental governance is to make local governments play an active and leading role in local environmental protection. However, a care must be taken in decentralization in the cases where and when local environmental interests and institutional capacities are low. Devolution of power, function and authority in environmental governance, therefore, should be done step by step and treated differently by regions even inside a country. Otherwise improper devolution may worsen environmental governance. Third, local capacity-building, including man resources, policy know-how, technical expertise, monitoring
equipment, and financial ability particular, is a necessitated element in the process of decentralization. In other words, local capacity should match its power and mission.

4. Environmental Policy and Instruments

4.1 National level

From Table 2, the general frameworks of national environmental laws/regulations in Japan, China, Korea, Thailand, and the Philippines resemble. All frameworks are structured for coping with specific environmental problems and for other necessary concerns such as financing, R&D of environmental technology, and environmental dispute resolution. And also they are dominated by command-and-control regulations, with supplements of economic instruments. Yet some unique still exist between five countries.

Table 2 Frameworks of National Environmental laws in five East Asian Countries

<table>
<thead>
<tr>
<th>Countries/policy</th>
<th>Japan</th>
<th>China</th>
<th>Korea</th>
<th>Thailand</th>
<th>Philippines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic environmental Policy</td>
<td>Yes(67,93)</td>
<td>Yes(79,89)</td>
<td>Yes(63,77,90)</td>
<td>Yes(75,92)</td>
<td>Yes(75)</td>
</tr>
<tr>
<td>Air</td>
<td>Yes(68)</td>
<td>Yes(87,95)</td>
<td>Yes(90,99)</td>
<td></td>
<td>Yes(99)</td>
</tr>
<tr>
<td>Water</td>
<td>Yes(70)</td>
<td>Yes(67,93)</td>
<td>Yes(90,99)</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Sea</td>
<td>Yes(70)</td>
<td>Yes(82)</td>
<td></td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>Policies against various environmental pollution</td>
<td>Automobile exhausts</td>
<td>Yes(72,92)</td>
<td></td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Soil</td>
<td>Yes(70)</td>
<td></td>
<td></td>
<td>Yes(95,99)</td>
<td></td>
</tr>
<tr>
<td>Noise</td>
<td>Yes(68)</td>
<td>Yes(96)</td>
<td>Yes(96)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solid Waste</td>
<td>Yes(70)</td>
<td>Yes(95)</td>
<td>Yes(86,99)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toxic materials</td>
<td>Yes(73)</td>
<td></td>
<td>Yes(90,99)</td>
<td>Yes(92)</td>
<td>Yes(90)</td>
</tr>
<tr>
<td>Sewage</td>
<td>Yes</td>
<td></td>
<td>Yes(66,99)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nature Conservation</td>
<td>Yes(72)</td>
<td></td>
<td>Yes(91,99)</td>
<td></td>
<td>Yes(78)</td>
</tr>
<tr>
<td>BIA</td>
<td>Yes(97)</td>
<td></td>
<td>Yes(93,99)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financing</td>
<td>Yes</td>
<td></td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental disputus resolution</td>
<td>Yes</td>
<td></td>
<td>Yes (94,99)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Development of environmental technologies</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economic instruments (the number of charge systems nationwide)</td>
<td>1</td>
<td>2</td>
<td>6</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Voluntary actions</td>
<td>Yes</td>
<td>Emerging</td>
<td>Emerging</td>
<td>Emerging</td>
<td>Emerging</td>
</tr>
</tbody>
</table>

Notes: 'Yes (93,99)' indicates that there is a specific law, and the number in the brackets is the year of the enactment or amendment of the law. 'Blank' means no specific law but in most cases, other relevant laws and the State or ministry regulations are available and cover the contents in question.

First, the Japanese and South Korean frameworks of environmental laws and regulations relatively cover almost all-necessary areas of environmental management. Both include basic policy, policies against diverse environmental pollution problems and natural degradation, financing, environmental technology R&D, environmental dispute resolution, integration of environment and development, and global environmental issues. In contrast, Chinese, Thailand and the Philippine frameworks mainly consist of basic law and several core laws concerning pollution control of air, water, solid, noise, and other environmental elements, and natural conservation. But several crucial policy categories for supporting the core policies in Chinese framework particular, such as financing, R&D of environmental technology, and environmental dispute resolution, are generally of shortage, or incorporated into other relevant laws, or in the form of ministerial regulations and administrative systems. In other words, environmental legislation in China and some of other East Asian developing countries lags behind the actual needs of environmental management.

Second, in terms of the emphases of basic environmental policy, Japan is moving toward intensive actions for environmental amenity, environmental sound material cycle, and global environmental issues such as global warming, ozone protection, and biodiversity conservation. In contrast, China, for example, now is arduously battling against industrial pollution and urban environmental problems and attempting to improve environmental quality on the whole in some regions and to curb the nationwide environmental deterioration caused by fast economic growth. In other words, it is still at the early stage of pursuing entire improvement in environment nationwide although the philosophy and goals of sustainable development are well considered in its strategies. To some extent Thailand and the Philippines are facing the similar situation to China. In many respects Korean situation seems to be of between Japan and China. Although still facing industrial pollution, effluent lifestyle and other urban environmental problems, Korea's environmental quality as a whole is more improved than China. Hence Korea has more available conditions, including economic power, to support for pursuing sustainable development at a faster pace.

Third, although all five countries widely adopt standards, regulatory instruments, and plans in environmental management, their policy instruments still see some other unique. Pollution Control Agreement (PCA) between local government and business is well recognized as Japanese-style voluntary approach. In the new paradigm of Japanese environmental policy, PCA experience facilitates industries' voluntary actions more active in waste management and CO$_2$ mitigation as well as introduction of environmental management systems such as ISO 14000 series, of which the 1997 Keidanren Voluntary Action Plan on the Environment is often exemplified. In Korea, voluntary action has emerged recently in some big business companies. The Samsung Electronics, for example, declared its Green Management Charter in May 1996 and has launched voluntary actions inside and outside company such as developing environment-friendly products, sponsoring a clean-up campaign of the Han River and ecological studies of local communities (Samsung Electronics, Green Management Report, 1999). Likewise, a number of prominent business groups and individuals in Thailand recently have taken up environmentalists stands in
one form or another. Bangchak Petroleum, as a key sponsor, has established environmental forum and network to advocate the philosophy of environmental protection in the business and lunch campaigns and activities related, in collaboration with environmental NGOs nationwide (Somruadee Nicro, 2000:88). In short, environmental voluntary actions in South Korea, Thailand, China and the Philippines are emerging now but not as evident as Japan.

Another difference in environmental policy instruments between five countries is the intensive mechanism of governmental financial aid to industrial and urban pollution control (Table 3). In addition to normal tax breaks and financial grants as commons applied in all countries, Japan, Korea and Thailand employ special institutions and instruments to grant funds and lend low-interest loans to industries for installation of pollutant abatement facilities and to municipalities for construction of environmental infrastructure. Such government-affiliated financial institutions in Japan such as Japan Development Bank, Japan Environment Corporation, and others have lent a large amount of loans to industries, especially to small and medium industries for pollution control since the late 1960s. These institutions have to a large extent removed the financial shortage of industries in pollution control on the one hand.

On the other hand, they have also helped the introduction and R&D of environmental technology, which is vital element to support the achievements of environmental standards and regulatory instruments in Japan. Likewise, Korea installs a Special Environment Account to raise environmental investment and grant programs for the R&D of environmental technology, according to the Special Account for Environmental Improvement Act and the Act on the Support and Development of Environmental Technologies that both were first issued in 1994. Earlier than Korea, in 1992 Thailand established the Environmental Fund according to the 1992 Environment Act. The Objective is to support Local Administration, State Enterprises and Private Sector for environmental conservation by providing low-interest loans. In particular, air pollution, wastewater and solid waste projects are targeted. In contrast, China and the Philippines don’t see similar intensive institutions and instruments to Japan, Korea and the Thailand for financial support, rather than disperse instruments in different policies and programs related or national fiscal planing.

Fourth, for market-based instruments, China and Korea share more experience than Japan and Thailand as well as the Philippines do. In addition to charges on households for sewage treatment and garbage disposal applied in some cities, Japan introduced SOx emission charge system in the early 1970s. It is viewed as Japanese-type PPP—Polluter Punishment Principle. Actually the origin of this system was to raise the funds of compensation for the pollution-related victims. Distinctly, China and Korea employ many market-based instruments including pollution charge and fee, user tax and charge, deposit-refund system, and tradable emission permit particular in some Chinese cities (table 3). Although the actual incentive effects of those market-based instruments are still unclear yet, at least they are used as good instruments to raise funds for both institutional capacities building and financing pollution control. China, for example, uses 20 per cent of the revenues of pollution fees to build local monitoring capacities and
returns the rest 80 per cent to industries by grants and low-interest loans for installation of pollution abatement facilities. Six national pollution charges in Korea pool a large amount fund for its Special Environmental Account. With the raising in incentives of these economic instruments to industries and other polluters, environmental policy instruments in China and Korea are expected to be more cost-effective as compared to no-economic instruments Japan applied in the past. When examining the nationwide as a whole, market-based instrument is absent of their presence in both Thailand and the Philippines, except for those preferential policy in financial subsidies and tax breaks. Yet the benefits of market-based instruments and difficulties of application are in hot discussions and planing there. It is hoped that intensive introduction and application will come in near future.

4.2 Local levels

Kitakyushu of Japan, Dalian of China and Seoul—a capital of Korea, all cities once experienced serious pollution by industrialization and urbanization. Nowadays environment in each city has been greatly improved however. Kitakyushu received two awards from the United Nations: the Global 500 Award in 1990, and the Local Government Honors in 1992. Dalian was named as Environmental Model City by the Chinese national government in 1998. Likewise, many evidences show that Seoul outperforms other Korean cities in environment management although its dwellers account for one-fourth of Korean population. In a word, each of these cities may be viewed as a good paradigm of environmental management in its own country.

In comparison with these three cities, Metro Manila is still suffering from serious urban environmental problems such as traffic pollution and household effluent contamination. While the declining water quality and the increasing household wastes generation become problematic, Bangkok has achieved much reduction in ambient levels of lead, SOx, NOx and CO. Whatever Bangkok and Metro Manila are in environmental quality, they are doubtlessly venues where environmental management is mostly intensified in both countries. Therefore, environmental performance or local initiatives, and policy instruments particular in all cities listed in table 4 may portray the top level or the intensive level in each country.

The development of local environmental regulations and policy instruments are determined by a complex interaction of influences, including the national environmental policy, local unique of environmental problems, local socioeconomic conditions, and local governmental and citizens' interests and efforts, as well as the national political regime.
| Table 3 Financial and market-based instruments in Japan, Korea and China

<table>
<thead>
<tr>
<th>Japan</th>
<th>Korea</th>
<th>China</th>
</tr>
</thead>
<tbody>
<tr>
<td>Governmental grant to environmental infrastructure</td>
<td>National and local environmental budgets</td>
<td>National and local environmental budgets; Special Environmental Account</td>
</tr>
<tr>
<td>Financial aid to industries by low-interest loan</td>
<td>Japan Environmental Corporation, Japan Development Bank, Small and Medium Enterprises Finance Corporation</td>
<td>No specific institutions but policy bank or commercial banks; Special Environmental Account</td>
</tr>
<tr>
<td>Tax breaks</td>
<td>1. Accelerated depreciation for pollution control facilities and recycling facilities. 2. Exemption of local governments' property tax and urban planning tax on the pollution control facilities; 3. Reduction in corporate income tax when pollution enterprises move outside city.</td>
<td>A small number</td>
</tr>
<tr>
<td>Pollution charge and Fee</td>
<td>1. SOx charges for compensation for health-damage in the designed area 1. 2. Automobile weight tax for compensation for health-damage in Area 1; 3. Charges on special pollutants for compensation for health-damage in Area 2; 4. Noise fee of air flights; 5. Sewage treatment fee (local); 6. Garbage disposal fee (local); 7. Waste disposal charge (industries)</td>
<td>1. Environmental Improvement Charge; 2. Emission charge; 3. Sewage treatment fee; 4. Garbage treatment fee; 5. Waste disposal charge (industries); 6. Volume-based collection fee of household waste; 7. Congestion charge (Seoul tunnels) for private vehicle carrying fewer than 3 persons.</td>
</tr>
<tr>
<td>Tax, Charge and Fee</td>
<td></td>
<td>1. Traffic charge; 2. Water quality improvement charge</td>
</tr>
</tbody>
</table>

1. See last four references at the end of the paper.
Japan introduced local autonomy post-war, whereas the Philippines did in 1991 and Korea in 1995. Although China generally does not see local autonomy system except for few minority regions, local provincial governments share large authorities for local affairs including enactment of local regulation and ordinance since the early 1980s through decentralization in both administration and fiscal redistribution. In environmental governance, the implementation of national environmental policy and necessary local initiatives all fall in the responsibilities and authorities of provincial and metropolitan governments.

China is so large that in many cases it is impossible for the central government to stipulate laws, regulations, and ordinances, or even administrative systems with unified and specified articles tailored to all regions of the country. Hence provincial and metropolitan governments normally issue the detailed regulations, ordinances and administrative systems based on local conditions for implementation of the national ones. Consequently, the development of local environmental regulations and instruments in China more depends on the national initiatives.

On the other hand, local governments may issue local standards and regulations more stringent than the national ones, and formulate special instruments according to local unique conditions and local initiatives. In reality, the formulation of many national policy instruments of environment is right a process of generalizing and popularizing the experiences of local initiatives or policy on trial in demonstration regions. As a result, the framework of local environmental policy like Dalian consists of national policy that can be directly applied; local regulations and ordinances based on the national ones; and local unique instruments in form of administrative system. The items about Dalian listed in the table 4 belong to the later two groups.

However, local initiatives in China heavily depend on local government and its governor’s interests and efforts, whereas the voices from local citizens, in particular in those less-developed regions are generally quiet unlike situations in Japan and Korea and even in Thailand and the Philippines. The more the local government and its governor are eager for local economic growth, the less the local initiatives in

---

2 “Three-at-the-same-time” refers to the policy that requires new or expanded facilities to include pollution prevention and control in design, construction and operation.
environment protection. Generally the local initiatives in environmental management in East China are more active than the West. In other words, the constraint to local initiatives in China to some extent is rather local philosophy about dilemma of growth and environment and local capacities than otherwise.

In Japan, the development history of local environmental regulations like Kitakyushu is much longer than national one (Table 2, and 4). Before the start of intense period of national environmental legislation at the beginning of 1970s, many local governments of Japan already issued a number of local environmental regulations and ordinances and inaugurated some unique instruments. Of particular significance, has been the PCA. In that period, some bottom-up oriented factors and the fact of no national laws and regulations to follow constitute the causes of local initiatives and efforts by Japanese local governments. The bottom-up oriented factors include violate pollution and its serious damages, the pressure by victims and citizens' anti-pollution protests, local autonomy system, and direct election of governors by citizens particularly.

<table>
<thead>
<tr>
<th>Cities</th>
<th>Kitakyushu Japan</th>
<th>Dalian China</th>
<th>Seoul Korea</th>
<th>Bangkok Thailand</th>
<th>Manila Philippines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic policy</td>
<td>Yes (72)</td>
<td>Yes (86,91)</td>
<td>Yes (1995)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air</td>
<td>Yes (55, 69,70)</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water</td>
<td>Yes (70)</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regulations against various environmental pollution problems</td>
<td>Yes (66, 85)</td>
<td>Yes (86, 95)</td>
<td>No-evidence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soil</td>
<td>Yes (88)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Noise</td>
<td>Yes (55)</td>
<td>Yes (81, 95)</td>
<td>No-evidence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solid Waste</td>
<td>Yes (72, 79, 92)</td>
<td>Yes (92)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sewage</td>
<td>Yes (64)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EIA</td>
<td>Yes (98)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financing environmental conservation</td>
<td>Yes (68,79)</td>
<td>Yes (1990)</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Environmental disputes treatment</td>
<td>Yes (73, 74)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Market-based instruments</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No-evidence</td>
</tr>
<tr>
<td>Voluntary approach</td>
<td>PCAs</td>
<td>Emerging</td>
<td>Emerging</td>
<td>Emerging</td>
<td>No</td>
</tr>
<tr>
<td>Pollution control/environmental plan</td>
<td>Yes (72, 84)</td>
<td>Yes</td>
<td>Yes (1995)</td>
<td>Yes</td>
<td>No-evidence</td>
</tr>
<tr>
<td>Local agenda 21</td>
<td>Yes (1995)</td>
<td>Yes (1998)</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

After the establishment of the national framework of environmental laws and regulations in 1970s, Japanese local governments mainly concentrated on implementation of the national policy according to local conditions. It also included local initiatives that local governments issued detailed regulations and ordinances following the national ones, set more stringent standards, and formulated policy with which the national government did not deal like EIA before 1997. Since the 1990s, local initiatives and pinioning roles have been encouraged by the renovation of national environmental policy. Environmental pollution control is still an indispensable emphasis of local policy. But such areas as integrating
environmental consideration into development policies, plans and programs; promoting voluntary actions by business and citizens; and disseminating information become new interests of local environmental policy agenda. The phrase “think globally, act locally” describes the new roles of local governments in Japan nowadays. Kitakyushu, for example, now is trying to make a new industrial city model through launching projects and activities such as the Eco-Town Project, which focus on the research and development of waste recycling and recovery technologies. At the same time, the City has been engaged in international environmental cooperation activities to transfer the know-how, experiences, and technology of Kitakyushu to cities overseas that are facing with problems similar to Kitakyushu in the past.

In Korea, the story of local initiatives in environmental management before 1995 seemed to be totally different from Japan and China. Before the introduction of local autonomy, governance in Korea was very centralized. Local governments of Korea concentrated on the implementation of national environmental laws and regulations and carried out the duties delegated by the central government. Moreover, when the central Environmental Administration established 6 regional environmental offices in 1986, the major tasks of enforcing environmental regulations were given to these national governmental branches (Deoko Cho, etc. 2000:20). As a result, the authorities and initiatives of local governments are quite limited, and no evidence shows that some local environmental regulations and ordinances were available before 1995.

The establishment of democratic government in the early 1990s and the introduction of local autonomy in January 1995, however, have given greater autonomy to provinces and municipalities. Although it is still a big challenge to Korean decentralization in environmental governance now, a number of local autonomies have been aware of their responsibilities and roles in formulating their own policy and launching local actions to improve local environment. Seoul, for example issued Seoul Basic Environmental Regulation, Seoul Green Version 21, and Seoul Environment Charter in the late of 1990s. These locally soft guidelines set ambitious targets of environmental policies and specify some concrete measures and actions to achieve these targets. In order to implement the regulations and plans, Seoul metropolitan government also institutionalized some creative instruments such as the Citizens’ Committee for a Green Seoul (details in section 5).

Ulsan, an industrialized city in Korea where was one of the most polluted urban areas before, made the Municipal Codes defining the principles of environmental preservation and the roles and duties of local government, industry, and citizens in 1997. Following the Code, Ulsan Metropolitan government established the Mid-term plan on the Ulsan Environmental Improvement (1998-2002). Like Seoul, Ulsan also institutionalized the Green Ulsan 21 Promotion Committee so as to implement the relevant plans effectively (Deoko Cho, etc. 2000:25). To sum up, local initiatives in Korea have become increasingly active in environmental governance since the late of 1990s. Moreover, the local interests, policy targets, and governance philosophy in Korea such as the advocacy for full involvement of citizens and NGOs, pursuing material recycling and urban amenity, now are getting close to those in Japan. This takes place
also by the encouragement of achievements that serious industrial pollution and some of urban environmental problems have been resolved or mitigated to some extent in some Korea cities.

In comparison with Japan, China and Korea, local environmental regulations and instruments in both Thailand and the Philippines are quite limited (table 4), although in many respects local environment management have achieved much in both countries. In Thailand, the responsibilities and powers of local government units in environmental governance mostly concentrate on the implementation of national environmental policies and carrying out activities delegated by the central government. After the 1991 Constitution and 1992 Environment Act, the role of local government units has been encouraged. In particular, Bangkok Metro Administration and Pataya municipality have been given more local autonomy, characterized by direct election for governors, to deal with local affairs including environmental matters. For those regions located in pollution control areas and protected areas set by the central government, local governments are asked to prepare local action plans for implementation of the national plans and programs. Generally the limitation of local roles in Thailand may be first due to the centralization of politics, administration and financial distribution. The members of local councils of provincial governments and the municipalities excluding Pataya are elected by local constituency, but the governors or mayors are appointed by the central government and assisted by several officials from different ministries and agencies (Thailand Environment Institute, 1996:4-1,4-3). This regime normally discourages local initiatives of governors and governments in local affairs, including environmental management. The local shares in the total public expenditure and the total tax revenues in Thailand were only about 9.6% and 5.5% in 1997, respectively. This situation expects to be changed after carrying out the planned decentralization in near future.

On the contrary, after the devolution of many powers and functions from the central government in the early 1990s, the constraints to local active roles in the Philippine environmental governance are rather the local institutional capacities that mismatch their functions than otherwise. The realities of Metro Manila and other local governments in the Philippines show that several years after decentralization are insufficient to raise local capacities, including man resources, policy know-how, technical expertise, monitoring facilities, and financial power particular, to the extent that local governments can fully exercise their missions. Moreover, poverty and economic difficulties in the Philippines make the process of local capacity-building slower and longer.

To sum up, Japanese local governments generally have all long played a pioneering and leading role in local environmental governance since as early as 1960s and accumulated rich experience in how to launch local initiatives, including governance skills, technical expertise, manpower training, and policy know-how. The forces driving the leading role by Japanese local governments are such bottom-up oriented factors as local citizen's initiatives and voices, in addition to decentralized responsibilities and powers based on local autonomy system. Similarly, Chinese local governments also act as a key actor in environmental governance. Devolution in administrative authority and functions as well as fiscal
redistribution since the early 1980s encouraged the initiatives of Chinese local governments. In addition to common problems of low institutional capacities, low environmental interests and priority caused by the dilemma of growth and environment also are important factors to influence the local initiatives in environmental governance in China. In comparison, Korean local governments did nothing special in environmental governance before local autonomy was introduced in the early 1990s. Now local initiatives in Korea become increasingly active. Moreover, in many respects local interests, policy targets, and governance philosophy in Korea now are getting close to those in Japan. This takes place also by the encouragement of achievements in industrial and urban pollution control. Yet how to properly decentralize environmental governance is still a challenge to Korea. Likewise, centralization in administrative powers and function as well as fiscal distribution in Thailand seems to constitute the main limitations of leading roles local government could play. On the contrary, after the devolution of many powers and functions from the central government in the early 1990s, the constraints to local active roles in the Philippine environmental governance are rather the local institutional capacities that mismatch their functions than otherwise.

5. The roles of Actors and Embodied Rules in Urban Environmental Governance

Past experience suggests that in the absence of a strong institutional foundation, environmental management suffers and policy goals are often not achieved. The institutional foundation particularly includes such elements related to all actors as: full involvement, playing proper roles, capacity-building, and partnership. The actors involving in environmental governance include the national and local governments, business, citizen, NGOs, media, and other civil societies.

Another prerequisite to make actor participate in and take the responsibility is that each actor must have sufficient capacity. Table 5 describes a conceptual model of actor's roles and embodied rules in environmental governance.

<table>
<thead>
<tr>
<th>Actors</th>
<th>Roles/responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>National government</td>
<td>• Slim regulator—decentralization;</td>
</tr>
<tr>
<td></td>
<td>• Decision-maker: Open and consensus-building;</td>
</tr>
<tr>
<td></td>
<td>• Coordinator: inter-ministries; inter-regions; and vertical between national and local;</td>
</tr>
<tr>
<td></td>
<td>• Monitor and inspector;</td>
</tr>
<tr>
<td></td>
<td>• Judge: environmental conflicts;</td>
</tr>
<tr>
<td></td>
<td>• Provider—capacity-building of local and other stakeholders: information, policy know-how, technical expertise, and finance.</td>
</tr>
<tr>
<td></td>
<td>Playing a leading role</td>
</tr>
<tr>
<td>Local/City</td>
<td>• Full responsibility for local environmental quality;</td>
</tr>
</tbody>
</table>
government

- Implementing national environmental policy and launching any local activities needed;
- Formulating local policy and taking local measures adaptable to local conditions;
- Providing necessary supports to business, citizens, and NGOs, and working together with them.

Towards self-governance and voluntary actions

Self-governance implies “quasi-voluntary compliance”. It refers to that business conscientiously and actively exercises activities in environmental management under external constraints (such as governmental regulations and social pressures against pollution) and internal environmental culture, rather than passively does, which differs from voluntary actions. The shift from self-governance to voluntary actions should be encouraged under the support of environmental awareness and culture.

Business

- Participation in policymaking processes at both national and local;
- Monitoring environmental performances by government and business;
- Responses to household waste management;
- Changing lifestyle toward environmental friendly.

Citizens, Media, NGOs and other civil societies

5.1 Consensus-building in city environmental policymaking

In comparison with the national government at the top level and provincial government at the middle level, city government acts as a basic governance unit in many countries responsible for local affairs, directly providing services to and working with local people. In comparison with local community at the lowest level, city government is also a real power organ of governance in terms of administrative and financial independence. Hence public participation in the process of policymaking at the city level becomes the most critical and pragmatic to achieve consensus among all social members in local environmental governance. A number of cities in East Asia have developed the diversified mechanisms to increase the presence of citizens, NGOs, and civil societies in environmental policymaking. Of particular relevance to others have been the mechanisms of Kitakyushu in Japan (Box 1) and Seoul in South Korea (Box 2).

Box 1 Kitakyushu Environment Council (Kitakyushu Environment Bureau, 1999:158)

Similar to the system of Central Environment Council at the national level, Kitakyushu City employs its own Environment Council. The Council consists of 7 experts and scholars, 9 representatives from citizens, and 3 from business. Its mission is to provide policy related consulting according to the requests by the Mayor. It makes policy proposals, reviews the proposals, and gives suggestions for any big actions in local environmental governance. In the process of environmental policymaking, while the academic members of the Council primarily review policy proposals and provide advice from the scientific viewpoint, representatives from business and citizens pay more attention to technological and economic feasibility questions, social acceptability and equity. Theoretically, such an open process of policymaking can promote
scientific rationality and social understanding about the policy, thereby releasing institutional tensions between regulator and regulated party. At some stages of the policymaking process, the Council also holds public hearing meetings to explain the context of policy proposal and get comments of the public. In the process of making 21st Agenda of Kitakyushu, for example, the public made few hundreds suggestions and comments at several public hearing meetings, of which several decades suggestions were adopted by the City government.

Box 2 the Citizens’ Committee for a Green Seoul (http://www.seoul.org)

According to the relevant ordinance of Seoul Municipality and its amendment, Seoul Municipal Government established the Citizens’ Committee for a Green Seoul in 1996 and is reorganizing the Committee now. The mission of the Committee is stated as: to promote and supervise activities for Seoul Agenda 21 for the sustainable development of Seoul; to contribute to the preservation of the global environment through joint activities with the UN Sustainable Development Commission; and to take on the role of a venue for civil participation in the city administration for the improvement of Seoul citizens’ quality of life.

The Committee consists of board members and standing members. The board members include 3 co-chairpersons (a civil representative, a business representative, and mayor) and 3 vice chairpersons. The standing members are totally 94, 33 of academia, 29 from civil groups, 5 of journalists, educators and attorney, 5 of City councilmen, and 8 of public officials. The Committee installs four subcommittees: “Seoul Agenda 21” Promotion Board; Sustainable Development Policy; Environmental Publicity/Education; Citizens Devoted to the Han River.

The concrete activities done by the Committee to date covers six aspects:

- **Preparation and promotion of “Seoul Agenda 21”:** It includes such activities as: publicity of Seoul Agenda 21; education of the Agenda for local youths; and establishment of forums for building up the local Agenda 21 network.

- **Invitation to participate in city administration (environment sector):** In order to build citizen-government partnership, civil groups are invited to propose environmental projects, and then Seoul Municipal government provides financial support to the selected projects. It gives an opportunity for civil groups to develop themselves and for more citizens to participate in administration spontaneously. In four years from 1996 to 1999, the municipal grants for 135 projects proposed by civil groups summed up 157 billion won.

- **On-site environment preservation activities:** Members of the Citizens’ Committee for a Green Seoul have inspected those facilities environment related under Seoul City’s jurisdiction, and investigated the water purification status at upstream Han River in order to propose realistic alternatives for environmental policies.
5.2 Rules to foster an active role by city governments in environmental governance

The approach to fostering an active role by city governments in environmental governance varies by countries in East Asia, mainly caused by different backgrounds of political-economic structures, social norms and cultural values. As two different stories, Japanese approach is historically bottom-up oriented, whereas Chinese approach is generally top-down oriented.

Historically, environmental protest movements exerted a heavy influence on Japanese local politics and local initiatives in environmental governance. As citizens directly select local leaders based on local autonomy, local governors and mayors have to be aware of trends in public awareness about local affairs including environment. Citizens can also voice their opinions in local environmental governance by other formal and informal channels such as Environment Council and public hearing meetings as described earlier, and mass media. Hence most Japanese mayors and city governments keep environmental protection in their minds and on governmental agenda. Certainly sufficient abilities of Japanese citizens, including good education, high environmental awareness and knowledge, and environmental and other social interests aroused by high incomes, are critical premise to foster the leading role by local governments, in addition to institutional opportunities for citizens participation.

In comparison, China doesn’t see nationwide and prominent forces from citizens to push city government into play in environmental governance. Alternatively, Chinese central government has set some top-down systems for local governors and governments. The upper governments, for example, set target responsibilities of lower governors and their governments for environmental protection, and consider environmental achievements by local governors and governments into the annual review of their governance performance. Of particular significance has been the system of nationwide quantitative review of environmental performance by cities. For a decade since the first implementation of this system
in 1989, it has been of a critical agent to bring most of Chinese city governments into play in urban environmental governance (Box 3).

From Japanese and Chinese experiences, the critical is to design relevant rules that drive local governments to take active initiatives in environmental governance. These rules should be based on national conditions of each country, whatever they are bottom-up oriented or top-down oriented. From the perspective of managerial efficiency, however, bottom-up approach is more cost-effective. When public fully participates in environmental policymaking and implementation as well as review of governmental environmental performance, environment protection will be governed by all stakeholders' interests and efforts, and as a consequence the costs of enforcing those top-down rules will be avoided.

In addition, decentralization also needs to be seriously considered in bringing city governments into a play as discussed earlier. Decentralization encourages city governments to take actions by devolving the relevant powers and functions in environmental governance. On the other hand, decentralization can provide capacities for city governments to launch activities. In this respect, community-oriented forest management program in the Philippines has a good relevance to others (Box 4).

<table>
<thead>
<tr>
<th>Box 3 Quantitative Review of Environmental Performance by Cities in China (D. F. Feng, G. Xia, 2000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Since 1985, China has implemented a landmark policy for the improvement of urban environment—comprehensive management and improvement of urban environment. The policy calls on city governments to play a leading role in urban environmental management. It includes three basic elements: prevention and abatement of urban industrial pollution, construction of urban infrastructure, and strengthening urban environmental governance.</td>
</tr>
<tr>
<td>In order to promote enforcement of the policy and encourage the leadership of city governments, National Environmental Protection Agency, China (NEPA) (elevated as State Environmental Protection Administration in 1998 (SEPA)) began to carry out the system of quantitative review of city environmental performance in 1989. The system is designed to assess city governments’ and their mayors’ efforts and achievements in urban environmental management. Their performance is reviewed annually through the assessment of 26 indicators in 4 groups: environmental quality, pollution prevention and abatement, environmental infrastructure, and environmental governance. All indicators are quantified so as to calculate out an index of environmental performance. Then the review results are published in newspapers and NEPA's annual report or by other media. Therefore the review system produces heavy pressures on city governments and their mayors from the upper governments, competitions between cities, and citizens. It is no exaggeration to say that all achievements in Chinese urban environmental management have been to some extent attributed to this review system. At present, SEPA reviews 47 cities including municipalitics (as the same level as province in administration), provincial capitals, tourist cities, and coastal cities. And provincial</td>
</tr>
</tbody>
</table>

—59—
governments and municipalities review cities in their jurisdictions. Nowadays 609 cities, 91 percent of Chinese cities, involve in this review system.

Based on a decade experience, SEPA has launched the program of building Environmental Model City since 1996. SEPA added some new indicators and raised the valuation standards in environmental performance review system, particularly addressing the relationships between economy and environment towards sustainable city. The city that passes this new review system is awarded the Environmental Model City by SEPA. To date 13 cities have been obtained this title. As a result, the new review system encourages city governments very much to pursue higher targets than before in urban environmental management.

Box 4 Decentralization in Forest Management of the Philippines—Community-based Approach
(Merlin M. Magallona and Ben. S. Malayang, 200:132)

Deforestation has had a long history in the Philippines. But earlier attempts to control it has focused on top-down mechanisms, which essentially involved efforts of the national government to enforce the boundaries of public forests. After the devolution some powers and functions of environmental and natural resources conservation to local government units in the early 1990s, there has been a clear shift in the strategy. The involvement of local governments, local communities, the private sector, and civil society has been institutionalized by the way of community-base and community forest development and protection programs. NGOs are tasked to evaluate the performance of reforestation contractors. The appropriation of revenues from forest resources and the responsibility of conservation are clearly defined and devolved to local communities and other contractors. It provides both incentives and motivations to local communities to take care local resources. This experience in governance decentralization is of good relevance to others in natural resources management.

5.3 Rules for Self-governance by business

Self-governance by business in environmental management is shaped by both environmental awareness of business and external constraints including governmental regulations and social pressure against pollution. Normally the raising of environmental awareness takes time. Hence external rules should be first in place to regulate environmental behaviors of business. In addition to national environmental laws, regulations, and standards that are designed for business,

Japanese experience show that in-plant systems of environmental management are also needed. Japan has introduced such systems in factories and business establishments as notification systems for specified facilities, monitoring of factory operations, data keeping and reporting, responsibility systems and
training, and assignment of engineers to be in charge of pollution control. Of particular significance has been the system of pollution control managers. Meanwhile, the Pollution Control Agreement signed between local government and business fostered honestly commitment of business to pollution control.

5.4 The rules to encourage public participation in environmental governance

As shown in Table 5, citizens, media, NGOs, and civil society can play their roles in four respects of environmental management: participation in policymaking processes at both national and local; monitoring environmental performances by government and business; response to household waste management; and changing lifestyle toward environmental friendly. For the later two respects, they greatly depend on the raising of environmental consciousness of the public and the creation of environmental culture of the society. In comparison, the public roles in the first two respects are more encouraged by formal rules related. Among many necessary rules, the fundamental one is to define environment rights of citizens’ enjoying healthy and clean environment, which has a presence in the constitutions of many East Asian nations. At the same time, the public duties in environmental governance need to be specified together with their rights. The 1992 Environment Act of the Kingdom of Thailand, for example, recognizes certain legal rights and duties of Thai citizens in relation to environmental protection. They include 1) right to access information on the environment; 2) right to claim compensation from the state for damages caused by pollution of state projects; 3) right to make a complaint against polluters; 4) duty to cooperate with environmental protection authorities; and 5) duty to comply with environmental laws and regulations.

In practice, operational rules are extremely important to ensure the rights and duties written in the constitutional laws to be in place. First, government needs create special institutions for representatives of the public to participate in the process of environmental policymaking. Environment Councils at Japanese central and local levels, National Environmental Board in Thailand, the Citizens’ Committee for a Green Seoul, and the Philippine Council for Sustainable Development provide good institutional implications for others as discussed earlier.

Second, in order to monitor environmental performance of government and business, the ordinary public should have the political and non-political opportunities to voice. Pollution-related victims and citizens in Japan, for example, changed local political structure and the attitudes of some local governments toward industrial pollution through direct elections for local governors in the 1960s. China installs the public reporting system in environmental administrative bodies at all levels. Everyone can express his or her opinions, suggestions, and complaints about environmental affairs by writing, visiting or phone. This system in reality acts as a main resolution for environmental disputes in China. On an average, governments at all levels in China annually receive about a hundred thousands letters and 60 thousands visitors about environmental disputes, and 8 thousands proposals. For non-political or non-governmental
opportunities, media is the most critical one. It is not only a venue for public to voice but also an agent to help or push governments and polluters. The Box 5, as a random example among a considerable number of stories related, shows how mass media push polluter to comply with environmental regulations in Dalian City of China. On the other hand, media is worldwide recognized as the most popular tool to inform and educate the public in environmental protection.

Third, Japanese and Korean experiences show that environmental dispute resolution and compensation systems can encourage citizens to participate in environmental management. The citizens’ fight for their causes in environmental disputes actually is a process of public participation. The reason for the citizens’ fight is because they suffer from pollution and environmental degradation and attempt to get compensation for the health damages or property losses from the polluters. This motivation and process essentially provide material incentives to the public to monitor polluters and regulators. In other respects environmental dispute resolution and compensation systems directly resolve social conflicts caused by environmental problems, and indirectly expand governmental capacities of environmental governance through citizens’ interests in monitoring and through accessing information in the process of dispute resolution.

Box 5 A Pressure on non-compliance by media---a story from Dalian City of China (D. F. Feng, G. Xia, 2000:32)

In 1993, Dalian Huaxin Industrial Group planned to invest 20 million Chinese Yuan in building Xinhai Cement Plant near Dalian Airport. According to related regulations of Dalian, any projects with an investment above 10 million Yuan need conduct environmental impact assessment and obtain the approval by Dalian Municipal Environmental Protection Bureau (MEPB). But the proprietor of the Plant trickily obtained the approval from the district office affiliated to MEPB by deliberately reporting its investment in amount of 9.8 million Yuan. Then the Plant started in construction. On April 16 of the same year, the MEPB was informed this matter by citizens’ complaints. After an investigation, MEPB gave the Plant an order to suspend the construction. But the Plant continued the project without considering the order. The Plant would have annually emitted over 1,000 tons cement dust on the surroundings of the Airport, which would be still below the relevant emission stands, if it had been in operation. Therefore the MEPB firmly planed to take further coercive measure to stop the project in spite of strong oppositions from the Plant. However the intervention of media made the situation easy surprisingly. On April 28, Dalian Broadcast Station published the news with a commentary entitled “Construction of Polluting Plant must be stopped”. The heads of the Plant was deeply shocked by the publicity of the press and social opinions against pollution, immediately stopped the project, and went to MEPB in person for an apology.
Finally, the public must be well informed first before their participation in environmental management. Information disclosure covers not only environmental quality data but also information related to policymaking, environmental performances by government and business, and even the volumes of pollutants discharged by main polluters as well as production situation of polluters. At present, environmental quality information is generally accessible to the public in a number of East Asian countries. Weekly report system of environmental quality in China, for example, has produced very significant effects on educating citizens and inspired their interests in environmental protection (Box 6).

Modern market renews a good corporate image including a consideration of good environmental performance. It implies that environmental governance can take advantage of market forces. Consumers and stakeholders of company are powerful enough to push a company to promptly respond to its pollution problems when its discharges and emissions of pollutants are made public. For information in relation to the volumes of pollutants discharged by polluters, however, it has seen no more other cases except for Indonesian Clean Rivers Program in East Asia. This program took good advantage of firms’ concern for their public image, and thereby induced them to limit the release of pollutants. By publicizing information on plant emissions, the program lowered the total discharges of 100 participating plants by one-third between 1989 and 1994 (World Bank Report 1999/2000: 24).

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Box 6 Weekly Air Quality Report System in China (D. F. Feng, G. Xia, 2000:29)

Several Chinese cities started to weekly publicize air quality information on local newspaper and TV in 1997. To date the publicity of air quality, called the system of weekly air quality report in China, has dramatically popularized in 46 cities nationwide. The system includes five air pollutants: SO$_2$, NO$_x$, TSP, CO and O$_3$. In order to be easily understood by ordinary people, the air quality is publicized in the form of comprehensive index of air pollution. The index is categorized into five quantitative grades based on the concentrations of five pollutants. Since June 1998, Dalian, Shanghai, Nanjing, ChongQing, Beijing, and several other cities started to publicize the information of daily air quality by local media. Moreover, in 1999 such cities with good monitoring capacities as Dalian and Xiamen initiated the forecast of air quality in the coming 24 hours. The Amendment of Air Pollution Prevention and Control Law institutionalizes this system and requires major cities to open their air quality data to the public. Moreover, the State Environmental Protection Administration has released daily air quality of 42 major Chinese cities on Chinese Central TV and nationwide newspapers since the middle of this year.

The weekly and daily publicity of air quality in China has greatly aroused the public interests in environmental problems and protection. The system in Nanjing City, for example, has produced several effects. First, air quality becomes one of hot topics in mass media and ordinary citizens’ concerns. Consequently, the number of citizens’ complaints about environmental quality and inquiry calls is going up, and environmental affairs are increasing their presence in newspapers and on TV. Second, environmental quality becomes an increasingly important factor considered in citizen’s daily life and even business management. The real estate transactions often flourish in
areas with good environmental quality. Citizens are aware of air quality situation like whether forecast, so as to choice good time and places for outdoor exercises and city sightseeing. Third, the daily publicity of air quality, therefore, pressures Nanjing Municipal Government to take more effective measures for improvement of environmental quality. Since 1998, the Municipality has made a great effort in urban infrastructure construction, moving those heavy polluting factories out of downtown, setting dust control areas, transforming boilers, and prohibiting the use of leaded petrol as well as adopting other administrative and technical measures for control of automobile exhausts. As a result, the household gas connection reaches 96 per cent, and the concentrations of SO2 and TSP are gradually decreasing. Generally local citizens are satisfied with the Municipal efforts and the improvements in environmental quality, which in turn further encourage interests of citizens in environmental protection.

6. Concluding Remarks

In the history of initial response to environmental problems by five East Asian countries, it saw two approaches, bottom-up as Japan experienced, and top-down as China, South Korea, Thailand, and the Philippines once followed. Bottom-up approach, which mainly originates from all stakeholders’ motivation, consensus, and efforts, normally shares a good effectiveness of environmental governance. In contrast, top-down, which results from governmental initiatives and efforts as well as international concerns, faces such difficulties as conflicts in stakeholders’ cognizance about growth and environment, no-compliance problem of regulated parties, and low institutional capacities of regulators in environmental governance. Since the late 1980s and the beginning of 1990s particular, however, citizens, NGOs, media, and civil society have increased their presence in environmental governance of five East Asian countries, and consequently the mix of top-down and bottom-up approach has been emerged and gradually improved environmental performance.

In comparison, the timing gap between Japan and other three countries, including China, South Korea, and Thailand, is about a decade in terms of both initial responses and formal legislation in environmental governance. But for the period of intensive actions and legislation, the gap expands to from a decade and more through two decades and less. In other words, Japan saw that period in the 1970s, whereas Korea, China, and Thailand started in the late 1980s and the early 1990s.

The development of Japanese environmental governance can be evidently viewed as distinct stages. In contrast, the evolutions of environmental governance in other East Asian countries tend to be a compressed process. The compressed process is characterized by both the compound environmental and governance issues they are facing and the holistic strategies and measures they need. The compound issues include the combined industrial and urban pollution, the combined domestic and global issues, the dilemma of poverty (growth) and environment, and the conflicts of governance demands and capacities.
The development tempo of environmental policy and governance in other East Asians is faster than that in Japan, and the philosophies about policy and governance are converging in all countries.

Globalization and localization in East Asia, as a common trend in the world, bring about some convergent innovations in environmental governance of East Asia such as deregulation and decentralization. From East Asian experiences, a care must be taken in decentralization however, in the cases where and when local environmental interests and institutional capacities are low. Devolution of power, function and authority in environmental governance, therefore, should be done step by step and even treated differently by regions inside a country. Otherwise improper decentralization may worsen environmental governance because of local misuse of powers devolved from the national government. At the same time, local capacity-building, including man resources, policy know-how, technical expertise, monitoring equipment, and financial ability particular, is a necessitated element in the process of decentralization. In other words, local capacity should match its power and mission.

The general frameworks of national environmental policies in five East Asian countries resemble. All frameworks are structured in such policy categories as basic policy, special policy for coping with diverse pollution and ecological degradation, financing, the R&D of environmental technology, integration of environment and economy, environmental dispute resolution, and global environmental issues. And also they are dominated by command-and-control regulations, with supplement of economic instruments. Yet some unique still exist between five countries. In comparison with Japan and Korea, China and other East Asian countries are suffering from the shortage in some categories of environmental policies, such as financing, environmental technology, environmental dispute resolution, and integration of environment and economy. And also Japanese environmental policy sees some unique instruments like Pollution Control Agreement and voluntary actions. But for market-based instruments, China and Korea share more experience than others do. With the raising in incentives of those market-based instruments applied in China and Korea, their environmental policies are expected to be more cost-effective as compared to no-economic instruments Japan applied in the past.

Japanese local governments historically have all long played a pioneering and leading role in local environmental governance since as early as 1960s and accumulated rich experiences in governance skills, technical expertise, manpower training, and policy know-how. Similarly, Chinese local governments also act as a key actor in environmental governance. But low institutional capacities and low environmental interests and priority caused by the dilemma of growth and environment still limit the local initiatives in environmental governance of some provinces and cities in China. In comparison, South Korean local governments did nothing special in environmental governance before local autonomy was introduced in the early 1990s. But local initiatives in Korea become increasingly active now. Moreover, in many respects local interests, policy targets, and governance philosophy in Korea now are getting close to those in Japan. Yet how to properly decentralize environmental governance is still a challenge to Korea. Likewise, centralization in administrative powers and function as well as fiscal distribution in Thailand
seems to constitute the main limitations of leading roles local government could play. On the contrary, after the devolution of many powers and functions from the central government in the early 1990s, the constraints for local active roles in the Philippine environmental governance are rather the local institutional capacities that mismatch their functions than otherwise.

The past experience in East Asia as other regions also suggests that in the absence of a strong institutional foundation, environmental governance suffers and policy goals are often not achieved. The institutional foundation particularly includes such elements related to all actors as: full involvement, playing proper roles, capacity-building, and partnership. Facing the realities in most of East Asia that environmental awareness and culture is not available to popularize voluntary actions in environmental management, it need strengthen formal rules to encourage roles all actors should play and to form the partnership between actors. In this sense, East Asia shares a number of successful stories and embodied experiences for cross-societal learning in building consensus in policymaking, fostering a active role by local governments, taking the shape of self-governance by business, and promoting a full participation of citizens and NGOs.
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Comprehensive Urban Environmental Management and Administration in China

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1. Introduction

During the initial period after the founding of the new China, when it had a relatively small population and small-scale production, most of the environmental problems occurred were regional ecological destruction and environmental pollution. Then, conflicts between economic construction and environmental protection were not yet obvious. In the late 1950s and early 1960s, when China embarked on the campaign of producing iron and steel by all people and the construction of heavy industries, serious environmental pollution and ecological destruction resulted thereupon. During that period, undue emphasis on economic construction gave rise to resources waste and environmental pollution. Some newly constructed projects were irrationally distributed, and the unchecked expansion of some cities aggravated the pollution of these cities. Serious problems occurred because of the policies of "taking grain production as the principal target" and the "deforestation and destruction of grassland and dumping earth into the lakes and seas to make farmland". In 1972, the first Conference on Human Environment was convened in Stockholm-- the capital of Sweden. As a result of this meeting, high-level decision-makers of China began to realize that there also existed serious environmental pollution in China, which called for earnest treatment. In August 1973, the State Council organized the first National Environment Protection Conference. It adopted the environmental protection working policy of "all-round planning, rational distribution, integrated utility, transformation of harm into good, dependence on the masses, environment protection and benefit to the people". The enactment of the first environmental protection document "Several Regulations of Environmental Protection and Improvement" marked the real start of China's environmental protection cause. On October 25, 1974, the State Council's Leading Group for Environmental Protection was officially set up. Since then, environmental management organizations and institutions of environmental protection, research and monitoring were set up in the relevant state departments, provinces, autonomous regions and municipalities. The campaign of pollution prevention and control was gradually spread nationwide with control and integrated utility of the "three wastes" as its main content. In November 1973, China promulgated its first set of environmental protection standards
"Proposed Standards of the Discharge of Industrial 'Three Wastes'". In April 1977, the circular of "Several Regulations on the Control and Integrated Utility of Industrial 'Three Wastes'" was jointly issued by the State Planning Commission, the State Construction Commission and the State council's Leading Group of Environmental Protection. This marked the new stage of development of China's pollution prevention efforts characterized with the control and the integrated utility of the "three wastes". Meanwhile, the concept of treatment and integrated utility of the "three wastes" in the 1960s was substituted by the concept of environmental protection. During this period, investigations of pollution in some key areas were conducted and the national plan of environmental protection was made. And pollution prevention and control with the characteristics of the control and the integrated utility of the "three wastes" was implemented. In addition, the management systems of "three simultaneous" and control of the polluting sources within a set time were also bought into effect. The Constitution of the People's Republic of China enacted in 1978 proclaimed that "The State protects environment and natural resources, prevents and controls pollution and other public disaster. This was the first definite proclamation of environmental protection in the Constitution, which laid down a solid foundation for the construction of environmental protection laws and the environmental protection cause.

In September 1979, the first basic law of environmental protection "(Proposed) Regulations of the People's Republic of China Concerning Environmental Protection" was adopted, which marked the beginning of the environmental protection operation onto the legal track. In December 1983, the State Council organized the Second National Conference on Environmental Protection, which made an explicit declaration that environmental protection is one of the basic state policies of China.

In April 1989, the Third National Conference on Environmental Protection, organized by the State Council, was held at which 5 new systems or measures were taken. They included: active promotion of target responsibility system of environmental protection to deepen environmental management, the system of quantitative examination of integrated urban environmental management and control, licensing system of pollutant discharge, concentrated control of pollution and forced rectification and control within set times. These five new systems or measures, combining three former systems: continuous implementation of environmental impact assessment, "three simultaneous", and the charging of waste discharge fees, composed the eight systems in the environmental protection of China. They also paved the scientific and systematic way for China's environmental management. After the UN Conference on Environmental and Development in 1992, China became the first nation worldwide to announce its "Ten Policies of the Environment and Development", in which it first put forward the policies of transformation of the traditional development mode and adherence to sustainable development. Later, some other programmatic documents were ratified such as "China's Agenda 21" and the "Operational Plan of Environmental Protection of China". All of them contributed to the establishment of sustainable development strategy as the basic guiding ideology in the social and economic development of China. In 1993, new measures of the prevention and control of industrial pollution were proposed and adopted.
They included compulsory implementation of clean production and the realization of three transformations, namely transformation from end control to that of the entire production process, from density control to that of the combination of both density and the total sum, from dispersed management to the combination of both dispersed and concentrated management. The adoption of such measures marked another new change in the guiding principles of the prevention and control of industrial pollution in our country.

In 1982, the Environmental Protection Bureau was set up within the Ministry of Urban Construction and Environmental Protection. In 1984, the State Council's Environmental Protection Commission was set up responsible for the organization and coordination of the national environmental protection. In 1988, in the organizational reform of the State Council, the State Environmental Protection Bureau was set up as an organization under the State Council. After the organizational reform in 1998, the State Environmental Protection Bureau was promoted to the current state --the State Administration of Environmental Protection. All this change reflects that more and more importance has been paid to environmental protection. At the same time, our country advocated the sustainable development strategy, endeavored to implement two fundamental changes--from the planned economy system to socialist market economy system and from extensive economy to intensive economy.

Now, sustainable development has become the overall strategy to guide the national economic and social development, and environmental protection has also become an important component in the opening-up, reform and modernization construction. In July 1996, the Fourth National Environment Protection Conference was organized by the State Council, at which the targets, tasks and measures of environmental protection to be carried over to the next century were explicitly drawn up. In this respect, two measures were taken: "Plans of the Control of the Total Sum of Discharge" and the "Trans-Century Green Project Plan". A large-scale project of pollution prevention and control, of ecological construction and protection was launched in the major cities, drainage basins, land areas and maritime spaces nation-wide. Environmental protection entered a new era. At present, after nearly 30 years of efforts, China has set up a fairly complete environmental management system with urban environmental management as one important component.

In the following parts of this paper, a thorough study will be conducted into China's environmental management, especially its urban environmental management. It will summarize the nature of environmental management, its experiences of both success and failure, and make some tentative suggestions as for its development and improvement.

1.1 China's Environmental Management System

China follows the pattern of government-dominated environmental management, in with the government functions as the leading force in the environmental management. The characteristics of such a pattern is mainly
shown in the institution construction and capacity construction of environmental management, its functional divisions, operational methods, and inter-relations and other areas. Besides, with the deepening of social and economical reforms and the improvement of the public's general awareness of the environmental protection in China, enterprises, the media, the public and non-governmental organizations are becoming more and more active and important in environmental management.

1.2 China's Environmental Management Structure

At present, China has already established a fairly complete system of environmental management organization at both central governmental level and local governmental level. This system functions all through the whole process of environmental management, laying down the foundation and guarantee of all other environmental protection work in China. The environmental management organizations at the Central Government level mainly include bodies for the law-making and supervision of environmental management, for environmental administration and law execution, and for environmental judicature (See Figure 1-1).

☐ Environmental Legislative Bodies

The function of environmental law-making is chiefly undertaken by the National People's Congress and local people's congresses at various levels and their standing committees. The people's congresses at various levels all have environmental committees and resources protection committees. Their main functions are to make environmental protection laws and to supervise and urge the Government to implement and execute these related laws. Personnel at the legislative bodies have wide representativity, and the deputies at the Environmental and Resources Protection Committees and People's Congresses come from all social strata, they represent the interests of different interest groups.

Therefore, in the process of discussing and making of environmental laws, to some extent the interests of all different interest groups are taken into consideration. The adoption of any laws concerning environment is actually the result of consultations among all the social interest groups.

☐ Environmental Administrative Bodies

Environmental administration is a governmental action, which means that government applies its administration and management authorities to effectively implement environmental policies such as laws, regulations, plans, measures and methods and hence the Government administration and management is the main force in environmental management.
Figure 1-1 Environmental and Natural Resources Management System in China

The Management System of Environmental Protection & Natural Conservation

Legislative & Supervisory Bodies
- The Environmental & Natural Resources Protection Commission of the NPC
  - The Environmental & Natural Resources Protection Commission of Local People's Congress

Administrative Bodies
- Unified Supervision & Administration Institution
  - State Environmental Protection Administration (SEPA) of China
  - Local Environmental Protection Bureaus (EPB)
- General Economic Management Institution
  - State Development & Planning Committee
  - State Committee of Economics & Trade
- Resources Management Institution
  - Ministry of Agriculture
  - Ministry of National Territorial Resources
  - Ministry of Water Resources
  - National Forestry Bureau
  - National Bureau of Oceanography

Judicial Bodies
- People’s Court at various levels
- People’s Procurators at various levels
The environmental administrative bodies are mainly composed of the State Environmental Protection Administration, the State Development and Planning Commission, the State Economic and Trade Commission and other government authorities. Among them, the State Environmental Protection Administration is responsible for the establishment of environmental protection policies, blueprints and standards and the actual implementation of them. It is the principal body in environmental administration and management. The State Development and Planning Commission, the State Economic and Trade Commission are in charge of the planning of pollution prevention and control, examination and approval of the relevant plans, as well as the layout, plan and demonstration of clean energy resources, clean production and the development of environmental protection industries. The Ministry of Construction is responsible for the administration of the layout and plan of the construction and management of urban sewage disposal facilities.

In sum, China’s environmental management mechanism is as follows: the administration, supervision and management power is concentrated in the State Environmental Protection Administration and other local environmental protection administration bodies at various levels, while the functions of protecting nature and resources are shared by several departments (environmental protection, resources, agriculture, forestry, water conservancy, territory and other departments).

- Environmental Judicial Organs

Environmental judicature is the process to protect the environmental rights of different social-interest groups with people's courts and procuratorates at various levels as its chief executive bodies. It deals with civil, administrative and criminal lawsuits concerning environmental issues and upholds justice in environmental management. In the new Criminal Law enacted in 1996, an entry was made of the "crime of sabotaging environmental and natural resources", which aims at strengthening the dynamic of punishment against environmental destruction activities.

- Social Organizations and the Public

With the strengthening of environmental publicity and the improvement of the public's environmental awareness, social forces are playing more and more important roles in environmental protection. Environmental judicature acts as the process to protect the environmental rights of different social interest groups, with people's courts and procuratorates at various levels as its chief executive bodies. The public can participate in environmental protection through many channels such as interfering and forcing the illegal activities to stop directly, reporting to the media, complaining (or writing) to the administration authorities, filing lawsuits and so on. All government administrative authorities in charge of environmental protection have special organs (organs to receive complaints either by person or by mail),
which are responsible to feedback and handle complaints concerning environmental issues.

The State Environmental Protection Administration

The State Environmental Protection Administration is the authority organ exercising unified management, supervision and execution of environmental protection on behalf of the Central Government. It also guides and supervises the environmental protection work of the local governments at all levels. The Establishment of the State Environmental Protection Administration traces back to the early 1970s. In 1982, the Environmental Protection Department of the Ministry of City and Town Construction was founded. In 1984, the State Environmental Protection Bureau, affiliated to the Environmental Protection Department of the Ministry of City and Town Construction, was founded. In 1988, the State Environmental Protection Bureau was separated from the Environmental Protection Department of the Ministry of City and Town Construction and became independent. It became a deputy-ministerial-level department directly under the State Council. In 1998, in the organizational adjustment of the Central Government, the status of the State Environmental Protection Bureau was raised to that of full ministerial level and was renamed the State Environmental Protection Administration, which was endowed with 12 governmental administration and management functions in the fields of environmental pollution protection and ecological protection (See Column 1-1 of the Appendix). Since the organizational adjustment in 1998, the State Environmental Protection Administration has had ten functional departments: General Office (Propaganda and Education Department), Planning and Financial Department, Policy and Regulation Department, Administration, Organization System and Personnel Department, Science, Technology and Standards Department, Pollution Control Department, Natural Ecological Protection Department, Department of Environmental Management of Nuclear Safety and Radiation, Supervision and Management Department, International Cooperation Department. At the same time, in order to ensure the implementation of all functions with scientific decision-making, strict execution, supervision and management, the State Environmental Protection Administration has set up corresponding technical supporting organs including the State Environmental Monitoring Station, a state-level environmental research institutes directly under the State Environmental Protection Administration, colleges to train environmental management cadres and qualified environmental protection scientists and technicians, press and publication institutions (including environmental newspapers and a publishing house). Among them, the State Environmental Monitoring Station is chiefly responsible for environmental monitoring and the processing and releasing of statistics information. The scientific research institutes mainly serves the State Environmental Protection Administration with environmental theory study, environmental application technique development including environmental projects and environmental management, environmental management policy research and others. The training institutes and colleges mainly aim at cultivating and improving the qualities of environmental management personnel at various levels and raising their management levels. The press and publication
institutions play an important role in the environmental propaganda and education, and the improvement of the environmental awareness of the public.

Besides that, there are also environmental management organs in the administration and management organs of all the industries and industrial departments. They operate under the guidance of the State Environmental Protection Administration and are responsible for assisting the institutions in charge so as to implement environmental protection tasks within the respective industries. Also, in the management committees of large drainage basins there are similar environmental management institutions.

1.3 Structure of Local Environmental Management Organizations

The local environmental protection organizations are chiefly divided into three levels: provincial, provincial and municipal, and county levels. The arrangement of local environmental management organizations mainly follows the pattern at the state level. Besides the local environmental protection bureaus at different levels that are responsible for the implementation of local environmental management functions, there are also environmental monitoring stations, environmental supervision and inspection offices and environmental science and research institutes. Generally, provinces and cities at the local level will set up environmental information centers and training centers and other institutions. With the increased attention paid to environmental protection on the part of China's Government, local environmental management capacity has been greatly reinforced. At present, relatively complete systems of local organization structures of environmental management have generally been set up on the provincial, provincial and municipal, and county levels. In some economically advanced areas and in areas that attach great importance to environmental protection, some towns and township seats have also set up environmental management organs.

The environmental protection departments of local governments at different levels are mainly responsible for the concrete execution and implementation of the environmental policies. They operate by means of organization, coordination, supervision, and compulsion. The environmental protection departments on the provincial levels even have certain policy-making functions. To carry out these functions, the local environmental protection bureaus normally directly establish supporting institutions for environmental supervision and inspection and environmental monitoring. They possess certain administration power and can take such measures as compulsive stopping and even punishing the environmentally illegal actions.

At the meantime, local environmental protection bureaus and the inspection and supervision organs are also responsible for handling civilian's complaints, mediating pollution issues and carrying out investigation into pollution incidents and so on. Their work quality determines the actual effect of the environmental management.
1.3.1 Environmental Administrative Structure in Beijing

Beijing has always paid high priority to environmental protection. It has set up a practical and effective environmental management system in accordance with its own specific conditions. The administrative organs of environmental protection are the organizing power especially for environmental management. They can be divided into two classes: the organs of leadership and cooperation on the city government level, such as the Beijing Municipal Environmental Protection Commission, Beijing Municipal Administration and Management Commission and so on; the environmental protection bureaus on the municipal, district and county levels (In some neighborhood areas and towns, there are also full time environmental protection personnel). Besides, as supporting technical power to the above administrative management, there are organs of environmental monitoring and inspection, environmental science research, environmental propaganda, and environmental education. The environmental monitoring work includes automatic air monitoring system, manual controlled monitoring network of water, air and sound. They also conduct a series of work items and processes such as road inspection, selective, seasonal and annual check of exhaust gas of motion vehicles, and analyses of solid wastes, radioactive wastes and poisonous wastes and so on. The environmental science research in Beijing has had an early start and is now at an advanced stage with concentrated science research manpower. Its propaganda work also has a rather long history. The relations of the above organizations are shown in Figure 1-3. Now, the environmental protection system of Beijing has an administrative staff of 500 persons and staffs of 900 persons in the institutions, among whom there are about 300 science research personnel and nearly 500 monitoring and inspection technicians.

The Beijing Municipal Environmental Protection Bureau is the functional department of the city government in charge of environmental protection. Its main tasks include unified inspection, supervision and management of environmental protection in Beijing according to state laws, regulations and rules. It is also responsible for comprehensive planning, organizing and coordinating, execution and supervision of works concerning environmental protection. It aims at pollution control and control of other social effects of pollution. It protects and improves people's living environment and ecological environment in order to promote sustained, balanced and healthy economic and social development. Its daily works include drafting of regulations, drawing out policies, making environmental protection blueprints, preventing and controlling pollution, supervising and managing natural protection. It also organizes quantitative examinations of comprehensive management and control, levies pollution discharge fees, and promotes the implementation of environmental protection science and technology plan. In addition, it manages environmental monitoring, guides the publicity and education of environmental protection, organizes training programs, sees to the construction of the environmental protection teams in the districts and counties, and many others.
Accredited by the Municipal Environmental Protection Bureau, the Municipal Environmental Protection Brigade, as an institution, directly joins in the inspection and handling of polluting sources, copes with pollution incidents that disturb people, and inspects the execution of law of the environmental protection bureaus of the districts and counties. The Municipal Inspection and Monitoring Center, the Municipal Environmental Institute, the Municipal Propaganda and Education Center, and the Municipal Radiation Center are all institutions directly under the Municipal Environmental Protection Bureau. With the participation of the bureaus and corporations concerned, the Municipal Environmental Protection Bureau applies concrete pollution control measures to units both under the Central Government and the Municipal Government by issuing waste discharge permits, ordering them to control the polluting sources within a set period of time, or forcing them to remove if they are disturb the residents nearby and so on.
The Municipal Environmental Protection Bureau directs the operations of the environmental protection bureaus at the county and district levels by means of examination and evaluation through comparison, making environmental blueprints, establishing environmental protection laws and regulations, monitoring the technical standards and so on. The Municipal Environmental Protection Bureau is also responsible for the guidance of the team construction of the environmental protection institutions at the county and district levels.

1.3.2 Environmental Administration Structure in Dalian

Dalian has its own characters in environmental administration. In early 1970's, Dalian had been selected as one of the important cities in environmental protection. In order to implement the environmental protection policies/instruments, Dalian Government set up the Environmental Protection Office in 1973, and then set up Environmental Protection Bureau in 1979. In the 1970s, The environmental protection technical supporting institution, such as environmental monitoring station and research institute of environmental sciences, has been established. During the 1980s, Dalian established the Environmental Protection Committee, the Environmental Protection Propaganda and Education Center, the Environmental Monitoring Team and other Environmental Protection institutions. Meanwhile, a complete network of Environmental Protection Bureaus and Environmental Monitoring Stations was established throughout all the counties and districts of the city. Functional departments for environmental protection have grown from under 100 staff at the beginning to nearly 1000 at present, forming an effective reinforcement for environmental protection implementation. There are 8 sections of office, comprehensive planning section, legislation section, waste disposal enforcement section, development supervision section, nature protection section, monitoring research section and personnel supervision section, etc, in Dalian environmental protection agency. Besides, Dalian environmental protection committee, Party committee and Dalian environmental demonstration district office are also included. To enhance the city environmental protection, four branch agencies of Zhongshan, Xigang, Shahekou and Ganjingzi are founded as deputy institutions of Dalian environmental protection agency. There are also 8 attached enterprises of Dalian Environmental Monitoring Center, Dalian Environmental Information Center, Dalian Environmental Science Planning College, Dalian Environmental promotion & education center, etc, and some directly under sections of Dalian Environmental Industry Association and Dalian Environmental Protection General Corporation, etc, in Dalian environmental protection agency. Environmental protection agencies are set up in Lushunkou, Jingzhou, Wafangdian, Pulandian, Zhuanghe and Shanghai by the city, which are all governed by the corresponding government and perform environmental management power to the corresponding area. Under the levels, drain contamination charge station, supervision group and environmental monitoring station is also established. In Dalian Economic Technological Developing Area, the environmental protection office and environmental monitoring station are set up.
Regarding organizational structure, two cities' (Beijing and Dalian) environmental management structure and functions are very much similar. What is different is that in Beijing the environmental management is conducted at the municipal level with a comprehensive management organization, the Municipal Administration and Management Commission, which the Municipal Environmental Protection Bureau directly guides its operation. Such an arrangement is relevant to the fact that Beijing is a large metropolis and its urban administration is more complicated. Dalian is an experimental city in the environmental management organizational reform. The Environmental Protection Bureau of Dalian has changed from under the direct leadership of the District Government to that of the Municipal Environmental Protection Bureau, thus becoming an agency of the Municipal Environmental Protection Bureau, now a district environmental protection branch-bureau. This change reduces the interference of the District Government to environmental management, which is beneficial to the effective urban environmental management.

In sum, two types of urban environmental management structures are in common that are shared by all China's urban environmental management as a whole. They are both under the direct leadership of the
city government, the relations of the environmental management administrative organization (Environmental Protection Bureau), the legislative organs, the urban macro-management division, industrial departments and municipal administrative construction departments in the social and economic development are coordinated by the urban environmental management commission; the municipal and district organizations in charge of environmental administration are responsible for the specific implementation and application of the environmental protection policies of the central and local authorities. The departments of monitoring, inspection and measurement, inspection and supervision, science research, information and propaganda and education will provide various technical supports, in order to increase the dynamic and efficiency of the urban environmental management, inspection and supervision, execution of law.

1.4 Implementation Mechanism of Environmental Management

China’s environmental management follows the pattern of government-dominated environmental management. The government plays a critical role in environmental protection. To ensure the effective implementation of environmental protection policies and measures of the state, the environmental administration organizations of the central and the various local authorities always maintain close relations with each other. In China, environmental protection work is under the direct leadership of the State Council, with a vice-premier in charge of it. The State Environmental Protection administration, as an administrative organization directly under the State Council, actually controls the environmental management work of the whole nation. It is the supreme state authority organization on environmental management. Its chief function is to carry out unified inspection and supervision, as well as execution of law of environmental protection.

Meanwhile, China practices a responsibility system, in which the local government shoulders the responsibility for the local environmental quality, and the local administrative leaders must pass an environmental protection target responsibility examination. Therefore, different from the administrative management systems of the banks and of the tax fields, China’s environmental management system is not an independent administrative system under the direct leadership of the higher level of authorities, which means that as an institution, the state Environmental Protection Administration has no direct administrative leadership power over the local environmental protection bureaus at various levels. It only guides, directs and supervises the local environmental management organizations in their operations.

On the other hand, local environmental management organizations are controlled by local government in terms of administration, and therefore is under the direct leadership of local government, which determines the appointment of the leaders in those environmental administrative organizations. Similarly, at the municipal level, environmental management depends highly on the municipal government. The leaders of all the other environmental protection bureaus at the district and county levels are also appointed by the corresponding
government, with the latter directly leading the former. These bureaus are also under the direction of the municipal environmental protection bureau in their operations.

**BOX 1-1 Target Responsibility System of Environmental Protection**

"The National Environmental Protection Law of PRC" stipulates that "local people's governments at all levels must be responsible for and take measures to improve the environmental quality of the areas under their jurisdiction." The specific application of this stipulation is the target responsibility system of environmental protection, which assumes the form of a responsibility letter to be signed by the provincial governors, mayors and county magistrates. The letter prescribes the targets and tasks concerning environmental protection in their terms of office, which are to be regarded as an important part of the criteria for the assessment of their achievements. These executives further distribute the targets and tasks in the form of responsibility letters to the heads of the government departments concerned and reward or punish them in accordance with their performance.

As regards the integrated management of urban environment, in 1988, the State Environmental Protection Commission enacted the "Decision concerning the Conducting of the Quantitative Examination of the Integrated Urban Management and Control of Environment". This decision stipulates that integrated management and control of the environment are an important obligation of the urban governments. The major is responsible for the urban environmental quality and should regard it as a target in his term of office and treat it as an important indicator for assessing his administrative achievements. The decision stipulates explicitly that all the cities must gradually establish a management system with the municipal government as its leading body, all the departments sharing its own responsibilities, all the people participating and the environmental departments carrying out unified supervision and management. And a corresponding operational mechanism must be created with plan making, tasks assignment and distribution, supervision and inspection and appropriate examination and assessment.

The relations between the central and the local authorities in the environmental administration and management are shown in Figure 1-4.

All the local governments can have an appropriate degree of independence and can make their regional environmental protection policies, regulations and measures according to the specific situations, along
with the state environmental protection policies and measures.

Figure 1-4 Mechanism of Environmental Governance in China

Therefore the local environmental management institutions are under dual leadership. Such an organization pattern is flexible and is beneficial to the fulfillment of the purposes of the local government
concerning environmental protection.

On the other hand, this management pattern can result in too much administrative interference of the local government on the local environmental protection actions, especially when the local government is attaching great priority to economic development and neglecting environmental protection. So it is evident that this pattern is unfavorable to environmental administration. Now in the forthcoming environmental management organizational reform of the local government, there is a trend to strengthen the direct leadership within the environmental management system.

Implementation of environmental management is achieved through the close cooperation of the central and local administrative departments in charge and other divisions concerned. The National People’s Congress is responsible for drawing up environmental laws, regulations and at the same time supervising the implementation of them. Led by the State Council, the State Environmental Protection Administration sees to the execution of environmental protection laws, drafts related environmental protection acts, policies, target, and layout, and provides general instruction and coördination of environmental protection of the whole country. Under the leadership of the local governments, the local environmental protection bureaus at different levels monitor the polluting sources, supervise the actions of the polluters to see if they are observing the environmental laws and regulations, levy wastes discharge fees, organize environmental prevention and control, establish local environmental policies and plans. People’s courts and people’s procuratorates at different levels adjudicate and judge environmental conflicts in accordance with the laws and regulations of the country and of the local government.

Meanwhile, the departments of planning, finance, city management and construction of the central and local governments, all participate in the implementation of the environmental management in light of environmental planning, environmental investment, city management layout and construction and other aspects. In recent years, the media and the public have paid more attention to environmental issues, which adds another supervision sector in the implementation mechanism of environmental management. This not only exerts more pressure on the polluters, but also functions as a driving force to the department at different levels in charge of environmental protection. The above implementation process is a dynamic process in which both the central and the local authorities keep making timely adjustments in their policies and measures of environmental protection in accordance with the characteristics on environmental issues at different periods in order to achieve the final goal of environmental protection and improvement.

1.5 Capacity Evaluation of China’s Environmental Management

Local environmental protection institutions are divided into provincial level, prefecture level and county level. In the township governments of some developed municipality and county, there are special environmental protection institutions or enforcement staff. Environmental protection departments in the
local governments at various levels are mainly responsible for the implementation of environmental policies and the approach of work includes organizing, coordination, supervision and compulsory enforcement. The provincial environmental protection departments have certain functions of formulating policies. The local environmental protection departments are under overlapping leadership, with the local governments being the main one.

In order to carry out the functions, local environmental protection bureaus normally establish supporting institutions specializing in environmental supervision and monitoring. These institutes normally have some discretionary power of enforcement against violation behavior. In the meantime, local environmental protection bureaus and supervision institutions are also responsible for dealing with the public complains, solving pollution disputes and investigating into pollution accidents. Their working has direct impact on the results of environmental management. In the whole country, 31 provinces, autonomous regions and the municipalities governed by the Central government have environmental protection institutions, among which 26 are first level environmental protection bureaus. In the whole country, 94% of the prefecture level administrative zones have established environmental protection institutions, among which, 88% of the prefecture level administrative zones have set up independent environmental protection bureaus; all cities above county level in the whole country (including deputy provincial level city) have set up independent environmental protection bureaus, 56% of the prefectures (leagues) (excluding cities) have set up environmental protection institutions; 84% of the county level administrative zones have set up environmental protection institutions, among which 70% of the county level administrative zones have set up independent environmental protection institutions.

Since the 1990s, the management capacity of environmental protection in China has been strengthened significantly, with the number of environmental protection institutions and staff increased. The environmental protection institutions here refer to the environmental protection bureaus, monitoring stations, supervision stations, scientific research institutes, education centers, information centers of various levels and other institutions related to environmental protection. Compared with 1993, the total amount of national, provincial and county level environmental protection institutions in 1998 increased by 26.8%, 20.1% and 8.6% separately, with the urban environmental protection institutions at prefecture levels remained the same; the amount of environmental protection bureaus of various levels increased by 10% respectively (among which, the provincial level remained the same, the prefecture level decreased and the county level increased by 14.7%); the environmental supervision stations of various levels increased by 37.8% (among which the provincial level increased by 20%, the prefecture level increased by 14.3% and county level increased by 50.8%); and the number of monitoring stations decreased by 8% (the provincial level remained the same, prefecture level decreased by 8% and county level decreased by 12.5%). The number of the professional staff in environmental protection system increased from 65561 in 1990 to 105932 in 1998, with an increase of 61.6%, among which the number of the staff at the grass root level increased quite rapidly (the staff of environmental protection staff at county level increased by
46.3% and the environmental protection staff in towns and villages increased by 197.5%) and the number of professional staff at country and provincial institutions decreased (the environmental protection staff at provincial level decreased by 1.8%).

After the governmental restructuring in 1998, National Environmental Protection Agency has been upgraded from vice ministerial level institution to ministerial level institution and was renamed as State Environmental Protection Administration. The number of the institutions is reduced from 56 to 37, and there are 12 main responsibilities. After the institution restructuring, the number of staff is reduced from 264 to 200 and the number of actual staff is reduced from 320 to 209, with 111 staff being reduced.

The nature of China’s environmental protection institution can be summarized as follows:

(1) As the water resources management and water pollution control, there is no enough coordination;

(2) Overall speaking, the environmental protection institution and staff have been enhanced, and the number of environmental protection institutions and professional staff has increased significantly, which provides a sound basis for strict environmental protection enforcement;

(3) Environmental protection institutions and personnel at grass-root level have been strengthened significantly, especially that the institutions and staff of environmental management, monitoring and enforcement have developed rapidly, which adapts to the actual demand of environmental protection and is active to the promotion of environmental management, monitoring and enforcement;

(4) The reduction of the number of national and provincial environmental institutions is consistent with the policy of the institutional and administrative management reforms of the government. Due to the reduction of staff and increase of responsibilities, more efforts should be devoted to the guidance and enforcement supervision concerning environmental management;

(5) The development of monitoring stations is rather slow (even the number has decreased), which should be taken into consideration. There are lots of reasons for it, among which the most important one being the lack of financial sources and technology. The slow development of environmental monitoring capacity in China will have negative impact on environmental monitoring and enforcement. In order to strengthen the enforcement and supervision capacity, the capacity building of environmental monitoring should be strengthened.

The investment of manpower and finance into the environmental and natural resources management by the government is an important parameter, which can reflect the functional strength of the government from one aspect. However, in fact it is difficult to determine this parameter. For one reason, there is no such statistics, and for another, it is difficult to draw a clear line of demarcation of the government organizations participated in the environmental and natural resources management. For example, of the functions and work of the organizations such as the State Development and Planning Commission, the State Forestry Bureau, it is difficult to determine how much can be regarded as for the environmental and
natural resources management. Because of the unavailability of direct statistics, we can only cite some individual research results.

According to a study made by the State Environmental Protection administration and the Environmental Research Institute of China in 1998, the revenue of the entire environmental protection system of China totaled 5.53 billion yuan between 1994 and 1996, averaging 25000 yuan per person. Compared to the average level of the operation outlay of the nation, this average sum is at a lower level. Of the total sum, 7542 yuan per person, which amounted to nearly 1/3 of the total, was spent on salaries and other capitals on the manpower each year. The remaining 2/3 was used for expenses of environmental protection operations, which was far less than the actual sum needed for the work.

In reality, the environmental supervision personnel had a very heavy workload. Their work targets per person were: to collect 0.18 million yuan of wastes discharge fees, to supervise 42.1 industries, to inspect 11 (sets of) pollution control facilities, to handle 8.13 letters and calls of complaints concerning environmental issues, to supervise 1.74 "three simultaneous " projects and to cover an inspection area of 0.348 hectares for natural protection.

Because of the lack of outlays, for a long time the technical equipment badly in need for the supervision and management of environmental protection couldn't be sufficiently supplied or updated. The monitoring stations at different levels in the country can report approximately 30 million valid monitoring data annually. But on average, the original value of the equipment is less than 0.3 million yuan at each station. Even at the 2000 state-controlled stations, this sum only averaged 1.35 million yuan, of which about over 70% was purchased before 1985. There is a wide lack of fast, continuous and on-the-spot monitoring equipment, and equipment suitable for the monitoring of the gross wastes discharge. And the transportation vehicles and telecommunication facilities are far from adequate.

All these matters seriously hinder systematic monitoring operation in environment. On the one hand, the functions and tasks of environmental protection are increasing; on the other the budget for the operation of the organizations can not be raised; on the contrary, it is reduced sometimes, which can not even meet the minimal needs for work. At some places, quite a large number of environmental management personnel depend on the discharge fees collected.
Table 1-1  Enforcement of Environmental Protection Laws in China

<table>
<thead>
<tr>
<th>Year</th>
<th>Rate of Implementation of Environmental Report System (%)</th>
<th>Implementation Rate “Three Simultaneous” (%)</th>
<th>Discharge fees collected (100 million yuan)</th>
<th>Important Events</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>Large and Medium sized Enterprises: 100 Small Enterprises: 95</td>
<td>97</td>
<td>17.4</td>
<td>4992 enterprises in 207 cities finished registering for the report of pollutants at the polluting sources. Waste discharge permits were issued to 436 important sewage discharge openings in 107 cities.</td>
</tr>
<tr>
<td>1991</td>
<td>45</td>
<td>22</td>
<td>1.7 (20.58 million yuan worth of pollution fined)</td>
<td>1700 enterprises were shut down, forced to suspend production, changed to other production or moved to other sites in 15 provinces and autonomous regions.</td>
</tr>
<tr>
<td>1992</td>
<td>60.4</td>
<td>86.5</td>
<td>23.6</td>
<td>The reported registration to prevent pollution reached 295 enterprises in 370 cities.</td>
</tr>
<tr>
<td>1993</td>
<td>56.8</td>
<td>84.9</td>
<td>26.6</td>
<td>Inspections were carried out of the execution of environmental laws and regulations in 45 cities and 7 provinces. The environmental problems in 19 provinces were publicized on the media, which evoked strong repercussions in the society.</td>
</tr>
<tr>
<td>1994</td>
<td>62.5</td>
<td>87.3</td>
<td>31</td>
<td>Execution of the environmental laws and regulations was carried out in 10 provinces and autonomous regions with more than 3000 illegal cases investigated and prosecuted.</td>
</tr>
<tr>
<td>1995</td>
<td>81.6</td>
<td>83.1</td>
<td>37.1</td>
<td>Execution of the environmental laws and regulations was carried out in more than 200 enterprises in 61 prefectures, cities and counties in 3 provinces.</td>
</tr>
<tr>
<td>1996</td>
<td>81.6</td>
<td>90</td>
<td>41</td>
<td>More than 60,000 enterprises in 5 provinces and autonomous regions were shut down, forced to suspend or stop production, changed to other production or moved to other sites.</td>
</tr>
<tr>
<td>1997</td>
<td>85</td>
<td>95</td>
<td>45.4</td>
<td>74774 &quot;15 Smalls&quot; enterprises were shut down or forced to stop production.</td>
</tr>
</tbody>
</table>

Note: Data are taken from the "China Environmental Year Book".

1 The data of 1991 were the statistics of the township-enterprise industries.
2. Enterprises, the Public, and NGO's in Environmental Management

2.1 Enterprises, the Public, and NGO's in Environmental Management

Enterprise, which is the actor of production and business, is looked as the polluter and destructor of environment. Before the 1990s, industrial pollution control is the core content of Chinese environmental protection work. At that time, most of the enterprises are forced to participate into environmental protection. Since the 1990s, with the increasing of environmental protection awareness, enterprise volunteering participating into environmental protection has been to popular international trend, and the enterprise volunteering environmental protection actions, such as ISO14000 (14001) of environmental management system, green labeling (i.e. eco-labeling) is going to be spread widely in Chinese enterprises, especially the huge and medium-sized enterprises. This can be looked as the milestone of enterprise environmental protection activities transferring from passiveness to volunteering. But at present time, most of the Chinese enterprises are still in the stage of passive participating into environmental protection and compliance of environmental protection. Especial regarding of the Township and Village Enterprises (TVIEs), because their production techniques are out of fashion and pollution intensive, in addition of the poor environmental and compliance awareness of the owners, so the pollution caused by TVIEs is very serious in China. In order to solve the TVIEs's pollution problems, the Chinese government has been implemented a very strict environmental management policy, which called "Close Down, Stopping Business, Merging and Transferring of 15 Types of small and Mini TVIEs". By the end of 1999, about 70,000 pollution intensive TVIEs had been closed down, and it plays a very positive influence to improve the local environmental quality.

According to the requirements of national environmental laws and regulations, the enterprise should be complied with national, local and sectoral environmental related laws, regulations and environmental policies and mechanisms in the process of their planning, constructing and operating. In the phase of project designation and construction, the project should be done the EIA, complied of "Three Simultaneous" Mechanism, and registered of pollutants discharges. The projects which have passed EIA should be insured that the pollution treatment facilities must be continuously operated, the pollutants discharges should be complied the related standards, and the pollution fees should be submitted. In the advanced enterprises, the government encourages to implement cleaner production and operate ISO14000 environmental management system. The subjective is to guide the enterprises to gradually volunteer to participate into environmental protection. Through the analysis of the effects of industrial pollution prevention and control in China, we can find that the amount of industrial pollutants (including industrial wastewater, waste gas and solid waste) discharges appears to be decreased while the industrial output value is increased annually. This positive trend is because the coordination and efforts of both industrial sectors and environmental management organs.
China exercises the environmental management system responsible by the individual department, shift, and group under the leadership of the head of the enterprise (see Figure 2-1).

Figure 2-1 Diagram for the environmental management system in China's enterprise

The head of the enterprise is also the leader of the enterprise’s environmental protection work and responsible for the environmental protection. Under the head's leadership, the vice head in charge of production is also in charge of the environmental protection work and the other vice heads are responsible for the environmental protection within their mandates. The chief engineer is responsible for the leadership in environmental pollution prevention technologies in the enterprise. Each functional section of the enterprise has identified their own responsibility for environmental protection with the responsibility degraded down to the grassroots, i.e. the shift and group and thus there established the system of environmental protection responsibility for each position. It is characterized with the combination of leadership and public supervision, management by expertise and public and also with stringent examination.

The features of environmental management by the Chinese enterprises are as follows:
The leader for production is also responsible for environmental protection. In the environmental protection regulations promulgated by the industrial sectors of the State Council, it has been identified that the head of the enterprise assumes the legal responsibility for environmental protection.

The enterprise's environmental management is closely integrated with its production and management. Environmental management is comprehensive and is interspersed within all the management of the enterprise and closely associated with them.

The enterprise's environmental management is based in the grassroots. Environmental management is falling to the workshops, groups and shifts and builds up an environmental management network. In general, the chairman of the workshops is the one responsible for environmental protection, and the technical staff is in charge of specific work and there is also environmental manager in the shifts. By the graded management, the responsibility is falling to the grassroots level and it thus forms the effective environmental management from the above down to the grassroots.

According to the scale of the enterprise, the volume and toxicity of the discharge and the nature of the enterprise, the environmental management organizations in the Chinese enterprises are generally composed of three parts, i.e. general management, environmental monitoring and environmental research. The general management institution is the important functional section managing the environment and in charge of planning the targets, implementing the plan, supervision and examination and coordination. The environmental monitoring station is in charge of environmental pollution monitoring and fulfilling the monitoring task, the watchdog and assistant for understanding the environmental situation in its management. The research institute is in charge of environmental research, engaged in research in how to prevent its enterprise's pollution and what technology adopted to do so. And there are some independent research organs while some integrate the scientific research body and environmental monitoring body into one. The major functions of the enterprise’s environmental management institutions are in the following aspects:

- Urge and examine its enterprise as well to carry out the state environmental protection guidelines, policies and regulations and also its own environmental protection system.

- Formulate the enterprise's environmental management regulations and work out the enterprise's pollutants discharge indicators, the economic and technical principle for the comprehensive pollution prevention and treatment in line with the state and regional stipulations.

- Organize the survey of the pollution source and the enterprise's environmental quality assessment as well as formulate the environmental quality report.

- Organize and facilitate its enterprise to enforce the regulation of 3- synchronization in the enterprise’s basic construction and technical innovation and also take part in the review of relevant program and appraisal and approval of the finalization of project.
Join in the competent department in making the environmental forecast and formulating the long-term program and annual plan for environmental protection and urge to carry out them.

Organize the work on environmental monitoring, examine the enterprise's environmental state and its development trend.

Urge the operation of the enterprise’s environmental protection facilities and look to the pollutants discharge.

Join the competent departments in organizing and conducting enterprise’s environmental scientific research.

Organize the training of the environmental protection staff and the information exchange, spread the advanced technologies and experience for environmental pollution prevention home and abroad.

In charge of the investigation and handling of the environmental accident in the enterprise.

Engage in the enterprise's environmental statistics and take care of the archive for the environmental protection.

Join the competent department in conducting cleaner production drive in the workshops and organizing the environmental protection publicity and education activity as well spreading the scientific and technological knowledge.

What deserves special mentioning is that the state environmental and the industrial departments concerned have made many regulations and requirements of the enterprises on environmental management from that concerning the institutes to that concerning the regulation system. Nevertheless, the environmental protection systems of the enterprise are just seemingly perfect. There is a great gap between the reality and the theory. In the industrial pollution control of China, priority used to be attached to the state owned large and medium-sized enterprises, hence the institutes and the regulation system of such enterprises on environmental protection were comparatively sound. But for the small enterprises, especially township enterprises, inadequate attention was paid to the environmental protection there. As a result, the institutes and the regulation system of environmental protection in these enterprises were far from adequate.

For the state owned large and medium-sized enterprises, most of them can abide by the laws and regulations of environmental protection. This chiefly accounted for the gradual reduction of pollutant discharge year after year and the increase of the treatment rate of pollutants since the Ninth Five-Year Plan in China. However, with the deepening of the reform of the SOE's, the market orientation in the enterprises is increasingly prevailing and pressures from the market are becoming more acute. Consequently, some enterprises, though with the already established environmental protection organizations and facilities, tend to sacrifice environmental interests when faced with the conflicts
between financial interests and environmental protection, because financial interests drive them. The ideologies of local protectionism in economy and the unilateralism of only paying attention to regional finance and taxation often foment the enterprises' actions that are against the laws and regulations of environmental protection. As a result, it was very hard for the environmental protection organizations to fulfil their responsibilities in the enterprise, resulting in the great discrepancy between the form and the effect.

BOX 2-1 Experience of Pollution Control inside the Enterprises

Beijing No.3 Chemical Plant was a major enterprise in the China Chemical Industry Group. But it had to produce a large amount of pollutants in its production. So it had to pay 5 million yuan of pollution discharge fee annually for the discharge that exceeded the amount set in the standards. In 1992, the plant began to practice the system of collecting pollution discharge fees within the enterprise by setting corresponding targets after investigations and studies were conducted. In 1993, it distributed its pollutant discharge control targets to the workshops, teams, groups and individuals, and used the pollution statistics as the basis for collecting the discharge fees. This system stipulates that no fee is to be collected to those that have met the standards set by the environmental protection departments. But for those that have exceeded the set quota, they will be doubly charged for the part that exceeded the set amount. The fees thus collected will mainly be used to pay for the pollution discharge fee for exceeding the amount set in the standards. Since the implementation of the measure, the enthusiasm of all the staff and workers of the plant was greatly mobilized for the prevention and control of pollution. The management approach of the plant to tackle environmental problems by linking pollutant discharge with the income of the staff reduced the consumption of raw materials and other materials and minimized its pollutant discharge, thus realizing the two-wins of both the environment and economy. Taken a nationwide view, many enterprises, especially large and medium-sized SOE's have implemented similar internal environmental protection systems such as collecting pollutant discharge fees, linking up of the workers' salaries with the environmental efficiency, saving raw materials, and encouraging cycling and utility and so on. Such measures of environmental protection within the enterprises have had excellent impact on the reduction of pollutant discharge and environmental improvement of the enterprises.

Regards some small enterprises, especially township enterprises, the environmental protection institutes and their regulation systems both in and out of the enterprises are far from adequate. As such enterprises are taking up more and more important positions in the national economy, with their gross industrial products occupying over half of the gross industrial product, their contributions to environmental
pollution are also great. The enterprise pollution load of some township enterprises can take up over half of the pollution in the area and so have become the main sources of the environmental pollution there. In such cases, the state has adopted very severe control measures towards the township enterprises, especially those small enterprises with heavy pollution, backward production techniques and serious energy wastes. The measures taken include forcing them to close, suspending their production, converging of several enterprises into one and changing of their products. By 1999, the state has already shut down nearly 70,000 such heavily polluted enterprises, which eased the pressures of pollution, improved the regional environmental quality.

With the implementation of the open policy in China, "the three foreign enterprises" (foreign joint ventures, contractual joint ventures and total foreign capital enterprises) have become vital components in China's industrial economy. Most of such enterprises have established complete institutions and systems of environmental protection within the enterprises. They can abide by the laws and regulations of environmental protection, and are willing to participate in environmental protection. For example, in Dalian for those enterprises that have already passed the ISO 14000 certification of the environmental management system, the majority of them were of the above three kinds.

But in some regions, foreign funded enterprises mostly focus on fields with heavy pollution and some have shown the tendency of pollution trans-boundary movement, which has already caused the attention of the departments concerned. Therefore in the active absorbing of foreign capitals, strict examinations and strict execution of environmental laws of such enterprises must be reinforced.

Now although enterprises in China have generally set up environmental protection organizations and facilities, driven by the economic interests these enterprises tend to sacrifice the interests of the environment when faced with the clashes between economic interests and environmental protection. Therefore, strict execution of laws and regulations must be reinforced in the environmental management of the enterprises.

To prevent these enterprises from breaking these laws or regulations, the inspection and supervision of the environmental protection organizations is highly necessary. However, faced with the large enterprise scale, the force of the environmental management appears too weak. So it is necessary to bring social forces into play and apply them in the supervision and inspection of the polluting actions of the enterprises while strengthening the capacity building of the environmental management system itself.

2.2 The Functions of the Public, the Media and NGO in Environmental Governance

Social organizations and public wield great impact on China's environmental management. It is stressed in the Decision on Certain Problems of Environmental Protection by the State Council that the public participation mechanism should be set up so as to bring the role of the social groups into play. Also, the
public should be encouraged to participate in environmental protection, report and expose various behaviors breaching the environmental laws and regulations. It is also stipulated in the Law of Environmental Protection that all the units and individuals are responsible for the environmental protection and also entitled to report and accuse the unit and individual polluting or damaging environment. In revising the Law of Water Pollution Prevention and Control, it has integrated the stipulation that the environmental impact report should incorporate the comments by the units and residents in the location of the construction project.

For the behaviors polluting or damaging the environment, the social groups and citizens can generally use the ways such as prompt stopping the behavior, reporting to the mass media, administrative complaint and justice litigation, and no matter which way taken, the control of illegal behavior against the environment is effective. The public can also convey their opinions and suggestion on environment through the people’s congress and the political consultative conference as well as the local authorities (e.g. resident commission and village resident commission) at all levels. Among the above-mentioned ways, the most common ones are the letters, visits and complaint report from the public.

In the environmental protection institutions at various levels, there generally establishes an office of letter complaint and visit which exclusively handles the public opinions and suggestions. Through the office, some emergent environmental incidents and environmental disputes can be solved with the guidance and intervention by the upper-level environmental institutions; on the other hand, the decision-makers of the environmental departments also take the letters from the public as an important information source to learn the actual situation. Also, this information is complementary to the information from the normal sources (e.g. environmental statistics and environmental report) so as to help bringing about the policy based on the accurate information. Presently, there are about 90,000-100,000 letters, 60,000 visits and 8000 proposals on environmental matters per annum, amongst which, letters from the developed region account for a large proportion while the under developed region accounts for less. For example, the number of letters and visits happened in Beijing is 4.7 per 10,000 persons while Shanxi and Yunnan Provinces, the numbers are respectively 0.7 and 0.4 per 10,000 persons. If the role played by the social groups and individuals in the implementation of the environmental policies could be called as civil mechanism, this civil mechanism will be much more influential.

The government supports and encourages the public and NGOs to participate into environmental protection. At present, the government has released the environmental information through formal channels (e.g. Central TV, newspapers) in order to help the public to know the environmental status. The release of environmental information includes three major aspects: (1) Annual Environmental Status Bulletin since 1980; (2) To annually release the result of Quantitative Examination of Comprehensive Improvement of Urban Environment since 1990; (3) To release the Weekly Report of Ambient Air Quality very week since 1998(some cities started earlier). This kind of release of environmental information get very good reflection and effects, especial the Weekly Report of Ambient Air Quality,
which is going to be one of the hot issues of the public concerned.

The supervision by the media is another important way for the public participation in the implementation of the environmental policies. With the reports by the news media, some environmental problems attracted the attention of the governments which is also a way of pushing the governments. The Chinese government consecutively organized the pollution control initiatives in Huaihe River and Taihu Lake in 1997 and 1998, in which, the news media played an important role. Today, exposure in the news media of the environmental problems is not less authoritative than the administrative instruments in terms of environmental management and control and its impact is still on the rise. At the same time, it is also conducive to raising the environmental awareness of the whole society. At present, the environmental protection related reports and news of the media are going to be gradually increasing, for example, the Central TV have some famous environmental protection programs, such as The New Environmental Protection Express, The Nature And Human, etc. In order to bring the role of the supervision by the mass media into full play and also raise the public environmental awareness, State Environmental Protection Administration together with the Committee of Environment and Natural Resources Protection of the National People’s Congress, Department of Publicity of Central Committee of the Communist Party of China jointly launched the initiative of Chinese Environmental Protection Century Tour since 1993. With the participation of more than 750 news units from the central government and more than 40 provinces and municipalities, Century Tour identifies the major subject each year in line with the national environmental situation such as Protecting the Water for Life and Combating the Air Pollution etc. The news units conducted activities focusing on the subject as well as the local key environmental work. Over the last 7 years, there have been more than 6,000 reporters taking part in this initiative and over 48,000 reports brought about which has facilitated the solving of an array of hard environmental problems, such as the ecological damage by the coal exploitation in the triangle area of Shanxi, Shaanxi and Inner Mongolia Region and the environmental pollution by the gold exploitation in Xiaoqinling.

Recently, several environmental protection measures from both National People’s Congress and National Political Consulting Conference are introduced. In 1993, there were only 35 environmental protection related proposals, in 1999, there were already 184 environmental protection related proposals increasing more than 6 times in 5 years. These proposals covered a wide range of environmental issues, from water pollution of river, lake and ocean to household waste problems, from plastic bag and film pollution to the safety of radiation source, from wild animal protection to green labeling, etc. It means that the public awareness and participation in environmental protection are going to be strengthened.
BOX 2.2. Weekly Air Quality Report System in China

To reflect the status quo of urban environment, raise the environmental awareness of the public, invite the supervision of the public to environmental protection work and create a social image of sustainable development, the National Environmental Protection Agency (predecessor of the State Administration of Environmental Protection), taking into consideration of the proposals of the State Council Environmental and Resources Commission, issued the "Circular on the Implementation of Weekly Pollution Report in Some Major Cities" in March 1997. Within it, it declared that starting from June 5, 1997, 13 major cities including Beijing, Shanghai, Chongqing, Dalian and Xiamen were to make weekly reports of the local air pollution indexes on the local media and TV stations. The major pollution indexes to be examined mainly included the following five categories: sulfur dioxide, nitrogen oxide, total suspension particles, carbon monoxide and ozone. By the end of 1997, 21 cities including Haerbin and Changchun started to publish weekly air quality reports, followed by another 12 cities including Guilin on June 5, 1998, and in January 1999, Beijing, Taiyuan and some other cities and in June 1998, Dalian, Chongqing, Shanghai and Nanjing followed suit. So far, the 46 major cities nationwide have all begun to make weekly air quality reports. In 2000, the newly revised "Law of the People's Republic of China on the Prevention and Control of Air Pollution" explicitly demanded that major cities must conduct weekly reports of air quality. It also encouraged cities with the necessary conditions should gradually conduct daily air quality reports and predictions. The State Administration of Environmental Protection declared that starting from June 5, 2000, daily air quality reports in some 40 major cities would be broadcast or published on CCTV and all the major national newspapers. Moreover, in some cities that have the necessary conditions such as Dalian and Xiamen, air quality prediction has already begun in 1999, announcing the air quality for the coming 24 hours to the public on various media. The weekly and daily reports and predictions of air quality have caused great repercussions in the society. The degree of public solicitude has greatly increased than ever before.

In Nanjing, since it began to make weekly and daily reports of air quality, environmental quality has become a hot topic among the city residents, which greatly promoted their environmental awareness. As a result, more complaints and consultative calls from the local residents concerning environment resulted thereupon and the solicitude degree and the strength of coverage and publicity of various media also shot up.

After the publicity of the environmental quality, the real estate transactions flourished in areas enjoying good air quality. Even for such outdoor activities as exercises and
outings, the local residents began to pay attention to the air quality as to the choice of
time and place. Meanwhile, the implementation of the air quality reports has imposed
more pressures on the government concerning environmental work, which in turn
brought about improvement in urban environmental quality. Since 1998, the city
administration facilities of Nanjing City have been further upgraded and its urban
gasification rate went up to more than 96%. A great number of heavily polluted
enterprises in the downtown areas has been moved out, control of the smoke dust of the
urban areas have been improved. Many boilers have underwent renovation and the
sources of low placement controlled which further decreased the indexes of sulfur
dioxide and total suspended particles. Petroleum with led in it was forced out of use,
motion vehicles were ordered to go through renovations and examinations to control
their exhaust gas, which brought about better air environmental quality. To sum up, the
air quality of Nanjing has been greatly improved, which was warmly acknowledged by
the society and further mobilized the solicitude enthusiasm of the public on
environmental issues.

According to a survey conducted jointly by SEPA and the Ministry of Education in 1998 on the public
environmental awareness nationwide, 79% of the public access to the environmental information through
the news media such as TV and radio. Also the news media are making further efforts in making reports
on environment. According to the survey of 76 newspapers conducted by the Friend of Nature
consecutively from 1995 to 1997 across the nation, the environmental awareness and participation
awareness of the leading news media raised dramatically. In 1995 there were 1358 reports on environment
for each news paper and in 1996, it rose to 2508, and 2903 in 1997. Volunteers taking part in the
environmental protection activities are a fashion over the last decades. Together with the Ministry of
Railway, SEPA launched the activity of clearing the white pollution along the railways. In which over
200,000 youth volunteers were involved and 23 million tons of wastes were cleared. Organized by SEPA
and the All-China Women Federation, the activity of Woman, Home and Environment called for 1 million
women to take part in the environmental protection and more than 200 top women nationwide for
environment have been selected. With their unique social role, women have facilitated the all walks of life
to concern about the environment. Together with the Chinese Society of Science and Technology, SEPA
organized 100 Biological Activities for the Chinese Youths. Which involved 20 million middle and
primary school students to attend the science publicity and hand-making with science and technology.
These activities cultivated a large number of young environmental activists. Together with the State
Tourism Administration, SEPA organized the Eco-tourism activity to train the tourism managers by
elaborating the correlation between tourism development and environmental protection. Thus, the
environmental behavior of the tourism managers were regulated and through them to convey the
environmental conception to each of the tourists. SEPA also together with the central committee of the Youth League launched various environmental initiatives including “Hand in Hand,” “Pick Up a Hope and Protection”, and “Big Earth With Small Actions.”
BOX 2-3 Dalian Xinhai Cement Plant Case

In 1993, Dalian Huaxin Industrial Group planned to build Xinhai Cement Plant near Dalian Airport, with a project construction investment of 20 million yuan. According to the related regulations of Dalian, all construction projects with an investment of above 10 million yuan should undergo environmental protection examination and approval procedures conducted by the environmental protection bureau and receive environmental impact assessment. However, this company resorted to deceptive means and obtained the approval from a district environmental protection bureau at the expense of 9.8 million yuan. Then it began construction of its own accord without conducting any environmental impact investigation. On April 16, Dalian Environmental Protection Bureau was informed of it through people's complaint. After an investigation, the Bureau ordered it to stop construction. However, the plant continued with the construction even after it had received the circular of the Municipal Environmental Protection Bureau. As the production and operation of the plant will surely produce serious environmental pollution to the areas surrounding the airport, even its discharge of wastes fulfills the standards, it will still discharge more than 1000 tons of cement dust. Hence, Dalian Environmental Protection Bureau decided to firmly deal with this case which had broken the environmental protection statutes. At first in the process of administration, they were met with great resistance from the enterprise.

On April 28, Dalian Broadcast Station published the news, accompanied with a commentary entitled "Construction of Polluting Enterprises Must be Forbidden". Intervention and publicity of the press greatly stirred the leaders of the enterprise. They went to the environmental protection bureau in person to accept the mistake and at once stopped the construction to await administrative disposal.

The Municipal Environmental Protection Bureau seized the opportunity of this case to launch an all-round education campaign of the policies and statutes concerning environmental protection in all the township enterprises and other enterprises, while strengthening education and execution of laws within the environmental protection organization system. The publicity of this case also greatly shocked the leaders of the city authority and the people. It actually served as an environmental education lesson to the government, enterprises and the public alike. The solution of the case also demonstrated the active functions of public participation and the media.

In recent years, a large number of NGOs focusing on environmental protection were newly established. As a survey conducted by the Beijing Municipal Environmental Protection Bureau, for example, there are
over 50 associations affiliated to the Society of Science and Technology which conducted environmental sciences research all throughout the year. Also, among 36 colleges and universities in Beijing, 13 colleges and universities has set up 15 environmental groups which have been very active on the campus and in the society to conduct various environmental activities. The NGOs such as “Friend of Nature,” “Global Village,” and “Green Home” received positive response from the public.

BOX 2-4 Beijing's Environmental Protection NGO's

Beijing is not only the center of politics and culture, but also the center of the environmental protection movement in China. It boasts of a great number of NGO's on environmental protection.

In the "Decisions concerning Several Issues of Environmental Protection", the State Council stipulates explicitly that the government should "set up the mechanism of the public participation, bring into play the function of the social organizations, encourage public participation in environmental protection, expose and accuse activities against environmental protection statutes..." According to the incomplete statistics, there are about 1600 environmental protection societies and organizations in China, of which about 100 are of nationwide status. The environmental protection societies include some associations within the environmental protection such as China Environmental Protection Industrial Association, China Wildlife Animals Protection Association; some academic organizations such as China Serenity Science Association, China Marine Association; and some Funds such as China Environmental Protection Fund, Fund for the Protection of Biological Diversity in China and other civilian environmental protection organizations such as the Journalists' forum on Environmental Protection. At present, the most influential NGOs in Beijing are the Global Village, and the Friends of Nature.

The Global Village has been a long time advocate of environmental protection. It has engaged itself in a variety of environmental publicity and educational activities, backed up with the cooperation of the press and the media. Of their activities, advocacy and promotion of garbage classification is an important one. Starting from 1996, it began to publicize the importance of garbage classification by providing technical guidance and material support. At the same time, they set up the first batch of experimental units of garbage classification in Beijing, which effectively boosted the garbage classification in the city. Currently, Xuanwu District in Beijing has set up a demonstrative area of garbage classification in Huai Baishu Neighborhood.

As an NGO, the Friends of Nature highlight the development of ecological and environmental protection. Its most successful action is to advocate and participate in the
protection of a special chiru (pantholops hodgsoni), a wildlife animal living on the Qinghai and Tibet Plateau that is on the verge of extinction. Because of their high value cashmere, they have become the targets of ferocious plundering and killing of the illegal hunters, which has put it in danger of species extinction. The Friends of Nature participated in the actual protection activity and also sought cooperation from the press and the media to publicize chiru protection, which has made the protection known to all. With the support of the Friends of Nature and from all social strata, the “Wild Yak Team” was organized to launch all-out offensives on the illegal hunting of the chiru.

Meanwhile, through efforts of the Friends of Nature, the protection of chiru has evoked wide attention from the government and the society, which ensured the protection efforts to be conducted in an appropriate and regulated way and provided it with more guaranteed backup.

Through many years’ of publicity and education, the environmental awareness of the public has been raised substantially. Many urban environmental protection bureaus have set up hot lines of complaints concerning environment; some have opened hot lines of complaints on the Internet, such as those by the environmental protection web-sites in Beijing and Xiamen. This ensures that all complaints can be directly heard or viewed by the urban environmental protection departments and timely solution can be carried out.

Of the complaints from the local residents, that of noises and oil smoke have occupied a great proportion. For instance, in 1999, Beijing Environmental Protection Bureau received a letter of complaint forwarded by the municipal government, complaining that a restaurant with its noises and oil smoke was seriously disturbing the normal life of the nearby residents. The Municipal Environmental Protection Bureau immediately made an investigation into it and based on the findings ordered the proprietor to control and manage the noise and the smoke within a set time period. Only after it passed the supervision and the approval of the local residents, the restaurant was allowed to resume its business. Parallel to this, in light of years of strong complaints of the local residents against noise and oil smoke, recently statutes have been passed concerning the control of the pollution by the central and local authorities respectively. This shows that public participation is playing a more and more crucial role in China’s urban environmental protection.

Cooperating with the Ministry of Education, SEPA conducted a survey on the national public environmental awareness, the result of the survey shows that the major characteristics of the public environmental awareness at present are as the follows:
In general, the levels of public environmental knowledge and participation into environmental protection are very low. There were 13 questions, marked 1 for each, on environmental protection common knowledge in the examination. The average mark of the people investigated is 2.8; the proportion of the public who actively participate into environmental protection activities is only 8.3%. The public is lack of environmental awareness, the proportion of the public who negatively participate into environmental protection is 65%.

There is a closely positive relationship between the education background and environmental awareness, the higher of the educated level, the more of understanding of environmental knowledge, the higher of environmental awareness. The environmental awareness of citizen in urban area is higher than that of in rural area. The environmental awareness of the youth is power than that of the adult. It means that with the different kinds of the environmental protection education and activities, the environmental awareness of the students in high and primary schools is going to be higher. The result of the survey shown that 70.3% of the environmental protection knowledge of the students is obtained from the education of school, and the concerning degree of environmental protection, the opinions of nature, and the activity of participation into environmental protection is obviously higher than the adults.

The environmental awareness of the public is the type of "Government Depending " method. Since 1970's, Chinese environmental protection mode is the government controlling mode, the public and the other social organizations are not very clear about what they should do and they can do for environmental protection. Therefore the responsibility of environmental protection, which is "the polluter treats " should be strengthened.

The result of the survey also shown that the most powerful influences for the public environmental awareness are the educating & disseminating actions and the spread aboard of the media. 79% of the people obtained the environmental protection information from TV and radio programs. The education and dissemination of environmental protection are commonly identified in many aspects in the survey, and environmental education and dissemination are considered as the best works of environmental protection, and they are also considered, as the priority to should be strengthened in the future.

3. The Framework of Environmental Laws, Regulations and Instruments in China

At present, China has already established a comparatively complete system of laws and regulations on environmental protection. By the end of 1999, the Chinese government had promulgated 6 environmental laws, 9 resources protection laws, 28 administrative regulations and 70-odd rules and regulations concerning environmental protection enacted by the environmental protection departments. Besides, 361 national standards on environment, 14 industrial standards had also been adopted. In 1997, related clauses on the punishment of those criminal activities violating environmental resources were entered in the Criminal law of China established. Besides the national laws and regulations, the various level local
governments had issued 900 local environmental protection laws and regulations according to the need of their own environmental protection and nature conservation.

3.1 The Environmental legal system of China

The environmental legal system of China covers two aspects: the environment and the nature. The base of the environmental legislation is *The Constitution of the People's Republic of China*. The environmental legal system can be horizontally divided into the following levels:

- **The Constitution**

  The Constitution regulates the basic objective and guiding principle of environmental protection. The Ninth article of the Constitution regulates that *the state conserves the reasonable use of natural resources, protects rarity animal and plant. All of the activities of the natural resources occupied and destroyed by anyone through any method are forbidden*. The twenty-sixth article regulates that *the state protects and improves the living and ecological environment, prevents and controls the pollution and other pollution disasters. The state organizes and encourages to plant trees and protects forestry.*

- **Basic Environmental Law**

  According to the regulation of the constitution, the General Committee of National People's Congress promulgated *The Environmental Protection Law of the People's Republic of China* (trial). It was revised and passed the discussion of the General Committee of National People's Congress in 1989. It is considered as the basic environmental law (power following The Constitution), which is the base and dependence of other environmental laws and regulations institution. At the meantime, it is also the base and foundation of environmental enforcement and governance.

- **Pollution Prevention and Control Laws**

  The Laws of Pollution Prevention and Control, which are the special environmental protection laws based on the Environmental Protection Law, are the improvements and details of the Environmental Protection Law. They are the important dependence and foundation of environmental management and enforcement, including: *The Water Pollution Prevention and Control Law of the People's Republic of China, the Air Pollution Prevention and Control law of the People's Republic of China, The solid Waste Pollution Prevention and Control Law of the People's Republic of China.*

- **Ecological Conservation Laws**

Resources Use and Protection Laws

The laws on resources use and protection are important contents of Chinese environmental protection legal system. Until now, The General Committee of the national People's Congress had allowed totally eight resources protection laws, and they actually also play a role of basic law in the criterion of natural resources use and its' protection, e.g. The Forestry Law of the People's Republic of China, The Mineral Resource Exploitation Law of the People's Republic of China, etc.

Natural Disaster Prevention Laws

Including the Laws closely related to environmental protection and ecological conservation, such as The Flooding Prevention Law of the People's Republic of China, The Earthquake Prevention & Disaster Reduction Law of the People's Republic of China, etc.

Others

Referring to other environmental protection laws.

In the other laws, they also have some environmental protection related articles and regulations, such as The Laws of Township and Village Enterprises, The Urban Planning Laws, Laws of Agriculture, Laws of Foreign Trade, etc.

The system of laws and regulations on environmental protection includes the following levels:

Constitution

The Constitution of China specifies the fundamental goals and guiding principles of environmental protection in China. It is the basic foundation for the establishment of all laws and regulations on environmental protection.

Basic Laws on Environment

In 1989, the NPC Standing Committee discussed, revised and promulgated the Law on Environmental Protection of PRC. This law, whose force of law is just inferior to the Constitution of PRC, functions as the basis on which other environmental laws and regulations are established. At the same time, it also functions as the basis and yardstick for execution and administration of environmental protection issues.

Special Laws on Environmental Protection

Based on the Law on Environmental Protection of PRC, a variety of special laws and regulations on environmental protection constitute a vital part of the environmental protection policy system. They include the Regulation on Prevention and Elimination of Water Pollution of China, the Regulation on Prevention and Elimination of Air Pollution of China, the Law on Ocean Environmental Protection and so on as well as detailed enforcement regulations for them.
Special Administration Rules, Regulations & Formal Documents on Environmental Protection

A variety of administration rules, regulations and formal documents specially adopted in China on environmental protection are also a vital part of the environmental protection policy system. For example, we have the Management Procedures for the Environmental Protection of Construction Projects, Resolutions on a Variety of Issues Concerning Environmental Protection of the State Council, Procedures on the Administrative Punishment Concerning Environmental Issues and so on.

Environmental Standard

Various environmental standards also form an important component in the environmental protection policy system. They are issued by the national administrative departments in charge, therefore are also a part of our national administrative regulations and hence have national administrative mandatory power. They include various pollutant emission standards, environmental quality standards, basic environmental standards and the related standards of the measurement methods of the environmental index. Some of these standards are Standards of Air Quality, Environmental Quality Standard of the Surface Water, Standard of the Noise in the Urban Area and so on.

Except the above laws and regulations, the major environmental protection policies and mechanisms are also important contents of the environmental management system. The policies and mechanism include: System of Environmental Impact Assessment, “Three Simultaneous” Policy, Pollution Charge System, System of Abating Pollution within a Definite Time, System of Total Emission Control, System of Emission Permits, System on Environmental Protection Planning and Program, System of Environmental Protection Target Responsibility, “Close, Stop, Merge and Re-Engineering” the Enterprises, Public Participation.

3.2 Urban Environmental Protection Policies and Instruments

3.2.1 Comprehensive Management and Improvement of Urban Environment

In China, comprehensive management and improvement of urban environment aims at reaching the goals of protecting and improving urban environment by means of legality, economy, administration, technique and others under the unified leadership of the city government. More specifically, it includes: Establishment of comprehensive management plans and bringing them into the overall urban construction plan; Effective adjustment of industrial structure and overall construction arrangement; Change of urban energy component; development of centralized urban heating services; Protection of and economization on water resources; Stepping-up of urban sewage process and afforestation; Improvement of urban environmental management mechanism; and Increasing investment in urban environmental protection and so on. It involves at least three parts, prevention and control of urban industrial pollution, construction of urban infrastructure and management of urban environment. Urban environmental issues result from
complicated social, economical and natural environmental backgrounds, which results in the qualities of comprehensiveness and complexity of urban environmental management. Therefore, it is by no means a task solely of the urban environmental management departments. Instead, the forces of urban authorities, enterprises and the public must be mobilized to take up their due responsibilities and duties of the task of urban environmental protection. Moreover, as regards the administration system in China, environmental protection organs at the local level are affiliated to the local authorities, hence except the leadership of the State Environmental Protection Administration for their business operations, their work in other aspects is more under the leadership of the local authorities. This, to a large extent, makes them subject to the control of the local authorities. In consideration of the above two reasons, the comprehensive urban environmental management policies pay special attention to the functions of leadership and coordination of the government in environmental protection. The mayor’s responsibility system for environmental protection has been set up and emphasis has been put on the coordination between departments and on comprehensive management; in other words, comprehensive decision-making and operations in the urban environmental protection are being emphasized. Facts have proved that this policy, since coming into practice, has brought about a great advance in the urban environmental protection of China. Box 3-1 introduces the major measures taken in the process of the comprehensive management and improvement of urban environment.

3.2.2 Quantitative Assessment of Comprehensive Improvement of Urban Environment

In 1989, the State Environmental Protection Administration began to carry out the system of quantitative assessment of comprehensive management and improvement of urban environment in the major cities in China. This system conducts a general assessment of the developments of all the aspects in a city’s comprehensive management and improvement within a certain period by employing a quantitative index system regarding environmental quality, prevention and control of pollution and urban construction, in order to stimulate the local government’s enthusiasm in the implementation of the comprehensive urban environmental management and improvement, in the hope of accelerating the improvement of urban environmental management policies. The objects of the assessment are the city government and the mayors, and the areas under assessment are the urban areas. The assessment covers 4 parts, urban environmental quality, urban environmental pollution prevention and control, urban infrastructure construction and urban environmental management.

The quantitative assessment of comprehensive management and improvement on urban environment follows a classification system. Applying a unified index system, the state examines the 47 cities hierarchically, i.e., the four type cities directly under the jurisdiction the central government, cities at deputy-province level, provincial capital cities, tourist cities and coastal cities. Then the provinces, autonomous regions and municipalities directly under the central government in turn examine he
prefectures and cities at the county level respectively. Based on the unified state index system, the assessment index system can be modified according to the local characteristics and special needs. The examination tasks are mainly performed by the environmental protection agencies at various levels. The annual results of the examination will be published to the public on the media such as newspapers and yearbooks.

So far, participant cities of the quantitative assessment have reached 510, occupying 76.6 percent of the total number of cities in China, of which 47 cities are assessed on the state level. This assessment system aims at enhancing the attention of the government administrative departments in charge on urban environmental protection and comprehensive management and control, strengthening the coordination and cooperation of various government departments in the field, through the information publicity and appraisal. Meanwhile, through the social and media supervision, it hopes to reach the goal of promoting the awareness of the importance of urban environmental protection on the part of the government, enterprises and the public, and of educating them to protect environment on their own accord. This assessment system is an important means in the promotion and implementation of the policies of comprehensive management and improvement of urban environment. Since its operation, city authorities and environmental administrative departments on various levels have made great efforts in the protection and perfection of the urban environment.

Consequently, urban environmental condition has been greatly improved. In particular, those cities that are assessed on the state level have witnessed a great improvement in their urban environmental infrastructure construction, an effective control of the industrial pollution, and a noticeable progress in the urban environmental quality through painstaking efforts. In this regard, Dalian is considered a successful case.

3.2.3 Establishment of Model Cities on Environmental Protection

Based on the policies of the comprehensive management and improvement and the quantitative assessment, the State Environmental Protection Administration launched the activity of establishing model cities on environmental protection nation-wide in 1996. It is in fact another urban environmental protection policy. The guiding principle is to achieve sustainable urban development. It aims at bringing the urban environmental quality up to the standards of all the urban functional areas, and causing the cities' authorities to adhere to sustainable development, to perfect urban environment constantly, and to build ecotype cities while maintaining high economic growth rates. To do this, the State Environmental Protection Administration studied and setup assessment criteria for the model cities on environmental protection, which involves urban socio-economy, infrastructure construction, environmental quality and management and others. Because of these strict criteria, the designation of the model cities on environmental protection is regarded as the "Nobel Prize" in the field of urban environmental protection.
in China. So far, 13 cities including Dalian, Shenzhen, Zhuhai, and Xiamen have been designated as “model city.”

**BOX 3-1 Experience of China’s Quantitative Examination of Comprehensive Improvement of Urban Environmental and the Establishment of National Model Cities on Environmental Protection**

Quantitative examination of comprehensive improvement of urban environmental and the title of model city on environmental protection through comparison and assessment are important methods in the urban environmental management of China. To conduct the quantitative examination of the integrated management and control of urban environment, the system of classified management is adopted.

According to this system, the State Administration of Environmental Protection directly examines 46 cities, which include the four municipalities directly under the Central Government, the provincial capitals, municipalities with individual planning, major tourist cities, the open coastal cities and cities in the special economic regions.

The authorities of the provinces, autonomous regions and municipalities under the Central Government examine the cities at the prefectural and county levels under their jurisdiction. The examination follows the procedures of first examination, joint examination and experts' examination. For those cities to be examined by the state, first they will carry out self-examination, then they will go through the examination and verification of the environmental protection bureaus of the provinces and autonomous regions, and finally the examination results will be submitted to the State Administration of Environment Protection. The State Administration of Environment Protection will first conduct a joint examination of the city, and then will organize an expert group to examine and verify it and to carry out on-the-spot selective examination. Finally the State Administration of Environmental Protection will publish the results of the examination after conducting the final examination and approval in the routine meeting of the Administration.

The examination indicator system contains 26 indicators in 4 aspects which cover the following aspects: environmental quality, pollution control, environmental construction and management. Total marks of all the indicators put together are 100 points, of which 30 points are for the 7 items of environmental quality, 31 points are for the 8 items of pollution control, 20 points for the 6 items of environmental construction, 16 points for the 5 items of environmental management, and 3 points for work quality (Please refer to Appendix 3-3 for the detailed list of all the indicators).
Since the implementation of the quantitative examination, urban environment has been improved enormously. A review of the examination results of the past ten years shows that on the whole, the grades of the 46 major cities examined by the state have been on the increase, with the tendency of environmental quality being improved year after year. In the 46 cities, the daily average value of sulfur dioxide has dropped by 0.04mg/m² per year.

Among the increased indexes, the coverage rate of areas with urban smoke dust management and control went up by nearly 40%, the gasification rate by 50%, the standardization rate of the industrial sewage discharge by almost 5%, the standardization rate of exhaust gas of motion vehicles by 25%, the urban sewage treatment rate by nearly 15% and the treatment rate of urban livelihood garbage by nearly 70%. The examination measures the achievements on environmental protection of the city authorities, hence proves to be beneficial to the implementation of the supervision of environmental protection target responsibility system. At the meantime, the cities can conduct historical contrasts and horizontal comparisons to promote the environmental protection work of the city governments. In reality, through implementation of the integrated management and control, many city authorities are now putting more emphasis on the urban infrastructure construction to build up the integrated capacities of the cities on prevention and control of pollution. It can also develop the environmental load bearing capacity of the cities and greatly improve urban environment. Therefore, the quantitative examination is an effective policy measure to urge the city authorities to continuously improve urban environment.

With the examination results getting better and better, the State Administration of Environmental Protection made up another decision of a higher level nature: awarding the title of model cities of environmental protection on the basis of the quantitative examination in order to further stimulate the initiative of the urban government on environmental protection. It aims at creating a group of excellent model cities with harmonized development of society, economy and environment, better environmental quality, complete urban infrastructure, beautiful and clean urban appearance and good ecological recycling so as to usher the cities onto the road of sustainable development. The assessment indexes for model cities include basic conditions, society and economy, environmental quality, construction and management. These insects fall into five aspects with a total of 27 categories. They involve the crucial factors that restrict the sustainable urban development such as economic development, population growth, resources consumption, environmental status and level of environmental management, coordination degree between infrastructure and environmental protection. To apply for the title, all the cities can carry out self-assessment according to the state assessment standards. Those cities that think they are up to the standards can file an application of their own accord. The State Administration of
Environmental Protection will organize expert groups to conduct examination and assessment. It will also listen to the opinions from all walks of the social life. Then based on the results of the experts’ examination and assessment, the State Administration of Environmental Protection will make a final verification and will confer the title of state model cities onto the cities that have proved to be really up to the standards.

In every 3 years, the State Administration of Environmental Protection will conduct reexamination of the model cities and in-between that period, occasional selective examinations will be made now and then. Those cities that have failed in the occasional selective examinations will be ordered to rectify and manage their environmental protection within a set time period. If they still fail in the reexamination, they will be deprived of the title. So far, 13 cities have already been awarded the title of model cities.

Source: "Urban Environmental Management of China", Pollution Control Department of the State Administration of Environmental Protection, 1999.

3.3 Dalian's Environmental Protection Legislation System

Dalian achieved to establish an effective environmental protection management system. In the 1970s when Dalian's environmental protection just started, only incomplete environmental management policies and regulations existed. Since 1980s, Dalian has been working hard for the establishment of systematic local environmental management policies and regulations. In accordance with the national environmental protection laws and regulations, in view of the main tasks confronting local environment protection and in combination with the characteristics of local environmental protection, a series of local environment protection policies and regulations has been established (see Table 3-1).

In "the Seventh Five-Year Plan" Period, more than 10 local environmental protection regulations and policies were issued; and based on the previous achievements, 15 regulations and policies were issued and implemented in "the Eighth Five-Year Plan " Period. By 1995, a system of urban environment protection laws and regulations of Dalian City had been near completion, providing laws and regulations biding urban environmental protection practice. Realizing the characteristic that industrial pollution sources are the major pollution sources, Dalian City has focused its treatment on them. Meanwhile it also makes corresponding adjustment of the local industrial development policies in order to reduce emission of industrial pollutants.
Table 3-1 The Regulations for Local Environmental Protection

<table>
<thead>
<tr>
<th>Year</th>
<th>Contents of Regulations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1982</td>
<td>Provisions on the Protection and Management of Fishing Harbors Areas along the Coastal Areas</td>
</tr>
<tr>
<td>1982</td>
<td>Notification on Control and Elimination of Urban Traffic Noises</td>
</tr>
<tr>
<td>1986</td>
<td>Interim Regulation on Control of Motor Vehicle Exhaust Gas Pollution</td>
</tr>
<tr>
<td>1986</td>
<td>Decision on Strengthening Integrated Treatment of Urban Environment</td>
</tr>
<tr>
<td>1991</td>
<td>Provisions on Environmental Protection</td>
</tr>
<tr>
<td>1992</td>
<td>Methods for the Management of Bacterial and Poisonous Urban Garbage</td>
</tr>
<tr>
<td>1992</td>
<td>Decision on Further Strengthening Environmental Protection</td>
</tr>
<tr>
<td>1993</td>
<td>Dalian Municipal Notification on the Area Division for Environmental Protection of Drinking Water Sources</td>
</tr>
<tr>
<td>1994</td>
<td>Ordinance on City Appearance Management</td>
</tr>
<tr>
<td>1994</td>
<td>Regulations on the Management of Water Sources.</td>
</tr>
<tr>
<td>1995</td>
<td>Decision on Strengthening the City's Supervision of Environmental Enforcement.</td>
</tr>
<tr>
<td>1995</td>
<td>Notifications on Strengthening the Management and Protection of Environment at Urban Construction Sites.</td>
</tr>
</tbody>
</table>

3.4 Beijing's Environmental Protection Legislation System

Beijing is a key city in the environmental protection of the country. Its environmental protection started rather early. Currently, the local system of environmental protection laws in Beijing is comparatively complete, especially with the newly issued series of environmental laws, regulations and standards to curb atmospheric pollution.

Table 3-2 Regional Environmental Protection Laws, Regulations and Standards Issued in Beijing

<table>
<thead>
<tr>
<th>Laws, Regulations and Standards</th>
<th>Designated Issuance Date</th>
<th>Implementation Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regulations on the Implementation of the &quot;Law on the Prevention and Control of Air Pollution of PRC&quot; of Beijing</td>
<td>1988.7.7</td>
<td>1988.7.15</td>
</tr>
<tr>
<td>Regulations on the Implementation of the&quot; Prevention and Control of Water Pollution of PRC&quot; of Beijing</td>
<td>1985.9.28</td>
<td>1985.10.11</td>
</tr>
<tr>
<td>Regulations on the Protection and Management of the Water</td>
<td>1995.7.27</td>
<td>1995.11.1</td>
</tr>
</tbody>
</table>
Sources at Mi Yun Reservoir and the Jing Mi Water Channel of Beijing

| Methods of Management of the Underwater Resources of the Urban Water Works of Beijing | 1986.6.10  | 1986.6.10 |
| Methods of the Administrative Punishment on the Implementation of the "Law on the Prevention and Control of Air Pollution of PRC" of Beijing | 1990.5.28  | 1990.5.28 |
| Methods of Management on the Prevention and Control of Exhaust Gas Pollution of the Motion Vehicles of Beijing | 1989.8.23  | 1997.11.25 |
| Provisional Methods on the Management of Environmental Noise of Beijing | 1984.3.8   | 1997.12.3  |
| Provisional Methods on the Management of Environmental Protection of the Enterprises of Township and Neighborhood Offices | 1986.6.13  | 1997.12.31 |
| Methods of Implementation on the "Provisional Methods on the Collection of Waste Discharge Fee of the State Council" of Beijing | 1982.5.13  | 1997.12.31 |
| Methods on the Implementation of Compensated Use of Funds Specially for the Control of Polluting Sources of Beijing | 1989.10.25 | 1989.10.25 |
| Standards for the Emission of Exhaust Gas of Beijing | 1984.3.8   | 1984.5.1   |
| Standards for the Emission of Pollutants of Beijing | 1985.10.15 | 1985.1.1   |
| Standards for the Emission of Pollutants of Vehicles Using Gasoline at Dual Idle Speed | 1994.6.8   | 1994.7.1   |
| Standards for the Smoke Emission Density of Vehicles Using Diesel Oil when Accelerating Their Speed | 1994.6.8   | 1994.7.1   |
| Standards for the Smoke Emission Density of Vehicles Using Diesel Oil when Fully Loaded | 1994.6.8   | 1994.7.1   |
| High-Quality Coal with Low Sulfur and its Products | 1998.7.23  | 1998.8.1   |
| Standard for the Control of Alarm Sounding Of Annunciators in Motion Vehicles | 1998.9.10  | 1998.11.10 |
| Standard for the Emission of Air Pollutants of Boilers | 1998.11.6  | 1998.11.25 |

Meanwhile, faced with the increasingly serious air pollution, Beijing tries to fight it from three approaches, accompanied with the correspondent regional laws, regulations and standards. Its major measures are as follows:
Control Coal Smoke Pollution

Major measures include: Forcing the use of low sulfur coal, and the use of clean fuel in the catering industry and for the stoves in all the work units; Quickening the construction of non-coal area in the downtown area and enlarging the area with gas application.

Control Motion Vehicle Pollution

Major measures include: Discarding old and useless cars strictly according to state standards; Strengthening the inspection of exhaust gas discharge for second-hand vehicles; Employing traffic control of some types of vehicles; Forcing automobile manufacturers to install exhaust gas processing devices; Making various discharge standards for exhaust gas of motion vehicles and strictly implementing them; Developing public transportation system with clean fuel.

Prevent Dust pollution

Major measures include: Strengthening the management of dust production in the construction site, on the road and at piles. Reinforcing the strength of afforestation, green-land planting and concrete covering of roads.

The laws and statutes of environmental protection of Beijing and Dalian have some common futures, but they also have strong regional features. This reflects the basic principle of the local and especially the urban legislation of environmental protection of China. The legislation in China in this regard is to rely on the goals of local environmental protection, improve and supplement the state environmental protection laws and statutes in order to benefit the local environmental supervision and execution of law. A review of the law system of environmental protection of the two cities demonstrates that the local environmental legislation mainly serves the major environmental problems of the regions. In principle, the state laws and statutes of environmental protection have the supreme authorities, while the local legislation improve and supplement the former. It goes without saying that local laws and statutes can not contradict the state environmental laws and statutes. In practice, the local statutes lay particular emphasis on the implementation and execution of the state statutes and, in a sense, are the detailed versions of the former.

Local laws and statutes include detailed implementation rules of the state statutes, and also laws, regulations and detailed implementation rules on environmental protection to be applied in the key environmental protection areas in the region. In circumstances where local environmental protection laws and regulation do not exist, the state laws and regulations must be reinforced. While making local environmental protection statutes, the clauses and articles must be equal in force or stricter than the equal clauses and articles in the state laws and regulations. For the stricter environmental laws and articles, they must be submitted to the state departments for examination and ratification. For the areas that are uncovered in the state environmental protection laws and statutes, the local authorities can establish local
laws and regulations according to the specific situations and on the basis of related state laws. These local laws and statutes must be submitted to the related state departments. This way of establishing environmental protection statutes with strong local features demonstrates the initiative empowerment of the local authorities in environmental protection. In the actual administration of local environmental protection, the stricter local articles are to be observed for cases that are suitable for both the local and the state statutes. For cases that do not fit any state statutes, the local statutes and policies are to be applied.

On other occasions, the state statutes are to be implemented. Because of the addition and amendment of the local statutes, a more complete and perfect environmental protection legal system has emerged. As environmental issues have different characteristics in different historical period, likewise its legal system has always been in a constant process of improving and perfecting. So when the state endeavors to revise some environmental protection statutes, trial experiments will normally be conducted in some local areas. As a rule, revision of some of the state statutes will often first appear in the form of local statutes, which will be made into state laws after summarizing the implementation of the related laws and statutes and through drawing lessons from the experience and failures in practice. Therefore establishment of the state laws is also a process to refine, supplement and perfect the shared characteristics of the local environmental protection statutes. The statutes thus passed embody the environmental protection needs of the local authorities and will in turn guide the local environmental lawmakers and call for strict implementation and execution. The relations between the environmental lawmakers of both the central and local authorities and between the two legal systems are complementing to each other.

4. The Experiences from China's Urban Environmental Management

From the comprehensive analysis, it is easy to draw up the following major experiences and features in China's urban environmental management.

- The pattern of government dominated environmental management with public participation being still at the initial stage.
- In the urban environmental management, orders and controls being the primary methods in environmental management.
- The Central Government taking up the principal role in urban environmental management and leading the local government in the establishment of laws, regulation, and decision-making.
- In accordance with the specific conditions of the urban environmental management, comprehensive methods of urban environmental management adopted.
- Dual leadership of the environmental management organizations, and the corresponding employment of environmental target responsibility systems for the local administrative leaders in environmental
management.

The long-term practices of environmental management have proved that China's method of urban environmental management is practical and effective. China's urban environmental management has already made some achievements. However, in it there also exist some evident shortcomings, which need improvement. At present, some of the chief shortcomings and the directions of development can be summarized as follows:

☐ Too much dependence on the government in the urban environmental management.

This can lead to over-burden on the government, especially in the aspects of finance, overstaffing of the organizations in the field of environmental protection. On the other hand, as China is still changing from planned economy to market oriented economy, the government, still functioning as the enterprises prolocutor, can not execute strictly according to the environmental laws and regulations. This can reduce the effectiveness of the urban environmental management. Therefore, the pattern of participation by all sectors of the society should be encouraged and promoted through channel building, system perfecting and law protection.

☐ Monotony in the management methods, and too much dependence on the administrative and legal methods.

Of all the urban environmental management policies, only a few economic methods have been employed, such as collection of discharge fees. As a result, environmental management lacks of economic driving boost. At the meantime, because of the lack of elasticity in the environmental management, confrontation can be easily built up between the party to manage and the party to be managed. In light of this, in the future urban environmental management, we should actively study, explore and implement new ways of environmental economic management, reform and perfect the current environmental economic management methods, and increase the effectiveness of the urban environmental management.

☐ Too little social and public participation in the urban environmental management.

With the increased public awareness on environmental issues and also the raised cost in environmental management and supervision, the public's participation is becoming inevitable. Strengthening the public's participation can help mobilize the power of the whole society to environmental protection so as to reduce the cost of environmental management and supervision. Meanwhile, it can reduce or avoid the government from unprincipled protection of the enterprises, which may happen in the mode of government dominated management. Thus, supervision through two channels, of the enterprises and the government, increases the efficiency of environmental protection.

☐ The effect of the local governments in environmental protection needing to be reinforced.

In the urban environmental management of China, the local authorities mainly fulfill and implement all
the environmental management policies made by the Central Government; they lack independence and originality in their environmental management. In the future, more efforts should be made to explore the potential of the local governments and the environmental protection organizations there in order to add more local characteristics to urban environmental management.

☐ Carrying out reforms in the current environmental management organizational structure.

The local departments in charge of environmental administration should be put more under the direct leadership of the environmental administration and management organizations at the central level. The State Environmental Protection Administration should be allowed with more control power over the local environmental protection organizations, not only in regard to their operation, but also in the appointment of their personnel and leaders. This can make the local environmental protection organizations more independent and impartial, reduce the administrative interference of the local government to the urban environmental management and increase the strength of the execution of environmental laws and regulations.

☐ With the increasing perfecting of the market economy, the need to innovate urban environmental management system being more and more urgent.

The current urban environmental management system is, to a large extent, the result of the period of the planned economy. Both the policies and methods of the management call for further innovation so as to better cater to the needs of the market economy.
Urban Environmental Governance in Korea

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and
Hoiseong Jeong, Korea Environment Institute

1. Introduction

Environmental issue will be a top priority in all-social policies in the 21st century. The development paradigm of an industrial society can not be pursued in this century because it has gradually deteriorated the global environments. New development paradigm, "sustainable development," are absolutely required in this century. This sustainable development can be actually implemented by the environmental governance.

Environmental governance generally notes about how societies deal with environmental problems. It is concerned with the interactions among formal and informal institutions, and how environmental problems are managed. It also relates to how environmental issues reach the political agenda, environmental policies are formulated, and programs implemented (Institute for Global Environmental Strategies, 2000).

Actors involved in environmental matters broadly include governments, industries, and citizen activities. The concepts and roles of these actors differ from countries to countries, depending upon their social-political structures, development stages, and natural circumstances. However, we can identify common experiences and unique characteristics from those countries. These experiences on environmental governance also will be helpful to other countries.

This paper focuses on the Korean environmental governance in the context of central and local governments. South Korea is a country that has experienced rapid economic growth but serious environmental deterioration since the 1960s. Moreover, environment-related actors like central and local governments, industrial sectors, and Non-Governmental Organizations (NGOs) and citizens have actually made a lot of efforts to address the environmental problems which is the negative effects of rapid economic growth. Due to these efforts, Korea's environmental problems are recently being improved in several aspects. Therefore, the Korean experiences, including policy formulation on the environmental governance, public-private partnership, and NGOs activities, can provide some policy implications for other developing countries in terms of environmental governance.
This paper first reviews the development of environmental governance in the decision-making process. Following the brief review on both environmental governance and the history of the Korean environmental governance, the paper will examine the central and local environmental governance in regard to legal and administrative organizations, public-private partnership, and NGO and citizen activities. The final part of the paper will draw the lessons and policy implications on the environmental governance from the Korean experiences.

2. The Concept and Development of Environmental Governance

United Nation Developments Programme (UNDP, 2000) defines that sustainable development meets “the needs of the present without compromising the ability of future generations to meet their own needs.” The terms sustainable development has been widely used in scientific, industrial, and public institutions since it has been first defined at the Bruntland Commission’s Our Common Future in 1987 (http://www.epa.gov). The term, “Environmentally Sound and Sustainable Development,” was firstly used at the Rio de Janeiro Conferences, where the Agenda 21 was adopted in 1992. Since then, environmental sustainability has emphasized because the environmental problems became worse and has emerged as an important issue in both local community and global society. The ultimate goal of environmental governance is to maintain the economic prosperity for the better human life without the deterioration of the human and natural environments.

Until now, human economic activities have, however, been causing environmental damages. In particular, the existing economic activities can not guarantee the sustainable development for human life in the long term. Therefore, in order to coordinate environmental protection and economic development, economic agents should be concerned with environmental problems in the whole process of economic development projects. These considerations should be included in the whole decision-making process, ranging from policy formulation to its implementation (http://magnet.undp.org/policy/chapter2.htm).

Governance can be defined as the exercise of economic, environmental, political and administrative authorities to manage a country’s affairs at all levels (http://magnet.undp.org/policy/chapter1.htm). It contains the mechanisms, processes, and institutions which citizens and agents articulate their concerns, exercise their legal rights, meet their obligations, and implement their own aims. Environmental governance can be conceptualized as the management on the environmental issues among the environment-related actors. It has several legs in decision-making process and its implementation. Legal, administrative, and institutional systems, private-public partnership and citizens and NGOs activities can be included in the environmental governance.

In order to identify the environmental governance, this paper focuses the following four areas where the environmental governance are concerned:
Governing institutions: legislature, judiciary, and political structure on the environmental governance. This part notes three branches of government on the environmental issues - executive, legislative and judicial - and the processes needed to establish and operate them in the central and local governments. The legislature and administration in the national and local government levels are critical for creating the environment policies and implementing them. Especially central government mainly establishes the legal and administrative codes and local government implements them in the real field.

Socioeconomic changes: the change of political structure, characteristics of social culture, and economic development. The public concern and awareness on the environmental issues differ from the stages of economic development, such as GNP, GDP and income level. The natural environments also are important factors in environmental governance and policy.

Industrial aspects: industrial structure, international competitiveness of economic bases, and structure of environmental industries. At the beginning stage of economic stage, the industrial structures are usually related with the light and pollution-oriented industries. However, these industrial structures are gradually changed to the low-pollution and high-tech-oriented industries, following the process of economic growth. Recently environmental industry has become popular because the environmental problems are social issues and environmental industry begins to have economic incentives, comparing with other industries.

NGOs' activities and citizen's awareness: The public concerns on the environmental issues have been increased according to the improvement of quality of life and increase of income level. NGOs have more concern on the environmental issues and the ranges of their activities are gradually become bigger and deeper than the past. Mass media like TV and Internet Broadcasting has also increased the public concern and citizen awareness on the environmental issues.

3. The Evolution of Environmental Governance in Korea

Since the early 1960s, the Korean government has pursued industrialization and economic growth policies with little concern on the environment protection in order to overcome an absolute poverty. These economic growth policies have made lots of contribution to the economic growth and as a result Korea could eventually escape from an absolutely poor country. Although Korea has been successfully transformed from an agrarian society into a newly industrialized society in less than three decades, she now faces serious environmental problems with negative effects on rapid economic growth. The social costs of pollution and ecological destruction emerged gradually during the 1970s. Environmental accidents in Korea occurred frequently and received increasing exposure in the mass media. It increased the public concern of the Korean people on the environmental issues. Some of the incidents provoked violent antigovernment protests from the public and local citizens (Park and Kim, 1999). These
environmental accidents and public awareness on the environmental issues have changed the political, administrative, and economic structures for the Korean environmental governance.

3.1 The Changes of Political and Cultural Structures in Korea

Many developing countries have experienced the change of political structure from the authoritarian or dictatorship government to democratic government since the World War II. Korea is no an exception. After the Korean War, the political circumstance in South Korea was still very unstable and military coup was occurred in 1961.

General Park, who was a leader of military coup in 1961, initiated the 5-Year Economic Development Plan for the economic development. All available human and material resource had been channeled into the acceleration of late-industrialization, with a particular attention to the export-driven economy (Cho, 1999; Kim, 1996). This authoritarian leadership is, to some extent, believed to contributions to implement effective development policy. However, this economic growth policy under military dictatorship caused several problems even though they had contributed rapid economic growth within very short period. Korea actually paid and is still paying lots of costs in terms of political, cultural, and environmental aspects as follows (Cho, 1999):

☐ This military dictatorship generated the political protests from scholars, students, and other social organizations that pursued a democratic government. This political protest caused political turmoil like the Kwangju Democratization Movement and strong student movements during the last 30 years. Korea actually paid lots of costs in building a democratic society and finally succeeded the construction of democratic system since the 1990s (Park and Kim, 1999).

Korean living philosophy basically had been a harmonization with surrounding nature. However, at the initial stage of economic growth an economic growth policy only focused on the development of nature without considering its environmental aspects. Moreover, social norm was changed from a moral or value-oriented society to an economic or money-oriented one. These changes of social norms caused a moral corruption and a material-oriented society and they created several social problems (Kim, 1996).

☐ Korea was a “calm morning country” where natural environment was very clean and people lives had been harmonized with surrounding natural environments. However, development projects and economic growth policies imported pollution-oriented industries like a heavy-chemical industry and other pollution industries in order to accelerate economic growth. These industries caused several environmental problems, especially in urban areas, such as the shortage of fresh water, air, water, and soil pollution, and waste problems. Due to this environmental pollution, Korea has changed from a “calm morning country” to one of the most polluted countries in the world (Cho, 1999; Park and Kim, 1999).
3.2 Socioeconomic Developments in Korea

3.2.1 The Growths of Population and Urbanization Process

South Korea had 46.4 million inhabitants in 1998 and became almost one of the highest population density countries in the world (452 inhabitants per square kilometer). Population growth, which was a serious social problem in Korea in the 1960s and 1970s, is now down to 1.0 percent in terms of annual growth rate due to the continuous efforts for reducing the annual growth rate such as birth rate control and public education on the population growth. The growth rate of the economically active population has risen twice as much as that of population growth. The unemployment rate, which used to be fairly close to perfect employment during the 1990s, rose to 6.8 percent in 1998, owing to the economic crisis from the late 1997 (see Table 1). Life expectancy has risen dramatically in recent decades and now stands at 76.3 years for women and 72.6 years for men (Jeong and Cheong, 2000). In sum, the demographic characteristics of Korean population have become dramatically changed shown in Table 1.

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Demographic Change in South Korea, 1970s – 1990s</th>
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<tbody>
<tr>
<td>Total population (in thousand)</td>
<td>32,241</td>
</tr>
<tr>
<td>(increase rate: %)</td>
<td>(2.4)</td>
</tr>
<tr>
<td>Population (15 Year old &amp; Over)</td>
<td>17,468</td>
</tr>
<tr>
<td>Economically active population</td>
<td>10,062</td>
</tr>
<tr>
<td>Unemployment rate (%)</td>
<td>4.4</td>
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</tbody>
</table>

Source: Jeong and Cheong (2000); National Statistical Office (various years).

The urbanization process in Korea is more dramatic than that of the demographic changes due to the rapid industrialization and economic growth policies. Given that two-thirds of Korea’s territory is composed of uninhabited mountains and hills, the actual density in developed areas is much higher than total density. The nation is partitioned into nine provinces, six metropolitan cities, and Seoul Special City for the administrative purpose. More than 10 million inhabitants live in Seoul Special City. Other metropolitan cities, with the inhabitants of 1 million or more, experienced rapid growth of urban population respectively: Pusan (3.8 million), Taegu (2.2 million), Inchon (1.8 million), and so on (Jeong and Cheong, 2000). 42.7 percent of the total population are concentrated in and around Seoul, an area where occupies only 11.8 percent of the territory.
This population concentration in the Seoul Metropolitan Region (SMR) created several urban problems such as traffic congestion, freshwater shortage, and inefficient urban land use. Due to such a rapid urbanization in Korea, the urban population will be reached 86.2 percent of total population by 2000 (see Table 2).

|-----------------------|------|------|------|------|------|------|------|

Source: Korea Statistical Yearbook, National Statistical Office

3.2.2 Economic Growth and Industrial Structure

After the Korean War (1950-1953), the urgent concern of Korean society was economic development and political stabilization. The first priority of government policy was economic development and there was social consensus on the economic development policy (Park and Kim, 1999). From the early 1960s to the late 1970s, the economic development plan was established and implemented under the strong dictatorship of President Park. Most public policies were planned and controlled by the bureaucratic elite of the strong central government (Cho, 1999). To accomplish social and economic development, all possible human and material resources had been utilized for the increase of industrial products and its exports to the foreign countries. Given the priority on national economic growth policies, environmental policies had relatively lower priority in decision-making process and its implementation though some scholars argued these economic growth policies (Park and Kim, 1999). With the success of a series of Five-Year Economic Development Plan, the Korean economy has continuously grown and its annual growth rates actually reached about 9 percent in the 1970s and 1980s. The Gross National Product (GNP) per capita in Korea increased to 10,307 US dollars in 1997 from 82 US dollars in 1962.

Table 3 The Growth of Nation Economy and Personal Income in Korea

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</tr>
</thead>
<tbody>
<tr>
<td>GDP (billion US $)</td>
<td>2.3</td>
<td>8.1</td>
<td>62.8</td>
<td>94.3</td>
<td>252.5</td>
<td>402.4</td>
<td>476.6</td>
<td>321.3</td>
</tr>
<tr>
<td>Growth Rate (%)</td>
<td>8.8</td>
<td>-2.7</td>
<td>6.5</td>
<td>9.5</td>
<td>9.0</td>
<td>5.0</td>
<td>-5.8</td>
<td></td>
</tr>
<tr>
<td>Per Capita GNP (US $)</td>
<td>82</td>
<td>253</td>
<td>1,597</td>
<td>2,242</td>
<td>5,886</td>
<td>8,998</td>
<td>10,307</td>
<td>6,823</td>
</tr>
</tbody>
</table>

Source: Bank of Korea (various years).
In terms of industrial structure in Korea, there was a significant change in industrial structure occurred. In 1960, the agriculture and fisheries industry accounted for 36.8 percent, while the mining and manufacturing industry represented 15.9 percent, and the service industry represented 47.3 percent of the GDP. However, in 1998, the ratio of the agriculture and fisheries industry to GDP was reduced to only 4.9 percent, and the mining and manufacturing industry increased to 31.1 percent.

Big changes in the industrial proportion also occurred within the manufacturing sector. Light industry, which had accounted for 60.8 percent of the manufacturing sector in 1970, decreased to 26.9 percent by 1994. In other words, heavy and chemical industry grew from 39.2 percent in 1970 to 73.1 percent in 1994. Fabricated metal products, machinery, and equipment constitute the largest contributor to manufacturing output (more than 25 percent), while the chemical industry does the second largest (about 20 percent). Particularly the central government focused on the development of four strategic industries such as iron, petroleum-chemical, shipbuilding, and electronics in the 1970s. These strategic industries had accompanied rapid growth of Korean industrial conglomerates (Chaebol). These large-scaled factories had benefited from the growth-oriented economic policy of the central government (Cho, 1999; Park and Kim, 1999; Jeong and Cheong, 2000).

3.3 The Evolution of Korean Environment Policy

From the early 1960s to the mid-1970s, the economic development plans were established and implemented by the strong leadership of the President Park. The bureaucratic elite controlled all public policies. All human and material resources were invested in the economic development and product export. Moreover, anyone who insisted the environmental protection and criticized the government policy seriously was in danger of being viewed an anti-governmental activist or communist. And sometime he or she was jailed due to his or her action on the environmental protection. However, there was some small progress toward protecting the environment in this period. The Environmental Protection Law was passed in 1963. And the Ministry of Health and Social Affairs was established in 1967 and it was responsible for the pollution prevention. However, the role of this ministry was very weak and the environmental protection policy was low-priority mission. And no budget was actually allocated for it. Environmental Protection Law was at best symbolic (Jeong and Cheong, 2000).

During the late 1970s, economic growth was in the first place of all governmental policies in Korea. However, public concern on the environmental protection was gradually increased and public organizations and research institutes were established and increased their roles. The Environmental Preservation Law was enacted in 1978 and the National Environmental Research Institute was established.

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1 The examples include Pohang Steel Plant, Ulsan petroleum-chemical industry complexes, Daewoo shipbuilding factory in Keojado, Hyundai automobile factory in Ulsan, and Samsung electronics in Kumi and Suwon.
in the same year. In 1980, Environment Administration (EA) was founded under the Ministry of Health and Social Affairs and its size and function were expanded. Furthermore, the Environmental Right Article was included to the 1980 amendment of Korean constitution. The public movement on the environmental protection was gradually expanded after the mid-1980. However, the role of EA still was weak and the budget and human resources for the environmental protection were not enough. Since the late 1980s, Korea had experienced the series of political change from the military dictatorship to the democratic system. Passing through this political change, the public wanted more dynamic and diversified government policies. Moreover, environmental problems have become gradually diversified and complicated. In this period, the public began to voice demands for a clean and healthy environment through protests and the participation of NGOs (Jeong and Kang, 1998; Ministry of Environment (MOE), 1997 and 1998).

In order to solve worsening environmental problems, the Korean government introduced new anti-pollution measures, including the supply of lower sulfur content oil in 1981 and more rigid vehicle emission standards in 1987. She also required the supply and use of clean fuels like Liquefied Natural Gas (LNG) in major cities in 1988. The central government also tried to enforce the environmental regulations by establishing more stringent environmental standards, conducting the Environmental Impact Assessment (EIA), designating special protection zones, and transferring the costs of pollution control to the firms which they created environmental pollution. Despite all these efforts, increasing public demand for a cleaner environment could not be met. Furthermore, as urban residents were becoming aware of the adverse impact of pollution on health risks and the value of clean environment, the environmental movements inspired citizens' participation. The Korean Institute for Pollution Studies, the first professional NGO, was established in 1982. Environmental movement made some contributions on the awareness of the public on the environmental problems in this period.

Environmental activism resulted in the relocation of pollution-exposed residents in both Ulsan and Onsan at the early 1980s. The ‘Protect Youngsan River’ campaign in 1983 led to the abandonment of a construction plan for the Jin Ro Wine Company in the city of Najoo. The 1990 riot at Anmyeon Island against the building of nuclear waste disposal site gained nation-wide attention and then stopped the plan. Several NGOs consolidated into the Korean Federation for Environmental Movement in 1988. The Environment and Pollution Research Group was founded to perform more scientific environmental movement in 1989. Several NGOs were born at this period and many religious, consumer and women organizations began to pay attention to the environmental issues. Most industries began to construct their own pollution control facilities and equipment. Some of them, however, still hesitated to accomplish the pollution emission standards and voluntary environmental management was still very restrictively implemented at this period (Korea Environment Institute, 1996 and 1997).
In 1990, EA became the Ministry of Environment (MOE) and in 1994 its functions were expanded. Along with this change, some environmental functions were transferred from other ministries to the MOE. Eventually Water Supply and Sewage Treatment Bureau of the Ministry of Construction, Potable Water Management Division of the Ministry of Health and Social Affairs, and Water Quality Inspection Department of the National Health Institute transferred to the MOE. Regional Environmental Management Offices re-organized as four offices, each responsible for one of the four major rivers, and three Regional Environmental Management offices (www.me.go.kr; Accessed 05-00-2000).

The Environmental Impact Assessment System was adopted for balancing economic development and environmental preservation. Despite of all these efforts, the Korean environmental problems still have been deteriorating or stagnant (MOE, 1997). However, the public concerns on the environmental pollution have been largely improving due to the environmental education, NGOs activity, and citizen participation. Traditionally Korea has been ruled by a strong central government. But the replacement of authoritarian government with democratic one in the early 1990s and the introduction of local autonomy in 1995 have given greater autonomy to local provinces and municipalities. Metropolitan Cities (cities under the direct control of the central government), Provinces (Do), Cities (Shi), and Counties (Kun) have their own assembly, these assemblies can enact ordinances in accordance with national laws and its ordinances should be to be approved by the higher-level local government. Provinces, cities, and counties, in addition to their responsibilities, carry out many duties with their own decision that the central government delegated to them. Even though Korea has had a complete portfolio of sophisticated environmental policies since the early 1990s, several pollution-related incidents such as the Phenol discharge incident\(^2\) in the Nakdong River in 1991 and citizens' protest against reclaimed land for waste disposal at Kimpo in 1993 had been occurred (Jeong and Cheong, 2000; MOE, 1997).

4. The Current Environmental Governance of Central Government in Korea

4.1 Legal Structure on the Environmental policies and Governance

The first environmental law in Korea is the Pollution Control Act (PCA) in 1963 and the Garbage Clean-up Act (GCA) in 1961, respectively. The former is associated with the regulation of air, water, and noise pollution control, while the latter is a guideline for municipal garbage collection. There was, however, little concern for environmental quality and these acts were not enforced properly. In 1977, the PCA was replaced with the Environment Conservation Act (ECA). It extended the legal dimensions of environmental policy to cover most environmental issues including the nature preservation and pollution control. Despite some developments in environmental laws, their low priority and weak administrative

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\(^2\) Phenol Tank of Doosan Factory was broken and it invaded into Namdong River. It resulted in the pollution of the sources of drinking water for the 5 million persons who lived in the southeast part of Korean peninsula. Due to this environmental accident, water and environment pollution had become big social issues and environmental awareness also was greatly improved.
capacity prevented them from being properly implemented (Environmental Organization of Taegu Region, 1990; Jeong and Kang, 1997). In 1980, the Korean Constitution first introduced environment rights as a basic human right and Article 35 of the 1987 Constitutional Amendment declares:

“All people have the right to lead a life in a healthy and pleasant environment, and the government and people should make efforts to conserve the environment.”

Based upon this code of Korean Constitution, most environmental policies have been established and implemented. At the beginning of 1990, the Environment Administration was upgraded to the Ministry of Environment (MOE). The Environmental Conservation Act was replaced by several individual sectoral laws, which were more detailed and had more specified and strengthened regulations. The Basic Environmental Policy Act (BEPA) stipulates the core principles of environmental policy. This law declares that both harmony and balance between humans and the environment are essential to the health of the nation, cultural life, the conservation of national territory, and permanent national development: The act also clarifies the Polluter-Pay Principle as the guiding principle of pollution control policy (MOE, 1997; http://www.me.go.kr).

As of 1998, the thirty environmental laws listed below had come under the jurisdiction of the MOE. The major laws include the Natural Environment Conservation Act, the Air Quality Preservation Act, the Environmental Impact Assessment Act, the Noise and Vibration Control Act, the Water Quality Preservation Act, the Marine Pollution Prevention Act, the Waste Management Act, the Toxic Chemical Control Act, the Act Relating to Environmental Improvement Charges, and the Environmental Dispute Settlement Act (see Appendix I).

4.2 Administrative Structure and Its Roles on the Environmental Governance

The Ministry of Environment (MOE) was established in 1990 with the primary responsibility of developing legislation, policies, and measures for environmental management. The MOE must implement the Korean environmental management system with responsibilities for maintaining air quality, water quality and tap water supply, waste management, and nature conservation policy.

As of 1998, there were 1,320 staff members, 396 of which serve at the MOE headquarters. The headquarters is comprised of the Planning and Management Office and six bureaus, including the Environmental Policy Bureau. Also part of the MOE are the Central Environmental Disputes Coordination Commission and the National Environment Research Institute (Jeong and Cheong, 2000; Jeong and Kang, 1997; MOE, 1997 and 1999). The former coordinates the environmental conflicts among the governmental branches or local governments and the latter charges the research on the environmental issues.
To achieve effective environmental management considering each local environmental circumstance, MOE is basically composed of 1 Planning and Management Office, 6 bureaus such as Environmental Policy, National Conservation, Air Quality Management, Water Quality Management, Water Supply and Sewage Treatment, Waste Management and Recycling Bureau, and General Services Division. In order to manage the quality of river water, four Watershed Environmental Management Offices were established.

The boundaries of the four regions correspond to the basins of the four main rivers such as Han, Kum, Nangdong, and Youngsan rivers. Moreover, The Environmental Management Offices are responsible for regulating, permitting, monitoring, and enforcing air, water quality, waste management, and nature conservation. They also carry out environmental impact assessments (EIA), including public consultation. Moreover, three public corporations like the Environment Management Corporation (EMC), the Korea Resources Reutilization and Recycling Corporation (KRRRC), and the National Park Management Corporation are a third sector on environmental management, which are semi-private, commercial organizations.

4.3 The Decision-Making Processes on the Environmental Governance

Environmental problems usually are related with several governmental offices. The MOE must coordinate with other ministries and administrative bodies that have substantial responsibilities for environmental management. The ministries and administrations that are responsible for environment-related policy have integrated decision-making processes as follows:

4.3.1 Coordination of Prime Ministry Level on the Environmental Governance

Sustainable development and urban governance requires an interdepartmental coordination mechanism. The Environmental Conservation Committee under the Prime Ministry assumes the task of interdepartmental coordination for environmental issues. Environment-related policy objectives are established through coordination between the Ministries of Finance and Economy, Health and Welfare, Industry and Resources, Construction and Transportation, and governmental branches (see Figure 1). The private and research organizations such as the Korea Chamber of Commerce and Industry, the Seoul National University, the Taegu University, and the Korea News Editors' Association are also included in this committee. Especially several NGOs like the Korea Saemaul Undong Center, the National Council of Consumer Protection Organizations, Korean Federation for the Environmental Movement, and the Korea National Council of Women participate in this meeting. When a broader mandate is required, the local council can also be summoned (http://www.me.go.kr; Jeong and Cheong, 2000; Jeong and Kang, 1997).
This committee basically coordinates mid or long term environmental plans, the decision of investment priority on the environment conservation, and the allocation of financial resources, and other environmental issues. Moreover, the prime ministry should coordinate certain special environmental issues. For instance, in order to manage the water pollution and shortage of water resources, the water management committee was established in 1997. Its members are composed of the prime ministry, ministry of environment, 8 related ministries, and Metropolitan local autonomies.

4.3.2 Coordination with other environment related organizations

Depending upon the environmental issues, environmental governance are related with several different organizations. Therefore, in order to carry out its functions, the MOE coordinates with other ministries and administrative bodies that have substantial responsibilities for environmental management. The distribution of these functions is inherited from earlier institutional structures. Ministries and administrations responsible for environment-related policy are as follows:

The Ministry of Science and Technology is responsible for control of the transport, handling, and disposal of radioactive industrial wastes. The Ministry of Government Affairs and Home Affairs is responsible for natural hazard management. The Ministry of Agriculture, including the Forestry Agency is responsible for sustainable agriculture and protecting forestry resources.

The Ministry of Trade, Industry and Energy is responsible for the management of industrial complexes, supply of environmentally friendly energy, and research and development of renewable energy sources. The Ministry of Construction and Transportation is responsible for designating development-restricted areas and managing rivers and lakes. The Ministry of Maritime and Fisheries is responsible for supervising and enforcing marine regulations and for preventing marine pollution.

The Ministry of Foreign Affairs, which is responsible for diplomatic issues related to international environmental cooperation. These organizations should coordinate with the MOE and other related organization in implementing environmental governance projects. Coordination with local government will be mentioned in the next chapter. Moreover, in order to help integrate sustainable development issues into the decision-making process, multi-disciplinary experts through 25 environment-related committees should participate in national environmental plans and policies (http://www.me.go.kr).³

Capacity-building programs should be developed for experts in the government ministries and inter-ministerial coordinating panels. Consultative meetings to coordinate and integrate inter-ministerial policies for sustaining national development projects also should be revitalized (http://www.ksdn.or.kr).

³ There are 25 environment-related committees under the MOE (http://www.me.go.kr).
Figure 1  Environment Related Organization Structure in South Korea
4.4 Charge System and Special Account for Environmental Improvement

Korea employs six types of charge systems and deposit-refund systems as an indirect regulatory measure of environmental protection. Emission charges are imposed on pollutant discharging facilities in the manufacturing sector. Previously, businesses and industries that emitted pollutants in excess of the permissible emission standards were imposed with emission charges as a form of penalty.

Starting from 1997, basic charges were added to these emission charges, as a type of fee for the use of the environment. Environmental Improvement Charges were levied on buildings larger than a specific size and diesel-powered vehicles as a sort of environment user fee to strengthen efforts to improve the environment in distribution and consumption sectors (http://www.ksdn.or.kr). The Deposit-Refund System is employed to induce the recycling of resources. Deposits are refunded when the product wastes are recycled or properly treated. A Waste Disposal Charge System deals with waste not covered by the deposit-refund system. It aims the promotion of waste reduction and resource conservation. This charges on the producers or importers who product or import the goods which are difficulty to collect or recycle.

To efficiently promote the financial investment on the environmental improvement and secure new revenue sources, the government introduced the Special Account for Environmental Improvement in January 1995. Financial resources secured through economic instruments are deposited in the Environmental Improvement Special Account to pay for the construction of basic environmental facilities, such as sewage treatment plants and waste treatment facilities. Revenue sources include various charges imposed on polluters, transfers from general and other accounts, loans from the National Bond Management Fund and foreign loans (MOE, 1997 and 1999).

In 1996, the central government adopted a National Action Plan for Agenda 21. Moreover, the MOE is also responsible for the policies relating to Environmental Impact Assessments (EIA). In order to ensure the objective of EIA, Central and Regional Committees at EIA, which consist of professors, engineers, and specialists, review the assessment. Residents are invited to the hearing process of EIA. Those who plan to carry out projects that are subject to EIA must prepare draft assessments, which are made public, and hold a public hearing on the proposed project (MOE, 1997; Jeong and Cheong, 2000).

4.5 Capacity Building Measures

In capacity-building measures, the central government played a central role in the past, but recently the role of local governments has been increasing gradually to meet their local needs. The Emission Charge System (1983), the Environmental Improvement Charges (1991), the Deposit-Refund System for Waste Disposal (1992), the Waste Treatment Charge System (1992), the Volume-based Collection Fee System for Domestic Wastes (1995) are major environmental policy instruments utilizing economic incentives.
Environmental Impact Assessment system (EIA) was introduced in 1977 by the Environmental Preservation Act, and in 1993, the Environmental Impact Assessment Law was enacted. The EIA system aims to balance environmental preservation and economic development through the analysis and investigation of the impacts of certain development and business projects on the environment before its implementations (http://www.un.org/esa/agenda21/natinfo/countr/repkorea/inst.htm).

5. NGOs and Citizens in Environmental Governance

5.1 Environmental NGOs

The NGOs movements in Korea had been related with the democratization movements since the 1970s. Environmental NGOs and civilian environmental movements have continuously increased their number and sphere of activities since the late 1970s even though the authoritarian government has suppressed their activities since 1961. Not only the Democracy Movement of 1987 and the Rio Summit of 1992 but also several pollution accidents concerning drinking water sources increased and enhanced the public awareness of the environment. Main commission of the environmental movement also changed from local anti-pollution movements to a national environmental conservation movement. Moreover, religious and social NGOs, such as the Young Men Christian Association (YMCA), the Young Women Christian Association (YWCA), and consumer groups participated in the environmental movement in this period. It resulted in a dramatic increase in the number of environmental NGOs.

In 1980, only 33 NGOs were active, and most of them were not legal foundations (see Table 4). In 1996, its number increased up to 339 and most of which had legally registered with the relevant governmental sectors. Eighty-two organizations have registered with the MOE, 190 with the local governments, and 67 with environmental issues (Jeong and Cheong, 2000; Jeong and Kang, 1997, Korea Environment Institute, 1996).

Table 4  The Number of Environmental NGOs

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<tbody>
<tr>
<td>Registered in MOE</td>
<td>4</td>
<td>7</td>
<td>18</td>
<td>30</td>
<td>61</td>
<td>82</td>
<td>129</td>
</tr>
<tr>
<td>Registered in Local Gov't</td>
<td>-</td>
<td>4</td>
<td>13</td>
<td>25</td>
<td>66</td>
<td>190</td>
<td>-</td>
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<tr>
<td>Religious &amp; Social NGOs</td>
<td>2</td>
<td>2</td>
<td>11</td>
<td>18</td>
<td>22</td>
<td>22</td>
<td>50</td>
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<tr>
<td>Others</td>
<td>27</td>
<td>34</td>
<td>41</td>
<td>44</td>
<td>45</td>
<td>45</td>
<td>263</td>
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<tr>
<td>Total</td>
<td>33</td>
<td>47</td>
<td>83</td>
<td>117</td>
<td>194</td>
<td>339</td>
<td>442</td>
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Recognizing the increase in the number of environmental NGOs and expansion of its roles, South Korea's government has realized which cooperation with NGOs in the environmental sector is extremely helpful in achieving more efficient and effective policy implementation.

The Korean government launched several programs to improve the relationship between the public and private sectors. Environmental NGOs, which had participated in the anti-government movements, realized that positive participation in the decision-making would be more effective in conserving the environment. Hence, the relationship between environmental NGOs and the government has significantly improved since the mid-1990s.

Environmental NGOs play especially an important role in educating and informing the public. About 340 NGOs have been carrying out a variety of campaigns on a local and national scale. Recently, the Government has begun to provide a limited financial support for such activities of environmental NGOs (http://www.ksdn.or.kr).

5.2 Public Information and Citizens Participation on the Environmental Governance

By 1995, a survey on public awareness of environmental issues in South Korea demonstrated that 63 percent of respondents were "highly concerned" about environmental issues. Government environmental policies were considered favorably by 63 percent of respondents. About half of the people surveyed indicated that they were strongly opposed to installing polluting facilities in their neighborhoods, even if appropriate pollution control facilities were installed at the same time (Jeong and Cheong, 2000).

In the 1990s, the central government recognized that well-organized citizen groups make a contribution to protect the environment. The MOE is engaged in activities aimed at raising citizens' environmental awareness, for instance, through the development of environmental courses in schools and the publication of environmental statistics, including statistics on administrative actions like enforcement measures.

The MOE also invites community representatives and NGOs to participate in the policy formulation process. The 1993 Environmental Impact Assessment Act stipulates that a public hearing must be held to obtain the opinions of local residents. A regional environmental commission is held once or twice a year in order to hear from specialists in their areas of expertise (Jeong and Kang, 1998; Korea Environment Institute, 1997).

To attract the consumer attention towards products that are less polluting or more energy efficient and to encourage manufacturers to adopt environmentally friendly production and distribution processes, the MOE initiated a Voluntary Eco-Labeling Programme in 1992. Those products that use environmentally benign materials and technologies can be certified for the Eco-Label after the consultation of a tripartite committee of government, industry, and consumers (http://www.me.go.kr).
5.3 The Role of Industry on the Environmental Governance

Korean economic development has been dominated by the export-oriented policies. Export-oriented industries are well aware of how important it is to manage their operations according to the international environmental standards in order to compete with products of other countries in the international market. For instance, some industries are prepared to follow ISO 14000 environmental management systems, and have their own internal environmental audit systems, formulating guidelines and criteria for environmental actions. Sometimes their own environmental targets are more stringent than government regulated ones (Jeong and Cheong, 2000; http://www.ksdn.or.kr).

A few large companies provide environmental training programs to their subcontractors, who are deficient with the environmental awareness and technology. With the significant rise of environmental awareness, some industries have set up their own environmental research institutes to push forward with R&D on environmental technologies. Since the mid-1990s, the MOE has tried to change the direction of environmental policy from the end-of-pipe approach to more integrated pollution and prevention methods by introducing policies on clean technology development and voluntary environmental management system. The Environmentally Friendly Plant Certification Programme\textsuperscript{7} was initiated in the early 1995.\textsuperscript{4} It induces enterprises to respond to environmental needs voluntarily by conducting environmental impact assessments and achieving their own environmental goals. It is also expected to change the relationship between governments and enterprises from “command and control” to “partnership.”\textsuperscript{5}

6. The Environmental Governance in Local Government

Local governments in Korea have implemented the environmental policies of central government since 1961. However, after the local autonomy in 1995, the role of local government has increased in the local environmental governance. Recent introduction of local autonomy in Korea has brought about conflicts on environmental problems between central and local governments or between local governments themselves. Therefore, dispute settlement mechanisms are required to resolve these conflicts among regions or organizations. Furthermore, basic principles and mechanisms predefining rights and obligations of related parties are also necessary to prevent such disputes in advance. For the reconciliation of conflicts, the Korean government activates a conciliatory mechanism such as “Local

\textsuperscript{4}In order to promote the voluntary participation on the environmental improvement and conservation, the MOE manages three economic incentive system which includes the Environmentally Friendly Plant Certification Programme, Environment Mark on the Production, and Environment Improvement Charge. Environment Management Cooperation certifies as “Environmentally Friendly Plants.on the industries that voluntarily keep the environmental standards (http://www.mc.go.kr).

\textsuperscript{5}As of 1997, 122 workplaces had been certified as “Environmentally Friendly Plants.”
6.1 Sharing Responsibilities between Central and Local Governments

Under the ordinance of the Environmental Conservation Act, local governments are basically responsible for local environmental governance. When the Environmental Administration established 6 regional environmental offices in 1986, however, the major tasks of enforcing environmental regulation were given to the new national governmental branches.

After the Phenol Pollution Accident in 1991, along with the trend of localization, all of the responsibilities of monitoring and enforcing environmental regulation devolved to provincial governments in 1992. From water pollution accidents at Nakdong and Youngsan Rivers in the early 1994, the responsibilities implementing environmental governance began to be shared by both the Environmental Management Offices and provincial governments which emission sources belonged to. The Environmental Management Offices control emission sources of industrial complexes and other emission sources are regulated by the provincial governments. Most implementation tasks have been transferred to the provincial governments and again conveyed to the local governments like cities or counties (Jeong and Kang, 1997; Korea Environment Institute, 1997).

6.2 The Environmental Governance of Local Governments

Local governments (metropolitan cities, provinces, counties, and municipalities) are in charge of implementing central government’s environmental policies and regulations. Metropolitan and provincial authorities operate regional institutes for environmental research that monitor pollution levels. The major roles of local authorities can be summarized as follows:

- Establishing and implementing regional environmental protection efforts within the limit of their authority.
- Executing environmental impact assessments (development of their own EIA procedures).
- Providing water supply services and installing and operating sewerage and wastewater treatment facilities.
- Monitoring violations of environmental standards and illegal emissions and discharges.
- Establishing and operating sewage and waste treatment facilities.
- Designating and managing regional parks (provincial, city/county) and conducting activities associated with nature conservation.
Each province and the Seoul metropolitan area operate regional Institutes of Health and Environmental Research to support local governments in performing surveys and monitoring pollution levels (Jeong and Cheong, 2000; MOE, 1997 and 1999).

In the local government level, Ulsan opened the department of environmental management in 1987. Local government approached more positively these environmental problems because they are directly related with the quality of life for citizens. At first, the local government employed a monitoring system to note the circumstances of the pollution on air and water, smoke, noise, poison, coastal water, and so on. Based upon the survey on the environmental pollution, she made a mid-term implementation plan for the environment improvement in 1997.

Especially, this plan focused on the improvement of quality of citizen's life but the environmental policies of central government mainly emphasized the compensation to the damaged citizens and their relocations to the other place. The basic principle of this plan is that the emission of pollutants should be "Zero Base." Based upon this principle, the local government controls the environmental pollution as follows: (1) In order to construct a new factory, it must produce the environment-friendly goods or recycle the waste; (2) In order to increase the scale of existing factory, total amount of pollutant emission should be less than that of the existing plant. Following an officer of Ulsan, he argues that if this plan is implemented successfully, Ulsan will be changed from the symbol of polluted city to a environmentally clean city in 2002.

6.3 Political and Administrative Organization in Ulsan Metropolitan City

As the above description the right and responsibility of local government on the environmental governance have been significantly increased after the local autonomy. And then UMC government enlarged the organization and the number of officers on the environmental governance since 1995.

Basically, UMC is composed of 7 bureau, 2 offices, 1 headquarters, and local assembly. Each community has its own administrative organization. Moreover, the citizens elect a mayor and local assembly. And then they have to consider local environmental problems which local citizens have been concerned.

Environment Bureau is composed of three sections. Environment Protection Section covers the environmental policy, water quality management, and air quality Management. Scavenger Section charges scavenger administration. Sewerage Management Section takes the work on the waterworks management, sewerage administration, and sewerage facilities. Forestry & Park Section had a responsibility on the management of green tract of land and administration of park & forestry. In addition, there are several environment-related organizations that are belonged to other sections.
6.4 The Decision-Making Processes on the Environmental Governance

Urban environmental problems are closely related with the local people's thinking and activity because the lives of local people as both consumers and producers of infrastructure services influence the nature, quality and flow of environmental infrastructure. Therefore, they have to be actively involved throughout the project cycle from the formulation of goals and policies to its implementation. There often are conflicts between the policy preferences of different sectors of society (Mangal, 1998). For example, industries benefit from lax water standards but they externalize the burden to downstream populations who are likely to want stricter standards. Local community and citizens face the environmental problems due to lax pollution standards but industrial sectors can benefit from them. However, the industrial sectors also can face the environmental problems in the long terms. Because of these conflicts, all stakeholders participate in formulating the environmental policy or suggest their opinions to the policy building in order to ensure that the goals of environmental governance are consistent with the broader values and goals of society as a whole.

Since the adoption of local autonomy, UMC made the municipal codes on the principles of environmental preservation and the role and duty of local government, industry, and citizens in 1997. Based upon this code, eventually Ulsan Metropolitan City established the Mid-term plan on UMC environmental improvement (1998-2002) in 1997. It is actually the first comprehensive plan for the improvement of local environment. Before this plan, the local government only had implemented the environmental plan of central government. This plan contained 10 sections and 103 projects on the environmental
management, the preservation of natural resources, air and water quality, and pipeline water (http://www.metro.ulsan.kr).

Furthermore, in order to promote the citizen's participation in building the environmental policies, Environmental Committee, Environmental Preservation Consulting Committee, and Environmental Conflict Coordinating Committee were established in 1997. The first covers the environmental education for the public and consulting on the environmental policies and alternatives. The second consults the environmental preservation and environmental plan. The third charges the consulting of environmental conflicts among agents and between the public and the private sectors. All committee are composed of governmental officers, professors, and NGO groups. UMC also established the "Green Ulsan 21 Promotion Committee in order to implement efficiently the "Green Ulsan 21 Plan." Its members are composed of the education, broadcasting, police, NGOs, and citizen organizations (http://www.metro.ulsan.kr).

7. NGOs Activities on the Environmental Governance

7.1 Environmental Preservation Activities

Due to the increased public awareness of environmental preservation, environmental NGOs have been more active in their activities. Environmental NGOs are engaged in diverse activities, such as keeping up public relations on environmental preservation, conducting campaigns, surveys and research on environmental issues, and holding seminars on environmental policies. Moreover, most of NGOs have their own local branches. Therefore, the roles of NGOs in central government are similar with those of local government. The roles and activities of the NGOs are as follows:

First, the Korea Environmental Preservation Association and the Toxic Chemical Management Association were established in accordance with the Basic Environmental Policy Act and other relevant laws. The Associations were formed to conduct inspections and research, develop environment-related technology, promote education and training, and improve public relations.

Second, organizations that are similar to research institutes include the Korea Action Federation for the Environment, the Baedal Eco-Society, the Environment & Pollution Research Group, etc. These organizations, consisting of environmental experts and social leaders, hold seminars, conduct academic studies and research on environmental policies, and exchange environmental information with both national and international organizations.

Third, with the environmental movement developing into a kind of civic movement, various civic groups, including religious groups and women's groups, are staging campaigns for environmental preservation under diverse themes. For example, campaign titles such as "Let's reduce food wastes," "Let's use public transportation," and "Let's save water," have become common slogans for many environmental groups.
On February 1, 1996, representatives from six major religious groups met together to declare the "Declaration of the Greening of Our Society" and to start an aggressive campaign for environmental preservation.

Fourth, there are many regional organizations represented by local residents, such as Earth and Eco-friends. These organizations are involved in the environmental preservation of the local community. They hold seminars on local environmental issues and conduct activities to protect water supply resources. Ten NGOs in Ulsan participate in various environmental improvement activities, including the promotion of public awareness on environment, environment watch, and preservation of eco-system. The Green Environment Conservation, the Korea Environment Movement Federation, and some other NGOs are Ulsan Branches of national-wide organization. Onsan Complex Environment Management Committee, Community Countermeasure Committee on Onsan Pollution Problems, Taehwa River Conservation Committee, and some other NGOs are working for the local specific environmental problems. The Ulsan Natural Environment Preservation Committee, Onsan Environment Preservation, and Environment Preservation Committee of Ulsan Local Prosecution Attorney are on action for the local natural environment and eco-system. Total 80 plants and more than 3000 personals including university, government officers, and professionals are participated in the above NGOs' activities (http://www.metro.ulsan.kr).

7.2 Support for NGOs

At present, the government extends financial support to some private environmental organizations. This financial support, however, is expected to decrease or discontinue as the government makes changes in its budget. An environmental preservation fund should therefore be created by the private sector. The Korea Environmental NGO Promotion Association was established for exactly that purpose in March 1994. Since then, the Association has provided much assistance to NGOs.

Representatives of NGOs have been increasingly involved in the activities of the Central Environmental Preservation Advisory Committee, its sub-committees, and the government's other environment-related committees. Moreover, local NGOs has participated in building local environmental policies and implementing them. This has ensured the formulation of more effective policy.

The Private Environmental Organizations Policy Consultation Council, which consists of officials of the Ministry of Environment and various persons recommended by 16 NGOs, including the Korea Action Federation for the Environment, has served as a body for consultation on environmental problems. The Council held three meetings in 1996 to incorporate the opinions of the NGOs into policies regarding pending environmental issues and major environmental policies.

The monthly "Environmental Information" periodical and various other information and public relations
materials were provided to some 300 environmental organizations. On World Environment Day, the Ministry of Environment honored environmental organizations and individuals that had been active in environmental preservation (http://www.ksdn.or.kr/resource/sd/sd11/sd110001_e.htm). Actually, 9 factories are certified as the “Environmentally Friendly Plants” in UMC. Local government supports these factories with the financial, technical, and other incentives (http://www.metro.ulsan.kr).

7.3 The Public and Private Partnership on the Environmental Governance in UMC

Local environmental problems are closely related with the local people’s lifestyle, awareness, and participation. Therefore, the success and failure of environmental governance are highly depended upon the public and private partnership on the local environmental issues. As the above descriptions, UMC environmental problems are significantly different from those of other cities. Especially, UMC was the origin of the Korean urban environmental problems because where was the heavy-chemical industry-oriented city. Therefore, the concern on environmental governance in UMC is higher than any other city in Korea. The “Campaign-Oriented Culture”, which is probably a result of military dictatorship culture, encourages the partnership between the public and private sectors. There are several environmental governance activities by the public-private partnership.

First, the Green Ulsan 21 will be developed into the citizen movement on the environmental preservation. This program has its own community organizations for stimulating the citizen participation in the Green Ulsan Network. It charges the citizen education and public awareness on the environment preservation.

Second, the Environmental Technology Development Institute was established in 1998. The Ministry of Environment, local municipal, Ulsan University, Industry, and citizen including NGOs were involved in this program. This institute charges the environmental technology development, survey on the natural resources and environmental pollution, and water quality management system. Its total budget was 1.35 billion Korean Won. Its budget came from 50% in central government and 50% in local government.

Third, in order to improve the local environmental quality, local environmental standards will be reestablished in the near future. This project is on processing. A new standard will be higher than that of central government (SO2: 0.030 PPM/year; TSP, 150/μg/m³/year) and World Health Organization (SO2: 0.015–0.023 PPM/year; TSP, 60/μg/m³/year).

Fourth, the Ulsan Health and Environment Institute is establishing in order to study the relationship between the public health and environmental problems. It will be opened in July 2000. In addition, several environmental governance programs are implementing and are scheduled. As the above description, the effects of these environmental governance programs, however, are not clear or very small because most of programs were established very recently or are at the beginning stage now. In spite of these problems, the public concerns on the environmental governance, including housewives, have been
largely increased due to the implementation of local autonomy and NGOs activities. Moreover, the central and local governments also begin to recognize the importance of the local environmental governance. Therefore, we can have the optimistic view on the improvement of Ulsan environmental problems.

8. Lesson and Implications of Korea's Environmental Governance

The complexity of environmental issues in Korea is attributable to various factors such as serious industrial pollution in major industrial complexes, high ozone concentration in metropolitan areas, collection and treatment of urban and industrial solid wastes, preservation of bio-diversity and ecologically sensitive spots, etc. It is also closely related with the emerging deterioration of global and regional ecosystems due to climate changes, ozone depletion, desertification, and deforestation. These environmental problems are very similar to those of other developing countries. However, Korean environmental problems have some unique characteristics, comparing them with those of other countries.

First, in the political and cultural aspects, Korea has passed several historical experiences like the Japanese colonial rule (1910-1945), the Korean War (1950-1953), and political unrest after the war. After these long and hard historical incidents, the strong military dictatorship government had controlled the Korean political and social structures. This authoritarian government however induced the strong political protests from the scholars, students, and even citizens in the 1970s and 1980s. These strong protests had made great contributions to build a democratic society in the end of the 1980s. However, the political and administrative structures were still controlled by the central government, while local government only played the role of sub-organization of the central government. The local autonomy system was introduced in 1995. And then the roles of local government are gradually increasing and some responsibility and rights are transferring into the local government.

Second, Korea is one of the most successful countries in the context of economic growth. Korea was one of the poorest countries in the worlds due to the Japanese Colonization and the Korean War until the early 1960s. After the military coup by the General Park, the strong military dictatorship government initiated the Five-Year Economic Development Plan. During the periods of the economic development plans, human and material resources had been invested in the economic production activities and their exports in order to promote the economic development. Due to these kinds of national efforts, Korea could escape from an absolute poor country and advance into a semi-developed or developed country. Eventually, GNP had been only 82 U.S dollars in 1962 when the Five-Year Economic Development Plan was launched but it rose to 10,307 dollars in 1997. It was an explosive growth and this economic growth was almost no example in the world.

Third, even if Korea is one of the most successful countries in the economic aspects, she has paid lots of social and environmental costs to this economic growth. Environmental problems have been dramatically
increased since the 1970s. She was a calm morning country for the long time but an environmental quality has acutely drawn a down-slope curve along with this rapid economic growth. Furthermore, the central government did not consider the environmental effects of rapid economic growth in the initial stage of economic development plan. On the other hand, Korean people seemed to think the black smoke of industry chimney as a symbol of economic growth. We were very proud when we saw the huge-industrial complexes. Most Korean people including government officers, institutes, and even citizens had fall into a syndrome of economic growth. However, environmental problems have been getting worse in the opposite site of this economic growth.

Fourth, environmental governance is closely related with the political and administrative structures, economic growth, and environmental problems. Especially environmental governance has depended upon the Korean political structure. Most environmental policies were planned and implemented by the central government until 1995 when the local autonomy was adopted. The local government only implemented the guideline and direction of central government policies in the local and regional level. Since the mid 1980s, several laws and policies on environmental governance were adopted as the above descriptions. However, most policies were just introduced or are staying at the beginning stage. And then effects of these policies are not shown or very small. However, public awareness and concerns on the environmental governance has significantly increased since the adoption of local autonomy system in 1995. A mayor and local assembly must consider the quality of local environments. Furthermore, the public-private partnership has significantly improved since 1990s when a political system changed from an authoritarian government to a democratic society. Ant-government groups like student union, environmental organization, and other social groups changed their roles from the democratization movement to environmental one. The central and local governments also begin to consider the environmental problems and they try to co-work with NGOs on the environmental issues. Each local government establishes its own environmental improvement plan and citizens and NGOs participate in the implementation of environmental governance policies.

9. Conclusion

East Asian rapid economic growth, urbanization, and industrialization have placed increasing demands on air, water, and land resources. Major urban areas in the region are particularly plagued with unacceptably high air and water pollution levels. Land degradation and deforestation are acute problems in heavy-chemical industry cities. Urgent steps are needed to reverse this trend and to foster a more efficient and environmentally friendly growth in years ahead.

Because of rising of income levels, the public concern on a clean environment is increasing. In order to challenge this demand, East Asian countries must prepare a new paradigm on the economic development strategy. A new policy approach is clearly needed in order to handle the global environmental issues and
challenges posed by rapid changes in social structure. The government must accordingly develop environmental technologies to match those of advanced nations, take immediate action to cope with environmental problems, and take an initiative in solving global environmental problems. An environmentally friendly consumption patterns and business management system must be fostered. The ideal of "Environmentally Sound and Sustainable Development (ESSD)" for the economic growth must be promoted.

All these challenges make environmental governance system in Korea much more sophisticated. However these does not mean that the environmental governance system in Korea is very effective to meet the sustainable development requirement. There are several tasks and strategies to improve efficacy of the environmental governance system. Accepting these changes of Korean society, this paper suggests some policy implications on the environmental governance for other developing country and Korea itself.

First, the administrative paradigm in the progressive era should be replaced by "governance" paradigm, especially environmental governance for the sustainable development. Based on this new paradigm, key themes of administrative reform should be to reduce organizational hierarchy, empower local communities, promote task-centered management, and apply multi-media approaches including the public-private partnership and citizen participation.

Second, local governments need to build up expertise in implementing and enforcing environmental protection measures to tackle compliance problems involving small local factories and enterprises. Policy measures currently discussed to improve the capacity of local governments include the privatization of environmental service provisions, promotion of citizens' participation (of course NGOs) in environmental management, and development of Local Agenda 21 and comprehensive regional environmental plans, community partnership with industries, etc.

Third, restoration and fortification of environmental capacity is needed. It is a prerequisite to have a margin within the limits of environmental capacity to continue economic growth without, however, compromising environmental quality. Furthermore, investment should be enlarged for fortification of sewage treatment plants, solid waste treatment installations, fostering environmental industries, and technology development for environmental improvement. Land use planning and industrial policy should maintain harmony with environmental policy.

Fourth, it is urgent to develop new methods and techniques to solve and reduce regional conflicts. Some scholars suggest that the Polluter Pays Principle must be emphasized more. Others believe the Beneficiary Pays Principle should be adopted as a way of settling regional disputes. Still others recommend the use of a community fee system regarding NIMBY facilities. However, the most important thing, I think, is to design a "principled negotiation" mechanism to solve the increasing environmental conflicts and disputes.
Fifth, the promotion of public participation is encouraged. Environmental policy cannot be successfully implemented without the cooperation of the public. Recognizing these facts, the role of non-governmental organizations (NGOs) is becoming more important in Korea and increasing number of NGO leaders actually participate environmental policy formulation and implementation. Moreover, environmental education for students and the provision of suitable environmental information for the general public should be strengthened and enhanced to promote public participation.

Sixth, to help promote voluntary environmental management and clean technology development, government should provide more flexible environmental regulatory system. Industries, which had paid little attention to voluntary environmental management, began to realize the importance of environmental management to survive in the high competition system of the global economy. Therefore, it is necessary to develop much more voluntary programs to help such positive business’s attitudes. Moreover, it will be helpful to improve industrial environmental practices, if Korea can introduce the environmental accounting system for individual industry and bank loan system based on industries’ environmental performance.

Developing countries must consider the environmental issues and their governance when they establish economic development strategies, considering the Korean environmental governance experiences. They must induce low-pollutant factories. Moreover, in order to solve local environmental problems, each local government must make a plan on the protection of urban environments and implement it, considering socioeconomic situations of planned areas. Her citizens and organizations also must voluntarily participate in protecting urban environments. If other Asian developing countries obtain lessons from the Korean experiences, they can get away from the Korean terrible experiences and a sustainable economic growth can be maintained. They also can save the East Asian and global environments.
References


Appendix 1  The Current Structure of Environment Laws

<table>
<thead>
<tr>
<th>Field</th>
<th>Environmental Acts</th>
<th>Enacted Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management</td>
<td>3. Wetland Preservation Act</td>
<td>1999</td>
</tr>
<tr>
<td></td>
<td>4. Special Act on the Conservation of the Ecosystems of Island Regions such as Tokdo, etc.</td>
<td>1997</td>
</tr>
<tr>
<td></td>
<td>3. Air Quality Management Act for Underground Living Spaces</td>
<td>1996</td>
</tr>
<tr>
<td></td>
<td>5. Toxic Chemicals Control Act</td>
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<tr>
<td></td>
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<td>1979 (1993)</td>
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*Years in parentheses denote year of most recent amendment*
Appendix 2 Environmental Administrative organization and its roles of Korea

Japanese Experience in Environmental Management and its Implications for Asian Developing Countries

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1. Introduction

Japan achieved an "anti-pollution miracle" in the 1970s following its "economic miracle". The anti-pollution miracle was mainly attributed to such factors as: stringent environmental regulations and standards and strict enforcement of them; cooperation between governments and industries; availability of funds and abatement technologies at the end-of-pipe; and increased energy efficiency as well as changes in economic structure. In a battle against urban environmental pollution since the late 1970s, huge investment by governments in urban environmental infrastructures, including sewage treatment and garbage disposal facilities and green buffer zones was critical to greatly improve urban environment of Japan. And since the 1990s, a number of significant changes in Japan's environmental policy targets, and governance mechanisms as well as policy instruments have taken place in response to the varying environmental problems and the new economic, social and political moves in the country. In a word, Japan's environmental management has indeed developed some models with both a successful mainstream and some weaknesses.

For these reasons, Japan's environmental policy and experience have become an area of considerable research interest in international academia. Particularly, the 1990s has been a period of intense academic and popular interest in the applicability of Japan's experience to Asian developing countries now facing similar environmental problems to those Japan experienced in the past. To date, all available literatures have three distinct characteristics.

First, most of the relevant studies have been done by scholars from World Bank, OECD and developed nations including Japan itself. Consequently, the relevance of studies to developing countries is limited or unsuitable more or less because of less consideration from the perspective of developing nations. Second, Japan's success in environmental management is brought about by a complex interaction of influences and not by a single and isolated factor, nor a favorite instrument, nor a single type of actor, nor a particular framework condition or institution. It would definitely be impossible to simply mechanically copy environmental policies from Japan and expect them to work in other countries. Many studies have figured out Japan's environmental management and indeed penetrated essences on some sides of the picture. Those factors underlying Japan's success such as environmental governance mechanism, and roles and relationship of stakeholders, as well as context of political-economic structure, social norms and culture value, however, have received little academic attention to date. It leads to the situation that the existing results of studies are not sufficient.
yet to be organically integrated into an overall picture of Japan’s environmental management. And finally, most of the related literatures to be accessible to Asian developing countries now still are those focusing on Japan’s experience in the period of industrial pollution control, rather than information about and in-depth analysis on the new changes in Japan’s environmental policy since the 1990s. Moreover, with the theoretical development of environmental science, conclusion from today’s knowledge may be more systematic and relevant than that from the past insight even when viewing the same historic experience of Japan.

Therefore all available studies on Japan’s environmental policy to date lend a strong support to and their three characteristics above motivate attempts of this study. A comparative Study of Urban Environmental Governance in East Asia, which compares the commonality and unique of environmental policy and governance between Japan and some selected Asian countries and identifies background analysis for identifying of applicability of Japan’s experience to others, this chapter comprises two sections. The first section attempts to figure out the overall picture of Japanese experience in environmental management, from an integrated perspective. And then the chapter emphasizes on section 2 about strategic implications drawn from the Japanese experience for other Asian countries.

2. Japanese Experience in Environmental Management

Several aspects environmental policy and governance in Japan resemble those of many other Asian countries. Yet Japan still sees a number of unique in initial response approach to environmental problems, environmental administrative structure, policymaking process, policy instruments, actors’ role and embodied rules, and a complex interaction of influences from economy and technology as well as from the context of political, social and cultural. All these unique themselves may be meaningless to other Asian countries, but the underlying strategic implications could be universally adopted. Before revealing the underlying strategic implications, Japanese successes and failures as well as their causes in environmental management are naturally questioned. To answer the question, it needs a holistic thinking or integrated perspective as methodologies to systematically figure out Japanese experience, which will be discussed first in this section.

2.1 Integrated perspective of environmental management towards sustainable development—how to examine Japan’s experience

☐ Challenges to and new directions in environmental management

M. Janicke and H. Weidner argued that successful environmental protection is brought about by a complex interaction of influences and not by a single, isolated factor, nor a favorite instrument, nor a single type of actor, nor a particular framework condition or institution (M. Janicke and H. Weidner, 1997:4). Inside the domain of environmental management, the complex interaction mainly includes environmental policy, the availability of environmental technology and funds, institutional capacities,
and all stakeholders' roles as well as their partnership. And outside the domain, it deals with politician attitude toward environmental protection, governance regime to institutionalize environmental administration, social norms and cultural value about environment, and impacts of economic and technologic development on environment. Hence modern environmental management toward sustainable development needs a holistic thinking to consider all necessary factors interacted. To understand experiences in environmental management, on the other hand, it also needs examine all respects of the complex interaction underlying the successes and failures.

In comparison with conventional strategies for abatement of pollution and mitigation of ecological damages, consideration in social dimension becomes an increasing importance to environmental management. The 1970s and early 1980s constituted a period of intense academic and popular interest in processes of environmental degradation: global, regional and local. However, it soon became increasingly clear that reversing such degradation would not be a purely technical and managerial matter. All the technical knowledge in the world does not necessarily lead societies to change environmentally damaging behavior. Hence a critical understanding of socio-economic, political and culture processes and structures has become of central importance in approaching environmental problems (Timonthy doyle, Doug McEachern, 1998:1). These processes and structures determine how environmental problems are identified and framed in society, and how environmental issues reach the political agenda, and policies are formulated and implemented. They also relate to social norms and cultural values about environment. In other words, socioeconomic, political and cultural context takes the shape of formal and informal institutions and the actors' roles and their relationships in environmental management.

The past experience of environmental management implies that in the absence of a strong institutional foundation, the outcomes of good policy initiatives and effective technologies tend to dissipate. In the new institutional economics, institutions are viewed as rules. Rules can be formal, taking the shape of constitutions, laws, regulations and contracts. Or they can be informal, like values and social norms. Institutions simultaneously facilitate and constrain the actions of individuals or organizations. Successful environmental management needs not only good formal institutions but also good informal ones. In a battle against pollution related to mass consumption society, for example, environmental awareness and culture are particular important to change lifestyle toward environmental friendly. In economic dimension, the internalization of externality of diseconomy and the privatization of property rights have provided good solutions to solve environmental and resource problems, from the point of view of economic institutional reforms.

However, environmental costs in a profit-driven capitalist economy are typically not fully internalized. And the process of economic growth also creates vested interests like dependent consumers who oppose to the internalization of environmental costs. Moreover, even if all environmental costs were successfully internalized, economic growth could still lead to environmental deterioration. This would occur if the added benefits from growth exceeded the added social costs of environmental damage resulting from growth (Douglas E. Booth; 1998:2-18).
In terms of privatization property, it is a good instrument for managing common resources like forest, land and others, but it is impossible to define the boundary of environmental elements like air and water in open access area for people. Even if property to pollution or pollution-free are assigned to someone, the pollution still could not be well resolved due to high transaction costs to achieve agreements between polluter and the owner of pollution-free. Hence the critical is to change traditional production pattern by improving eco-efficiency through technological improvement and innovation, like cleaner production technology. It, together with institutional innovations such as internalization of diseconomy and the privatization of property rights, can minimize burdens of economic activities on environment. From all above, modern environmental management needs a more holistic thinking or integrated perspective to build a unified framework of management from social, economic, and environmental dimensions.

- Conceptual model of integrated perspective

Modern environmental management (or environmental management toward sustainable development) should be perceived as an integration of three managerial approaches or dimensions—managing social and economic, as well as environmental changes. Managing environmental changes is the conventional approach to abate pollution and mitigate ecological damages caused by human activities. Managing social and economic approaches are to control the interactions of socioeconomic activities and environment, and minimize burdens of socioeconomic activities on environment, thereby reducing the pressures on managing environmental changes.

Managing social approach aims at developing good environmental governance. It mainly includes setting formal constraints for all stakeholders’ roles and their partnerships, structuring environmental administration, and building capacities of environmental governance, as well as creating social norms and cultural values toward environmental friendly. It provides the social-dimensioned or institutional-oriented supports for activities of environmental management.

Managing economic approach is to manage economic activities toward environmental friendly. The solutions include integrative policymaking of environment and development, economic institutional reforms such as correcting price system and defining property right for internalization of externalities of diseconomy, and improving technology for the raise of eco-efficiency as well.

The three approaches or dimensions should be seen as complements; one without other must not work effectively and efficiently. The integrated perspective of environmental management could be treated as a methodology not only for constructing a holistic strategy for environmental management toward sustainable development but for examining national experience in the past as well.

2.2 Japanese successes and failures in environmental management

According to the integrated perspective above, it sees four aspects, which are both Japan’s successes in environmental management and causes leading to the Japanese “anti-pollution miracle” and great improvement in environment. They include ☐ cooperative approaches to environmental governance;
source improvement in economy and technology and integration of environment and development; and
more effective approaches for environmental governance; and fifth, how to deal with the dilemma of growth and environment; fifth, how to restructure the national environmental policy; and sixth, how to finance environmental management.

3. Strategic Implication of Japan's Experience for Asian Developing Countries

Japan's successes and failures in environmental management discussed above suggest universally strategic implications for Asian developing countries in four respects. They are:

1. How to build cooperative approaches to environmental governance;
2. How to deal with the dilemma of growth and environment;
3. How to restructure the national environmental policy;
4. How to finance environmental management.

3.1 How to build cooperative approaches between actors to environmental governance

3.1.1 What are cooperative approaches?

Actors involved in environmental governance are national and local governments, business, citizens, NGOs, media, and other civil societies. Good environmental governance requires that all actors play proper roles and form cooperative relationships, leading to collective actions in environmental management. There are different models to describe the cooperative approaches between actors in environmental governance. For the relationships among inter-administrative sectors and among governmental tiers, it sees hierarchical model anywhere. Environmental governance in this model is hierarchical. Governance is viewed as a purely executive activity delegated from the top. Managerial activities within organizations are governed by routines and standard operation rules and procedures. Co-ordination between organizations depends on superior coordinator. When the hierarchical administration itself is workable, credible and trusty, the efficiency and effectiveness of governance are acceptable in short term. But it often becomes problematic in long term because of the structural weakness of hierarchical administration such as corruption, bureaucracy, shortage of consensus between social members, and ineffective monitoring by actors outside administration.

Network model, originated from business management, is being pursued in public management. Within this model, other necessary actors including business, citizens and NGOs are involved in environmental governance. Governance is strategic and operational as well. In other words, all actors related involve in policymaking, identification of problems, and formulation of solutions, as well as executive actions for policy and program implementations. Co-ordination among actors in a network depends on a mixture of horizontal and vertical linkages and development of partnerships. Hence it extremely requires close dialogs, communication and commitments between those parties responsible for policymaking and policy implementation. The improvements in performance critically depend on ensuring that the activities of the component parties of a network mesh with each other.

Environment is perceived as a common good. The common good closely associates with the interest of each member of society. Moreover, environmental problems such as urban environmental pollution
particular are caused by not only industries but also citizens themselves. All have responsibility to conserve environment and ought to involve in environmental governance. The network model, therefore, becomes extremely necessary and effective in environmental governance. Cooperative and collective action by all actors is a critical element in the model. Developing partnership of actors now is an appealing idea for network model. It puts emphasis on the voluntarily cooperative relationships on a willingness basis, which implicitly contrasts with the vertical pattern of obligatory hierarchical relationships. Partnerships presume shared or overlapping interests if not necessarily common purposes and, also, a willingness to engage in collaborative action on an enduring basis. Partnerships require more durable working relationships and more cooperation than business relationship in a competitive market (Les Metcalfe, OECD, 1994:64).

Before the 1990s, the environmental governance model in Japan generally followed the mix of hierarchical model and network model. It was characterized by a cooperation within hierarchical administration systems and between government and business, in which, of course, included conflicts before achieving consensus about governance targets and measures. The mix model was shaped by formal constraints. They were also attributed to Japanese unique political-economic structure of the Ruling Triad and cultural values of vertical loyal and collectivism.

Entering the 1990s, the mix model continued to work, but Japanese environmental governance started to pursue partnership between government, business, citizens, NGOs, and other civil societies. Several factors have fostered new evolution in Japanese environmental governance, including the advocacy of decentralization and deregulation in politics and economic management, and the changing environmental issues from industrial and urban pollution to problems caused by mass consumption lifestyle and to global environmental issues. Of particular significance has been the availability of those supportive prerequisites related, consisting of good environmental awareness in Japanese society, increasingly public interests in participation in environmental governance, and good institutional capabilities of regulators, as well as the formation of self-governance and some voluntary actions by business.

On the contrary, it is such prerequisites that are generally absent or insufficient in most of Asian developing countries to build partnership of actors in environmental governance. The priority for them is first to build cooperative approach or network mainly through formal constraints—a regulatory approach as Japan has experienced. Through regulatory approach, the pressing target is to shift governmental-led-governance to social-driven-governance, in which environmental management are launched by initiatives and joint efforts of all stakeholders, rather than by a sole government. In the case when and where environmental awareness and the relevant capacities of both the public sectors and other social actors rise at a certain extent, partnership should be encouraged.

3.1.2 National government

In principle, the national government should try to be a slim and decentralized regulator in environmental governance through devolving some of policymaking authorities and most of executive
functions of policy and program implementation upon local governments. Then the national
government acts as a policymaker for policies dealing with the basic principles, nationwide and
regional planning, universal tolerant standards, and international environmental conventions; and a
coordinator for the policies and actions among inter-administrative sectors in environmental affairs
and among local governments for regional issues. It should also be a monitor for environmental
quality and an inspector for overseeing environmental performance by local governments, and a judge
for social conflict resolution caused by environmental problems. In addition, provision of supports
for local governmental and other actors’ capacity-building should fall within the central responsibility
of the national government, so as to enable them to play a active role in environmental management.

The critical elements to determine the functions of the national government and its relationships with
local governments and other social actors in environmental governance compromise administrative
structures and policymaking process.

- Administrative structure and joint efforts by all sectors

Environmental management involves so many aspects of the socioeconomic system that it is beyond
the capacity of one or even a few organizations to address all of them. Particularly, the deep
involvement of economic and public sector actors in environmental governance helps to promote the
consideration of environmental matters into industrial and general infrastructure developments. In this
sense, the power-sharing structure at the national level like Japan has helped to bring all governmental
departments into play, and has fostered cooperation among them. While Environment Agency of
Japan (EA) has general responsibilities for policy development and coordination, the Ministry of
International Trade and Industry (MITI), the Ministry of Construction and the Ministry of Health and
Welfare have considerably contributed to industrial pollution control, municipal wastes management,
and urban environmental infrastructure construction. In the total national environmental budget from
1995 to 1997, the EA only took up 2.78 percent and the largest amount was shared by others.

Nevertheless, all the advantages of power-sharing structure can appear only after consensus among
relevant ministries and other administrations is achieved. In practice, there has been a lot of conflict
among the ministries and between environmental groups and industries in Japan. Before the 1970s,
such conflict was so strong that some strict policy proposals once died. Even after that time, the
Environmental Assessment Law couldn’t be passed until 1997 because of the opposition of industrial
circle. High costs for consensus-building and coordination is one of important reason why Japanese
government has decided to elevate the EA as Environment Ministry in 2001.

In contrast, environmental administration in South Korea and the Philippines belongs to power-
centralized structure. In addition to similar responsibilities to those in power-sharing administration,
tap water supply, sewage treatment, and solid waste management are under the authority of the
Ministry of Environment (MoE) in South Korea. Likewise, the responsibilities of the Department of
Environment and Natural Resource in Republic of the Philippines (DENR) even include mineral
resources, land, forest and ecosystems, protected area, wildlife protection, and pollution prevention
and control comprising sewage treatment and solid waste management. Moreover, the MoE and
DENR both install regional offices, 4 in South Korea, and 16 in the Philippines. Generally regional office carries the main burden of implementing laws, regulations, standards, and programs within the administrative region of its responsibility.

The advantage is also obvious in power-centralized structure. The central body overseeing environmental affairs is subject to less influence from other ministries and agencies related, as compared to the power-sharing regime. It is easier to promote environmental policies and formulate ministerial regulations in its jurisdiction. In particular, with the supports of regional office affiliated, policy implementation can be strengthened by its owned managerial resources. These characteristics are of significance to the cases where environmental management is given to less importance by relevant ministries and local governments. On the other side of a coin, the power-centralized administration leaves less space to encourage active roles by local governments and other ministries, however.

From all above, it is hard to simply value the advantages and shortcomings of power-sharing or centralized structure in environmental administration at national level. It should be structured based on national general administrative regime and other conditions. But the principle still needs to be considered, i.e., keeping the balance between a full use of managerial resources and costs for coordinating various administrative sectors. For vertical structure between the national and the local, decentralization proves to be an effective approach to facilitate environmental governance. Decentralization in environmental governance should become a long-run target at least to be pursued in countries where the present conditions are unavailable to carry out it in consideration of poor local capacities and low interests and initiatives by local governments (details in the section 4.1.2), for example.

Consensus-building in policymaking

Regardless power-sharing or power-centralized administrative structure, consensus-building in policymaking always is critical to form cooperation and joint efforts among all actors in environmental governance. The common good of environment implies that there is agreement on values among social members. Common ground exists whenever parties blend their values through a social decision process (Enda Tusk Loehman and D. Kilgour, 1998: 5). Common ground now becomes a basic concept or principle for environmental and resource management. The concept implicates that different interest party shares same or similar values on the matter in question and is willing to make its own efforts to the common targets. Disagreement in a friendly atmosphere can actually enhance the creativity of collective efforts, even if common ground is not achieved (Enda Tusk Loehman and D. Kilgour, 1998: 5).

Japan's negotiations in environmental policymaking is right a process of common-ground-seeking or consensus-building, which has been extremely effective in both forming a cooperative approach by the authorities concerned and enforcing policies (Fig. 1). The keys to consensus-building policymaking are to open decision-making process to all relevant administrative sectors, local governments, and ordinary citizens as well as civil societies, and provide institutionalized
opportunities for them to voice their opinions. The Central Environment Council at Japanese national level and local Environmental Councils are good instruments for consensus-building in environmental policymaking (Box 1).

Fig. 1 National Process of Environmental Policymaking in Japan
Box 1 the Central Environment Council (Yong Ren, 2000:83)

The 1993 Basic Environment Law stipulates that the Central Environment Council (CEC) has a mandate to provide policy consultations to the Prime Minister and the Minister of Environment Agency according to their requests. Before 1993, it was called the Central Pollution Control Council. There are 10 subcommittees under the CEC responsible for consultation of policy in major areas of pollution problems like air, water, and others. Each local authority also installs its own environmental council. The Council consists of representatives from academia, industry, citizens' and worker's groups and retired officials circle. In environmental decision-making, the CEC promotes scientific and democratic policy-making. While academic members of the Council mainly provide advice from the scientific viewpoint, representatives from industry, citizens' and worker's groups pay more attention to technological and economic feasibility questions, social acceptability and equity. Theoretically, such an open process of policymaking can promote societal understanding, thereby releasing institutional tension. At the same time, negotiations among ministries, industries and local governments help to formulate common perceptions among regulators and regulated parties.

Now, the relevant meetings of the CEC are open to the public. At some stages of the policymaking process, the Council also holds public hearing meetings to explain the context of policy proposal and get comments of the public. It is a good instrument to consider public opinion in policymaking. The formations of the Basic Environmental Plan at the national level and 21rst Agenda of Kitakyushu at local level, for examples, followed this kind of new process with public participation.

3.1.3 Decentralization and the leading role by local governments

Decentralization entails the transfer of political, fiscal, and administrative powers to subnational units of government. In environmental governance, decentralization involves not only properly devolving governance powers and functions upon local governments but assigning resources to local governments as well. While devolving the policymaking mandate for local environmental affairs, responsibilities for local environmental quality, and functions for all policy implementation upon local governments, the national government needs providing financial aid, personnel training, policy know-how, and technological expertise to local government for institutional capacity building so that it matches local functions.

In Japan, the central government has all long provided local governments with considerable grant subsidies and bonds in environmental monitoring facilities, research and development of environmental technology, and local public works. It has greatly helped to raise local institutional capacities in environmental governance. But on the other side of a coin, the central government in turn has obtained a strong power to influence on local policy and initiatives although the local autonomy is applied. To release the contradictory, the solution is to increase local share in total tax revenues to a proper extent.

It is noteworthy that decentralization in environmental governance differs from in economic management. Economic activities can be to some extent managed by market forces to achieve an
optimal allocation of resources. In contrast, governmental intervenes in environmental management seem to be more important for the particular reasons of environmental problems caused by market failures and policy failures. Improper decentralization in environmental governance may worsen situation in the cases where the local capacities and the real motives of local governments for environmental conservation are low. In these cases, local governments are unable to take care local environmental affairs and may give the priority to local economic growth and consider less in environmental conservation by misusing the powers delegated from the national government. Therefore, decentralization of environmental governance is a long process and should be pursued gradually, keeping pace with the raising of both local capacities and interests of environmental management, and with the reforms in political and economic context.

However, it is worldwide recognized that local government has several causes to be a core actor in environmental governance. First, the national policy impossibly tailors to all regions inside country, particularly the country rich in the variations in geography and demography as well as culture. In comparison, local governments understand much more about their local problems and conditions. Hence it is easier for them to formulate policy and measure adaptable to local conditions. Second, local government is closer to citizens and knows much more about the real needs of local society. Local government is also a practical venue for participation of citizens, NGOs and civil society in any local affairs. Third, local government, directly managed by a governor, is a smaller administrative body with few sub-organs and simple operational rules in comparison with national government. As a result, the characteristics of higher managerial efficiency and lower coordination costs help local government make integration of environment and development.

Therefore in many respects local government can play the leading roles in environmental governance. Japanese local government units historically have all long played a pioneering and leading role in local environmental governance since as early as 1960s. First, Japanese local governments responded to industrial pollution control much earlier than the national government did before the 1970s. Second, many local governments adopted proactive measures like EIA before the national government issued relevant ordinance and law. Third, according to local conditions and capabilities, they have formulated local environmental regulations and standards, launched local unique activities like Eco-town project in Kitakyushu nowadays, and particularly inaugurated policy instruments like Pollution Control Agreement in the past. Finally, in comparison with the national government, Japanese local governments have done much more in considering environment in industrial development, urban planing, urban infrastructure construction and other sectoral policies.

The leading roles may be diverse depending on countries and local governments. But the critical is how to design rules to make local governments play a leading role, according to the national political-economic structures. In Japan, a kind of bottom-up oriented forces drives local government to be a core actor in environmental management (Box 2). In the case where those bottom-up forces are weak or absent, top-down constraints are needed. China, for example, has applied the system of quantitative review of environmental performances by cities since 1985, which has produced strong pushes to city government in improvement of urban environment.
From Japanese and Chinese experiences, the bottom-up and top-down approaches both may work in fostering the leading roles by local governments. From the point of view of managerial efficiency, however, bottom-up approach is more cost-effective. When public fully participates in local environmental policymaking and policy implementation as well as review of governmental environmental performance, environmental management will be governed by all stakeholders' interests and initiatives, and as a consequence, the costs of enforcing those top-down instruments will be avoided.

**Box 2 the bottom-up oriented factors to foster the leading roles by local governments in Japanese environmental governance (Yong Ren, 2000:84-83)**

First, as distinct from the national government, local governments deal directly with anti-pollution measures, and have to respond directly to victims' protests and citizens' complaints about environmental quality. Second, as the leaders are selected by the citizens based on local autonomy, they are obliged to be aware of trends in public awareness toward pollution. Third, local authorities' environmental departments negotiate directly with local industry to set their own standards and goals step by step. They are not, as at the national level, subject to influence from other bureaucratic sectors. Underlying these external grassroots reasons, of particular significance has bee the factor that good education, higher environmental awareness and knowledge, and political participation opportunities as well enable local citizens and civil societies to exert influence on local governments. Of course, Japanese local governors and their governments have their own interests and initiatives in local environmental improvement. They normally also have good capacities of monitoring and R&D of environmental technology, and employ staff with good technological expertise in pollution control.

3.1.4 Self-governance by business

Self-governance implies "quasi-voluntary compliance". The term of "quasi-voluntary compliance" is applied by Margaret Levi to describe the behavior of taxpayers in systems in which most taxpayers comply. Paying taxes is voluntary in the sense that individuals choose to comply in many situations in which they are not being directly coerced. On the other hand, it is quasi-voluntary because the non-compliant are subject to coercion if they are caught (Elinor Ostrom, 1997:94). Self-governance by business refers to that business conscientiously and actively exercises activities in environmental management under external constraints such as governmental regulations and social pressures against pollution, rather than passively does, which differs from voluntary actions. Hence the external constraints are critical to take the shape of self-governance in environmental management. According to Japan's experience, three levels of constraints are needed: governmental regulations, standards and agreements that are designed for businesses; in-plant environmental management systems; and social pressures such as anti-pollution protests, citizens' claims for damages caused by polluters, and public opinions against pollution (Box 3 and 4). Certainly Japanese unique corporate culture has contributed much to foster environmental performance by business (Box 5). In addition, Japan's experience also shows that industrial associations' roles should be paid attention in bridging government and
industries, in coordinating industries' initiatives, and in exchanging environmental technological expertise and experience (Box 6).

Whether the external constraints are able to shape the self-governance highly depends on the standards set in environmental laws and regulations and the extent of enforcement. In the period of Japanese industrial pollution control, the external regulations and their enforcement reached the extent to which the cost of not taking anti-pollution measures was higher than that of doing so. It was real reason why Japanese industries invested huge funds in industrial pollution control. Potential costs of not taking anti-pollution measures in Japan include suspension of business operations if effluent and noise standards are not met; cost of compensation for damages caused by pollution; decrease in product sales due to the lowered image of the enterprise. A study estimated that the costs of compensation to victims of SOx air pollution throughout Japan would be 6 times the costs of desulfurization and fuel conversion if these improvements had not taken place. It also showed in some cases that the benefit-cost ratio of taking preventive measures varied from 1.4 to 102 (World Bank, 1994:101).

After the battle against air pollution, in particular since the 1990s, many factors have helped raise the environmental consciousness and managerial capacity of Japanese business. The motives for environmental management by business have partly shifted to willingness from external constraints. Many Japanese businesses are treating environmental affairs as necessary elements for promoting profits, and they are trying to set up new business philosophies that can help to improve their enterprises' image or market shares based on their environmental performance. The environmental auditing system, life cycle assessment, and ISO 14000 series have been introduced in many Japanese companies. Of particular significance has been the Voluntary Action Plan on the Environment, published by Keidanren in 1997, the biggest and most powerful economic federation in Japan. Following Keidanren’s initiative, 32 industrial federations and associations also published their sectoral voluntary action plans (H. Imura, 1998).

Japanese experience reveals an evolutionary process in business environmental management from “quasi-voluntary compliance” to “voluntary action”. These two stages might be not overstepped to some extent, because those supportive conditions such as environmental awareness, capital capacity, and environmental friendly market competitions get available step by step. The pressing task for Asian developing countries at present, therefore, is first to take the shape of self-governance by business through designing external rules and strictly enforcing them. At the same time, Of course, voluntary actions could be encouraged in some business companies with the availability of supportive conditions. Actually voluntary actions by big business companies are increasing their presence in a number of Asian countries now. In South Korea, for example, the Samsung Electronics keeps pace with environmental performance of those leading companies in developed countries while South Korea still faces the problem of non-compliance with the environmental regulations by some small and medium enterprises. The Samsung Electronics declared the Samsung Green Management Charter in May 1996 and has launched voluntary actions inside and outside company, such as developing

—160—
environment-friendly products, sponsoring a clean-up campaign of the Han River and ecological studies of local communities (Samsung Electronics, Green Management Report, 1999).

**Box 3 Some surveys on the motives of Japanese industrial investment in pollution control**

(Source: Quality of the Environment in Japan, 1992:177)

According to a survey of the presidents of 100 major companies in Japan conducted by NHK, the majority admitted in 1970 that pollution couldn't be avoided. However, because of victims' protests, public opinion against pollution and strengthened governmental regulations in just two years later, about 60% of them changed their opinions, indicating that pollution prevention must be promoted even while sacrificing economic growth. Another survey of 3000 businesses in Tokyo showed those external factors such as enforcement of governmental regulations, guidance of governmental agencies, and claims from citizens were motives for more than 80% of those in question. And it was clear that external pressure was far more influential than 'willingness of businesses' in pollution prevention investment in the period of industrial pollution control.

**Box 4 In-plant environmental management systems in Japan** (Yong Ren, 2000:86)

Japan has introduced such systems in factories and business establishment as notification system for specified facilities, monitoring of factory operations, pollution related data keeping and reporting, responsibility systems and training, and assignment of engineers to be in charge of pollution control. Of particular significance has been the system of pollution control managers.

The Law for Development of Pollution Control Organization for Special Factories issued in 1971 stipulates that specified factories have primary responsibility for their own pollution control programs, and have to appoint a pollution control supervisor and a pollution control manager who have formal qualifications in pollution control. Pollution control managers are engineers in charge of the management and operation of specified facilities, data analysis and other technical matters. They are required by law to pass national examinations in order to acquire credentials. Today, over 65 percent of Japanese enterprises have a pollution control department. There are at present about 23,000 pollution control supervisors and 40,000 pollution control managers. They bear personal responsibility for in-plant control. In the case of serious or deliberate environmental non-compliance, they may even be arrested under the law. Accordingly they have a strong motivation to comply with discharge standards set by relevant laws or agreements. They are also motivated to perform in such a manner that benefits to the factory are maximized and the costs minimized, because they are themselves factory staff. They usually achieve this goal through close cooperation with process engineers. This situation facilitates the development and deployment of cleaner production technologies in industry.
Box 5 Japanese corporate culture and environmental performance (Yong Ren, 2000:87)

Japanese modern business forms actually originated from family-based companies. They feature a line-of-command or “do as ordered from the top” approach to management—-a kind of combination of the household concept with modern business management. It is also common for companies to make lofty pronouncements stressing that business success must be honestly won with the best interests of society in mind. Thus, when management so desires, environmental protection can be carried out effectively. At the middle level of Japanese companies, the firm level, it is the high capability of a technically skilled management, which has played a major role in the actual introduction and operation of pollution control equipment and facilities. The joint-stock company also is a popular form of Japanese business; it is a kind of common-interest-entity where there is mutual stock holding among companies. Each big corporation owns a partnership business network involving many small and medium-sized corporations in production connections. As a result of this kind of business network structure, the environmental behavior of big corporations can have far-reaching and strong implications for small and medium-sized firms.

Box 6 Japanese business associations and environmental cooperation (Yong Ren, 2000:88)

The decision-making structure in the private sector with regard to industrial pollution, as with other strategic issues, takes place at two levels: one at the individual enterprise level and the other at the industrial group level. Industrial associations once played a central role by agreeing on the environmental protection measures that their members should take. The economic risk to any particular firm of taking costly measures therefore was reduced, since all member firms agreed to take the same kind of pollution control measures. This arrangement which continues even today, ensures that investment in pollution control affects firm’s competitiveness more or less equally. Associations, as representative of industry, negotiate with national and local governments regarding policies that affect them, such as energy, regional development and pollution control measures. As a consequence, national and local policies are developed with a high degree of technical and economic feasibility. The associations are also used for training in the use of pollution control technology, exchange of experience, presentation of pollution control measures taken by local governments, and discussion of regulations. Kedanren, the biggest and top economic association in Japan, now is launching voluntary approach in environmental management of industries, on behalf of interests of industrial circle.

3.1.5 The roles of public and the formal rules to encourage public participation

Historically citizens and NGOs were widely recognized as one of the critical forces behind stimulating national and local governmental responses to industrial pollution in the 1960s and the early 1970s. After that time, the public roles in environmental governance and social capacity of NGOs in terms of membership were lower in Japan compared to those in European and American nations with more advanced mechanisms for public participation and effective NGO activity. Yet the
Japanese public role has been large when compared to other Asian developing nations. Particularly public participation has been getting increasingly active in Japan since it was institutionalized by the 1993 Basic Environmental Law in many respects of environmental governance.

From Japanese experience, the public, including citizens, media, NGOs, and any civil societies can play their roles in four respects of environmental management. These roles are participation in policymaking processes at both national and local levels; monitoring environmental performances by government and business; response to household wastes management; and changing lifestyle toward environmental friendly. For the later two respects, they greatly depend on the raising of environmental consciousness of the public and the environmental culture of the society. In comparison, the public roles in the first two respects need more encouragement by formal rules related, in which Japan has some good relevance to other Asian countries.

First, the system of environmental councils from Japanese national to local levels (once be called pollution control council before 1993) has all long provided institutionalized opportunities for representatives from academia, industries, and NGOs to participate in environmental policymaking. The 1993 Basic Environmental Law makes policymaking process open to ordinary citizens by public hearing meetings (reference to Box 1). The 1997 Environment Impact Assessment (EIA) Law also specifies the procedure for local residents to express opinions in EIA process of projects that will exert influence on local community.

Second, for monitoring environmental performances by government and business, Japanese citizens to some extent share political opportunities such as local governor election to voice. As compared to some economic and social issues, environmental affairs, themselves often can not significantly change political and governmental agendas before their importance is well recognized by politicians and officials. But environmental concerns will shock or pressure politicians and governments when they are voiced through political participation. Pollution-related victims and citizens in Japan, for example, changed local political structure and the attitudes of some local governments toward industrial pollution through direct elections for local governors in the 1960s. Even today this mechanism still takes effects on local governmental initiatives in Japanese local environmental management. In addition, the Japanese media has been all long as a venue for public to voice, and an agent to help or push governments and polluter to take actions in environmental protection, as well as a tool to inform and educate the public.

Third, Japanese experience shows that environmental dispute resolution and compensation systems can encourage citizens to participate in environmental management. The citizens' fight for their causes in environmental disputes actually is a process of public participation. The reason for the citizens' fight is because they suffer from pollution and environmental degradation and attempt to get compensation for the health damages or property losses from the polluters. This motivation and process essentially provide material incentives to the public to monitor polluters and regulators.

Of course, these rules just provide institutionalized guarantees for public participation in environmental governance, the actual roles of the public also depend on their qualities such as
environmental awareness and knowledge, participation abilities, interests in politics, and actual demands for clean environment. All these factors closely relate to citizens' incomes and general education levels. In all respects, Japanese citizens are capable of making use of those institutionalized opportunities for participation in environmental governance compared to citizens in Asian developing countries. In addition to setting the formal rules to encourage the public participation, therefore, environmental education should be intensified and targeted as long-term task in Asian developing countries.

3.2 How to deal with the dilemma of growth and environment: some successful and failure stories from Japan

3.2.1 Paying higher cost for "growth first, then clean up"

Regarding economic evaluation of Japan's late responses to air pollution, the Committee on Japan's Experience in the Battle against Air Pollution (CJEBAP) drew some lessons based on economic model in 1997.

(1) The committee simulated the relationship between health-related damages per health victim and GDP per capita, based on Japan's actual data of compensation for victims caused by SOx pollution. Japan's actual compensation data show approximately 0.1 person of the number of victims caused by per ton of sulfur dioxide (CJEBAP, 1997:85). Supposing that the turning point of Japanese Kuznets curve of SO2 is at around 9000 US$ (in 1990 price)—close to GDP per capita in 1967, also a peak of SO2 concentration in Japan (Sh. Matsuoka, etc., 1998:349-362; T. Sugiyarna, 1997), the damages to per victim caused by SO2 in 1967 was around 1800 US$, 20 per cent of GDP per capita in damaged areas at that time.

(2) In Japan, the investment peak for SO2 abatement facilities was in 1975, and prominent investment for heavy oil desulfurization started in 1966 (CJEBAP, 1997:78). Given these two timings as the base years, the economic model indicates that the economically rational timing for investment in flue-gas desulfurization would have been approximately 8 years earlier than the actual case—around 1967, and for sulfur reduction in fuel, 4 years earlier—around 1962.

(3) Owing to the late responses to SO2 control, the actual damages to the victims plus the actual investment in pollution control was several times costs at the optimal timing. Moreover, the situation would have been more worsen if the response timing had been delayed several year later (Fig.2 and 3). It is noteworthy to say that the accumulated damages to the health and to production as well as other pollutants were not considered in the model. Either the damage to environment that can not be reversed was neglected here. Hence the actual price for late response to industrial pollution in Japan must be much higher than this estimation.
3.2.2 Win-Win Story I: The boom of environmental industry

In Japan, huge investment in pollution control has created big market demands for relevant facilities, and thereby it has fostered a rapid R&D of environmental technology. The production of air pollution control devices in Japan varies depending on the investment in air pollution control. It started to dramatically rise in the late 1960s, and peaked at about 550 billion yen at the mid-1970s, then dropped down and stabilized at 140-160 billion yen annually in the 1980s, but in 1990s, increased again by a double. In the period from 1966 to 1995, the production in air pollution control devices amounted to 6.6 trillion yen, 46.7 US$ in 1990 price and exchange ratio (1 $=141.52 yen) (CJEBA,
Since the 1980s when Japanese emphasis of environmental management shifted to household effluent control, the production of water treatment facilities started to domain environmental industry. The annual production increased to 310-370 billion yen in 1980s, and doubled in the 1990s. At the same period of the 1990s, the production of garbage disposal facilities was up to 600 billion yen (Fig. 4).

At present, the total annual production of facilities related to environmental pollution control is about 1.6 trillion yen in current market price, 0.3% of GNP and 0.8% of annual industrial value-added (Fig. 5). In other words, the 100 yen of environmental investment in Japan now would directly produce at least 15 yen of economic outcomes supposing the total environmental investment of Japan accounted for about 2% of GNP at present. Considering the value of services for pollution control and the incentives of environmental investment to general technological innovations, the direct economic outcomes would be much higher than this figure. Hence for some companies that are engaged in production of environmental facilities related, environmental pollution control is rather a business opportunity to obtain profits than a financial burden on business performance.

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Fig. 4 Environmental Facilities Production Value

![Graph showing environmental facilities production value over time.]

Source: Federation of Machinery Industry of Japan

Fig. 5 Shares of Environmental Facilities Production to GNP and the Industrial Value-added

![Graph showing shares of environmental facilities production to GNP over time.]

Source: Federation of Machinery Industry of Japan
3.2.3 Win-Win Story II: Japan’s automobile industry

Japan issued automobile exhaust regulations in 1972, following upon the Clean Air Act Amendment of USA in 1970. At the beginning, strong oppositions from automobile industry and hot debates about whether or not the technology at that time was possible to support for achieving the stringent standards took place. After scientific investigation concluded as positive answers, Japanese government made up its mind to implement the regulations. Finally, Japanese automobile industry succeeded in solving the problem of cleaning up automobile exhaust in 1978 despite of two years later than the deadline set in the regulations. At the same, engine's performance of Japanese cars was much improved in the battle against exhaust pollution, and thereby leading to the automobile industry a powerful boost in international competition at the same period. The advance of Japanese cars into American and other overseas market thereafter moved much faster (K. Ueta, 1993:41) (Fig. 6).

![Fig. 6 The Share of Exported Passenger cars of Japan and USA to the Major Countries](image)

By contraries, the same story in America—the hometown of relevant regulations was displayed quite differently. Because American study at that time indicated that attaining the standards would involve technological difficulties, government put the deadline of meeting standards by five years later in the consideration of protection American automobile industry. Ironically, however, this attempt to provide protection had the opposite effect. The postponement allowed American manufactures to continue producing dirty vehicles that emitted great quantities of pollutants, which contributed to some extent to a relative decline in the competitiveness of American cars (K. Ueta, 1993:41). As to the dialectics of environmental regulation and technology innovation, to date the academia has not come to convincing conclusions yet. But as the contrast of the experiences of Japanese and American automobile industries makes clear, there are at least some cases where a compelling need for stricter controls will generate demand for new technologies, accelerate the speed of inventions, and ultimately make an industry more powerful.

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As in the case of production technologies, necessity is the mother of invention, and social needs drive anti-pollution expertise forward (K. Ueta, 1993:42). The 1977 OECD report on Environmental Policies in Japan gives the similar comments from another angle: “The Japanese experience in the field of pollution abatement lends support to the idea that to a large extent it is not technology that should constrain policy choice, but policy choices that should constrain technology.”

Such a win-win story of the Japanese automobile industry lends developing countries an inconclusive but charming implication—how to properly use environmental regulations to foster technological innovation and the shifting of industrial patterns from mass resource consumption and heavy pollution to high efficiency and less burdens on environment.

3.2.4 Impacts of environmental investment on national economy

From long-term and macro perspectives, environmental investment can promote social and economic development, which has been clearly illustrated by the theories of sustainable development. From short-term perspective, however, their relationship often varies case by case, and a care should be taken in examination of the effects of environmental investment on economic growth. Generally, one effect of environmental investment is to reduce accumulation of production capital, meanwhile increase production costs and product prices, and subsequently depress the social demands. On the other hand, environmental investment creates new industry like environmental facility manufacturing and related service sectors, provides incentives to innovation of production technology, and thereby produces new opportunities of employment and increases social demands. The real effect of environmental investment on national economy relies on the balance of these two effects of negative and positive. The results of several surveys conducted by OECD show that the net job creation effect of environmental investment is either positive or, at the very least, neutral over the short time (Quality of the Environment in Japan, 1994:164). Environment Agency of Japan argued in its 1994 White Book: “Just as the period of high economic growth achieved by concentrated investments, when the peak in pollution prevention investments coincided with the recession following the oil crisis, these investments reinvigorated slumping demand and supported capital investment and employment to a certain extent.”

Based on an econometrics model, Environment Agency of Japan further quantitatively analyzed both negative and positive effects of pollution control investment in the period from 1965 to 1975 when investment was concentrated. The cumulative sum of pollution control investment by the private sector was about 5,300 billion yen (in 1970 price) in this period. As a result, real facility investment of the private sector increased by about 7.4% in 1975 compared to the case without any pollution prevention measures; real personal consumption increased by about 0.4%; and real GNP increased by about 0.9%. On the other hand, real ordinary overseas surplus decreased by about 300 billion yen (in 1970 price). The consumer price index that was at a level of 170.4 in 1980 (1975=100) increased by about 1.2% as the effect of pollution control investment. And the whole sale price index that was at a level of 154.2 in 1975 (1970=100) increased by about 1.7% (Quality of the Environment in Japan,
1992:199). The conclusion is that there was no severe negative impact on the whole national economy in the past process of high economy growth although economic impacts by pollution control investment are different by industry sectors. The experiences of other countries are also similar as OECD points out that “the impact of pollution prevention investment against national economy is neutral or negligible (Quality of the Environment in Japan, 1992:199).”

3.2.5 Financial impacts of environmental investment on business

The financial impacts of carrying out pollution control vary considerably by industries. In the mid-1970s, the costs of pollution control were very high for certain industry groups. It had at that time a considerable impact on their profitability. Thus company profits in the textile and steel industries were reduced in years of peak pollution control investment by over 90%, while for non-steel metals, substantial losses were incurred as a result of such investment. Subsequently, however, the impact of pollution control expenditures on production costs and profits is shown to have declined sharply, eventually becoming insignificant (Quality of the Environment in Japan, 1992:181).

The degree of impact of pollution prevention costs on business performance also differs by business sizes. The smaller the size, the larger the negative impacts. With larger businesses, the absorption power of the pollution prevention costs is larger so that the impact is not prominent. The actual situations in 9 electric power companies in Japan—large size companies, for example, show that improvement in business operation could help to absorb the pollution prevention costs. It included rationalization process of production, offering of value-added services, transfer of the cost to prices, and performance improvement of pollution abatement facility (Quality of the Environment in Japan, 1992:182). As result, for large-size companies with large amounts of management resources and many other choices, the initially anticipated financial burden did not take place in Japan. This experience implicates that integration of pollution control and improvement of industrial production can minimize the financial risk of environmental investment.

Nevertheless, in the cases where the financial impacts of pollution control are prominent on some industrial groups and small and medium size enterprises, government should provide some preferential policies to remain their competitiveness in the market. The preferential policies may consider those respects related to subsidies, tax breaks, financial aid like low-interest loans, and even price intervention. Japan has succeeded in development of such measures to help industries reduce the financial risks of pollution control investment, in particular the financing mechanism for small and medium enterprises in installation of anti-pollution facilities.

3.2.6 Effects of industrial structure shifts and technological improvements on environment

Japan’s economy has experienced three stages postwar in terms of industrial structures: economic recovery period (1945-50) dominated by light-industry-and-agriculture; heavy and chemical
industrialization (1951-70)—causing violent industrial pollution; transition to knowledge-based industry since the 1970s (Yong Ren, 2000:160).

Fig. 7 Changes in Energy Efficiency and Sulfur Dioxide Emission

![Graph showing changes in energy efficiency and sulfur dioxide emission over time.]

Sources: the World Bank Development indicators 1998; Li Zhidong, 1999

In this shifting process, production technology improvement always has been a leading force to drive economy forward. On the other hand, energy and resource conservation has made Japan's economic growth with the world best efficiency of energy and resource consumption. Against 1975, energy consumption per unit of GDP in Japan reduced by 30 per cent in 1991 (Fig.7, 8). As a result, the sulfur dioxide emission per unit of GDP, for example, roared down by around 88 per cent in the late 1970s against the peak in the mid-1960s (Fig. 7). For industrial water use in Japan, the recycled water usage in the total volume of fresh water consumption shows that 36.2% in 1965 dramatically increased to 75.7% in the 1990s (Fig. 9).

Fig. 8 Fuel Components in Japan

![Graph showing fuel components in Japan over time.]

Data source: the World Development Indicators 1988
3.2.7 Contributions of source and process measures to pollutant reduction in Japan

Among the contributions of measures to reduce SOx in Japan, the upgrading of industrial structures shared 17% since the mid-1980, and in 1996 this share increased to 20%; energy conservation measures, normally, 18-24%; fuel shifts (including desulfurization of fuel), 37%-52%. In the other words, the abatement by flue-gas desulfurization accounted for about 30% in the early 1970s, and then its shares dropped to around 12% at present (Fig. 10). Likewise, in the reduction of COD of pulp and paper industry in Japan, those measures at the source and process contributed as high as 84%, whereas effluent water treatment—a measure at the end-of-pipe, just abated about 16% (Fig. 11).
3.3 How to structure the national environmental policy: The Case of China

Generally, the package of Japanese environmental policies sees 7 policy categories. It includes basic policy; administrative organization-building; special policy against diverse environmental pollution and for natural conservation; environmental social policy like environmental dispute resolution and compensation; financing and technology R&D; integration of environment and development; and global environmental issues. Within each category, several relevant laws are employed. Since the 1967 Basic Law of Environmental Pollution Control, Japan's environmental management has installed around a hundred environmental laws. Some laws have been amended or abandoned with the varying environmental problems and applied conditions. The past experience in Japan suggests that all these seven categories of environmental policy be necessary or even extremely important for a holistic environmental management. In contrast, in some respects environmental policy in many Asian developing countries is normally of shortage to some extent, and particularly the later four policy categories found in Japan’s package above are weak or not in place.

Taking China as an example, six environmental laws, in combination with a considerable number of administrative systems, are main components of Chinese package of environmental policy. In many cases, low standards set in environmental regulations and loose enforcement make policy effectiveness poor. Too many administrative systems that normally need much managerial resources in implementation, on the other hand, make policy efficiency low.

3.3.1 Basic environmental policy

Environmental Protection Law in China, which was stipulated in 1979 for trial implementation and in 1989 as a formal implementation, is treated as the guideline of basic environmental policy. But its articles mostly concentrate on industrial pollution, and less on natural conservation and some other environmental pollution like household effluents and problems caused by urbanization. The roles and
responsibilities of the national government, local governments, and in particular actors outside governments such as business, citizens, and civil societies are not very specified in detail either. On the other hand, some articles in the Law are generalized as the principles, whereas others are specified as concrete measures, leading to the confusions of basic law and special law in terms of legislative techniques. Moreover, the philosophy of the Law holds the principle of coordinating economic development and environmental protection, rather than the theory of sustainable development. In practice it easily results in the situation of giving the priority of decision-making to economic growth although the Law interprets the principle as considering environment conservation in the development. Most of the weaknesses in Chinese Environmental Protection Law took place because of variations in environmental problems over time and renewals in philosophies and strategies for environmental protection domestically and internationally after the enactment of the Law. Renewing basic environmental policy, therefore, becomes a critical element to develop Chinese environmental policy nowadays.

3.3.2 Environmental dispute resolution and compensation

To date, only Japan, Korean and Taiwan see law related to environmental dispute resolution and compensation. Their experiences suggest that adopting rather administrative procedures than only judicial ones to resolve environmental disputes could bring about several positive effects on environmental management. First, it provides a practical, easy and immediate way for citizens to protect their environmental rights and interests. In normal judicial procedures, it takes time to obtain evidences of damages caused by pollution and needs specific expertise to scientifically identify the exact relationships between damages and pollution. Hence this approach is often costly and less operational, and sometimes even impossible for citizens to protect their interests deprived by polluters. In contrast, the special policy for environmental dispute resolution and compensation that has been adopted in Japan can timely minimize and mitigate social conflicts caused by environmental problems, and provide immediate relief fund to the victims by compensation system. Second, through dealing with a considerable number of environmental dispute cases, administration can obtain information about both environmental problems themselves and environmental performance by government and business. Normally such information could be captured only by employment of inspectors, monitoring facilities and other resources. Finally, through environmental dispute resolution and compensation mechanisms, citizens can protect the rights that they enjoy a good environment and obtain the compensation for damages by polluters. The policy therefore provides material incentives to citizens to monitor environmental problems and environmental performance by government and business. In other words, in many respects policy for environmental dispute resolution and compensation actually helps to expand the governance capacity of environmental administration.

China installs the public reporting system in environmental administrative bodies at all levels. Everyone can express his or her opinions, suggestions, and complaints about environmental affairs by
writing, visiting or phone. This system, in conjunction with normal judicial procedure, acts as a main channel of resolution for environmental disputes. On an average, governments at all levels in China annually receive about a hundred thousands letters and 60 thousands visitors mostly with the purposes of environmental disputes resolution. Among all these cases of disputes, only one percentage is filed at court and the most is mediated by relevant administrative bodies. However, the current system does not see special legal basis, and compensation for damages caused by polluters doesn’t see clear and detailed regulations either. Moreover, the capabilities employed in this system are generally low, and the network of dispute resolution has not popularized all over the country, particularly at county level. On the other hand, in comparison with environmental situation the actual dispute cases should be much higher than the number reported through the current system. This situation results from not only low environmental awareness and knowledge of citizens but week system of environmental dispute resolution as well. Consequently China loses considerable potential benefits from the policy for environmental dispute resolution and compensation as compared to Japan. Moreover, with the raising of public awareness of environment, the demand for such policy will rapidly increase. To enact relevant law concerning environmental dispute resolution and compensation and to improve current system becomes another pressing issue of environmental policy development in China.

3.3.3 Integration of development and environment

Japan’s experience shows that those measures at the sources and in the processes of economic activities are critical to prevent and minimize environmental pollution. The integration of environment and development is a win-win choice of preventing environmental pollution while promoting economic growth. The strategic ideas about integration of development and environment now are visible in most of Chinese top strategies, guidelines, policies and plans. However, they are generally not, at least insufficiently incorporated into sectoral policies and local policies, leading to ineffectiveness in practice. Consideration of environment protection into sectoral policies, such as energy, industrial location and structure, clean production technology, transportation, and urban infrastructure construction, must be particularly addressed now on Chinese environmental policy agenda in the period of fast economic growth. Otherwise China can not be away from the situation of taking cost-ineffectively remedy approach to abate pollution that already occurred as a consequence of growth, which most developed countries once experienced.

3.3.4 Sanctions on non-compliance with environmental laws and regulations

As Margaret Levi describes the behavior of taxpayers in tax systems in which most taxpayers comply, he argues that it is quasi-voluntary compliance because the non-compliance are subject to coercion if they are caught, and in other words, coercion is an essential condition to achieve quasi-voluntary compliance (Elinor Ostrom 1997:95). Hence sanctions to non-compliance are basic components of national package of environmental policy or within specific policy instruments when voluntary actions do not become a prevailing approach in environmental management. Japan’s environmental
laws easily see the context of stiff penalty on non-compliance. 1970 stipulated the Law concerning Punishment on Criminal Causing Damages to Health by Pollution in Japan. Under the Law for Development of Pollution Control Organization for Special Factories, enacted in 1971, pollution control managers in factories may even be arrested in the case of serious or deliberate environmental non-compliance. Generally, for those factories that violate environmental emission standards, administrative penalty and criminal sanction can be imposed in Japan. Administrative penalty includes administrative advice and order, which require non-compliance to stop violation. Criminal sanctions can be applied at the same time when administrative penalty is in place or in the case where the penalty measure fails to stop the violation. Although the criminal sanctions have been seldom applied in reality, the relevant rules are available.

In contrast, the sanctions on non-compliance with environmental laws and regulations are generally weak in China. The first measure widely applied is to impose fine normally incorporated in pollution fee on those who emission is over national standards. Because the fine rate and the pollution charge rate are normally low, many factories like to pay the fine and charge, rather than install facilities to prevent and abate pollutant. For those heavy polluters, governmental order of “setting deadline to cure pollution” can be applied. In the case when plant heavily pollutes environment but has not abilities and initiatives to control the pollution, government can also suspend the relevant production facilities or close the plant. Since 1997, China government has closed about seventy thousands small enterprises with heavy pollution and poor business profits. But this has been done according to a special ordinance of the State Council, not to regular rules embodied in relevant environmental laws and regulations. For criminal sanction, it could be imposed only in the case where the severe damages to health and properties take place, after articles related to environmental criminal were added in the Amendment of Penal Code of PR. China in 1997. But the judicial system is generally with low initiatives and capacities to resolve environmental criminal related. The totally mild sanctions on non-compliance, therefore, constitute one of reasons why enforcement of environmental laws and regulations is often loose in China.

3.4 How to finance environmental pollution control

3.4.1 the dialectics of regulation, investment and technology in Japanese environmental management

Environmental regulations, investment, and technology are often perceived as three fundamental elements in environmental management. In dealing with the relationships of these elements, Japan has developed a model with both successful mainstream and weakness. The model has four characteristics. First, stringent environmental regulations and strict enforcement as well force industries to bear higher costs for not taking anti-pollution measures than those of doing so. Consequently, industries have to invest hugely in pollution control. Second, while investing large funds in environmental infrastructural construction, Japanese government has established effective financing institutions targeted for industries. Hence third, huge investments have created market demands for environmental technology, and the demands thereby have provided incentives to the
booming of environmental technology and the innovation of some production technologies. And finally, as a result, huge environmental investment has not exerted an obviously negative influence on short-term national economy while greatly improving environmental quality, instead fostering the sustainable development of socio-economy. A 1994 OECD report described successful environmental performance of Japan as follows (OCED, 1994:95):

"During the last two decades, Japan had the largest economic growth among G7 countries, while substantially reducing emissions of a number of pollutants, notably air pollutants, and containing the growth of others. For instance, while GDP increased by 122 per cent, SO2 emissions decreased by 82 per cent and NOx emissions by 21 percent, the best performance among OECD countries. Such "decoupling" is a necessary condition for moving economic growth towards sustainable development."

In contrast, environmental investment is widely recognized as "bottleneck" of environmental management in developing countries. The bottleneck is attributed to not only small economic power but also disappearance of mutual promotion between environmental regulations, investment, and technology as seen in Japan. In other words, it is true and also critical that insufficient financial capacity in developing countries becomes a main constraint to raise environmental investment. But some other factors outside economic power also exert a great influence on environmental investment. Both policymakers and industries in many cases, for example, overestimate the conflicts between environmental investment and economic growth, and worry about that huge investment in environment would heavily affect economic growth. The misunderstandings, in conjunction with loose enforcement of environmental regulations often lead to less initiative by industries and even by government in environment investment. Moreover, a full use is not made of the existing potentials of funds due to ineffective financing mechanisms, and outdated managerial manners and poor technical capacities lower the efficiency of fund, on the other hand.

3.4.2 Japan’s environmental investment structures

- By sources

Financial sources for Japanese environmental investment include national government, national financial institutions, local governments, and industries. In principle, governments are responsible for investment in constructing environmental infrastructure; industries have to share a part of costs for public pollution control works while completely bearing all expenditures on in-plant anti-pollution; and national financial institutions are requested to provide low-interest loans to industries for installation of anti-pollution facilities.

(1) In Japan, local governments implement and manage most of environmental infrastructure projects including sewage, solid waste, and human waste. And also most of funds for these projects are from local governments. In 1991, local governments’ funds shared more than 60 per
cent of all expenditures on environmental infrastructures. In this share, local governments’ own funds covered about 20 per cent; national government and commercial banks lent loans to local governments from 20 to 30 per cent, respectively. In addition, national government provides local governments with direct subsidies, which normally covers 20-30 per cent of the total costs of the projects (World Bank, 1994:80).

(2) Based on “polluter pays principle (PPP)”, Japanese enterprise bears all costs of its own anti-pollution activities in plant. Among the 1991 investment in industrial pollution control, enterprises’ funds plus loans from commercial banks accounted for 71 percentage; national government affiliated financial institutions and local governments provided 28 percentage in low-interest loans; and local governments granted 1 percentage in subsidies (World Bank, 1994:80).

In addition, the Law Concerning Enterprises' Bearing of the Cost of Public Pollution Control Works, issued in 1971, calls for enterprises to share costs for environmental pollution prevention projects, depending on the degrees of the causes, as those project are necessitated due to the business performance of enterprises. As of the end of March 1993, enterprises shared 46.8% of all costs of 99 such projects, to which the Law had been applied (Quality of Environment in Japan, 1994:445).

(3) Nowadays most of the total expense on Japanese environmental protection is afforded by national and local governments, 87 percentage in 1991, for example (World Bank, 1994:80). This situation partly resulted from the shifts of investment areas from industrial pollution control that was generally resolved in the 1970s to lifestyle effluent control.

☐ By areas applied

Japanese government began to center its environmental budget on environmental infrastructural construction in the 1980s, as the emphasis of environmental management shifted to urban environmental problems from industrial pollution. In the 1990s, investments in environmental infrastructural construction have accounted for 83% of environmental budgets of the central government, and the share of natural conservation related, 11 percentage. In the expenditures on environmental infrastructures, the share of sewage piping plus sewage treatment projects took up 70 per cent, and the shares of noise prevention, domestic garbage disposal, and piping system in rural areas, about 8 percent, respectively.

Moreover, the share of environmental infrastructural investment to the total environmental budget of local governments reached up to about 90 percent and more. Only for sewage treatment, for example, this ratio was as high as 70 per cent, and the share of domestic garbage disposal, from 12 to 18 per cent. Totally, the costs of environmental infrastructural construction were about sevenfold, and even expenditures on sewage piping and treatment were as high as fivefold, against those of industrial pollution control in Japan.
In a summary, Japan's experience clearly implicates that the costly areas of environmental pollution control are the abatements of lifestyle effluents and other urban environmental pollution, rather than industrial pollution control. By comparison, many Asian developing countries have been busy in coping with industrial pollution control, and initiated their agendas to attack sewage and garbage very recently. In other words, the real costly areas are just emerging in the agendas of many Asian developing countries, but not as a center yet. The large population, rapid urbanization driven by fast industrialization, and the serious shortages of urban infrastructures have brought about a great pressure on and will further worsen urban environment. Hence huge investment in urban environmental infrastructure becomes the most pressing issue to them.

On the other hand, Asian developing countries now are simultaneously facing many environmental problems at low-income stage that developed countries have resolved gradually at different stages. It is impossible for them to follow the government monopoly of investment in environmental infrastructure construction like Japan. Even in Japan, the shortcomings of governmental monopoly model are reconsidered in terms of big financial burdens on governments and poor efficiency in operations. For Asian developing countries, therefore, they have to develop the joint-effort model of government and private sectors, namely create public-and-private partnership. At present, the partnership basically means that the management of environmental infrastructures should be market-based, and at the same time, government should provide incentives to private sectors to invest in environmental infrastructure construction. Policy interventions including preferential taxes, monetary policy, governmental subsidies, user charges, and even preferential instruments for entrance to stock market are critical incentives to private sectors' interest in environmental infrastructure construction. In other words, private sectors would have initiatives in environmental investment only when governmental policies create a relevant market where they can make profits.

3.4.3 Financial aid mechanism of Japan for industrial pollution control

Japanese financial aid to enterprises in pollution control includes three types: low-interest loans lent by the national government affiliated financial institutions, governmental preferential taxes, and governmental direct subsidies. Direct subsidies from governments to industrial pollution control are small, and most of aid is attributed to preferential taxes and low-interest loans. In terms of present values of net benefits to firms in 1991, the direct subsidies accounted for 1.2% of the total industrial investment in pollution control, the exemptions of taxes, 8.4%, and low-interest loans, 1.8% (World Bank, 1994:79). It should be noteworthy, however, that the absolute amount of funds lent by government in low-interest loans and its ratio to the total industrial investment in pollution control are high enough although its present values of net benefits seems not to be prominent. These loans played an extremely role in resolving the financial difficulties Japanese enterprises, particularly those small and medium sized enterprises, once faced in pollution control.

In Japan, government affiliated financial organizations that lend low-interest loans to enterprises for pollution control include Japan Development Bank mainly targeted for big sized enterprises, Japan
Environment Corporation (JEC) specifically designed for small and medium sized enterprises, Small and Medium Enterprise Finance Corporation, and People's Finance Corporation. Normally, the interest rate of loans provided by these institutions is 1-2% lower than the rate by commercial banks. In 1975-a peak year of investment, the maximum amount of loans might be granted up to 50%-80% of the total investment of the applied project (Quality of the Environment in Japan, 1992:185). In the period from 1975 to 1985, the low interest loans lent by all government affiliated financial institutions had taken up a very high portion of the total industrial investment in pollution control, 40% at the maximum (Fig. 12). In addition, these institutions, JEC in particular, are not only funds lending organs but also consultative organs in both environment and production technologies.

Among those Japanese financial institutions that provide funds to industries in pollution, of particular significance has been the JEC specially established for small and medium sized enterprises. The JEC was first established as the Pollution Control Service Corporation in 1965 in accordance with the relevant Law and reorganized twice in structure and functions based on the amendments of the relevant Laws. JEC has a mandate to conduct activities such as construction and transfer program, loan program and global environment program. In the actual operation process, JEC is an executive body for relevant activities, the Ministry of Finance is in charge of general administration of funds, and the Environment Agency is involved in the whole management and has a mandate to monitor the operations. The JEC funds come from two sources: the general financial budget of the central government, and public funds like pension and post deposits. The general financial budget affords the operation costs of JEC, subsidies for construction of facilities at national and quasi-national parks, and interest payment caused by low-interest loans of JEC as against commercial bank. The public funds is available for JEC to conduct transfer program and lend low-interest loans to individuals and enterprises.

Fig 12 Low-interest Loans for Industrial Pollution Control

![Graph showing low-interest loans for industrial pollution control](image)

- ■ the amount of low-interest loans by JEC (billion Yen)
- - - Ratio of low-interest loans by JEC to the total investment in pollution control by private sectors (%)
- - - Ratio of the total low-interest loans to the total pollution control investment by private sectors (%)

Data source: JEC, 1999
Figure 12 shows that the amount of low-interest loans lent by JEC is 15%-25% of the total pollution control investments by private sectors. Lacking the data of investment by small and medium sized industries in pollution control, hence it is difficult to estimate the actual contribution made by JEC to the financial supports for those industries. Certainly it must be higher the figures of 15%-25%, according to the fact that JEC allowed the maximum amount of loans to be 80% of investment of pollution control project in the past. In addition, a survey shows that the cumulative investment by small and medium industries in pollution control accounted for around 27% of the total by all industries in the period from 1986 to 1991 (Fujikara Riyo, 1999:1413). Based on this result, it is estimated that JEC once provided available funds at least about 50% of pollution control investment by small and medium industries, playing a critical role in releasing the financial difficulties of those industries.

To pay interest gaps caused by low-interest loans against commercial ones, Japanese government annually has spent 2.0-2.8 billion yen since the 1980s, and plus the operation costs of JEC, the total budget from the central government to JEC was annually around 4 billion yen. It accounted for 3% of the total annual environment budget of the central government, not high in comparison with its contributions to industrial pollution control.

Japan’s financial aid model suggests that special and centralized institutions be very much necessary to help industries attack the difficulty of fund in environmental pollution control. Such institutions can raise funds and provide financial aid to industries through a full use of public funds and governmental environmental budget. On the other hand, they can also give incentives to industries for raising efficiency through loan-lending approach—a quasi-market mechanism, unlike governmental grant. Moreover, such institutions may act as consultative organs of environmental technology for industries at the same time. In contrast, fund shortages and technological capacities in industries and small and medium-sized industries particular are a particular bottleneck of installation pollution control facilities in Asian developing countries. In this sense, Japan’s experience has a good relevance to Asian developing countries. In fact, the experiences of the Environmental Fund in Thailand and the Special Environment Account in Korea have also proved the positive roles of special and centralized institutions in financing environmental conservation.

4. Summary

The Japanese experiences of remedy control of industrial pollution in the 1970s offer a strategic hypothesis. Modern environmental management needs a holistic thinking and integrated strategies. Environmental management toward sustainable development should be perceived as an integration of three managerial approaches or dimensions—managing social and economic, as well as environmental changes. Managing environmental changes is the conventional approach to abate pollution and mitigate ecological damages caused by human activities. Managing social and economic approaches refer to control the interactions between socioeconomic activities and environment, and minimize burdens of socioeconomic activities on environment, thereby reducing the pressures on
managing environmental changes. Managing social approach aims at setting formal rules for all actors' roles they ought to play and their partnerships, structuring environmental administration, and building capacities of environmental governance, as well as creating social norms and cultural values toward environmental friendly. The solutions to managing economic approach include integration of environment and development, economic institutional reforms such as correcting price system and defining property right for internalization of externalities of diseconomy, and technology improvement for the raising of eco-efficiency as well. The three approaches should be seen as complements; one without other can not work effectively and efficiently.

In the concrete, Japanese successes and failures in environmental management provide strategic implications for other Asian countries in four respects. They are how to build cooperative approaches between actors in environmental governance; how to deal with the dilemma of economy and environment; how to structure the national environmental policy; and how to finance environmental management.

How to build cooperative approaches between actors to environmental governance

Before voluntary action becomes prevailing, the formation of collective and cooperative actions by all stakeholders in environmental management needs constraints of both formal and informal rules. The rules should clearly define the roles of and relationships among all actors including national government, local governments, businesses, citizens, NGOs and other civil societies.

In the case where local institutional capability is available, national government should try to be a slim and decentralized regulator in environmental governance and devolve some policymaking authorities and most of executive functions of policy upon local governments. For environmental administrative structures, power-sharing like Japan or power-centralized like Korea, each has its own advantages and disadvantages. But the principle for structuring administration is to make a full use of managerial resources while avoiding high costs for coordination. For any kinds of administrative structure, consensus-building in policymaking is the most critical to form collective and cooperative actions between all actors.

The keys to consensus-building in policymaking are to open decision-making process to all administrative sectors related, local governments, and ordinary citizens as well as civil societies, and provide institutionalized opportunities for them to voice. The Central Environment Council and relevant local councils in Japan are good instruments for consensus-building. However, the consensus-building often involves higher costs of policymaking in terms of time and resources taken for achieving agreements among multiple actors. Hence Asian developing countries should advocate the consensus-building approach, but also should properly adopt the elite approach in policymaking for those environmental problems that need taking proactive measures, and in the case where the environmental awareness and the motives of environmental conservation are low.

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Three group factors determine the leading roles by local government in environmental governance. First, the national government should properly devolve authorities and powers upon local governments. Second, the national government should help raise local institutional capacities to match local functions, including man resources, policy know-how, technical expertise, and financial power particular. Third, the critical is to design driving forces of both bottom-up and top-down oriented to local government, according to the national political-economic regime. The bottom-up driving forces in Japan include local autonomy system, social opinions against pollution, and the opportunities for citizens' participation in local affairs such as local governor election particular.

Japan's experience suggests that the external constraints at three levels, including governmental regulations, standards, and agreements between governments and business, in-plant environmental management systems, and social pressures against pollution could shape the self-governance by business. The formation of the self-governance heavily depends on stringent standards set in laws and regulations and strict enforcement. Environmental awareness and general social norms as well as corporate culture also exert a significant influence on the development of self-governance. Japanese experience also reveals an evolutionary process in business environmental management from self-governance ("quasi-voluntary compliance") to voluntary action. These two stages might be not overstepped to some extent, because of gradual mature in supporting conditions such as environmental awareness, capital capacity, and environmental friendly market competitions. The pressing task for Asian developing countries at present is to design external rules and strictly enforce them, so as to shape the self-governance by business. Meanwhile, the voluntary approach could be encouraged in some business companies with the availability of supporting conditions. In Japan's industrial environmental management, industrial association is also an important actor in bridging industries and government, averaging the economic risks of industries caused by costly pollution control measures, exchanging related technical expertise and experience, and training technician for industries.

Once the public including citizens, NGOs and other civil society participates in, environmental governance can shift from governmental-led actions to social-driven actions; namely, all actors together, rather than a sole government itself launch environmental management. The Japanese experiences suggest that some formal rules need to encourage the public participation in environmental management. Those formal rules should involve: (1) opening the process of environmental policymaking; (2) providing political opportunity for the public to voice their environmental concerns; (3) disclosure information; (4) providing material incentives to the public participation like environmental dispute resolution and compensation system; and (5) promoting environmental education.

How to deal with the dilemma of growth and environment

The Japan's lesson of paying several times post-costs for "growth first, then clean up" again gives an alarm to Asian developing countries not to recommit the same errors in dealing with the dilemma of
environmental protection and economic growth at both macro and micro levels. In Japan, huge investment in pollution control has fostered the booming of environmental industry. It in turn has brought about a great amount of benefits to the relevant industries and national economy. The win-win story of Japanese automobile industry's success in promoting its international competition while resolving exhaust pollution lends developing countries an inconclusive but charming implication. It is about how to properly use environmental regulations to foster technological innovation and shift of industrial development patterns from massive resource consumption and heavy pollution to high efficiency and low burden on environment. For these reasons of the booming of environmental industries and the innovations of general production technologies, the impact of huge environmental investments in the 1970s on Japanese national economy was neutral or negligible as OECD points out from the surveys on the other cases.

However, the financial impacts vary considerably by industries in short term. In this case, government has to ensure all industries taking anti-pollution measures at the same time so that they face relatively same equity in market risks. And at the same time, government may provide some preferential policies to those heavily suffering industries to remain their competitiveness in the market to some extent. Japanese big industries’ experience also show that incorporation of pollution prevention into the improvements of general production process can minimize the financial impacts of pollution control.

Japan’s economy development has experienced several shifts postwar from light-industry-and-agriculture dominated economy to heavy and chemical industrialization, and further to knowledge-based industry. In this shifting process, production technology improvement always has been a leading force to drive economy forward. On the other hand, energy and resource conservation has made Japan’s economic growth with the world best efficiency of energy and other resource consumption. As a result, those measures at the source and in the process of production, such as the upgrading of industrial structures, energy conservation measures, and fuel shifts made much greater contributions to pollutants reductions than those measures at the end-of-pipe.

- How to structure national environmental policy

In comparison with the structures of Japanese package of environmental policy, environmental legislation in many Asian developing countries generally lags behind the actual demands of environmental management. While those special policies against diverse environmental problems are of shortage in some countries, three policy categories particular, including policy for environmental investment and the R&D of environmental technology, policy for environmental dispute resolution and compensation, and integration of environment and development are general weak or not in place. They should become a central concern on the agenda of policy development in many Asian developing countries.
How to finance environmental pollution control

In order to raise environmental investment, a mutual promotion model among factors including environmental regulation, investment, and technology should be created like Japan. First, stringent environmental regulations and strict enforcement as well can force industries to bear higher costs for not taking anti-pollution measures than costs of doing so. Consequently, industries have to invest hugely in pollution control. Second, governmental supports are necessary to help industries attack fund difficulties in pollution control. Hence third, huge investments can create market demands for environmental technology, and the demands thereby foster the booming of environmental technology and the innovation of general production technology.

Japan’s experience and lesson show that Asian developing countries impossibly follow the governmental monopoly of investment in environmental infrastructure construction. Even in Japan, the shortcomings of governmental monopoly model are reconsidered in terms of big financial burdens on governments and poor efficiency in operation. Hence Asian developing countries have to develop public-and-private partnership through making the operation of the public environmental facilities market-based and providing policy incentives to private sectors for investment in environmental infrastructural construction. But differing from some of general infrastructure, government should all long play a leading role in environmental infrastructural construction.

Japan’s financial aid model suggests that special and centralized institutions be very much necessary to help industries attack the difficulty of fund in environmental pollution control. Such institutions can raise funds and provide financial aid to industries through a full use of public funds and governmental environmental budget. On the other hand, they can also give incentives to industries for raising efficiency of funds through loan-lending approach—a quasi-market mechanism, unlike governmental grant. Moreover, such institutions may act as consultative organs of environmental technology for industries at the same time. For financing pollution control in small and medium sized industries, the mechanism of Japan Environment Cooperation has a good relevance to other Asian countries.
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