Part Ⅱ: Environmental Governance in Four Asian Countries

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Environmental Governance in China

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1. Broad Introductory Overview

1.1 History of Environmental Protection in China

As in the industrialized countries, environmental protection in China has been growing with the arising of enormous environmental problems and evidence of their damages to our habitat and public health. The causes of environmental problems have much correlation with social and economic development.

At the beginning of 1950s, China implemented its first Five-year National Plan, with an industrializing strategy focused on heavy industry. Environmental problems began to appear when large-scale industrial complexes were constructed. A forest of smokestacks became a symbol of modernization.

In order to realize an immediate and rapid industrial development during the 'great leaping-forward' period in 1958, China carried out a development strategy pillared by steel and iron industry. A crowd of unplanned out-of-date processes and indigenous smelting furnaces were built, which resulted in extensive ecological degradation.

During the 1960s, China further stressed on establishing an independent self-supporting industrial structure. More serious air and water pollution generated as a consequence of constructing heavy industries in the middle and west of China. After 1970, environmental problems became more acute when many pollution accidents happened. It was the 1972's Stockholm Conference on the Human Environment that aroused the environmental awareness of the Chinese Government.

In the late 1970s, China adopted a reform and opening-up policy and began to transit from planned economy to a socialist market economy. With two decades' rapid economic growth, particularly fast development of township and village enterprises (TVEs) as representatives of non-state-owned enterprises, urban air pollution and water pollution of main rivers and lakes have been more and more fierce. In response to severe environmental situation, the Chinese Government has formulated a series of environmental laws, regulations and standards, as well as implemented a set of environmental policies and systems. The history of environmental protection in China can be summarized as the following three stages:

Stage I: Foundation (1972 - August 1982)

From Chinese delegation attending the 1972's Stockholm Conference till the First

China National Conference on Environmental Protection held in Beijing in Aug., 1973, Chinese government proposed 32-Chinese character guiding principles: 'overall planning, rational layout, comprehensive utilization, recycling, public participation, taking initiative actions, environmental protection and benefiting the whole society' , which marked the beginning of environmental protection work in China.

i) Theoretical knowledge

During this stage, environmental protection and ecological protection had been received more attention by the government whose knowledge level raised to a new stage. Firstly, environmental problems are not simple 'three-wastes', but important factors which may impede China's social-economic development. Secondly, the dilemma between environment and economy should be considered into the development strategy. Environmental protection should be integrated into economic growth to realize an harmonious development of population, resource and the environment. Thirdly, environmental management should be given first priority for environmental protection work.

ii) Policy and legislation

Chinese government adopted a set of environmental policies and promulgated several environmental laws to strengthen environmental management, including:

- On September 13, 1979, the Environmental Protection Law (Trial Version) was enacted by the Eleventh Meeting of the Standing Committee of the Fifth National People's Congress. From then on, the nation's environmental protection has been enforced on a sound legal basis.

- The System of Environmental Impact Assessment was explicitly stipulated in the Environmental Protection Law (1979): 'Site selection, designing, construction and production of every enterprise and institution should avoid polluting the environment and deteriorating the ecological system. Every new project, rebuilding project and expansion project must submit Environmental Impact Report to the environmental administration or other authorities concerned for their examination and approval.' The implementation of this system promoted the transformation from end-of-pipe control to pollution prevention and control.

- On May 2, 1982, the State Council released a Circular requiring the implementation of pollution charge system. The Circular also defined the rate of pollution charge, source of funding and usage of pollution charge. This had been an effective economic incentive for pollution control.

iii) Capacity building

After the First China National Conference on Environmental Protection in 1973, the State Council established a Leading Group on Environmental Protection in December 1974, which was composed of members from 20 ministries and state commissions, such as State Planning Commission, Ministry of Construction, Ministry of Industry, Ministry of Agriculture, Ministry of Transportation, Ministry of Water Conservation and Ministry of Public Health, etc. Its major responsibilities included making guiding principles and policies, formulating administrative regulations, defining state environmental planning and coordinating environmental protection work among different sectors. The founding of the Leading Group marked the beginning of environmental administration in China. The Environmental Protection Law (1979) stipulated the principles for establishing local environmental administrations and correspondence responsibilities. To respond to the Environmental Protection Law, local governments of provinces, autonomous regions and municipalities directly under the Central Government successively established local Environmental Protection Bureaus (EPBs). Ministry of Metallurgy, Ministry of Chemical Industry, Ministry of Light Industry, Ministry of Textile and Ministry of Petrochemical Industry, etc. also set up sectoral environmental protection administrations. During the administrative organizational reform in 1982, the Leading Group on Environmental Protection of the State Council was rescinded and its work was assigned to the Department of Environmental Protection of the Ministry of Urban and Town Construction.

Stage II: Development (September 1982 - April 1989)

The Second China National Conference on Environmental Protection was a milestone of environmental protection in China. General principles were established during this conference: 1) Environmental protection is a fundamental state policy; 2) China adheres to the strategy of 'three synchronizing' and 'three coordination', *i.e.* synchronizing the planning, implementation and development of economic growth, urban and town construction and environmental protection to facilitate the coordination of economic benefit, social benefit and environmental benefit; 3) Intensifying environmental management is a key task for environmental protection work.

i) Improvement of environmental policy framework and legislation

During this stage, the framework of environmental policy had been formed which consisted of three levels (see Figure 1). The 'fundamental state policy' was the highest level. 'three-synchronizing' and 'three-coordination' was the second level. The third level was 'three major environmental policies', *i.e.* 'emphasizing prevention and integrating both prevention and control'; 'polluters pay' and 'strengthening environmental management'. Further, there also contained

environmental economic policies, ecological protection policies and technical policies, etc. in the framework.

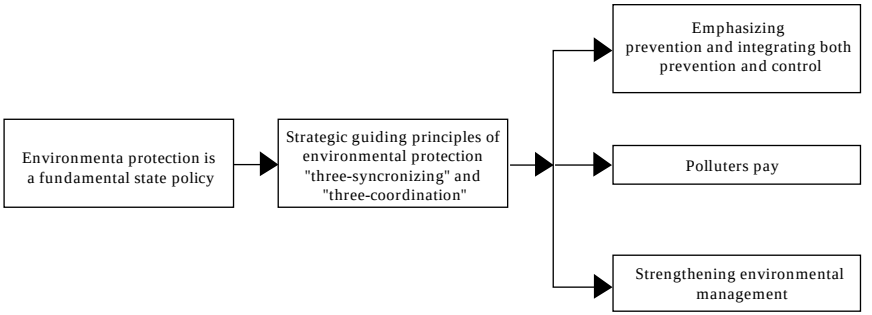


Figure 1 Framework of Environmental Policy in China

The initial legal system consisted of the Constitution, the basic Environmental Protection Law, administrative laws and regulations and local regulations (see Figure 2).

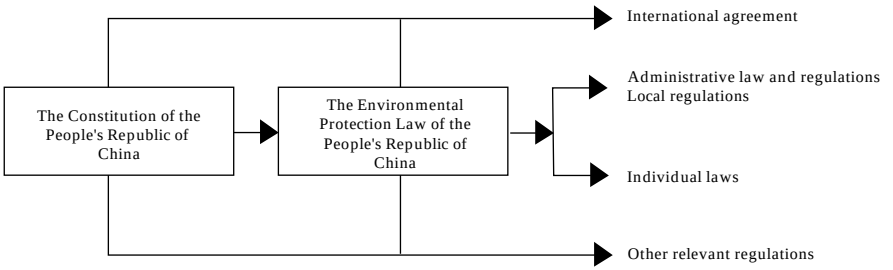


Figure 2 Environmental Legal System in China

ii) Formation and development of macro environmental management system

In May 1984, the State Council decided to establish the State Environmental Protection Committee. In 1988, the National Environmental Protection Agency (NEPA) was founded, directly affiliated to the State Council. Governments at each level also built local EPBs. A comprehensive environmental management mechanism with multi-levels and multi-departments was set up during this stage (see Figure 3).

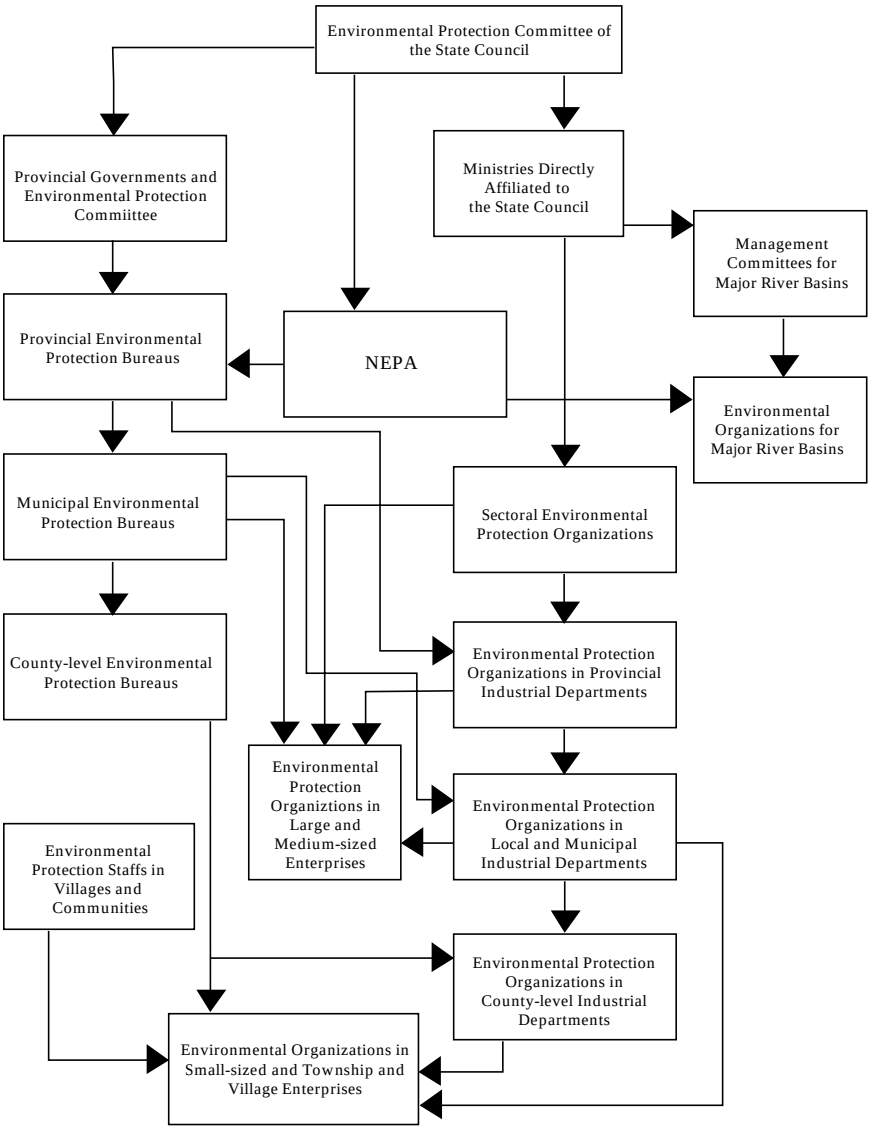


Figure 3 Environmental Management System in China

Stage III: Reform and improvement (May 1989 - Present)

In this stage, environmental issues have been of great importance around the world. During the Third China National Conference on Environmental Protection held in April, 1989, it was proposed that 'China should try to explore a road for environmental protection with Chinese features'. After the 1992's Rio Earth Summit, sustainable development has been received common recognition. In 1994, the Chinese government released China's Agenda 21 - White Paper on Population, Environment and Development in the 21st Century. The Fourth China National Conference on Environmental Protection was held in July 1996, during which two significant actions were advocated, *i.e.* National Plan for Total Emission Control of Major Pollutant Discharge during the Ninth Five -Year Plan and China's Planning for Cross-century Green Projects. In September 1996, the State Council ratified the Ninth Five-year Plan and Prospective Objectives in 2010 for Environmental Protection.

In this stage, environmental management has experienced three transformations: 1) from end-of-pipe control to life-cycle environmental management; 2) from concentration control to total emission control; 3) from administrative management to environmental management dependent on legislation, regulation and procedure.

The regime of environmental policy and legislation has been improved. In December 1989, the amended Environmental Protection Law was promulgated. At present, there are six environmental protection laws: 1) Environmental Protection Law; 2) Law of Prevention and Control of Water Pollution; 3) Law of Prevention and Control of Air Pollution; 4) Regulations of Prevention and Control of Environmental Noise Pollution; 5) Law of Prevention and Control of Solid Waste Pollution; and 6) Law of Marine Environmental Protection. There are also nine laws for resource protection. The revised Criminal Law added the definition of crime destroying the environment and resources. The nation has issued 28 environmental administrative regulations, 70 rules and 375 national environmental standards. There are more than 900 local environmental regulations.

Further, China established eight environmental management systems, including: 1) system of environmental impact assessment; 2) system of 'Three Simultaneity'; 3) system of pollution charge; 4) system of pollution discharge permits; 5) system of quantitative exam on integrated management of urban environment; 6) target responsibility system for environmental protection; 7) system of centralized pollution control; and 8) measure of setting deadlines for pollution source control.

In the spirit of the UNCED, China advocated ten countermeasures for the environment and development towards the end of this century and the 21st century:

- implementing strategy of sustainable development;
- taking effective actions for industrial pollution prevention and control;
- promoting integrated management of urban environment with emphasis on air pollution , water pollution, solid waste and noise pollution in urban areas;
- raising energy efficiency and improving the structure of energy production and consumption;
- promoting ecological agriculture, afforestation and biodiversity protection;
- supporting R&D and the development of environmental industry;
- applying economic incentives;
- enhancing environmental education and raising the environmental awareness of the public;
- strengthening legal system and intensifying environmental management;
- formulating action plan.

1.2 Primary Environmental Issues in China

Economic growth was realized by extensive development, which exerted great stress on the environment. Environmental pollution, centered in cities, has not been effectively controlled. Affected areas of ecological deterioration in some regions are expanding. Primary environmental problems in China include:

- Rivers, lakes and reservoirs are extensively polluted in varying degrees, particularly waters in industrializing towns. More than 50% of the ground water in urban areas is polluted.
- Near-shore pollution has not been effectively controlled.
- Soil erosion as a result of desertification and deforestation makes ecological environment in some regions more fragile. Loss of biodiversity threatens some endangered species.
- China's economy is expected to keep a sustained annual growth of 8%, which means more pressure will be placed on the environment, especially in the less-developed regions in the middle-and-west.
- Though the emission level of SO_2 and CO_2 per capita is much lower than the average world level, total emissions are huge.

Presently, Chinese government are taking stringent measures on waste water

treatment of 'three rivers' (Huaihe River, Haihe River and Liaohe River) and 'three lakes' (Taihu Lake, Chaohu Lake and Dianchi Lake)' and air pollution control in 'two control zones' (SO_2 control zones and acid rain control zones) and 'one city' (Beijing).

1.3 Attitude towards Global Environmental Issues

Since the quality of global environment and how to solve global environmental issues have close relations to China's sustainable and stable social-economic development, Chinese government has been attaching great importance to both regional and global environmental issues. China positively participated in the activities for solving global environmental issues and joined 18 international agreements, including Montreal Protocol on Substances that Deplete the Ozone Layer, United Nations Framework Convention on Climate Change and United Nations Biodiversity Convention, etc. More than 10 programmes and regulations, *e.g.* China's Agenda 21 and China's Biodiversity, were formulated as commitments to the international agreements.

On the other hand, China is still a developing country. Poverty is considered as one of top social priorities and the essential cause of environmental deterioration. Inadequate development makes dozens of millions of people live at the edge of the minimum level for living. They can not afford sufficient food, clothes, housing, health care and education, therefore China should undoubtedly devote to its economic development. In order to realize economic growth without sacrificing the environment, China should insist integrating environmental concerns into economic development. Sustainable development of China will contribute to the settlement of regional and global environmental issues.

2. Contextual Overview

Since 1978, China's economic regime has experienced a fundamental reform transforming from centralized planned economy to socialist market economy. Tremendous achievements were made during the last two decades. GNP increased from RMB 452 billion yuan in 1980 to RMB 6,756 billion yuan in 1996, with an annual growth of 10.3%. GNP per capita in 1996 was RMB 5,453 yuan. China has merged into the international economy.

With rapid economic development, living standard was improved in terms of income raising, poverty elimination and public health improvement. The average annual income raised from RMB 762 yuan in 1980 to RMB 6,210 yuan in 1996, with annual increment at 11%. The average annual income of village residents was RMB 2,807 yuan in 1996. Though the level of income has raised rapidly, it is still far lower than the average world level. Moreover, the income was unevenly distributed among different regions and between cities and villages. Income level in cities is higher than that in villages and income of coastal residents is greater

than that of residents living in the less-developed regions in the middle-and-west. 70% of the total population are rural residents. There are 80 million poor people live mostly in the villages and mountain areas in the middle-and-west of China. Eliminating poverty and evenly distributing social wealth and resources have been great challenges and responsibilities for Chinese government. One of the essential objectives for economic growth, opening-up and reform and social development in China is to accomplish common well-being. In order to realize this objective, Chinese government on one hand has accelerated economic development and cumulated welfare by encouraging people in some special zones to become rich; and on the other hand, it positively dedicated to poverty elimination by advocating richer regions to assist poorer regions.

At present, the consumption level has improved dramatically. People can afford sufficient food and clothes and they are now pursuing well-off living. However generally speaking, the consumption level of major commodities is still far lower than that in developed countries. In 1996, average consumption of energy per capita was 1.13 tons of standard coal energy[1], average consumption of food per capita was 265kg, number of refrigerators owned by per 100 families was 70 sets, number of televisions owned by per 100 families was 119 sets, number of telephone owned by per 100 persons was 5.8 pieces and number of private cars owned by 1,000 persons was 2.4 pieces.

The consumption pattern is not rational in terms that the share of food consumption is much greater than that of cultural consumption. On the other hand, the conflicts between population explosion and intensive depletion of resources are becoming more acute. Average resources per capita, such as fresh water, arable lands, forests and mineral resources, etc. are far lower than the average world level, which has been the 'bottle-neck' of restricting sustainable development in China. China is facing growing challenges for further improvement of consumption level.

China has adopted effective policy for population control and realized remarkable achievement. However, huge size of population, lower education and aging structure are three major population issues in China. Entering 1990s, China has been faced with third peak birthrate since 1949. Total population in the end of 1996 was 1.22 billion and is projected to reach 1.3 billion in 2000.

3. Current State of Environmental Governance Mechanisms

3.1 Political System

China is a communist and federal state which has exercised people's democratic dictatorship since 1949 when the People's Republic of China was founded. As

1 One ton of standard coal energy is equal to 29.31×10^9J.

the state machinery, the People's Congress System is a centralized democratic political system, comprising organ of state power, administrative organ, procuratorial organ, judicial organ and military organ. The People's Congress (*i.e.* People's Congresses of all levels) together with its Standing Committee are organs of state power which exercise their powers over state or localities according to the Constitution and laws. Their major authorities include legislative power; decision-making power over major state policies and urgent social and economic issues; personnel appointing and removing power; and the right of supervision over the administrative organs and the judicial organs.

The National People's Congress (NPC) is the highest level of state power. The relationships among different levels of the People's Congress are equal and relatively independent. On the one hand, the establishment of the People's Congress of each level is a bottom-up process, in which delegates of upper level accept supervisions from lower levels. On the other hand, the power of each level is top-down, by which the upper level exercises legal supervisions over the lower levels.

The administrative organs includes the State Council and Local People's Governments (LPGs). The State Environmental Protection Administration (SEPA), a ministerial authority affiliated to the State Council, is responsible for national environmental protection. Local EPBs are local authorities responsible for local environmental protection under LPGs.

3.2 Legislative Bodies

With respect to environmental legislation, the NPC is in charge of drawing up the Constitution, the Criminal Law and the Civil Law. The Standing Committee of the National People's Congress (SCNPC) is responsible for formulating the Environmental Protection Law (*i.e.* the environmental basic law), special laws on the protection of resources and laws on pollution prevention and control.

The State Council has charge of making administrative statutes on environmental protection. Ministries and state commissions, directly affiliated to the State Council, are responsible for formulating environmental protection regulations and issuing resolutions and orders. Regulations made by this level must not conflict with laws made by NPC and SCNPC.

Local People's Congress(LPC) and its Standing Committee (SCLPC) are in charge of local laws. LPGs and local EPBs are responsible for local regulations and issuing local resolutions and orders. Regulations made by this level must not conflict with laws and regulations made by the above mentioned two levels.

The relations among various legislative bodies include:

- NPC and SCNPC enjoy the highest legislative power;

- The relation of the State Council to NPC and SCNPC is a relationship of subordination, of which the State Council possesses the right to submit motions to NPC, while NPC and SCNPC have the power to repeal regulations, resolutions and orders enacted by the State Council;
- The legislative power of LPC and LPGs is subordinated to NPC and the State Council. However, local legislative bodies play important roles in the sense of translating the Constitution and laws into practice;
- The relation between LPC and LPGs is similar to that of NPC and the State Council.

3.3 Administrative Structure

The People's Government

The decision-making actors of environmental governance in China are the People's Governments of each level, who intervene environmental protection by making and implementing environmental laws, regulations, policies and standards. They hold the liabilities for environmental quality in regions under their jurisdiction and are responsible for integrating environmental planning into the social and economic development plan.

Environmental administrative authorities

Since environmental protection in China greatly relies on the government, environmental administrative authorities hold important positions in environmental governance.

SEPA (see Box1) and provincial EPBs have the responsibilities for decision-making, macro-guidance, coordination among sectors and supervision over lower levels. Town and county-level EPBs are responsible for the implementation of state policies, laws, regulations and standards, monitoring pollution sources, supervision on report and registration of pollution discharge, issuing pollution discharge permits, investigation on pollution control and collecting pollution charge. This is the micro-level. They have the liabilities to report to their upper level and enjoy the right to submit proposals to the upper levels. Municipal environmental administrations, which are between the two levels, have both macro and micro functions.

Box 1: Structure and Function of SEPA

During the administrative organizational reform in March 1998, the former NEPA was upgraded to ministerial level as the State Environmental Protection Administration (SEPA), directly affiliated to the Central Government. Its responsibilities include:

- Drafting national guiding principles and policies, formulating administrative regulations on environmental protection; implementing environmental impact assessment for major state economic-technical policies, development planning and economic planning; working out national environmental protection planning; coordinating the formulation of pollution prevention planning of major regions and major river basins and supervising its implementation.

- Formulating and implementing regulations on the prevention and control of air pollution, water pollution, soil pollution, noise pollution, solid waste, hazardous waste and automobile pollution; providing guidance and coordinating the protection of marine environment;

- Supervising the exploitation and utilization of natural resources which may exert impacts on the ecological environment; supervising the construction of ecological environment and the reclamation of ecological degradation; supervising and examining the protection of natural reserves, scenic spots, historic resorts and forest parks; supervising and examining the protection of biodiversity, wild species and control of desertification and supervising state natural reservoirs;

- Providing guidance and coordinating local governments and different sectors concerned in addressing major cross-regional or cross-valley environmental issues; investigating and handling major pollution accidents and ecological destruction; coordinating cross-provincial environmental disputes and examining the implementation of laws and regulations;

- Formulating and issuing national criteria of environmental quality and standards of pollution discharge; verifying municipal overall planning in respect to environmental protection; coordinating the compilation of state environmental quality report; issuing national bulletin of environmental state and drafting guidelines of national strategy on sustainable development;

- Formulating and implementing environmental management system; examining the environmental impact report of developmental projects

and providing guidance on the construction of ecological demonstration projects and eco-agricultural projects.

- Supervising the system of eco-labelling and promoting the development of environmental industry;
- Holding the responsibilities for environmental monitoring, statistics and information and promoting the participation of the public and NGOs;
- Drafting guiding principles on global environmental issues; responsible for international cooperation in the field of environmental protection; participating in activities of global environmental protection; supervising and coordinating the performance of international agreements in China;
- Holding responsibilities for nuclear safety; etc.

SEPA installed ten functional departments in addressing the above responsibilities, including general office, department of planning and finance; department of policy and legislation; department of administration and personnel; department of science, technology and standard; department of pollution control; department of natural resource conservation and ecological protection; department of nuclear safety and radiation management; department of supervision and management, and department of international cooperation. There are 200 staffs with one General Administrator and 4 Deputy Administrators.

The strength of this multi-level administrative mechanism is to facilitate the implementation of policies, laws and regulations. However, the top-down decision-making process has its weaknesses. First of all, because the Central Government and SEPA are decision makers and local EPBs are actors for exercising policies, there lacks the feedback mechanism from lower-level to upper-level in the process of decision-making, which has the possibilities that some policies and systems can not reflect the actual situation and fail to address priority problems. Secondly, during the decision-making process, there are no adequate channels for the communication among decision-makers, enterprises, the public and the media, therefore, enterprises may not take initiatives in response to the policies and the public may not play a positive role in participation, which may influence the effectiveness of implementation.

Other administrative authorities

Besides SEPA, other administrative authorities of the State Council, such as the

Ministry of Agriculture, the Ministry of Water Conservation and the National Marine Agency, etc. are responsible for the protection of resources. Sectoral authorities of the State Council, such as the Ministry of Chemical Industry and the Ministry of Metallurgical Industry, etc. are in charge of pollution prevention and control within each sector.

In the vertical direction, local EPBs are supervised and directed by SEPA. In the horizontal direction, other authorities of the State Council are parallel to SEPA with the same objectives, only differentiating in that the former one is responsible for environmental protection work within its sector while the later one is in charge of nationwide environmental and ecological protection.

LPGs have the same administrative structure as the State Council. Lower level is subordinated to upper level.

3.4 Industry

According to the Resolution on Environmental Protection (1984) made by the State Council, large and medium sized enterprises are required to set up environmental unit or designate full-time staffs for environmental work within each enterprise. In order to observe national as well as local environmental regulations and standards, these environmental staffs conduct source investigation and monitoring, prepare report of environmental quality assessment and ensure the proper operation of pollution control facilities.

For recent years, many large-scale or export-oriented enterprises have taken initiatives to satisfy the international environmental requirements on industrial process, production and products. On the one hand, they carried out technical reform and life-cycle control to raise production efficiency and therefore contribute to energy conservation and reduction of emissions. On the other hand, they invested in pollution control facilities (see Table 1). Till the end of 1997, 64 enterprises gained eco-labels for 264 categories of products. Some enterprises implemented ISO 14000 environmental management system.

Table 1 Pollution Prevention and Control by Enterprises[2]

Pollution Prevention and Control	Rate
Complying with the standard for waste water discharge	61.8
Smoke prevention and dust control	90.4
Process gas control	79.4

Source: China Environment State Bulletin: 1997 (NEPA)

2 Excludes township and village enterprises.

Generally speaking, however, most enterprises are taking passive attitudes towards pollution prevention. The environmental awareness among enterprises is still low. Large-scale enterprises usually invest in pollution control more intensively than small and medium sized enterprises. Enterprises who gain profits are more likely to invest in pollution prevention than those who suffer loss.

Sate-owned large and medium sized enterprises are the only main targets of environmental monitoring, pollution charge and fine, while small-scale enterprises can escape from their liabilities and TVEs are excluded from environmental monitoring and pollution charge. Because the cost increased when enterprises invested in pollution control while others did not invest, the unequitable enforcement of law led to an unequal competition, which resulted in passive reaction of enterprises against pollution control.

Enterprises who installed pollution control equipment can not yet reach the standard set for pollution discharge, partly because there are no efficient technologies available. Another reason lies in that the marginal abatement cost for satisfying the standard by most facilities is high. This greatly frustrated the enthusiasm of enterprises for their investment in pollution prevention and control.

The rate of pollution charge is much lower than the operating cost of pollution prevention facilities. For example, the operating cost for one ton of waste water treatment in a pulp enterprise is around RMB 1Yuan, but pollution charge for one ton of waste water is only RMB 0.1Yuan. Therefore, enterprises would rather buy the right for pollution discharge.

3.5 Public Participation

Scientists and experts are playing more and more important role in influencing policy-making in China. It was scientist who can predict damages caused by environmental pollution and ecological degradation, perceive the roots for those damages and find out solutions. There are many governmental and non-governmental research institutions dedicating to technological R&D, ecological protection, information, environmental economics and policy research, etc.

It is worth to mention the China Council for International Cooperation on Environment and Development (CCICED) which is co-sponsored by foreign countries and the Chinese Government. Founded in 1992, especially influenced by the 1992's Rio Conference, CCICED has developed to contain nine working groups in such broad areas as energy strategies, resource accounting, sustainable agriculture, transportation, environment and trade, cleaner production, pollution control, biodiversity and environmental economics. Convening both high-level officials such as vice State Chairman Wen Jiabao as well as deputy Ministers and

domestic and foreign scientists, CCICED provides a proper channel between decision-makers and scientists. Through cooperation on researches by domestic and foreign scientists and organizing a Plenary Meeting once a year, many proposals have been adopted by the government.

The media plays a positive role in revealing environmental violation, informing the public, reporting pollution accidents and thus influencing the business behaviors and governmental decisions. The Long March of Environmental Protection, which is a special documentary film co-produced by CCTVand NEPA with nationwide reporting coverage in 1994, revealed the state of the environment, both environmental friendly and badly business behaviors and ecological degradation. Another example is weekly reporting of urban air quality via the media in many cities, which was promoted by NEPA in 1997.

For political reasons and low environmental awareness among the public, there are few environmental NGOs in China. The public and NGOs played minor roles in environmental governance. However, for recent years, frequent incidences of pollution accidents and their damages to the public health have aroused public concerns on environmental problems which are closely linked to their health and living, such as noise, air and water pollution. Victims complained about degraded environmental quality, informed local government against pollution discharge and a few even brought suits against polluters, which placed pressures on local governments in certain degrees. However, organized civil protest has not developed in China.

Public participation has been guaranteed by the Constitution and laws pertaining to environmental and resource protection. Article 6 of the Environmental Protection Law stipulates that every institution and citizen holds the liabilities to protect our environment and enjoy the right to report and accuse.

More recently, the modified Law of Water Pollution Prevention and Control (1996) added that Environmental Assessment Report for new construction projects should include opinions from local citizens and other institutions.

However, there still lacks proper mechanism for bringing the public into full play. It has been suggested in the National Programme for Environmental Protection (1998 - 2002) that mechanism for public reporting, hearing and participation in EIA should be established and improved.

4. Case Studies

Case One: River and Marine Pollution

4.1.1 Current State of River and Marine Pollution and its Consequences

Waters of rivers, lakes and reservoirs in China were extensively polluted in

varying degrees which tends to be worse. Among seven large river basins, *i.e.* the Liaohe River, the Haihe River, the Huaihe River, the Yellow River, the Songhuajiang River, the Zhujiang River and the Yangtze River, the first three are the most seriously polluted rivers. Among urban sections of rivers, 87% are polluted to certain extent, of which 16% are seriously polluted, 11% are polluted, 33% are lightly polluted and 23% remain clear. Major pollutants include oil, ammonia nitrogen and volatile phenol. In some sections, total mercury pollution is serious. Lakes are seriously polluted. The pollution of total phosphorous and total nitrogen is found extensively, organic pollution and eutrophication of some lakes are serious. In a few lakes and reservoirs, heavy metal pollution could be found as well. Taihu Lake, Dianchi Lake and Chaohu Lake are the most seriously polluted lakes. Major sources of river and lake pollution are waste water discharge. In 1997, total waste water discharge reached 42 billion tons, of which 23 billion tons generated from industrial sources and 19 billion tons from domestic sources.

Several factors are attributed to the causes of river and lake pollution. Firstly, current environmental monitoring and administration, which target only state-owned enterprises, do not involve TVEs. From 1978 to 1995, the gross industrial output value made by TVEs increased at 35%. The amount of waste water discharge by TVEs in 1995 reached 5.91 billion tons, which accounted for 21% of the total discharge in the same year (NEPA, 1998).

Characterized in small and medium size and in a great number, TVEs as pollution sources are difficult to be monitored and supervised. Without stringent restrictions on their environmental behaviors, many TVEs discharged untreated waste water and caused serious pollution to the receiving rivers and lakes.

Secondly, because the environmental awareness in many cities and counties is still low, governments of these cities and counties seek one-sided economic profits at the expenses of sacrificing the environment.

Thirdly, under the direction of extensive economic development, heavy polluting sectors such as paper and pulp making, food manufacturing, chemical industry, tannery and electroplating developed without proper planning during the last decade. This unsound industrial structure resulted in many environmental problems especially water pollution. In 1995, COD discharged by paper and pulp making, food manufacturing and chemical industry were responsible for 42%, 28% and 9% respectively of the total industrial COD discharge. Further more, chemical industry was the largest polluters for mercury, arsenic, cyanide and volatile phenol, which accounted for 42%, 46%, 42% and 28% respectively of the total discharge by each.

Fourthly, the execution of environmental regulations and standards by local EPBs is weak, particularly EPBs of county level. The rate of industrial waste water

treatment was 78.9% in 1997 and the rate of industrial waste water discharge complying with the standard level was 54.4%.

Pollution of ground water resulting from runoff contamination was serious and extensive as well. About 50% of ground water was polluted, thus intensifying the conflicts of water resource scarcity. Though water resource of China ranked 6th in the world, the per capita level was 2,292m^3, one third of the average world level 7,176m^3 (WRI, 1996), which ranked 88th. Per capita level in the North is only one fifth of that in the South. According to statistics, 60% of cities were in shortage of water with a total deficit of 6 billion m^3.

Near-shore marine was polluted in varying degrees. Eutrophication is conspicuous and the frequency of red tide was growing. Major pollutants include inorganic nitrogen, inorganic phosphorous and mineral oil. The East Sea is the most seriously polluted and the Bohai Sea ranks second. The major causes of marine pollution lie in that on one hand near-shore enterprises discharged their waste water directly to marine and polluted water from rivers indirectly flows into marine; on the other hand, marine ships and facilities discharged oil pollutants into the sea.

Water pollution exerted great impacts on society, economy and human health, including:

- Serious water pollution threatened the safety of drinking water in towns and village. 64.5% of the population can not access to safe water. During 1994 and 1995, pollution accidents continuously happened along the main stream of the Huaihe River. Millions of residents in Huainan, Bengbu City and Yutai City could not access to dringking water for several weeks. Cyanophyceae appeared frequently in Taihu Lake, which made Wuxi Water Plant close for twenty days.

- Industrial and agricultural sectors suffered great economic losses as a consequence of water deficit. In some towns and cities, farmers had to use waste water for irrigating, which not only decreased output, but also caused hazardous substances remained in food. Water pollution also had negative impacts on fishery, such as a reduction in catches. Annual economic loss caused by water pollution is estimated up to RMB 33 billion Yuan (NEPA, 1997).

- Water pollution also damages human health. According to a health census, the incidences of intestines diseases, cancer and congenital malformation of infants in polluted regions were obviously higher than that in unpolluted regions.

- Frequent water pollution accidents in cross-regional areas caused more and more disputes and disturbed social stability.

4.1.2 Agenda Setting

Frequent accidents of water pollution resulted in scarcity of drinking water and health damage. Some factories had to stop production and farmers suffered loss from less harvest. These have caused growing complains from victims to the local governments. Increasing cross-regional disputes between victims and polluters also became sticky businesses for local governments. Report of monitoring data from local EPBs also sounded a warning to local governments. Local governments began to report this situation to upper levels.

The media also played a certain role in reporting pollution state of main rivers and lakes via TV, radio and newspaper. Its influences might not only be restricted to a specific region, but to the whole nation and aroused far-reaching concerns.

After on-site investigation by NEPA and the Central Government, as well as broad discussions among ministries and scientists, the Government decided to put water pollution prevention and control onto its agenda in 1994 and set water pollution as one of top priorities of environmental protection, with special emphasis on 'three rivers' and 'three lakes'.

Efforts made by many actors including citizens, local governments, local EPBs, scientists, the media, NEPA and the Central Government jointly affected the placing of water pollution issues on the political agenda. However, it was not there until extensive and serious pollution had threatened human health, generated regional water crisis and cross-regional disputes, and restricted regional social and economic development.

4.1.3 Implementation

There are many ministries involved in water resource management and protection in China. The Ministry of Water Conservation holds main responsibilities for the protection of water resources, including development and protection of main river basins; planning of water supply in main cities; construction of irrigation works; implementation of water and soil conservation; and construction and management of reservoirs. There are seven water basin Commissions under the Ministry of Water Conservation, which are mainly responsible for the coordination of cross-regional water conservation. Each province, city and county set relatively independent unit for water conservation under its jurisdiction.

SEPA is responsible for the formulation of regulations and standards on water pollution prevention and on the protection of water quality. Local EPBs are responsible for the execution of laws, regulations and standards and the monitoring and supervision of pollution sources.

Moreover, the Ministry of Construction and its corresponding local units are responsible for water supply, sewage collection and treatment. The Ministry of

Public Health is responsible for monitoring the quality of drinking water and the incidences of relevant diseases.

Since 1984, the Chinese Government has enacted the Law of Water Pollution Prevention and Control, other 11 special laws, regulations and policies on water pollution prevention and 24 standards relating to water quality, drinking water and waste water discharge. Based on three fundamental principles for environmental protection in China, a set of systems such as EIA, 'three simultaneity', pollution charge, reporting and registration of pollution discharge and centralized control were introduced for water pollution prevention and control.

In 1996, 40,869 waste water treatment facilities were running, by which 3.86 million tons of COD were reduced. At the end of 1996, 160 domestic sewage plants were constructed with an annual capacity of 1.4 billion m^3.

Box 2: Water Pollution Control in Huaihe River Basin

Water pollution prevention and control of the Huaihe River can be a good example to illustrate the implentation. Huaihe River flows over four provinces, i.e. Henan, Anhui, Shandong and Jiangsu, and consists of more than 190 branches such as the Yinghe river, the Wuhe River, the Hongruhe River and the Xihe River, etc. The catchment area covers 270,000 km^2 with 150 millions of residents. Since 1990s, the water quality in the Huaihe River has decreased sharply and some sources of drinking water have been seriously polluted, which brought about great impacts on industry, agriculture and human health. The grim situation aroused attention of the Chinese Government. In 1988, the Leading Grouping on Water Resource Protection of the Huaihe River Basin, which was composed of members from NEPA, the Ministry of Water Conservation and four Provinces, was established. In August 1995, the State Council promulgated and implemented the Temporary Regulation on Pollution Prevention and Control of Huaihe River Basin, the first environmental regulation for river basins. It definitely stipulated targets for pollution prevention and control, responsibilities of ministries and four Provinces and measures that should be taken for pollution control. Meanwhile, based on the Regulations, NEPA together with the State Planning Committee, the Ministry of Water Conservation and four Provinces began to draft a agenda for pollution prevention and control of Huaihe River Basin. In June 1996, the Agenda and the Ninth Five-year Plan for Pollution Prevention and Control of the Huaihe River was approved by the State Council.

- The Agenda stipulates a plan for total amount control of pollutants for Huaihe River Basin and requires that discharges from industrial

sources along Huaihe River Basin must comply with the standards by 1997.

- The Agenda divides the river basin into seven controlled areas and 82 controlled sections and defined water quality criteria for each section. In particular, it requires to designate full-time institution responsible for regular monitoring.

- In order to make the river clear in 2000, the Agenda includes two phases: 1) In 1997, industrial pollution discharges are required to comply with the standards. Seriously polluting small-scale enterprises which are not economically viable for pollution control are required to be shut down, stopped production or reconstructed; 2) A number of waste water treatment plants will be constructed. 303 potential projects are listed in the Agenda which requires a total investment of RMB 17 billion yuan.

Since the government attached great importance on the Huaihe River and local governments strictly implemented policies and laws, 1111 pulp-making factories with annual capacity lower than 5,000 tons and other 3,678 seriously polluting small-scale enterprises were shut down or stopped production in four Provinces. In response to the actions, newspaper, broadcasting station and TV station reported on stories. Citizens participated in supervision and reporting. At the end of 1997, the target was basically achieved and set a good example for water pollution control.

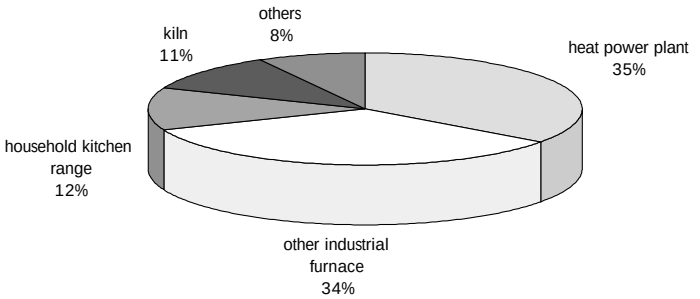
Case Two: Air Pollution

4.2.1 Current State of Air Pollution and its Consequences

Air pollution in China is characterized by typical smoke and dust pollution. Major pollutants are SO_2 and smoke dust due to the dominant share of coal (75%) in the consumption of primary energy in China.

Supporting rapid growth of economy and an improvement of living standard, the consumption of coal increased from 0.98 billion tons in 1990 to 1.39 billion tons in 1996, with an average annual growth of 5.8%. The consumption per capita was 1 ton of coal equivalent, which is much lower than the level in industrialized countries.

In 1997, the total emission level of SO_2 was 24 million tons, of which 35% generated from heat power plants, 34% form industrial furnaces, 11% from kilns and 12% from household kitchen ranges (see Figure 4). SO_2 emissions from TVEs



Source: Pollution Control Strategy, NEPA, 1997

Figure 4 Composition of SO_2 Emission Sources

made up 26.4% of the industrial sources (see Table 2).

In 1997, the total emissions of smoke dust were 19 million tons, of which 82.6% from industrial sources and 17.4% from households. Smoke dust emissions from TVEs were responsible for 56.2% of the industrial sources.

Table 2 Emission Level of Main Air Pollutants

Pollutants	Total Emission Level (million tons)	Industrial Sources (%)	Household Source (%)	County-level or above-County Level Sources (%)	TVEs (%)
SO_2	23.64	78.9	21.1	73.6	26.4
Smoke dust	18.73	82.6	17.4	43.8	56.2
Fine dust	15.05	100	0	36.4	63.6

Source: Pollution Control Strategy, NEPA, 1997

In 1997, the total emissions of fine dust were 15 million tons. Steel and cement sectors were two major contributors which were responsible for 15 percent and 70 percent, respectively. Fine dust emissions from TVEs contributed to 63.6% of the industrial sources.

According to the monitoring data of 1997, the average annual level of SO_2 concentration exceeded national standard II[3] and average daily level exceeded national standard III in 62.3% cities. Further more, the coverage of acid rain as a consequence of SO_2 emissions has been growing. There formed five zones of

3 The average annual criterion of SO_2 concentration in Standard II is $0.06mg/m^3$, which is the baseline for long-term exposure without causing health damage. The average daily criterion of SO_2 concentration in Standard III is $0.25mg/m^3$, which is the baseline for short-term exposure without causing acute health damage.

acid rain, *i.e.* southern and south-western zones covered most regions in Guangdong Province, Guangxi Province, Sichuan Province and Guizhou Province; central zone centered in Changsha and Nanchang; eastern zone centered in coastal cities Xiamen and Shanghai and northern zone centered in Qingdao.

The total number of motor vehicles raised from 6.3 million in 1990 to 11 million in 1996 as a result of the development of auto industry, which has an average annual growth of 9.7%. Particularly in metropolitans such as Beijing, Guangzhou, Chengdo and Shanghai, the growth of automobiles was much higher than the average rate. Emissions of NO_x, CO and CH from autos have been increasing year by year. Densely populated, these metropolitans are suffering large transportation volume and traffic jam, which result in growing emissions from motor vehicles.

Fine particulate (with diameter less than 10μm) and super fine particulate (with diameter less than 2.5μm) in the ambient air which mainly caused by smoke dust emissions are the most hazardous pollutants to human health. Scientists can show that the dominant leading to chronic respiratory diseases in China is air pollution. Among the causes of death, respiratory disease ranks first in rural areas and third in cities.

Lead produces irreversible negative impacts on the intellectual development of children. Lead-containing gasoline consumed by motor vehicles is a growing source of lead pollution as a result of the increase in automobiles. Two studies in Fuzhou city demonstrated that emissions from automobiles have a normal correlation to the increase of lead level in the blood of children (Li *et al.*, 1992 and 1993).

Long-distant transfer of SO_2 leads to the expansion of acid rain, which emerges as a regional issue accompanying with damages on agriculture, ecological system and buildings. An economic loss of RMB 116 billion Yuan was estimated in 1995 in China due to acid rain, which made up 2% of GNP. In addition, ODS and GHGs are contributors to such global issues as global warming and ozone depletion.

Major causes of air pollution include:

- In the process of making economic policies, industrial policies and planning of urban construction and development, it only stressed short-term and partial demand for economic development without considering the protection of atmospheric environment. Unplanned expansion of production scale and out-of-date technologies cause sever air pollution.
- The energy efficiency is low.

- The investment on air pollution prevention and control is not sufficient.
- The infrastructure for central heating is inadequate.
- The rate of air emission charge is low. Enterprises would rather pay for the emission charge than invest in emission control.
- Though a set of laws and regulations for air pollution prevention and control have been made, the implementation is not effective.
- Both economically and technologically efficient technologies are not available for air pollution control.

4.2.2 Agenda Setting

Because air pollution is directly detrimental to the public health (for example, an increase of coal consumption in the north in winter due to heating results in a growth of respiratory diseases), complains from the public as a consequence of severer air pollution placed pressures on local governments.

On the other hand , domestic scientists as well as foreign experts have conducted broad researches on the estimation of loss caused by air pollution and the solutions for pollution prevention and control.

However, it was the government who played a major role in placing the issue onto the agenda. On one hand, the government recognized the evident damages on human health and great economic loss as a result of air pollution. On the other hand, air pollution is a trans-boundary issue which can influence regional environment as well as global environment. As commitment to UNFCCC and Montreal Protocol, the Chinese Government has taken measures to response to air pollution.

Political factor is another impetus for setting the agenda against air pollution. Though still low in a sense of per capita level, China will ranks first for the total production of ODS and become one of the largest emitters of CO_2. The Chinese Government has received great pressures from the international society. SO_2 emissions from China were also be regarded by neighboring countries as contributors to regional acid rain.

4.2.3 Implementation

SO_2 and acid rain control

Acid rain and SO_2 pollution received more attention from the State Council. The Law of Air Pollution Prevention and Control, passed by SCNPC in August 1995, stipulates that acid rain control zones and SO_2 control zones are required to be

demarcated for the controlling of SO_2 and acid rain.

According to the Resolution on Environmental Protection (1984) enacted by the State Council and the Ninth-Five Year Plan and Long-term Target in 2010 on Environmental Protection, the targets for the controlling of SO_2 and acid rain in the 'two control zones' were set, which include two phases.

The targets set for 2000 include: 1) SO_2 emissions from industrial sources must comply with the standards; 2) Total emissions in the 'two control zones" must be controlled within the level set by the Government; 3) Air quality of major cities in the 'two control zones' must reach national environmental quality standards; and 4) The trend of acid rain in acid rain control zones should be mitigated.

The targets for 2010 include: 1) SO_2 emissions should be controlled at the level of 2000; 2) SO_2 concentration of ambient air in all cities located in the 'two control zones' should reach national standard of air quality; 3) the coverage of acid rain which $pH<4.5$ should be reduced distinctly.

Government has taken substantial actions and mobilized all sectors to realize the targets for SO_2 emission control in the 'two control zones'. SEPA has the main responsibilities for SO_2 and acid rain control, while other sectors take initiatives to tackle sectoral emissions.

LPGs and industrial sectors are responsible for drafting local and sectoral planning of SO_2 prevention and total emission control and integrating it into the local planning of social and economic development.

The Ministry of Coal and the Ministry of Construction have taken actions to restrict the consumption of high-sulphur coal. At present, the annual production of high-sulphur coal (sulphur content>3%) is 90 million tons, accounted for 7% of the total production in China. Most high-sulphur coal mines are located in the regions suffering serious acid rain. The exploitation of new high-sulphur mines is now forbidden. Existing high-sulphur mines will be restricted on their production or shut down. New or reconstructed coal mines (sulphur content>1.5%) are required to install coal dressing and selecting facilities.

The planning sectors and transportation sectors have taken initiatives to give priorities to regions of high sulphur coal in getting low-sulphur coal and dressed coal. By 2000, all household boilers and kitchen ranges are required to burn dressed coal or formed coal.

In 1995, the total capacity of heat power plants in China was 160MW. SO_2 emissions from heat power plants were responsible for 35% of total emissions. It is estimated that the capacity will reach 220MW in 2000 and SO_2 emissions will hold half of the total level. Therefore, SO_2 emission control by heat power industry

is vital for a successful SO_2 reduction.

The Ministry of Electricity has the responsibilities for SO_2 emission control of the sector. New plants are required to facilitate desulfurization equipment if sulphur content is greater than 1%. Existing plants are also required to take measures for SO_2 emission control and finish the installation of desulfurization equipment or other effective facilities by 2010. Studies show that investment in desulphurization for a new plant will make up 15% of the total investment, while investment in desulphurization for an existing plant will increase 20%-50% more. It infers that investment in desulphurization for new plants is more cost-effective.

Chemical industry, metallurgical industry and cement industry are other major contributors to SO_2 emissions. Their emissions account for 20% of the national level. Based on the Law of Air Pollution Prevention and Control, these sectors have taken administrative measures to require enterprises to reform their out-of-date process and equipment.

Local EPBs, who played important roles in the implementation, are responsible for source monitoring, supervision and collection of SO_2 emission charge. If emissions can not be controlled within the target level by enterprises in a specified period, EPBs will take administrative measures to shut down these enterprises.

CO_2 control

The main source of CO_2 emissions in China is the consumption of fossil fuel. Though China did not make a commitment to reduce its CO_2 emissions, the Government has taken many voluntary measures with special emphasis on energy conservation and industrial restructure to reduce CO_2 emissions.

On one hand, the average annual growth of GNP from 1990 to 1996 was 11.2%. Although China's economic growth was greatly dependent on energy, the average annual increase of energy consumption was only 5.8% in the same period, much lower than the economic growth. This proves that China did not take a 'business as usual' trajetory for its economic development.

On the other hand, the energy intensity (amount of primary energy consumed per unit GDP) has decreased 50% since 1980, with an annual decrease of 4.5% (World Bank, 1997). Though it was not rare for a matured economy, it is unprecedented when China tried to realize a rapid industrialization while keeping a decreasing rate of energy intensity at the same time.

Many policies aimed at industrial restructure and raising energy efficiency contribute to the control of CO_2 emissions, of which three policies are worth mentioning. They are:

- Economic reform policy. Since 1978, China has carried out a transition from

planned economy to market economy and from extensive economic growth to an intensive one. This greatly promotes the shift of investment in advanced technologies and processes and the transformation of industrial structure to high value-added and low-energy intensified products. The share of service sector is growing in the economic structure.

- Energy conservation policy. Since 1980, China has successfully launched nationwide activities on energy conservation which resulted in an evident decrease of energy intensity.

- Energy price policy. A rise in coal price, oil price and electricity price gave an incentive to the energy consumers to take energy conservation and increase energy utilization efficiency.

Besides, the government also introduced energy conservation technologies, desulphurization technologies and implemented the system of SO_2 emission charge. In 1997, NEPA promoted a weekly report system on urban air quality. By April, 1997, 35 cities issued air quality report via the media, which aroused the attention of municipal governments, received more concerns from the public and increased the environmental awareness of the enterprises.

Case Three: Deforestration

4.3.1 Current State of Deforestation

China had abundant forest resources in history with a forest coverage up to 49% and 26% in Qing Dynasty. However, driven by short-term economic profits and due to lacking the awareness of forest protection, a large quantity of natural woods were destroyed. Currently, forest area is 0.13 billion hm^2 with a coverage of 13.93%, unevenly distributed and concentrated in north-east and south-west. The forest owned per capita is only 0.114hm^2, one sixth of the average world level.

In summer of 1998, China suffered sever floods in the Yangtze River, the Nenjiang River and the Songhuajiang River which lasted for about two months. It was estimated that the economic loss caused by floods was up to RMB 250-300 billion yuan, accounted for 3%-4% of GDP. One of the major causes was destruction of natural forests in the upper stream of the Yangtze River which resulted in soil erosion - culmulation of sands - lift of river bed - loss of capacity for flood control - unbalance of ecological environment. The rate of deforestation increased sharply. There once had thick coverage of forests along the Three Gorges in history, but the coverage is now only 7.5%-13.6%. In Heilongjiang Province, the coverage of forests decreased from 53.4% in 1949 to 35.55% in 1993. The size of tropical rain forest decreased from 0.9 million hm^2 in 1956 to present 0.24 million hm^2 . The coverage of natural forests dropped from 26% to 7.2%.

The Ministry of Forest (reorganized as the National Forest Agency during the state institutional reform in March, 1998) has the main responsibilities for the extraction, plantation and protection of forest resources in China. Not recognizing the ecological damages that may stem from deforestation, the forest sector had laid more stress on extraction than on afforestation under its guidelines. Since no price system was applied to wood extraction, the depletion of forest resources was not economically compensated and the funds for afforestation were not sufficient. The extraction rate was greater than the recovery rate for a long period. Presently, the share of matured and post-matured forest is 29% of the total forests.

Another factor for the destroy of forests is the expansion of agriculture land. In Hainan Province, the encroachment of forest areas, as a result of slash-and-burn cultivation practices, was up to 10,000hm^2 annually. Similar phenomenon occurred in Yunan Province and Heilongjiang Province.

Though wood extraction is controlled by the Government based on the Forest Law, illegal extraction is prevalence in some regions, especially on the borders of administrative regions where the execution of laws is vulnerable. The illegal extraction was once two times as much as controlled extraction.

In the transition from planned economy to market economy, forest sectors have been receiving less financial support from local governments. To support their huge administrative expenses for a large amount of staff team, they pursued short-term economic profits without giving respect to the long-term ecological and social value gained from forest resources. Another factor is because firewood is used as major energy in rural areas. When there were not sufficient firewood for farmers, they cut down trees as substitutes. It was once reported that the annual depletion of forests consumed as fuel was up to 30% of the total consumption.

Forest fire was another cause for deforestation. There are several factors for forest fires, however 90% resulted from inappropriate human practices. The fierce fire in Daxinganling Forest in 1987 was a disaster and resulted in great economic losses.

4.3.2 Agenda Setting

Ecologists and scientists in forest sector and environmental sector had recognized that the ecological and social value of forest resources are much greater than their economic value (about 8:1). Scientists have conducted many researches on the accounting of forest resources and submitted many proposals, such as proper pricing of forests, to the government.

Severe destruction of forests leads to ecological degradation, loss of biodiversity, desertification and frequent incidence of floods. Ecological deterioration becomes

one of main factors for poverty in some mountain regions and flooding areas. Victims began to accuse the forest sectors.

These have been received more attention from the government. Particularly after the severe floods of the Yangtze River and the Nenjiang River last year, the State Council convened forest sector, environmental protection sector, agriculture sector and scientists and ecologists for countermeasures against deforestation. On August 5, the State Council issued an emergent Circular on the protection of forest resources, which stipulates that wood extraction in the upper stream regions of the Yangtze River is forbidden and the affoestation by forest sector must be greater than their extraction. Scientists played a positive role in placing the issue on to the agenda.

4.3.3 Implementation

In 1979, the SCNPC designated March 12 as the National Treeplanting Day. In 1997, 2.5 billion trees were planted by voluntary activities. On Jan. 1, 1985, the SCNPC enacted the Forest Law, which stipulates the principle of afforestation and requires that the annual extraction rate must be less than the growth rate of forests, aimed at mitigating the forest deficit. The administrative and criminal punishment and fine on illegal activities are also defined in the Law.

Local governments established special organizations for the management of forest lands and resources. Local forest administrators appointed forest police in target zones, who are responsible for the supervision of illegal extraction. Inspection stations are set in each forest district to control wood extraction.

In the late 1970s, the Ministry of Forest began to promote 'five affoestation projects', *i.e.* 'Sanbei' shelterbelt, shelterbelt in the middle and down-stream of the Yangtze River, coastal shelterbelt, afforestation in plain region and afforestation in Taihang Mountain. Local forest sectors played important role in the construction of these projects. In 1997, 2.07 millions hm^2 of afforestation was achieved.

4.4 Policy Recommendations

The major contributor to achieving rapid economic growth in China is the industrial sector[4], of which the positive roles played by TVEs can not be neglected. For recent years, the share of annual industrial production made by TVEs in total industrial production has been up to 27%. However, pollution generated by TVEs has become growing factor for many environmental problems. According to a survey on TVEs' pollution sources made by NEPA in 1997, waste

4 The share of agriculture sector, industrial sector and service sector in the economic structure of China in 1996 was 20%, 49% and 31%, respectively.

water discharged by TVEs was responsible for 21% of the total industrial discharge in 1995. Table 2 also shows evidence of great contribution to air pollution made by TVEs. Compare to the levels in 1989, waste water discharge and emissions of SO_2, smoke and fine dust from TVEs increased 120%, 22.6%, 56.5% and 182%, respectively.

TVEs have not been included in the system of monitoring and pollution charge, which has become a major factor for their severe pollution. Therefore, to strengthen the environmental supervision on TVEs remains an arduous task for environmental protection in China.

Several administrative measures, such as shutting down and setting deadline for air and water pollution control, have been proved as effective ways for short-term controlling of TVEs' pollution and should be insisted. However, in a long-run perspective, restructure of TVEs' from heavy polluting sectors to clean and high-tech sectors should be given more considerations.

The system of pollution charge has been implemented since 1979 as a major economic incentive of environmental governance in China. The total levy collection increased from RMB 1.2 billion Yuan in 1986 to 2.7 billion Yuan in 1993. Though being the most complete system among developing countries, the system of pollution charge in China has not been adaptable to economic development under market condition. Low rate of pollution charges compared with the operating expenses of control facilities made it impossible to serve as an effective impetus for pollution control. On the other hand, the pollution charges are major financial sources of administrative expenses for most local EPBs. Bargains on pollution charges between EPBs and enterprises made the implementation of the system vulnerable.

To reform the system of pollution charge in China will be very important. Many researches have been conducted on what the scale of rate should be increased and on how to properly make use of levy collection as investment in pollution control. A representative of these studies is that co-conducted by the World Bank and Chinese Research Academy of Environmental Sciences.

Because China's environmental governance mechanism is huge and complicated, there exists great gaps among staffs at all levels in terms of capacity and environmental awareness. The capacity of town and county-level is general low which may influence the effectiveness of policy implementation. It is necessary to strengthen the capacity building of town and county-level EPBs.

Environmental governance in China relys mostly on command and control. During the transition period from planned economy to market economy, economic tools can also be fully applied. For example, the water price and electricity price, which are set and controlled by the government, are low without internalizing the value of resources. Policy failure and market failure for resources

and the environment which are public goods result in excessive depletion of resources and environmental deterioration. Therefore, economic tools should be taken into account in the decision-making process to encourage enterprises to raise productivity and save resources and energy conscientiously.

The basic feature of water environmental management in China lies in that SEPA is in charge of overall supervision and coordination and each institution has independent function and responsibilities. This kind of mechanism can make full use of initiatives of each sectors. However, it is difficult to coordinate among various sectors and fail to implement overall supervision. Cross-provincial disputes can not be settled easily and promptly. It is suggested that a powerful administrative body for river management be set up for major river basins.

On one hand, for a long period, Chinese government gave priorities on pollution control and neglected ecological protection and construction. Only recently, the government placed both pollution control and ecological protection onto its agenda. On the other hand, price distortion, in terms of high price of forest products, low price of resources and no price for the environment, can not properly reflect the ecological value of forest resources. Moreover, a complete management mechanism for forest protection has not been formed and there has no overall planning for forest protection.

It is suggested that the legislation for forest protection and implementation should be strengthened. Economic tools, such as ecological compensation charge or ecological tax can be used for changing the behaviors and pattern of consumption.

Public participation was proved in many countries a positive impetus for policy making and the implementation of environmental protection. Studies showed that the frequency of reporting by citizens in many cities was in direct proportion to the frequency of pollution accidents, as well as in direct proportion to the pollution charge collected by local EPBs. However, public participation is still limited in China. Raise of the public awareness and the establishment of public participation mechanism are important.

Many environmental problems are attributed to not addressing environmental considerations into the economic development plan. Environmental deterioration caused by improper economic policies may be irreversible and far-reaching. Therefore, it is necessary to implement EIA for major economic policies and for long-term national and regional development planning. Cost-benefit analysis, cost-effectiveness analysis and other tools can be used for the selection of optimal policy.

Experiences in the industrialized countries show that advanced technologies and intensive investment in pollution control are vital for the success of solving environmental problems. Efficient technologies are still not available in many developing countries. To address regional and global environmental issues, such

as acid rain and GHGs emissions, it is necessary to establish effective mechanisms for the transfer of cleaner technologies. Financial support provided by developed countries to developing countries on pollution control is also important.

The project of demonstration cities in China, a cooperative project between the Chinese Government and the Japanese Government, will be supported by loans of Japanese yen with a return period of 40 years and interest rate of 1.3% (0.75% for air pollution control). Comprehensive pollution control projects with special emphasis on air pollution control will be developed to improve the environmental quality in three selected cities, i.e. Guiyan, Chongqing and Dalian in the first stage. This kind of cooperation will be an good example for the transfer of cleaner technology and financial support.

Environmental education aimed at raising the environmental awareness is of importance. A series of courses have already been organized for directors in governmental agencies in China. Courses on environmental protection are set in primary and high schools. It is recommended that communication and cooperation on environmental education, especially designed for enterprises and the public should be promoted among Asian countries.

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Comments

Kenji Kamino

1. Tasks of Environmental Protection Policy in China

Ms. Xin's paper consists of four parts. The 1st part surveys process of environmental schemes and policies from 1950s to today. This shows us some frameworks for the environmental governance. The second part inquires each division and the third part analyses the current mechanisms of environmental governance in China. Lastly, the fourth part tries to study some cases, depending on her governance theory.

At the part 1, developments from 1972 to today are divided into 3 parts and each provides materials for analyzing the governance. As many writers point out, since the turning toward a line of Innovation and Opening in 1978, China experienced great changes of economy and politics. Especially in 90s, the tempo of that changing , of which period Ms. Xin calls the third division, is rapidly progressing. Today, the Chinese problem of environment holds multi-sided, and at the same time, multi-dimensional problems with it. As you know, China is now confronted with almost the same difficulties, with which Japan used to cope during these 40 or 50 years after WW II, even though it may be shorter than in other advanced countries. If we arrange some of these difficulties, three types of tasks can be easily identified. At the 1st, there exist environmental victims caused by the rapid industrialization and bad influence s of urgent urbanization. But at the same time, at the second, there remain disasters and population problems, which may be peculiar in China.

At the last, China is confronted with new problems, such like coping with acid rain, inflow of wastes to the land, and pollution caused by the foreign enterprises. Governmental system in China, which are needed to deal with these environmental difficulties, also have experienced big innovations in these days, and may be estimated that it has been active to turn its policy to internationalization, and has promoted legal arrangements.

Active as these endeavor may be, these are at only primitive stage and may need to solve many problems in order to function as a hopeful system to be expected

2. Marketization and Environmental Governance

At part 2, Ms. Xin tries to analyze how the economic developments in China, produced by the promotion of Socialism-Type Marketization, influences to the tasks of environmental protection. Here I would like to pay attention to the relationship between economic marketization and environmental governance. It may be also useful to inquire how the rise of productivity and urbanization may influence environmental governance. But, I can not help forcing myself to

focus on the following two points.

2.1 From Public Sectors to Private Sectors

Though it may be no need to repeat again, economic marketization in China means to transfer the subject of economic activity of public sectors to the newly created private sectors, and to arrange conditions for them. This movement may influence not only conditions of environmental pollution, but also methods of control of it. These mean new way of techniques to control the society, because they are not limited to a command and control mechanism in which have only been used in the public sector, but also mean regulation by law and further, new methods including economic incentives. It may be important for governance theory that the method of control became externalized and legalization of the way of control of society became a main task for them. Of course, it does not mean that in classic socialism era there did not exist environmental pollution, but probably they might not have enough knowledge on environmental suffers.

2.2 Role of Non-public Sectors

As Ms. Xin wrote in her paper, it is a very important theme too, what kind of role non-governmental organization, for example, private enterprise, may take, as marketization proceeds. In China there are no social mechanism in which private sectors like residents, NGOs, or enterprises can play an active role. We can pay attention to how Chinese people recognize these actors, or how they estimate their roles in order to tackle with the task of environmental protection. As you all know, it has been only a national government or a governing party that can make a legitimate judgement concerning with the public values and execute it. But is it necessary for Chinese people to turn their head to the pluralism on the legitimacy? I think it may be not so easy to introduce the plural way of thinking and to establish some mechanism to make use of it. In the environmental problem, it may be difficult to solve many tasks, only depending on an unitary system of judging, executing, and estimating various policies. Here it may be indispensable for each sectors, public or non-public, to co-operate with each other. In this case what kind of roles can or shall non-governmental sectors take?

As such, in considering environmental governance in China, it might be one of main factor to inquire the roles of private enterprise, residents or NGO, as well aslocal governments. The words of decentralization or autonomy may be recognized as significant conception in the Socialism - Type Market. It is because that these phenomena are inevitable result of marketization of economy.

3. Execution Mechanism of Law and Environmental Governance

Though we may recognize new roles of private sectors in environmental governance, it is undoubtedly evident that the central government should be given the most significant part as an actor in environmental governance in this country. It has been a fundamental task for this country to establish Rule of Law as a system of a regime, and many statutes or regulations are promulgated. As Ms. Xin reported, promotion of law reform is one of great gains in China. But to make many laws does not automatically mean a victory of Rule of Law. It is only a primary step. If making laws reaches a certain level, it will be necessary to strengthen the system to execute these laws. By such an endeavor, it will become possible for China to canalize a separation between law and real life of the people, to increase the confidence of the people to their government, and finally to strengthen the consciousness of observance of law.

Ms. Xin pointed that lack of bottom up style of decision making caused loss of proper or reasonable decisions in China. That seems good point in considering how a government can improve its achievement. In order to promote the quality of environmental governance, frequent exchange of information, even in the same organization, or publicity of information will be required. Through such a system, more efficient society for environmental protection seems to be realized more easily.

Ms. Xin clearly indicated many current conditions of environmental governance of this country. I have learned many things from her work.

Environmental Governance in Japan

Mineo Kato

The objective of this report is to discuss the current status of environmental governance in Japan and expose its problems by examining environmental policies and how they are currently used by each actor, including state and local governments, private sector, citizens and NGOs, in dealing with environmental problems.

Chapter 1 will present a historical overview of Japan's environmental policies from the 1960's with an explanation of the current status. Chapter 2 will briefly introduce the land and natural environment of Japan, its industry and economy as well as citizens' lives.

Chapter 3, the main part of this report, will be divided into sections for each actor who plays an important part in making environmental policy and implementing it. Each section will introduce the role of each actor in order to fully present the current status of environmental governance in Japan. Chapter 4, focusing on the global warming problem which is recognized in Japan as the most serious and difficult environmental problem, will examine as a case study actions presently taken by each actor, identify problems with current policies and determine tasks to be completed. The chapter will conclude with some recommendations for improving current environmental policy.

1. The History and Current Status of Environmental Governance in Japan

In this chapter an overview of the history and current status of Japanese environmental policy will be presented. We will take a look at changing environmental policies in Japan, starting with its response to serious pollution problems in the 1960's, followed by the implementation of policies on pollution control and conservation of the natural environment and ecological systems, and finally leading up to Japan's action against global environmental problems such as climate change.

1.1 History and Current Status of Environmental Pollution

1.1.1 Relieving Victims to the Prevention of Pollution

Japan's early action against pollution problems in the 1960's dealt with the serious contamination of the air and water and diseases caused by the pollution. The first extraordinary step was to relieve victims who suffered from diseases caused by pollution. After a series of civil suits claiming damages, a legal principle in tort cases was widely accepted whereby companies that caused pollution would be responsible for civil compensation. Administrative policies directed at relieving the plight of pollution victims were also implemented to ensure swifter

action.

At the so called “Pollution Diet” in 1970 the Basic Pollution Policy Act was enacted in order to respond to increasing pollution problems and, after reviewing existing laws, a total of fourteen pollution related laws were either enacted or amended. However, anti-pollution matters at that time were handled by several different ministries. For example, the protection of citizens’ health was under the Ministry of Health and Welfare and the regulation of private companies causing pollution was under the Ministry of International Trade and Industry. Under such circumstances it was difficult to promote more comprehensive and preventive measures against pollution, and thus in 1971 the Environment Agency was established in order to comprehensively administer pollution control and serve as a liaison to other ministries that deal with environmental issues.

The core of these new anti-pollution policy measures was the establishment of environmental standards and emission regulations. Since the implementation of these policies we have witnessed a conspicuous reduction in air and water pollution and related diseases that accompany such pollution in areas previously identified as being polluted.

However, environmental pollution problems have not been solved completely. Whereas air pollution caused by fixed sources such as factories has decreased, pollution caused by moving sources such as automobiles has increased and many cities have not yet achieved acceptable levels of air quality according to approved environmental standards. Emissions of the more easily controlled pollutant, sulfur oxide (SO_x) has been surpassed by greater emissions of the less easily controlled pollutant, nitrogen oxide (NO_x), posing even greater problems for the environment. Water quality must still be improved although cases of contamination by specific agents and resulting pollution related diseases have become rare. It is also noted that a new problem has arisen where substances exuded from waste disposal plants are contaminating rivers and soils.

Under such circumstances new environmental steps should be taken towards prevention of environmental pollution. Among these measures the environmental impact assessment and PRTR (Pollutant Release and Transfer Report) seem to be the most remarkable.

1.1.2 Individual Lawsuits for Damages and Implementation of a System to Award Compensation to the Victims of Pollution related Diseases

In Japan an industrialization policy favoring the development of the petrochemical industry, heavy industry and chemical industry was implemented in the mid 1950’s. As the result of such developments, the country suffered serious air and water pollution and many cases of health hazard problems during the 1960’s. Such problems included bronchial diseases (*i.e.* Yokkaichi asthma)

caused by air pollution near petrochemical complexes and heavy industrialized areas, a central nervous system disorder (*i.e.* Minamata disease) caused by organic mercury contained in the drain off from chemical plants, and bone disease (*i.e.* Itai-Itai desease) caused by cadmium contained in the drain from mine located upriver.

Victims of such diseases did not receive any compensation except for some medical relief from local governments. Thus the victims had to file civil suits in order to claim damages against companies that caused pollution through their operations. The plaintiffs had won all the pollution lawsuits since 1971 and a legal precedent in tort cases (Polluter Pays Principle: PPP) was established ordering polluters to take responsibility for compensating victims of pollution related diseases.

Although the victims won their cases, the ordeal of a time consuming and costly trial process proved to be only a further detriment to the victims health and so the establishment of new administrative measures that would relieve victims more promptly and effectively without going to court was seen as a necessity.

In 1973 the Pollution Related Health Damage Compensation Act was enacted to reflect this necessity. By this act companies found to be a source of specific pollution related health maladies were taxed depending on the amount of pollutant emissions and the fund was used to compensate pollution victims. At the beginning the use of the fund was limited to compensating medical expenses incurred by pollution victims. After several amendments, the act now assures both medical and welfare benefits that compliment social insurance benefits.

1.1.3 Regulations on Polluting Activities and Financial Aid for Emission Reduction

The core measures taken against environmental pollution problems such as air and water pollution were regulations on emissions and financial support in the form of subsidies or tax reduction to companies committed to reducing pollution.

As an anti-air pollution measure, a set of Emission Standards for individual pollutants was set (density regulations) along with the Air Quality Standard, a standard for ideal air quality. Regular inspections were conducted and compliance to the regulations was enforced according to this emission standard. In the areas where there were many facilities causing pollution, special standards were determined according to the total amount of emissions in the area, since it would be nearly impossible to achieve the environmental air quality standard in such areas even if each facility complied to normal regulations. In each of these specified areas the pollution reduction target was determined by the total amount of pollution in the area and Total Amount Regulations, different emission standards stricter than those used in other areas, were then enforced.

While establishing such regulations, most laws such as the Basic Pollution Policy Act , the Air Pollution Prevention Act and the Water Pollution Prevention Act had financial support provisions such as subsidies and tax incentives to companies for pollution reduction so that they could readily comply with the regulations. This type of financial support measure has been incorporated into the Basic Environment Act which is the foundation upon which Japan's environmental policies today now rest.[1]

Although providing companies with financial assistance for pollution reduction may be considered a sound industrial policy, it may not ring so clear when it is tied to the Polluter Pays Principle. Some say that, instead of giving financial aid to companies, they should be charged special environmental taxes as long as they are polluting the environment. The Japanese government has not yet seen fit to implement such measures.[2]

1.1.4 Pollution Prevention by Environmental Planning and Impact Assessment

Planning preventive measures against pollution problems is essential to the promotion of any comprehensive environmental policy. Planning should focus on determining environmental plans and assessing the environmental impact of each project.

Some local governments have implemented area plans focusing on environmental conservation. In 1993 when the Basic Environment Act was enacted it became mandatory for the state government to establish their basic environment plan, and so a national Basic Environment Plan was developed in 1994.[3] Four fundamental principles of the plan are the cyclical system of nature and our life, the necessity of coexistence, full participation by all sectors and people, and promoting global environmental policy. Local governments are currently working on their own environment plans for their respective areas.

The implementation of environmental impact assessment on the national level had been delayed since 1983 when the proposed environmental impact assessment bill was scrapped. Because of this, national level assessment was merely guided by an agreement made by the Cabinet on some of the large scale projects (so called "Cabinet Agreement Assessment"). However, many local governments had already implemented their own assessment systems by establishing regulations or guidelines. In this respect environmental impact assessment as a preventive measure had already taken root in the country.

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1 See the Basic Environment Act, Article 22, Section 1.

2 The effectiveness and possibilities of such measures are described in the Basic Environment Act, Article 22, Section 2.

3 The Basic Environment Act, Article 15.

When the Environmental Impact Assessment Bill was enacted in 1997, basic concepts and procedures of assessment were finally standardized. Some important measures such as alternative plans which lacked Cabinet Assessment were announced, examined and incorporated into the act, though insufficient. Actual implementation of the assessment based on the aforementioned act will begin in 1999. It should be noted how effective it will be for prevention of environmental problems.

1.1.5 Environmental Hazards and Public Information Access

The OECD is currently promoting the Pollutant Release and Transfer Report (PRTR) for adoption. The purpose of PRTR is to assure proper management and disposal of chemical materials that can cause harm to human organisms and the environment by compiling and classifying information on how such chemicals are used in industries and how they are disposed of after use.

The PRTR system should be effective in preventing environmental pollution caused by harmful substances used in industrial activities and any resulting harmful byproducts. However, industries are anxious about publicizing such information because it may compromise corporate secrecy of manufacturing processes. Many companies also believe that publicizing their handling of harmful substance has a negative impact on their corporate image. For these reasons the PRTR has not been widely implemented.

1.2 History and Current Status of Nature Conservation

1.2.1 Changing Environmental Awareness

In Japan, a country blessed with a rich natural environment, mild climate and moderate precipitation, people have historically adapted their lives to their surroundings. They shared a common view toward nature, respecting and studying its divine nature, working harmoniously to make effective use of the bounty of nature, always complying with the laws of nature while holding its menacing power in awe.

It would seem that the period of rapid economic expansion since the end of World War II has broken this bond between people and the natural environment. The majority of people have moved to big cities[4] and the foundation of the economic structure has shifted from agriculture, forestry and fisheries to heavy and chemical industries and commercial service industries.[5] With this shift came

4 According to a 1995 census survey, 40% of the total population live in the three metropolitan areas which consist of less than 10% of the total land area.

5 The number of workers in primary industries, which consisted of nearly 50% of the total number of workers immediately after World War II, has now declined to 6%.

a change in people's lifestyle and their lives became more and more alienated from the natural environment. Economic growth made Japan a more materially affluent society but made the people less and less conscious of their natural environment. Technological developments which have enabled man to better handle natural disasters such as storms and floods have caused him to lose their awesome fear of nature's power. This weakened bond between man and nature has opened the way for further unchecked development and diminishing natural environment.

Environmental awareness is once again on the rise in Japan. Global environmental problems, such as global warming, have brought it to the forefront of people's minds. This is also evidenced by recent trends in outdoor recreation activities and changing lifestyles of city dwellers seeking nature in their daily lives.

1.2.2 Wildlife Conservation : from Hunting Control to the Preservation of Species

The history of wildlife preservation in Japan, like many other countries, began with the implementation of hunting regulations. In 1918 "the Act on Birds and Beasts Protection and Hunting" (the Birds and Beast Protection Act) was established. It implemented a licensing system for hunting and regulated areas and methods of hunting for all kinds of birds and beasts living in Japan. This law has provided the basis for wildlife preservation in Japan. As more kinds of species had been added to the list of animals and plants to be protected, it became necessary to establish other laws besides the Birds and Beasts Protection Act.

The Natural Monuments System (the Cultural Heritage Protection Act) was established to protect specified plants and animals and their habitats. Until 1998, 191 animal species and 533 kinds of plants have been designated as National Natural Monument under this system. Local governments can establish their own Natural Monuments Systems to protect specific plants and animals in their area. These types of conservation system, however, can only protect a limited number of species and their habitats.

"The Act on Preserving Endangered Species" (the Species Preservation Act), which came into effect in 1993, aims to systematically preserve endangered species living both domestically and overseas in order to maintain specific diversity and entire ecosystems. Hunting, taking and harming animals and plants is regulated under this act. Habitat protection is incorporated into the act and artificial reproduction of endangered species is also introduced. Until 1997, 51 species had been designated for preservation, but only five areas are designated for preservation of four kinds of species and their habitat. Land use and proprietary rights have made it difficult to claim certain areas for preservation.

After the United Nations' treaty on biological diversity was concluded, "the National Strategy for Biological Diversity" was proposed in 1995, with two long-term objectives: 1. To preserve and sustain diversity of existing species; 2. To seek preservation of diverse interrelationships among species as well as conservation of protected areas for the reproduction of species.

1.2.3 Expansion and Improvement of Protected Areas

Although it is not widely known, 14.1% of total area in Japan is designated as natural parks (national, semi-national and prefectural parks). There are some other systems for preserving the natural environment such as the Natural Environment Conservation Areas System, the Wildlife Protection Areas System, the Natural Monuments System, the Wildlife Habitat Conservation System, and the Forest Preserve System within the National Forest.

Areas within these systems are designated by governmental order and some development activities are regulated. However, when it comes to maintaining these designated areas, unlike publicly owned nature preserves where the authority for maintaining the area is assured, interests of both owner and the user must be negotiated, hence making it difficult to provide adequate maintenance in terms of nature conservation.[6]

Several preserved forests within National Forests are under the control of the Forestry Agency and with their strong management authority are potentially good sites for effective nature conservation. The main purpose of maintaining National Forests is shifting from production of lumber to conservation of natural forests for several reasons. The production and sales of domestic lumber have declined due to price competition from overseas, creating a deficit for the National Forest operation, and the need for environmental conservation is rising. It is expected that expansion of the Forest Ecosystem Preservation Area will play an important role in the conservation of the natural environment. The only concern is that, since such forest preservation systems are not based on specific laws but are rather part of forest management plans under the control of the Forestry Agency, it is possible for such systems to be easily abolished should there be a shift in the Forest Agency's policy.

1.2.4 The Future Agenda

In order to promote nature conservation in terms of preservation of ecological systems, it is essential to assure protection of areas where animals and plants can inhabit and reproduce. In addition to designating natural preserves it is necessary to maintain the environment around the preserves such as the water

6 Natural parks in the U.S. and Canada are typical examples of such areas.

purity of rivers, lakes, marshes and seas, reduce air pollution and regulate human factors such as noise, vibrations and artificial lights near the area.

However, establishing a designated nature preserve even in a small area can create many social problems such as conflicts with the landowner or user. Furthermore, if the water and air quality of the area is going to be controlled, it will make the situation even more complicated.

The National Strategy for Biological Diversity suggests appropriate objectives for conserving ecological systems but is unclear on how to achieve these objectives and necessary administrative and social actions.

1.3 Responding to Global Environmental Problems

1.3.1 Global Warming

Prior to the United Nations Conference on Environment and Development (UNCED, 1992, Rio de Janeiro) and adoption of the United Nations Framework Convention on Climate Change (UNFCCC), in 1990 Japan developed the Action Plan for Global Warming Prevention in order to deal with the problem. In 1997 Japan hosted the third conference of UNFCCC (COP3) at which the Kyoto Protocol was adopted.

The national government is currently working on amending energy-related laws and implementation of new laws concerning global warming problems in order to reduce CO_2 and other greenhouse effect gases (GHGs) emissions down to the level set by the Kyoto Protocol.

NGOs, although not very active in Japan, are responding to the global warming problem and their opinions on the international framework and domestic policies are influencing governmental decisions. Private sectors also responded quickly with various initiatives such as energy conservation in their business operation, manufacturing energy efficient products, promoting solar power generation and taking initiatives on overseas afforestation projects.

1.3.2 Tropical Forest Conservation

Japan, one of the biggest importers of tropical forest lumber while at the same time a host country of the International Tropical Timber Organization (ITTO, headquartered in Yokohama), should be in a position to have both interest and responsibility concerning preservation of world forests especially tropical forests.

Today the Japanese government along with Canada and the U.S. participate in meetings of non-European countries regarding setting standards and an index for management of sustainable forests as well as engaging in technological

cooperation in forestry between Japan and other countries in South East Asia, Oceania and South and Central America. Among all the member nations the Japanese government is the largest contributor to the ITTO.

In Japan public awareness as to the need for tropical forest conservation is seemingly low. One of the reasons for this lack of concern may be that, as a result of price competition between domestic and imported lumber, the felling of domestic trees has been reduced. Ironically people do not realize that a large number of trees are now being cut down overseas instead and globally forests are disappearing. Since lumber is mostly used as a construction material or consumed as processed goods such as paper and wooden products and does not usually touch the hands of the public, the end consumer, citizens do not take actions that are directly linked to the tropical forest conservation even if they are concerned.

Some trading companies, however, are taking the environment into consideration when importing lumber. Some construction companies and paper manufacturing companies are attempting to reduce the amount of lumber used and are concerned about the environmental situation of the countries which produce lumber. These companies pay special attention to the "Forest Certification System" and the recent trend in labeling on lumber and lumber products aimed at maintaining a "Sustainable Forest" through careful forest management.

Some NGOs have participated in tropical forest preservation and reforestation and through individual support to these NGOs public interest in tropical forest preservation is rising.

2. Land, People and Industry of Japan

2.1 Land and Natural Environment

Japan is located in the monsoon zone of the eastern coast of the Asian continent, and the total land area is 377,836 square kilometer. Over two-thirds of Japan is covered by mountainous terrain, and alluvial plains occupy only 13 percent. The notable features of the climate of Japan are the wide range of yearly temperatures and the large amount of rainfall. However, because of the complexity of land configuration, there are numerous regional differences throughout the seasons.

2.2 Population, Demography and Living Area

Japan's population is 125 million, the seventh largest in the world. Japanese population is aging faster than any other country in the world, becomes a situation that is causing serious problems to Japanese society. The percentage of Japan's population aged 65 or over was only at the 7 percent level in 1970s, it

reached 14 percentage in 1995. With rapid economic growth during postwar period, there was a strong tendency towards regional concentration. As a result, more than 40 percent of Japanese live in the three major city areas of Tokyo, Osaka, and Nagoya.

2.3 Industry and Economy

2.3.1 Scale of the Economy

The Japanese economy is the world's second largest market economy, with a gross domestic product (GDP) of US $ 5 trillion in 1995. In the same year, per capita income was more than US $ 30,000. This high-income scale was achieved largely due to high economic growth from the mid 1950's to the late 1960's. After the end of the 1986 to 1991 boom period known as "bubble economy", the economic growth slowed drastically and Japan has fallen into a state of recession.

2.3.2 Industrial Structure

The rapid economic growth resulted in significant changes to Japan's industrial structure. Production shifted from a heavy reliance on agriculture and light manufacturing to a focus on heavy industry and, increasingly, services. In the mid 1950's, the primary sector still accounted for 24 percent of output and 37 percent of labor force; in contrast, manufacturing accounted for only 24 percent of output and 19 percent of employment. Then in 1995, 6 percent of labor force was in primary sector occupations, 33 percent in secondly, and 61 percent in tertiary.

2.3.3 Energy Consumption and Efficiency

From the mid 1960's to the early 1970's, rapid economic growth also led to 10 percent average annual increase in energy demand. During the same period, there was shift from coal to oil as an energy source. Japan's dependence on imports for its energy supply rose over 90 percent. Because Japanese corporations positively initiated the development of energy saving technologies facing the oil crisis in 1970's, Japan has become the most energy efficient country. In 1995 amount of energy consumption per capita was 3,573 kilogram, which was less than half of the USA.

3. Current Status of Environmental Governance Mechanisms

In this chapter the current status of environmental governance in Japan will be summarized, describing the actors that are playing important roles in planning and implementation of environmental policies. The three areas of environmental problem to be focused on are environmental pollution (air and water pollution),

nature conservation (preservation of natural environment and ecological systems) and global environmental problems (global warming).

3.1 The State Government

3.1.1 Role of the State Government in Environmental Governance

Environmental policies at national level involve the establishment of environmental laws and nationwide implementation of them through the administrative systems. Their fundamental principles are manifested in the Basic Environment Act enacted in 1993.

Environmental administration in national level is under the control of the Environment Agency as it is stated in article 3 of the Environment Agency Establishment Act: The duties of the Environment Agency is to prevent pollution, to conserve the natural environment and to promote comprehensive administration of environmental conservation in order to contribute to and assure citizens of sound and civilized lives. The main role of the Environment Agency is to act as an administrative liaison for other ministries that deal with the environment. Since the Environment Agency does not always has absolute authority over other ministries, there are cases where the agency cannot act in the most effective way in order to ensure the conservation of environment.

3.1.2 Policy and Measures against Environmental Pollution Problems

The government has implemented several acts in order to deal with typical environmental pollution problems such as the Air Pollution Prevention Act, the Water Pollution Prevention Act, the Vibration Regulation Act, the Noise Regulation Act, the Odor Prevention Act and the Soil Pollution Prevention Act. The Basic Pollution Policy Act (enacted in 1967) laid the foundation for anti-pollution measures and was in effect until it was replaced by the Basic Environment Act in 1993.

Some of the major anti-pollution measures that have been enacted are the setting of environmental standards, regulations on emissions of each pollutant and noise levels and financial assistance for achieving standards such as subsidies and tax reductions. Such actions are supposed to be national affairs but air and water pollution management is entrusted to local governments as delegated affairs. This delegation system, however, has come under fire and is one of the important issues to be discussed as government authority become further decentralized in the future.

As described in section 1-1-2, establishment and operation of the pollution victim compensation system, providing pollution victims with adequate medical treatment and welfare was a significant factor in instigating national action

against environmental pollution problems. Although it seems that the need for such compensation system is no longer in great demand as severe environmental pollution have decreased, developing appropriate compensation measures is still essential to safeguard the public from any further pollution problem, should it arise.

Management and handing of various chemicals that can cause harm to humans and the environment is recently arisen environmental problem that requires urgent countermeasures. The OECD has already suggested the implementation of the Pollutant Release and Transfer Report (PRTR) to deal with such problem and the Japanese government has adopted a preliminary pilot project prior to implementing PRTR.

3.1.3 Steps toward Nature Conservation

In order to protect wildlife and the natural environment, the Environment Agency is in charge of operating conservation systems based on various laws such as the Natural Environment Conservation Act, the Natural Parks Act, the Hot-spring Act, the Birds and Beasts Protection and the Species Preservation Act as well as implementing other miscellaneous projects that are not necessarily based on a specific law.

Since the Environment Agency does not have jurisdiction over most of the land necessary for nature conservation, establishment and management of natural preserves such as Natural Parks (national parks, quasi-national parks and prefectural natural parks) and Wildlife Habitat Conservation Areas relies upon merely the designation of the areas and regulation on some development within the areas. In this respect such style of nature protection is not sufficient in terms of the conservation of entire ecological systems.

While some precious wildlife and natural areas deemed to have academic and social values are protected as National Monuments by the Cultural Heritage Protection Act under the jurisdiction of the Agency for Cultural Affairs, such a method of protecting specific individual species and landscapes does not contribute to the conservation of the entire ecological system.

Many of the major natural environment areas in Japan are located in National Forests controlled by the Forestry Agency and most of them are designated as nature conservation areas such as Natural Parks or Natural Monuments. The Forestry Agency has recently made a drastic change in its policy regarding National Forest management shifting from lumber production to environmental protection and is promoting preservation of the natural environment by establishing Forest Ecosystem Preservation Areas within National Forests.

“The National Strategy for Biological Diversity “ implemented in 1995 emphasizes the preservation of diversity of existing species and conservation of

protected areas to sustain the diversity. However, only a few specific actions to achieve such goals have been taken.

In addition to domestic actions toward nature conservation, the government has participated in international initiatives such as the World Heritage Convention and the Ramsar Convention.

3.1.4 Policy and Measures against Global Environmental Problems

The Japanese government has been actively participating and promoting many global environmental policies such as global warming prevention, ozone layer protection and the preservation of worldwide biological diversity.

Japan has enthusiastically entered international treaties such as the Ozone Layer Protection Treaty (1985) and its Montreal Protocol (1987), the UN Framework Convention on Climate Change (1992), the Biological Diversity Convention (1992) and the Environmental Protection Protocol to the Antarctic Convention (1997) and is further developing international measures (*e.g.*, hosting COP3 of UNFCCC in which the Kyoto Protocol was adopted).

Relevant domestic laws are being amended in order to comply with the purposes of the above-mentioned treaties. For instance, manufacturing and use of specified freon gases (CFC) is now regulated based on the Ozone Layer Protection Act and some amendments were made to the Energy Conservation Act in order to deal with the global warming problem and to achieve the standard of CO_2 emissions reduction enforced by the Kyoto Protocol (6% less than 1990 standard). In 1998 the Act to Promote Global Warming Policy (the Global Warming Policy Promotion Act) was enacted and set the basic national policy to address the problem, although specific actions have not yet been taken.

3.1.5 Trends and Agenda

A noteworthy trend in the implementation of environmental measures at the national level is the argument on who (or which ministry or agency) is going to take important part. Previously the Environment Agency would give advice with respect to environmental protection to other ministries and agencies that handled affairs in development and industries such as the Ministry of Construction, the Ministry of International Trade and Industry and the Ministry of Agriculture, Fisheries and Forestry. Although this scenario still applies to the current relationship among those ministries, there seems to be some changes in the handling of specific environmental problems.

For example, after COP3 when amendments to laws and regulations dealing with global warming were considered, there was an apparent conflict between the Ministry of International Trade and Industry which favors more of an energy

related approach and the Environment Agency which seeks more comprehensive measures.

Since most areas of public land within Natural Parks and other nature preserves are located in the National Forest, the Forestry Agency which has been committed to cutting trees for commercial profit and the Environment Agency which has historically advocated environmental protection would often find each other on opposite sides of a philosophical fence post. As the Forestry Agency changed its policy to one of environmental protection, their philosophical confrontation shifted to a turf battle over who should take the initiative in nature conservation. After the recent amendment of the Rivers Act, incorporating some environmental concerns, the Ministry of Construction under which major rivers are administered has stepped into the fray handling conservation issues related to rivers.

Such rivalry among ministries and agencies is another example of their traditional struggle for authority. But this attention to environmental problems can have positive effects on environmental governance. It is seen as a step toward more positive policy integration in environmental administration. The competition itself may have a effect to improve the quality and standards of environmental administration. However, there is a fear that in such a situation the administration of environmental affairs could become so decentralized and powerless as to render it completely ineffective. In either case it is noteworthy that environmental issues have become so important that their handling is contended for among ministries and agencies.

3.2 Local Governments

3.2.1 Policy and Measures against Environmental Pollution Problems

Local governments played an important role in preventing pollution during the time when the state government had not come up with sufficient anti-pollution measures to deal with serious air and water pollution. Many anti-pollution measures proposed by local governments are remarkable for their resourcefulness and ingenuity. For example, regulating the total amount of emissions as a countermeasure to air and water pollution was initiated by local governments in Yokkaichi, Osaka and Kanagawa where such problems were of an urgent matter.

One of the most remarkable aspects of local governments' anti-pollution actions is the pollution prevention agreement between a company and a government in order to prevent pollution. The agreement prescribes responsibilities of companies and regulations on their industrial activities such as regulations on pollutants including soot, smoke, drainage, noise, vibration and offensive odor. It also includes administrative inspection and operation shutdown as a punitive measure in case of contract violation.

The reason local governments used such measures was because local governments, especially municipalities did not have adequate authority over pollution control. Since the harmful influence of pollution problems on residents had to be urgently dealt with, instead of using administrative power for imposing regulations on companies, local governments had no other choice but turning to making agreements with them. Another reason was that, unlike imposing regulations by laws, making agreements allowed local governments to be flexible when dealing with each company depending on their situation and consequently was considered to be a more effective anti-pollution measure when applied locally.

Today when local governments develop their own anti-pollution measures, especially when they try to establish new regulations, they must be careful not to deviate from national laws. Local governments are allowed to establish new regulations if they include an item over which local governments' authority to enact an ordinance is not regulated by national laws or if they are different from the existing regulations prescribed by national laws. (This is often referred to as "yokodashi" or supplemental) It is now widely argued whether or not local governments should be allowed to establish new regulations that are stricter than existing regulations set by the national government (often referred to as "uwanose" or add-over).

Although amendments to the Air Pollution Prevention Act and the Water Pollution Prevention Act (1970) allow prefectural governments to add stricter regulations to the existing ones set by national laws regarding air and water pollution, it remains necessary to develop rational guidelines regarding national and local governments' authorities over environmental issues. Regulations with national standards are not necessarily adequate to all conditions and situations. As the result, stricter and wider pollution regulation by local governments is required according to the social and environmental conditions of each area. Such local regulations therefore should be respected validly.

Similar problems can be seen in the implementation of environmental impact assessments. Many local governments had already implemented their own assessment programs before the national government finally enacted the Environmental Impact Assessment Act in 1997. Some of the assessment programs developed by local governments are more advanced than the requirements described in the National Assessment Act in terms of the range of target projects and residential participation. Adjustments should be made prudently to both local governments' assessment systems and that of the state government in order to balance them out.

3.2.2 Steps toward Nature Conservation

Local governments have been making steady effort toward environmental

protection. All 55 semi-national parks and 304 prefectural parks are managed by prefectrual governments. Although generally speaking their administration standards are not the best, some prefectures are more advanced in their park management than the management at national parks. Environment related sections of prefectural governments have also been in charge of the management of certain areas of national parks in cooperation with the state government.

3.2.3 Responses to Global Environmental Problems

In their efforts against global environmental problems, some local governments have been offering technological and financial assistance as well as personnel education to developing countries mainly in Asia in their environmental projects.

An increasing number of local governments are concerned about the global warming problem and are implementing countermeasures. Another recent trend is that many local governments are seeking approval for ISO14002 (the Environment Management System) in a shift towards more comprehensive environmental protection measures.

3.3 Private Sectors

3.3.1 Changing Attitudes to Environmental Pollution Problems

When the first serious pollution problems arose in Japan, companies and industries were not very cooperative in dealing with such problems. As the defendants in civil trials for compensation of pollution related damages they strongly denied charges. Companies were offended by new regulations to reduce pollution. On the other hand, citizens and communities strongly criticized the companies that were causing pollution. The Polluter Pays Principle (PPP) as suggested by the OECD fostered the idea that a polluter is responsible for all the expenses necessary to clean up polluted sites. In Japan it would seem that this principle was regarded as “the Polluter Punishment Principle”, i.e., a polluter must be punished.

This situation gradually changed in time and private sectors became willing to negotiate with governments and citizens regarding pollution prevention. For instance, companies responded positively to making agreements with local governments on pollution prevention. (See section 3-2-1: Policy and measures against environmental pollution problems.)

Today, as severe pollution problems which arose in the 1960’s are almost resolved and public awareness of the environment rises, companies are very careful not to be pointed to as a polluter and more readily agree to settle their difference out of court in order to avoid being labeled publicly as a polluter.

Besides such a change in attitude, there has been another remarkable trend in the private sector. Companies are incorporating pollution prevention into their corporate projects, using a new PPP principle, *i.e.*, "Pollution Prevention Pays".

However, many companies are still unwilling to publicize the impact of their industrial activities on the environment as described in sections 1-1-5: Environmental hazards and public information access and 3-3-4: Effect of ISO14001 "Environmental Management System."

3.3.2 Participation in Nature Conservation

The private sector has not yet largely contributed to nature conservation since development in their corporate sense means destruction of the natural environment and new development is yet continuing to diminish natural areas and wildlife habitats.

Some companies, however, have started participating in nature conservation activities in order to appeal to the environmental consciousness of consumers and promote a better corporate image. Many companies donated funds to NGOs promoting nature conservation, but this trend has been declining due to Japan's recent sluggish economy.

There are some companies that are engaged in nature conservation activities through afforestation and the maintenance of nature preserves. One power company, for example, has an ownership to land within a famous national park. This property has been owned and managed as catchment area of a river needed to run hydraulic power plant downstream. Today, the power company advertises their effort in maintenance and management of the natural environment of the area through their subsidiary company.[7]

However, nature conservation activities by companies are limited to only the ones that help to improve their corporate image among consumers. Information on the negative environmental impact caused by companies and industries hardly ever reach the public. In order to get more accurate information about companies' involvement in nature conservation, both their effort in nature conservation and the impact of their activities on ecological destruction must be examined and evaluated. For this concern, attention must be paid to the effect of environment management systems in the private sector such as ISO14001 and especially the environmental ordinance system outlined in it.

3.3.3 Responses to Global Environmental Problems

The Federation of Economic Organizations (FEO or keidanren), an organization

7 Many areas within natural parks (even in national parks) are privately owned since the natural parks system in Japan is based on the designation of areas and regulations on some developing activities within.

of leading industries in Japan, developed the FEO Global Environment Charter in 1991 and manifested global environmental principles from industry's point of view. The charter asks industries for environmental consideration in their every industrial activity as well as active participation in environmental protection, applying the latest information and appropriate technologies in both domestic and overseas operations, especially in developing countries.

One of the most remarkable actions against global environmental problems by the private sector is their effort to deal with the global warming problem. The Federation of Economic Organizations identified objectives for each industry in its "Voluntary Action Program" and is working toward their achievement. One manufacturer of automobiles, which are the primary source of CO_2 emissions, recently started a large scale afforestation project in Australia in cooperation with some trading companies, aiming at offsetting the CO_2 emissions of the company and the cars it produces and preparing for future negotiation concerning CO_2 emission rights. This type of overseas afforestation project is becoming popular among industries.

Another trend is that companies are competitively developing new business plans that are directly linked to the solution of the global warming problem. Some of the examples for this are improving energy efficiency of automobiles and appliances, production of new types of energy such as solar power, recycling businesses and manufacturing of new types of vessels aimed at future demands for improved fuel efficiency.

Private sectors have not yet taken many actions against other global environment problems besides global warming. Although some trading companies and construction-related companies take the environment of lumber producing countries into consideration when importing lumber and lumber products, effective environmental measures with respect to lumber production (forestry) industries have not been implemented yet since environmental management systems like ISO14001 are not widely used in forestry on a global basis.

3.3.4 Effect of ISO14001 "Environmental Management System"

The environmental management system "ISO14001" (or "ISO14000 series") issued by the International Organization for Standardization (ISO) has been very influential on environmental projects undertaken by the private sector. The system is used by individual companies for evaluating the negative environmental impact of their corporate activities in an effort to reduce such impact. Acquiring the ISO14001 certification is optional but many leading Japanese companies are rushing to get one since in the past they made a late start in acquiring ISO9000 "Quality Management System" and got an unexpectedly severe blow in the international market for it.

Unofficial data shows that as of July 1998 the number of ISO14001 certifications acquired totals 5,147 by 55 countries and regions and Japan holds the highest number at 1,018, far over the number acquired by England and Germany, both have about 630-650.[8]

The reason for ISO14001's popularity can be explained by the fact that a company with ISO14001 has a better corporate image and without ISO14001 a company can be ostracized in business transactions. The number of company acquiring ISO14001 is rapidly increasing because big companies which already have ISO14001 are asking their business partners to get one also.

Such initiatives where companies take voluntary actions against environmental problems is desirable. However, the current environmental management system by ISO does not require companies to publicize the environmental impact of their corporate activities. Since disclosure of companies' environmental performance is not mandatory, it is difficult to compare the environmental impact caused by companies with their efforts to improve environmental performance.

In this respect the acquisition of ISO14001 by companies may be merely a means to improve their corporate image. It is expected that companies will willingly share with public the result of the evaluation on their environmental performance and seek to be rated on the basis of their efforts to improve the environment.

3.4 Citizens and NGOs

3.4.1 Participation in Nature Conservation Activities

Citizens and NGOs have been actively participating in conservation of the natural environment and wildlife although currently there are not so many influential NGOs in Japan.

Many citizens participate as volunteer nature guides in natural parks. They also participate in many activities such as wildlife protection, maintenance of mountains and forests, and creating biotopes in their surrounding areas. These types of nature conservation activities have a recreational aspect for participants and thus in many cases they work as volunteers and pay their own expenses. On the other hand, such activities may not serve as a lasting conservation contribution to nature.

In some areas national trust campaigns are carried out and properties are bought for nature conservation purposes. Although an NGO must be well organized in order to carry out such campaigns, the difficulties NGOs have in acquiring a corporate status has been one possible factor that keeps NGOs from promoting

8 *Source*: Nihon Keizai Shinbun, September 7, 1998, evening edition, p.3.

more effective environmental protection activities. Recently enacted, the Non-Profit Activity Promotion Act (the NPO Act, 1998) is expected to reduce the difficulty NGOs face in acquiring a corporate status. It should be noted if this will have any positive effect on NGOs' environmental activities.

3.4.2 Everyday Solutions to Environmental Problems

The most common way for citizens to participate in environmental activity is related to waste disposal. This includes segregating waste for recycling purposes, bringing reusable waste to a special recycling facility, reducing waste and changing lifestyles for energy conservation. Keeping an "Environmental Household Account Book" is an interesting approach to reduce CO_2 emission generated by everyday life.

When individual citizens try to take actions against environmental problems in their everyday lives, the problem is that only limited information and few options are available to them. Even if they want to buy products that have less of an environmental impact, they do not have access to information on each product's impact on the environment. It is hard to find products without waste such as heavy packaging. Furthermore, systematic collection of recyclable materials has not yet been implemented. In order to solve these existing problems, more information must be provided by governments and industries and new systems which enable environmentally sound consumer decisions must be established

4. Case Studies: Climate Change Policy and the Improvement of Forest Ecosystem Conservation through the National Parks System

In this chapter, the present situation of Japan's environmental governance is examined through the two case studies. One is climate change policy which requires comprehensive approach to tackle the problem. The other is forest ecosystem conservation through the national parks system.

4.1 Climate Change Policy

4.1.1 Present Condition of the GHGs Emission

The climate change in global scale such as global warming caused by the emission of GHGs (greenhouse effect gases) is the most important environmental problem to Japan.

Japan's GHGs emission is 5%of the total emission of the world. This volume ranks the 4th. following the U.S.A, China and Russia, and take the 2nd. place among the OECD countries. The emission per capita is far lower than the OECD average but a little higher than the average of EU countries(15 states). Japan's per capita emission is also twice higher than the average of the world.

4.1.2 Target of the Policy

The target of climate change policy is set by interanational agreements. The UNFCCC(the United Nations Framework Convention on Climate Change) in 1992 requires stabilizing GHGs emission in 1990 level until the year 2000. Kyoto Protocol(1997) of the UNFCCC sets Japan's new target of 6% reduction from 1990 emission level during the 5 years (average from 2008 to 2012). Japan's Action Plan to Prevent Global Warming agreed by cabinet also states its target to stabilizing emission in 1990 level after 2000.

4.1.3 Implementation and Problems

The Global Warming Policy Promotion Act in 1988 sets national climate change policy. Which requires the promotion of GHGs reduction in the state and local governments and in private sectors by making GHGs emission reduction plan. The act also supports citizens activities in climate change. The secretary of Environment Agency is allowed to request the chief of other ministries and agencies, if necessary, to cooperate in policies and actions for climate change. This could lead to the broader policy coordination and more comprehensive approach in climate change.

The 1998 amendments in Energy Conservation Act introduced "top runner method" to promote continuous improvement in energy efficiency. Under the "top runner method", energy standards is set in the level of the most energy efficient goods in the market. Penalties for the non-compliance to the energy standards are also reinforced. Energy consuming factories are required to submit Energy Saving Plan under new amendments. Despite of these amendments, the approach of the Energy Conservation Act does not necessarily leads to more comprehensive GHGs reduction.

More comprehensive approach and policy is needed to make climate change policy effective. The Global Warming Policy Promotion Act should take such role. However, the effectiveness of the act is questionable. One reason is that, under the Global Warming Policy Promotion Act, the making, implementing and publicizing emission reduction plan is not a duty but just a voluntary activity to private sectors because of the so called "adjustment" with the administrative authority of the Energy Conservation Act. How to secure the request from the secretary of Environment Agency to other ministers and secretaries is not unclear. The system to introduce economic incentives such as environmental tax is also missing. To promote comprehensive climate change policy effectively, an legal base is necessary which can coordinate related acts and policies and can introduce new measures. required.

Private sectors attach importance to international trend in climate change policy. Many companies are already moving toward many actions to improve energy

efficiency and GHGs reduction.

4.1.4 Policy Recommendation

Positive climate change policy and its active implementation in national and local governments and in private sectors are necessary to achieve 6% reduction target set in Kyoto Protocol. Following policy and measures should be considered to achieve the target.

- Establishing legal bases to promote comprehensive climate policy effectively.
- Policy assessment to coordinate related policy and measures and to improve efficiency in their implementation.
- Requiring industries to make GHGs reduction plan and to implement it.
- Introducing economic incentives such as environmental tax.
- Helping local governments' and private sectors' participation in international GHGs reduction activities such as Joint Implementation, Emission Trading and Clean Development Mechanism.

4.2 Improvement of the Forest Ecosystem Conservation through the National Parks System

Forest is Japan's representative ecosystem. It is also important as the source of river and lake through its function to foster water. As the awareness to global warming increases, forest's function as the "sink" of CO_2 becomes important. Natural Parks System such as national parks are important to conserve forest and its ecosystem.

4.2.1 Forest and National Parks

Japan's Natural Parks System (Natural Parks Act) consists of 28 national parks, 55 quasi national parks and 304 prefectural natural parks and covers more than 14% of Japan's land area. 60% of the area of national parks system (which covers 5.4% of Japan's land) is located within the national forest. In some national parks on the northern Japan, national forest covers more than 90% of the park.

4.2.2 Present Condition of the Forest Ecosystem Conservation in National Parks

Forest in national parks has not been conserved in good condition. The reason is in the character of the national parks system of Japan. Japan's national parks system is based on zoning and regulation and park management authority (Environment Agency) does not necessarily have the land ownership of the park

area. National forest is managed by the Forestry Agency which promote logging in the area on a self-supporting basis. As the result, even in national parks, forest conservation becomes difficult.

For example, Environment Agency regulates logging in national parks. Any tree cutting is prohibited in Special Protection Area of park and clear cutting is strictly restricted in Special Areas. However, if it is examined in area bases, tree cutting prohibited area is only 12.5% of the total area of national parks. Selected tree cutting is allowed in 7.9% of the park area and clear cutting is allowed in 79.6% of the national parks area. Moreover, Special Protection Areas in which any tree cutting is prohibited are generally located in high altitude or marsh land and do not have trees for logging. Therefore, logging is actually possible in almost all forest in national parks.

Overuse threats forest ecosystems too. Total number of visitors to national parks is close to 400 million per year and causes serious environmental impacts on the areas of sensitive and fragile ecosystem. These overuse problems have been originated in insufficient park management.

4.2.3 Policy Recommendation

In order to improve park management and to conserve forest ecosystem in national parks, following policy and measures should be examined.

- Managing forest ecosystem in unity. National forest in national parks should be transferred from the Forestry Agency to the Environment Agency and managed as park land. Alternative to this is to unify the management plan of Forest Ecosystem Conservation Area in national forest with park management plan.

- Purchasing private forest in national parks. The budget for present system to subsidizing private land purchasing by local government should be increased. Besides such subsidization, direct purchasing by the state government must be considered.

- Many types of contracts in forest conservation between land owners and the state or local governments must be considered. Through such contracts, park management authority can be reinforced and more effective control for conservation becomes possible.

- Park managing personnel and budget must be increased. Present condition such as only 167 rangers in total is to little to manage national parks in good condition.

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Comments

James E. Nickum

1. The Environment

One important facet of environmental governance is the "contestable" nature of both the environment (more precisely, what an environmental problem is) and governance. In bureaucratic life, problems tend to be defined along jurisdictional boundaries. They tend to be addressed by parceling them along jurisdictional lines - a chief characteristic of Weberian bureaucracy, and what I have elaborated elsewhere (*e.g.*, Nickum and Greenstadt, 1998) as the "project culture". The "environmental problem" is really a vast range of problems with varying governance characteristics. This means that, for example, the main purpose of an environmental ministry or agency is often considered to take environmental problems and "coordinate" action on them - *i.e.*, by arranging the parceling activity and assuming itself certain operations (*e.g.*, data bases) that do not easily parcel. It also means that defining the problem is itself an object of governance- or "discourse," to use another trendy term. Environmental policy problems, according to Hajer (1995: 24) are "historically constituted sets of claims," defined and phrased as much to reflect institutional and political imperatives as some sort of objective phenomena, although the two are clearly linked in one process. Thus, to jump ahead a bit, when Prof. Kato chooses climate change and national park maintenance as his key issues rather than the water quality, acid rain, and forest cover suggested by the framework, it is to some extent reflective of a certain discursive perspective, notably one that defines problems from the standpoint of the Environment Agency of Japan. Water quality is an area where the Environment Agency often has to surrender the initiative to the Ministries of Construction and Health and Welfare, and to local authorities. Acid rain is now seen as a largely imported problem, since the domestic sulfur oxide emission problem has largely been "solved," although most acid rain deposition in Japan is still probably from domestic sources.

2. Governance

So much for the environment. What does "governance" mean? Its origins are hierarchical, like government, and in some of the international financial institution parlance, is still in part a code term for the quality of government. Still, there is a recognition, in part sparked by Putnam's 1993 study of Italy, that good government requires a good relationship, perhaps participatory, with "civil society". In turn civil society relies on "social capital" - self-organizing capacity within society independent of government (or other hierarchies such as the Catholic Church).

Thus, I suppose, the Tokugawa policy of "make them rely on you, don't tell them anything" (loose translation) would be indicative of bad governance. Yet the Tokugawa (1603-1867) did a reasonable job of governing Japan for nearly three centuries, and it seems that civil society in Tokugawa Japan was often capable of (indeed, often required to) engaging in self-governance (Nickum, 1999). The mystery of Japanese governance is not new.

3. Japan's Remarkable Record

This brings me to one of the great mysteries of the Japanese approach to environmental governance - or to the economy, for that matter. Japan's record of environmental governance is quite remarkable in many areas: (1) the speed with which remedial action was taken where it was technically and economically feasible, (2) the use of innovative techniques such as the pollution victims' compensation fund and pollution control agreements, and (3) the general state of the environment in many (but not all) key areas (I shall return to this).

4. The Mystery of Japan's Environmental Governance

Yet Japan's environmental governance institutions challenge much of the conventional textbook wisdom as to how governance should be done. For example:

- Japan has a weak environmental agency dedicated to coordinating the unwilling strong, many of whom "loan" the agency key staff, including at senior levels.
- PPP in Japan means, in practice, the "pay the polluter principle" (does this differ based on size of industry?).
- Japan's judicial system has been less than accommodating to plaintiffs except in the most egregious of circumstances and the most extraordinary of times, such as the early 1970s described by Prof. Kato.
- Japan's environmental NGOs are weak, small, fractious, and rarely confrontational.
- Japan exhibits a high level of "information impactedness" by both government and business, keeping the public in the dark in many critical areas. Thus, for example, Japan and Turkey are the only OECD countries that do not issue figures or estimates for total hazardous waste production.

5. Japan's Environmental Performance

Despite all the above factors that would seem to inhibit effective environmental governance, by and large, Japan's environmental performance since the dark

days of three decades ago has been exemplary:

1. **Sulphur oxide emissions** per capita and per unit of GDP are very low (7 kg/cap, compared to 63 kg/cap in the US, 37 kg/cap in Germany and 119 kg/cap in Australia), second lowest in the OECD (next to Switzerland), and are continuing to decline, even though fossil fuel supply tripled from 1980-1995 (and GDP increased by 241%). (OECD Environmental Indicators 1998: 27)

2. **Nitrogen oxide emissions** are the lowest per capita in the OECD (12 kg/cap.), but have not declined since the mid-1980s. (*Ibid*: 29)

3. **Carbon dioxide emissions** grew by 24% from 1980 to 1995 while GDP increased ten times as rapidly - a significant decoupling from GDP and, to some extent, from commercial energy use, which increased by 43.5% in the same period [World Development Report 1998/99: 208-209]. Japan now only emits 5.0% of the world's carbon dioxide while producing 8.0% of the world's GDP. By comparison, the United States emits 24.1% of the carbon dioxide but only produces 20.8% of the world's GDP (see table).

	Japan	China	India	Thailand	USA	World
Population (1997: million)	126 2.2%	1227 21.0%	961 16.5%	61 1.0%	268 4.6%	5829
GNP 1997(PPP) US$billion	2951 8.0%	4382 11.9%	1587 4.3%	399 1.1%	7690 20.8%	36951
Commercial energy use (mmtoe)1995	497 6.0%	850 10.3%	241 2.9%	52 0.6%	2078 25.2%	8245
CO_2 emissions (mmt) 1995	1127 5.0%	3192 14.1%	908 4.0%	175 0.8%	5469 24.1%	22700
Deforestation rate (ann. ave, 1990-95)	0.1%	0.1%	0.0%	2.6%	-0.3%	0.3%

Compiled from World Bank 1998.

4. **Municipal waste** per capita has increased more slowly since 1980 than in any other reporting OECD country (7% compared to the average of 25%), and at 400 kg/cap. is below the OECD average (530 kg/cap) and well below the US (700 kg/cap). (OECD: 38)

5. **Afforested area** has basically remained stable since 1970, and only one-third of annual growth is harvested (OECD: 55-56).

6. A relatively small percentage of **species** in Japan are threatened [OECD: 65].

7. (Not a remarkable success): Consumption of **pesticides** has declined by nearly one-quarter since 1980, but application rates remain the highest in the OECD

(1,259 kg of active ingredients per sq. km, compared to 202 kg in Germany and 86 kg in the US).

8. (Not a remarkable success): Japan is the world's leading producer of dioxins, stemming predominantly from a poorly planned and governed incineration policy.

6. The Next Puzzle, for Others and for Japan

How these results could come from that governance structure constitute the puzzle of Japan's environmental governance-to date. The next puzzles, of course, are (1) whether there is something in all this for other countries, both developed and developing, Asian and non-Asian, to learn, or are the accomplishments due to an inseparable integument that is (or was) Japan's governance system, historically, culturally, and institutionally bounded? And (2) Will the inherited governance system work for Japan under the quite different rules that are likely to prevail in a globalized, information-based twenty-first century? Even after considering these problems for the past five years or so (*e.g.*, Nickum, 1997), I do not have the answers to these questions, but would propose them as central to any comparative governance analysis.

Now let me turn to some remarks more specifically directed at Professor Kato's paper.

7. The Paper at Hand

Professor Kato's paper provides us a basis for asking some of the important questions about what makes Japan's environmental governance tick, although by and large it does not address those questions directly. Unfortunately, there is little time or space to go through all the different points of interest here, so I will somewhat arbitrarily pick a few, I hope to stimulate further discourse.

a. Choice of problems. In Prof. Kato's paper, we have a concentration on two problems that match the project structure of IGES: global climate change and tropical deforestation. This selection of topics is somewhat different from the three topics suggested by the framework (water pollution, acid rain and forest cover), but is reasonable: IGES pays the bills and these are two very big problem domains where Japan is an important international actor. Prof. Kato also focuses on certain domestic pollution problems that confronted Japan historically, concentrating on industrial pollution, and on national park management. He also dwells to some extent in his narrative on the problems of information (*e.g.*, EIA, ISO and PRTR, but not FOI), an area of environmental governance that is critical but also may reflect in its practice the considerable variety of different national discourses (see, *e.g.*, Nickum, 1993).

b. Range of actors. Yet this also raises a telling point. In the analytic framework, a broad range of actors was suggested as having a potential role to play in agenda setting and implementation. These include "bureaucrats, politicians, scientists, the media, industries, local governments, and non-governmental actors." In this narrative, the actors are the national ("state") government, the large corporate ("private") sector, and a very constrained but sometimes innovative local government. One wonders if they are the only ones allowed to play the environmental governance game in Japan. The Environment Agency is presented as emblematic of the national government. Occasionally other ministries are mentioned, but for the most part the national government remains a largely unbundled entity. The Ministry of Construction, which handles the biggest ticket item in the nation's environmental budget, sewers, and which has embraced any environmental idea that can be embodied in a public works project, is mentioned briefly, as recently "stepping into the fray". The Ministry of Agriculture, Fisheries and Forestry is seen primarily through the Forestry Agency, and there only in the context of national parks. Despite the focus on the corporate sector, MITI shows up in this narrative primarily at COP3 to "favor an energy related approach" as opposed to the Environment Agency's "more comprehensive measures," with little additional explanation as to how these positions differ. The Ministry of Transportation, Ministry of Health and Welfare, and Ministry of Finance, all crucial Kasumigaseki actors in national environmental governance, especially in the current era of lifestyle-generated environmental problems, do not show up at all.

c. Where are the people? More important than the omission of a ministry or two, however, is the very limited attention given to the other actors mentioned above, especially politicians, scientists, the media, and (somewhat) non-governmental actors. In addition, the citizenry, or civil society, are present only in a very passive sense: as urbanites, they have lost their traditional connection with nature; when they are pollution victims, they receive compensation; when they own land, they make it difficult to implement laws to protect ecosystems; they volunteer as nature guides; they are not aware of the need to conserve tropical forests; they have problems taking action to improve the environment because they have little information and few options. Despite the reference at the end to Jeff Broadbent's 1998 study of citizen activism in Oita Prefecture, there is little evidence of citizen agency in this narrative—none of the 1970s citizen politics analyzed by Margaret McKean (1981), nothing of the successful anti-phosphorus detergent movement in Shiga Prefecture in the late 1970s, nothing of the clamor over golf courses of the 1980s, nothing of the current NIMBY movements against sitings of real or perceived hazardous facilities. Is there really no civil society in Japan, as some claim, or is it somehow overlooked in this overview?

d. Mechanisms of governance. Another gap, admittedly one that is hard to fill but that lies at the core of the nature of environmental (or any other) governance,

is a sense of how things work (and don't work). There are many problems that could surface on an environmental agenda. Why do certain ones get there and others do not? How are formal mechanisms such as laws, regulations, subsidies and standards banged into place by cooperating and conflicting interests in the political and administrative systems? What really happens at the grassroots level, and what are the actual motives and power positions of important actors? Does culture matter? Is the law a set of general principles for administrators to use in setting top-down regulations, or does it provide a vehicle for challenging bureaucratic decision-making, and if so, who holds the rights to make such a challenge? Does the law provide a "shadow" for private contracting, does it inhibit it, does it matter at all? What does street-level regulation, which Prof. Kitamura (1997) has investigated in Japan, look like in practice?

e. Why national parks? National park management by itself is clearly an administrative way of constructing an environmental problem, and reflects the organizational structure of the Environment Agency. But what is the environmental purpose of national parks? National parks may serve to preserve ecosystems, species and scenery from mutilation and destruction that accompanies relatively unrestricted development. But are they the best way to serve those purposes? Is deforestation more serious in national parks than in the rest of the country?

8. Reaching the Limits

I will stop here, even though I feel I have not done full justice to the topic or to Prof. Kato's multifaceted but of necessity all too brief paper. I hope I have pointed to some areas that could be usefully expanded upon.

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Environmental Governance in Thailand

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1. Introduction to Environmental Protection in Thailand

1.1 The History of Development Planning and Environmental Protection

Modern day development planning in Thailand dated back to the 1961 when the first economic and social national plan was promulgated. Although Thailand has never been colonized, it has adopted the practice of five-year plans, widely implemented by newly independent countries, since the post-war period. Until now, Thailand has experienced 7 five-year plans and is now implementing its Eighth National Plan (1997-2001).

Two processes characterise the development in Thailand throughout these national plans: industrialisation and urbanisation. Three main features of these processes can be identified. Firstly, throughout these decades, Thailand had correlated development with economic growth. Secondly, it had chosen industrialisation as the pivotal means for achieving economic growth. Thirdly, the planning process is top-down in its nature. The National Economic and Social Development Board (NESDB) was set up precisely to prepare the five-year plans.

The development planning process of Thailand, like other developing countries, is greatly influenced by the World Bank. As mentioned previously, Thailand has generally followed a top-down command-and-control approach, based on 'blueprint' plans in which economic growth is the predominant focus. However, in the past two or three decades, it is becoming increasingly clear to the world community and to Thailand that the economic growth-led economy has not eradicated poverty, but instead has increased inequalities between the rich and the poor; depleted natural resources; degraded the environment; promoted political unrest; and encouraged alienation and a loss of a sense of identity.

Visible environmental harm coupled with political pressure from social constituencies, experienced in most parts of the developing world, has triggered a paradigm shift with a new focus on sustainable development. The United Nations Stockholm (1972) and the Rio Environment Conferences (1992) are two international arenas where this new paradigm was manifested (Sandbrook, 1992). The Agenda 21 agreed upon by 157 United Nations member states, including Thailand, at the Rio Conference calls for these countries to help protect planet earth and make it sustainable for peoples of the next generations by the new millennium. Importantly, it should be noted that the Rio Conference has, at least in principle, lifted the status of the environment to that of development.

During the late 1970s, Thailand gradually recognised 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), after Thailand's participation at the Stockholm Conference. However, the Plan's priority was aimed at rehabilitating the economy, particularly since 1970s was a period of world recession.

Since the late 1980s and early 1990s, there has been a renewed interest and concern with environmental issues. Increasing enthusiasm to meet environmental challenges in Thailand has clearly been reflected and reinforced in the 7th and 8th National Plan which recognise environmental non-governmental organisations as important actors in environmental protection and has initiated the adoption of a bottom-up approach, focusing on the concept of "decentralisation".

Other equally important developments with respect to the environment include: the 1991 and 1994 Constitutions of the Kingdom of Thailand; and the enactment of the 1992 Enhancement and Conservation of National Environment Quality Act (hereafter the 1992 Environment Act), repealing the previous versions of the 1975, 1978 and 1979 Environment Acts, with the intent of improving the effectiveness of the enforcement of environmental law.

1.2 Environmental Legislation

The basis for environmental law in Thailand is found in the Constitution of the Kingdom of Thailand B.E. 2534 (1991). Article 74 states that "the State shall conserve the environment, balance the use of natural resources and their replacement, eliminate and prevent pollution, and plan for the use of land and water" (Baker & McKenzie, 1993). Based on the stated fundamental framework, the 1992 Environment Act was enacted.

Together with this Act, other environment-related laws were also amended or enacted in 1992, namely, the new Factory Act, the Hazardous Substances Act, the Energy Conservation Promotion Act, the new Public Health Act and the revised Cleanliness and Orderliness of the Country Act. In all, there is a total of approximately 70 to 80 regulations that are directly and indirectly related to environmental matters (TEI, 1997a).

The most significant and comprehensive is the 1992 Environment Act. New features that are different from the previous Environment Acts include (TEI, 1995: 1-2):

- Empowering the National Environment Board (NEB) to make decisions regarding national environmental issues, such as, the prescription of

environmental quality standards and sanctions.

The NEB was originally created under the 1975 legislation, but whose authority was limited to an advisory one. In this new framework, the NEB is a ministerial-level Board chaired by the Prime Minister with the Permanent Secretary of the Ministry of Science, Technology and Environment (MOSTE) as secretary to the NEB (TEI, 1997a).

- Restructuring the governmental offices in charge of environmental protection by replacing the Office of the National Environment Board (ONEB) with the Office of Environmental Policy and Planning (OEPP), the Pollution Control Department (PCD) and the Department of Environmental Quality Promotion (DEQP). MOSTE delegates each department with specific responsibilities and functions.

- Delegating the environmental protection authority from the above three departments on the national level to the provincial level.

- Designating certain areas to become Environmental Protection Zones (EPZ) and / or Pollution Controlled Zones (PCZ).

- Requiring the provinces with EPZ to submit an Action Plan for Provincial Environment Protection. Other provinces may also submit an Action Plan if they so desire.

- Establishing an Environmental Fund chaired by the Permanent Secretary of MOSTE.

- Increasing the type of projects or activities requiring an Environmental Impact Assessment (EIA) (Nicro, *et. al.*, 1997).

- Recognising the importance of public participation. Section six of the 1992 Environment Act stated that individual persons have the rights and duties to:

  "...petition or lodge a complaint against the violator, where the petitioner is a witness to any act committed in violation or infringement of the laws relating to pollution control or conservation of natural resources.

  To cooperate and assist government officials in the performance of duties relating to the enhancement and conservation of environmental quality." (The 1992 Environment Act, 1992)

1.3 The Process of Institutionalising Environmental Protection

Increased public interest on environmental issues and the environmental movement led by civil society in Thailand emerged in the late 1970s, partly

following the environmental movement in the 'industrialised' countries and the 1972 Stockholm Conference, and partly as an interrelated political movement for democracy, calling for changes in the overall ruling system.

In consequences, the environmental movement in the 1970s and 1980s was about "the people versus the bureaucratic / military power elite". The scandal around April 1973 involved military using publicly-owned guns and helicopters for illegal poaching in Thung Yai Naresuwan Wildlife Sanctuary, an area protected under the Wildlife Conservation Law.

This and other similar incidents - the campaign against the Union Carbide-dominated Thailand Exploration and Mining Corporation (TEMCO) from 1974-1975; and against construction of Nam Choan Dam that lasted from 1982 to 1988 - were initiated by students and non-governmental organisations fighting against authoritarian rule, by using the environment as a discourse to highlight abuses of power by government officials to build popular support.

At around the same time, there were also isolated cases of community grassroots organisations directly affected by environmental degradation, contributing to the environmental movement. Disputes are often either over the rights to utilise and manage natural resources, such as the campaigns to oppose corporate deforestation, or over the degradation of the rural environment which community groups depend on in their daily livelihood, such as large dam construction, logging, eucalyptus planting, mining, industrial and tourist developments.

However, negotiations between civil society and the government were extremely tense, and in some instances, leaders of the environmental movement were severely punished or even killed. Monk Phracak, who fought against the planting of the fast-growing eucalyptuses, had to face numerous threats. He was later arrested and deprived of his priestly rank.

Many authors such as Funatsu (1997) observed significant changes with the government's standpoint on environmental issues in the 1990s, partly in response to increasingly organised activism around environmental issues. The international calls for a turnabout in the attitude toward environmental problems, particularly from the United Nations 1992 Rio Summit, cannot be neglected as key external factors that catalysed this change. In fact, Thailand has seen rapid improvements in legislative and other institutional changes related to environmental protection at the government's initiative in the first half of the 1990s.

In particular, the first and second cabinets of Prime Minister Anand Panyarachun in 1991-1992 took a series of steps, such as the revision of the 1979 Environment Act and subsequent changes that empower environmental institutional and administrative structures, in line with the new environmental law, as described above. These developments can be seen to represent the government's domestic

responses to environmental problems that were becoming increasingly serious as a result of unsustainable economic development.

The Thai environmental movements were helped by the global environmental movements since the 1970s. Global linkages provided both a framework to challenge mainstream development processes and some financial resources for Thailand's new environmental organisations to tackle the country's environmental deterioration.

At the national level, the Thai monarchy is a key factor in prompting Thailand's commitment to environmental protection. Royal projects have had an environmental profile for some time, particularly King Bhumibol Adulyadej's highland development projects among highland ethnic minorities. An important speech delivered by the King on the 4th of December 1989, one day prior to his birthday, was in reference to November 1988's massive floods and landslides in Southern Thailand that left more than 700 people dead or missing. King Bhumibol declared the need for the whole nation to embark on a campaign to afforest and protect nature in order to prevent natural disasters.

Beginning the following year, the government designated the 4th of December as "National Environment Day," and it became an established custom to plant large numbers of trees on national holidays or commemorative ceremonies across the nation for the purpose of preserving forests.

With the Royal Family and the government, the two highest national authorities in Thailand, playing a part in the campaigns for environmental deterioration, in collaboration with the mass media, environmental problems in the 1990s transcended the confrontational concept of "government versus people" and turned into part of the national objectives in which people are expected to help each other in achieving. At the same time, the support base for environmental movements became broader, creating room for the participation of major corporations and a wide spectrum of urban residents.

Up until the 1980s, business and environmentalists were more often assumed structurally and strategically to be on opposite sides of the major environmental debates rather than in alliance. This was true globally and was reflected in Thailand in some of the early struggles, such as the TEMCO issue. More recently, business has been keen to, at least, be regarded as a partner in caring for the environment. Global initiatives such as the Business Council on Sustainable Development, which played an important role at the 1992 Rio Summit have been mirrored in Thailand (Hirsch, 1994). Thailand Environment Institute, a non-profit organization whose council of Trustee is chaired by former Prime Minister Anand Panyarachun, has initiated Thailand Business Council on Sustainable Development.

Recently, at the national level, a number of prominent business groups and

individuals have taken up environmentalists stands in one form or another. Among the best known and most widely respected as committed to making industrial practice compatible with sustainable environmental initiatives is Sophon Suphaphong, President of Bangchak Petroleum who was recently presented the Ramon Magsaysay Award.

Bangchak Petroleum is a key organiser of the 1994 Forum for Annual Reporting on the Environment (FARE), a collaboration of environmental NGOs nationwide. Mr. Sophon is widely known in Thailand as a public advocate for rural community development, democracy and self-sufficiency. According to an account on Mr. Sophon, "the key to building a self-sufficient economy lies in the partnership between business enterprises and communities whereby the business partner provides 'an immunity' for, and does not take advantage of, its community partner" (Bangkok Post, 27 July 1998).

It is based on this philosophy that Bangchak Petroleum manages its retail oil business. Community organisations and cooperatives have become Bangchak's partners. They owned the company's first 10 petrol stations and now run half of more than 1,000 Bangchak stations.

Other examples include Magic Eyes, an environmental organisation sponsored by the Sophonpanit conglomerate in 1984, famous for their anti-litter campaign, among others; and Think Earth, an environmental organisation founded by Pornthep Pornprapha, the President of Siam Motors.

As a result of the rapid industrialisation and urbanisation processes in Thailand, in recent years, there is a growing divide between rural and urban environmental problems. Massive in-migration from rural to urban areas and poor urban development planning have contributed to the cities' high levels of water, air and waste pollution from both industrial and domestic sources. They are of priority concerns because of their tangible effects felt by residents of towns and cities. In the rural areas, natural resources reduction, shortage of farm land and deforestation are main areas of concern. These problems can be regarded as the origins of other complications in Thailand, but they are often considered secondary to urban difficulties (Pradubraj & Nicro, 1997).

With respect to Thailand's attitudes towards regional and global environmental risks, the 1990s has seen an increased commitment by the Thai government, particularly in response to the 1992 Rio Summit which calls for global cooperation in protecting the environment. At the conference, Thailand signed a commitment to the United Nations Framework Convention on Climate Change (UNFCCC). To implement the agreement, the National Sub-Committee on Climate Change was established to coordinate research and policy strategies under the umbrella of the NEB. The committee also serves as a monitoring body to ensure that

institutional agencies follow the government's commitment to the Framework Convention.

2. Contextual Overview of Thailand

To place the challenges for effective environmental governance into context, it is helpful to understand the current economic and social situations in Thailand, particularly in the context of the Asian financial crisis.

2.1 Economic

For the past decade or so, since 1985, the economic miracle of the "Asian tigers" has been repeatedly hailed as a model for developing countries. Between 1985 and 1995, according to the World Bank, real average annual growth of Gross Domestic Product (GDP) for Thailand was 8.4 per cent (World Bank, 1997). However, in Thailand's rush to become a newly-industrializing economy, Thailand has aggressively pursued economic growth at the expense of cultural, environmental, political and social development.

In July 1997, Thailand witnessed a financial collapse with severe implications for Thailand's economic and social situations. The average annual GDP growth rate of Thailand is currently estimated at -0.4 per cent (Asiaweek, 21 Aug 98). The Gross National Product (GNP) per capita dropped from US$2,740 in 1995 to US$2,450 in 1998 (Asiaweek, 21 Aug 98). This can be compared with the United States with an average annual GDP growth rate of 1.4 per cent and per capita GNP of US$29,950 (Asiaweek, 21 Aug 98) up from US$26,980 in 1995 (World Bank, 1997).

2.2 Social

Thailand covers an area of 0.5 million square kilometres (about the size of France) and has a population of more than 60 million with an annual population growth rate of 0.9 per cent between 1990 and 1995 (World Bank, 1997). About 20 per cent of Thailand's population live in urban areas and the urban growth rate between 1980 and 1995 is estimated at 2.6 per cent per annum (World Bank, 1997). According to the World Bank (1997), in 1990, 64 per cent of Thailand's labour force work in the agricultural sector and 14 per cent in the industrial sector.

As Thailand strove for rapid economic growth, investments and subsidies were geared towards the urban industry and services; while the rural and agricultural sector of which the majority of the population were in was neglected. The income gap between the top ten per cent (mostly urban) and the bottom ten per cent (all rural) widened from 17 times in 1981 to 38 times in 1994. Half of all income gained during the economic boom period went to this top urban ten per cent (Ikemoto, 1994 cited in Phongpaichit & Baker, 1998: 285).

During this time of financial turmoil, a survey conducted by the National Statistics Office in May 1998 revealed that 1.6 million Thais were without jobs. The unemployment rate rose from 4.6 per cent in February to 5 per cent in May 1998 (Bangkok Post, 19 Aug 98).

With respect to consumption levels in Thailand, 1994 per capita electricity consumption levels is at 1,294 kilowatt-hours (compared with 12,711 kilowatt-hours in the United States) (UNDP, 1997). Although by world standards, Thailand is still a low per capita energy consumer, it is by far the dominant consumer in South East Asia, with per capita energy consumption in 1994 seven and twenty times that of Vietnam and Lao PDR (UNDP, 1997b). UNDP's Human Development Report (1997) also highlights the following consumption levels:

* 1992 daily calorie intake per capita: 2,443

* 1994 daily newspaper available per 100 people: 5

* 1994 figure for the number of televisions available per 100 people: 25

2.3 The Asian Financial Crisis

The 1997-8 Asian financial crisis has generated numerous discussion and analysis on its causes, impacts and solutions. Like other points in history when certain approaches and issues rise to popularity in our attention cycles and our agendas, there is a convergence of ideas occurring in the context of the Asian financial crisis. Many mainstream economists and international market analysts pointed the cause of the problem directly at the individual country's poor governance.

> *"Although the causes of the crisis are varied and complex, many of the problems that lie at the heart of Asia's difficulties are bound up with poor governance." (IMF, 1998: 3)*

Many economists claim that the Asian crisis has demonstrated the effects of poor governance. A closed government-business relationship infested with corruption, particularly in the granting of privileges to friends and families; the lack of open channels of communications between stakeholders, therefore, undermining transparency about the economic and financial conditions; and the lack of accountable procedures and responsibilities in the decision-making process - all are believed to have contributed to market uncertainty and triggered large capital outflows that threatened macroeconomics stability (Bello, 1998; The Nation, 4 July 98; Saludo & Shameen, 1998; UNDP, 1997a; World Bank, 1997).

Thus, solutions are based on structural reform that encompasses good governance which includes, eliminating corruption, providing transparency and increasing accountability. These are promoted as necessary to bring back foreign investors and stabilise the economy (IMF, 1997).

The mainstream argument for the cause of the crisis echoes the views of the modernisation theory by implying that the crisis-ridden economies are corrupt, lax and backward in the way the economy and government is run. This justifies economic and political reform, suggested by the International Monetary Fund (IMF), as necessary for Asian countries to return on the path towards a capitalist ideal of development, particularly in the context of a globalised economy.

In their rides out of the economic crisis some Asian countries, including Thailand, seem to believe that they have no choice but to listen to, and be convinced by the international consensus on the importance of good governance which has become a precondition to the IMF bail-out package (Kulawat, 1997; The Nation, 27 May 98).

However, one year after the crisis hit Asia, the economy has fallen into recession, while environment problems, unemployment and political unrest persist and in some cases worsened. The impacts of the drought, riots and rising unemployment rates in crisis-ridden countries demonstrate clear evidence of the worsening situation. This has led many to question the reform based on good governance imposed by the IMF programme and rethink the Western ideal of growth and progress by having to adjust itself to the demands of the globalising world (Phongpaichit & Baker, 1998).

Academics in some countries, including Thailand, and critics of the IMF bail-out package, directed the cause of the crisis on the strong forces of globalisation that individual countries were incapable of controlling, such as capital flows. Moreover, some believe that one major result of the crisis is that Asia will be more open to the outside world. The financial sector, and a large part of big businesses are already sold, or on auction block. Following this trait of thought, it is concluded that transnational companies will make decisions beyond the control of national governments and it will be up to each community to safeguard its interests (The Nation, 22 May 98).

A number of civil society groups in Thailand, have been advocating self-reliance by “turning inwards” to rediscover the country’s special inheritance of culture and natural resources, and find the course of development that suits the individual locality and country (on the revival of Thailand’s rural sector in the name of self-reliance, see for example, The Nation, 16 July 98). However, the concept of “self-reliance”, like good governance, is not new but has merely been revitalised as a result of the Asian financial crisis.

3. Current state of Environmental Governance Mechanisms

This section explores the basic structure of the cultural and political system of Thailand as it pertains to environmental governance.

3.1 Governance Culture

Kindliness, sharing and peaceful togetherness are attitudes which are reflected in traditional Thai social behaviour. Until recently, the use of natural resources was seen as every person's right as long as resources were treated with respect. This attitude is changing with the infiltration of a range of ideas and materialistic lifestyles, with the result that an attitude of 'get what you can before someone else gets it' is slowly beginning to take hold in the realm of natural resources utilisation.

Thai people have been ruled by a distinguished elite group for centuries. With abundant resources and a large land base, the country easily accommodated the small population, hence, the ruling system was more lenient when it came to controlling agricultural areas, contrasting with feudal Europe. Local people had the right to manage their resources without governmental interference for a long time.

This resource autonomy led to the development of what might be termed "local wisdom." This knowledge is derived from daily experience which has been passed from generation to generation as a cultural heritage. Early Thais believed that life was part of nature, and that nature can reward or punish humans for improper behaviour. Some rural communities still respect this concept and live by it; for instance, they pay honour to the river before consuming its water and to the tree before cutting it for lumber.

In a globalising world, Western concepts such as government, economics and natural resources management have been adopted by the Thai government. In 1896, the Department of Royal Forestry was established and applied the concept that all forests in the country belonged to the government. Accordingly, in 1940, the government implemented the National Forest Act, which stated that all forests in the country belonged to the government. Anyone who wished to cut down trees must first obtain a government concession license. People were charged if they cut down a tree without a permit. The conflict in utilising natural resources is believed to have changed Thai attitudes from their practice of 'moral naturalism' to 'capitalism', leading to the abandonment of the traditional Thai lifestyle.

As a result of the concept that all natural resources belong to the government, natural resources management depends by and large on government decisions and policies. Distribution of resources in the form of concessions directly benefits private companies, while the government receives benefits in the form of taxes and concession fees. This management system has led to the rapid degradation and destruction of natural resources.

Government agencies and national budgets have become overwhelmed with the need to address a rapidly deteriorating resource base. Water is heavily

polluted from organic and factory wastes. Fisheries are badly in need of access and recovery management plans. Cities are seriously polluted from vehicle emissions and traffic dust.

In the present environmental administration, the government has long been criticised over its inability to control and prevent the depletion of the environment. The structural and functional overlaps among associated agencies; poor coordination and inefficient management are the main explanations for worsening circumstances.

One encouraging move by the government has been the passing of the 1992 Environment Act, which provides for environmental quality standards and establishes national authority to designate conservation and pollution control areas.

3.2 Government Structure

As a revision of the 1979 Environment Act, the 1992 Environment Act released one of the most meaningful outputs. There were three brand-new governmental departments, launched to replace the Office of the National Environment Board, previously a central body overseeing environmental affairs. The followings are their specific responsibilities and functions:

- The Office for Environment Policy and Planning (OEPP) was established to designate policies and plans for environmental control at the local level, and to ensure the Environment Fund and the process of Environmental Impact Assessment (EIA) Report. The OEPP also has the authority to set up regional offices in order to coordinate regional activities.

- The Pollution Control Department (PCD) is in charge of recommending standards and developing measurements concerning environmental control. In addition, it is empowered to investigate complaints of pollution.

- The Department of Environment Quality Promotion (DEQP) is responsible for disseminating information, raising public awareness, forging private sector and NGOs alliances as well as conducting training courses and research.

As evident, the government depends greatly on a command-and-control approach to administer its task. Despite the delegation of environmental authority from the above three departments on the national level to the provincial level, many policies remain top-down. The objectives of controlling and monitoring polluters are clearly seen in Articles 59 and 60 of the 1992 Environment Act. Within a Pollution Control Zone, environmental quality standards and pollution control measurements are set up to improve the state of the environment, implemented at the provincial level.

The accustomed governance structure for environmental management in Thailand is one in which powers and responsibilities are divided among a number of ministries and departments at the level of the central government, while lower levels of government have traditionally had rather limited powers. Despite the government's emphasis on an environmental legislation, the implementation of environmental law has proved to be more difficult.

Although much progress has been made since then, the departments are just newly-emerged organisations which need more experiences to succeed in their goals. Moreover, accompanying reorganisation of the national environmental management bureaucracy, the problems of multiple centers of responsibility and overlapping jurisdictions have not been adequately resolved (Phantumvanit, *et. al.*, 1994).

3.3 Public Participation

The recent Thailand's Eight National Economic and Social Development Plan (1997-2001) (hereafter, the Eighth National Plan) 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. Recently, in June 1998, experts and members of the working group of the Eighth National Plan met to discuss ways of strengthening local communities as a way to resolve Thailand's economic crisis (The Nation, 6 February 98). The participation of civil society organizations(CSOs) is increasingly being recognised as crucial to the "balance of power" and the "strengthening of democracy", especially by holding the government and business sectors accountable (The Nation, 18 January 98).

The 1992 Environment Act recognises certain legal rights and duties of Thai citizens in relation to the protection of the environment. Such rights and duties are as follows (Section 6, 1992 Environment Act):

- Right to information on the environment
- Right to claim compensation from the state for damages resulting from pollution from state projects
- Right to make a complaint against polluters
- Duty to cooperate with environmental protection authorities
- Duty to comply with environmental laws and regulations

The 1992 Environment Act also allows non-governmental organisations (NGOs), Thai or foreign, that are directly engaged in environmental protection activities to register as an "Environmental NGO" (Section 7, 1992 Environment Act).

The DEQP is the registrar of the NGOs working in natural resources and

environmental conservation. At present, there are approximately 197 environment-related NGOs, but only 93 are registered with MOSTE. Registered NGOs are eligible to apply for financial support for development activities from the Environment Fund (MOSTE, 1997).

3.4 Civil Society

Civil society, through bottom-up lobbying, has been the motivator in putting environment on the development agenda. According to Prapat Pintopteng, lecturer at Kroek University, the number of protest demonstrations across the country reached 739 in 1993 and 754 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 (Funatsu, 1997).

The civil society movement, in response to the persisting dissatisfaction of government's development planning; together with government's realisation that the current development model is unsustainable, has led to a shift in the development discourse. Development with a human face or sustainable human development has become the new international agenda around the early 1990s, acknowledging the values of people's rights and democracy.

At the policy level, governance has evolved until the present time to also incorporate the ideas of human rights and democracy. By placing people at the centre of development efforts, 'participation' is increasingly recognized by the international donor community and national governments as being crucial to good governance (Badshah, 1998).

Consequently, civil society has also adapted the term "governance" as entry strategies in their lobbying and action-taking, albeit from a different perspective, focusing on community empowerment and the right to civil society participation in the decision-making processes. In turn, this process is eased, to some extent, by support from mainstream development agencies and their collaboration with CSOs in development projects and programmes.

In Asia, the capitalist quest and neo-liberal economics may have overwhelmed civic virtues during the 1970s and 1980s; but, the financial turbulence seems to provide a catalyst for a re-emergence of the importance of civic virtue and self-reliance in some countries, including Thailand.

Participation in good governance is perceived as necessary to control corruption and mismanagement.

Coordination and interaction between NGOs and the Thai government have been established through official and unofficial channels. The National Council of Social Welfare of Thailand was set up as early as the 1960s to coordinate

development efforts of NGOs and the government sector. In the 1980s, a national level NGO-Coordinating Committee on Rural Development and NGO networks in different regions were formed to improve communications and coordination among NGOs and government agencies on rural matters (MOSTE, 1997).

In Thailand, NGOs have acted as a mobilising force for public and local community awareness and action at the grassroots level. Nationally, they have succeeded in influencing planning and policy implementation due to their specialised capabilities.

Public awareness of Thailand's environmental state has increased partly as a result of the media. The media has extensively cooperated with the NGOs in almost every environmental and developmental issue, to ensure that they reach the political agenda. Wide media coverage on environmental issues have created a huge impact on society, gaining official responses, the cooperation of associated sectors, as well as, public concern (Pradubraj & Nicro, 1997).

The frequency of environmental disputes has caused the government to gradually change its attitude toward local people's protest movements. In recent years, there have been some cases of protesters actually achieved changes to their favour. In 1988, the construction of Nam Choan Dam was suspended; in 1995, local communities received damage compensation after the construction of Pakmum Dam; and also in 1995, plan to build a garbage-burning electric power generation plant in Hangdong was withdrawn. These events received wide media coverage which may have encouraged greater number of disputes over environmental issues (Funatsu, 1997).

Environmental issues, written complaints and actions by individuals, organisations and the media can be institutionalised through the National Environment Board (NEB) or the Parliamentary Sub-Committee on the Environment. These actions can influence the NEB who are empowered to prescribe national environment policy and plan.

3.5 Governance Mechanisms

A 20-year Environmental Quality Promotion Policy has been approved in 1997, under which a 5-year Environmental Quality Promotion Action Plan is prepared to achieve the policy targets. At the provincial level, areas designated as Environmental Protection Zones (EPZs) or Pollution Control Zones (PCZs) are required to formulate and implement an annual Provincial Environmental Action Plan.

The new Environmental Quality Promotion Policy forms the core basis for the government to consider natural resources management and environmental protection issues in coordination with economic and social development policy. The policy has the following key targets (MOSTE, 1997: 35):

- To prevent further deterioration and to accelerate rehabilitation of degraded natural resources, to serve as the basic resources for the sustainable development in the future;

- To coordinate use of and reduce conflicts over natural resources, to minimise the impacts of resource use, ensure overall balance of the ecosystem; and

- To support the participation of all related parties, including local organisations, NGOs and the public at large, in natural resource management and administration for their sustainable use.

To achieve the above targets, the 5-year Environmental Quality Promotion Action Plan is implemented in parallel with the 5-year National Economic and Social Development Plan.

Government sector's environmental programmes are implemented by sectoral ministries in coordination with the NEB. To ensure that the programmes and projects implemented by both governmental and non-governmental agencies comply with the environmental policies and laws, a number of mechanisms are used. The most commonly used tool is the establishment of standards and sanctions. Other mechanisms that are being experimented with include the use of environmental impact assessment (EIA) as a part of project planning; the adoption of economic instruments based on the "polluter pays principle"; and the development of appropriate social and environmental development indicators at different levels to monitor progress towards sustainable development of the country.

However, many of these mechanisms imitate those advocated by international agencies such as the World Bank and the United Nations. They are often based on existing tools from "developed" countries with little regard of the differing cultural, economic, environmental, political and social contexts. Thailand is, more often than not, faced with non-implementation of environmental policy and programmes. This is because environmental organisations in Thailand generally lack power and resources to implement environmental programmes and to audit the environmental performance of sectoral institutions.

For example, the introduction of market-based instruments such as the polluter-pays-principle (PPP) in Thailand, as reflected in the Seventh and Eighth National Plan and the 1992 Environment Act, ideally, provides incentives which will encourage enterprises to adopt production processes and consumers to buy goods which cause less environmental damage. However, although at present, PPP has been accepted in government environment policy, there is as of yet no comprehensive system of pollution charges nor incentives for firms to reduce their pollution.

4.1.1 Water Pollution

The state of water quality in all major rivers of Thailand has been deteriorating for many years. In 1995, the measurements of water quality on the major rivers, namely, the Chao Phraya, Tha Chine, Mae Klong, Bangpakong and other rivers were below acceptable standards (MOSTE, 1996). The Chao Phraya River is Thailand's principal river, draining a large part of the Central Plain - the rice bowl of the Kingdom - and running through the heart of Bangkok and other densely populated adjacent provinces.

Both organic degradables and toxic substances pose serious pollution problems. Water quality in the Chao Phraya has been monitored for organic degradables by the ONEB since 1980 and for several heavy metals (cadmium, lead and mercury) since 1983. Data from early 1980s shows that low dissolved oxygen (DO) levels were already a problem in the lower Chao Phraya (0-100km. from the river mouth), especially during low flow months. DO levels fluctuate between 0.2 to 0.8 milligrams per litre (Tapvong, 1995). The situation has deteriorated markedly since then. As of 1990, for a 20km. stretch in the lower course of the Chao Phraya River, bathing / recreational values have vanished. In addition, high pollution loads are damaging nearshore coastal fisheries in the Upper Gulf of Thailand (Phantumvanit, *et. al.*, 1994).

Toxic waste pollution is also an increasingly serious problem in the Chao Phraya and in the Gulf area around the river mouth. The industrial development and changes in the types of industries have led to increasing production of toxic waste. At the end of the 1970s, less than 12 thousand factories generated toxic and hazardous wastes. By the end of the 1980s, this figure grew to more than 31 thousand establishments (MOSTE, 1997).

Thailand has imported a large quantity of organic and inorganic chemicals each year, mainly for spinning and dyeing factories, electroplating and metal industries as well as for pest control. Moreover, the shift in agriculture during the 1970s and the 1980s to commercial crop production has been followed by increased use of machinery and chemical fertilisers and pesticides. They are all major contributors to river pollution.

Toxic substances in the Chao Phraya pose two major health risks widely publicised in the media: first, as they enter the tap water supply in certain communities (*e.g.* in Pathum Thani) and, second, as they accumulate in coastal sediments where they can enter the aquatic food chain. Ultimately, they pose a serious threat to human health.

Many sections of the Tha Chine, Mae Klong and Bangpakong Rivers have also suffered from poor water quality, with pollution reaching critical levels

particularly during the dry season. Much of the water is only fit for transportation (class 5) and industrial use (class 4), being too polluted to serve agriculture, household or fisheries and animal conservation purposes (MOSTE, 1995).

The Thailand country report to the United Nations Conference on Environment and Development (UNCED) (Royal Thai Government, 1992) summarised that the major sources of pollution in Bangkok (measured in terms of total biochemical oxygen demand (BOD)), and their relative contributions are: domestic waste (40 per cent), business services (32 per cent) and industry (25 per cent).

The combination of rapid economic growth and inefficiency in the provision of public services has resulted in inefficient public drainage and waste treatment systems. Open waters have become sewers for domestic and industrial waste. The rapid and dispersed establishment of factories in Thailand has made the control of effluents a formidable task, thus, contributing to increasing water pollution of the major rivers in Thailand.

Out of the 100 municipalities and 60 sanitary districts recently surveyed in Thailand (excluding Bangkok and pollution control zones) only 12 are served with wastewater collection and treatment facilities, five of which are deemed inadequate to meet current needs (Kruger Consult, 1996).

In the Eighth National Plan and the 1992 Environment Act, there is a clear commitment to improving water quality standards, establishing wastewater treatment facilities in cooperation with the private sector, and promoting the waste minimisation concept and clean technology. The preparation of a new and more comprehensive Water Resource Law is also under process.

There are environmental quality standards for drinking water, effluent, coastal water and surface water. Effluent standards exist for industrial effluent, discharge into deep wells, domestic effluent, building effluent and for waste dumping into water courses.

Although factories, industrial estates and large commercial buildings, hotels, restaurants and large condominium projects are required by law to treat their wastes, most continue to release waste directly into receiving waters. Apparently, the annual cost of operating the system exceeds the annual capital costs of purchasing the equipment, so while most factories and industries comply to regulations to install treatment systems, many do not actually use them, discharging untreated or barely treated wastewater and increasing BOD loads to already overburdened surface waters (Kruger Consult, 1996).

According to the sea water quality measurement, MOSTE (1996) states that the quality of sea water along the west coast of the Gulf of Thailand, and the Andaman Sea has generally been in a fair condition, except in large communities, industries and sea ports, where the sea water quality is lower than the standard

level. These areas include the coastal zone and seashore from Chon Buri province to Rayong province.

Marine fishery resource has been deteriorating in Thai waters area due both to the high rate of fishery, exceeding the renewability of marine life; and the pollution from the fishing vessels themselves and from factories, the tourism industry and residents along the coast.

Oil spill is one of the major concerns in marine pollution. Since 1995, there have been 7 oil spills along the Chon Buri and Rayong coastal stretch (MOSTE, 1996). In reaction to these oil spills, the government has formulated two action plans. They include the 1995 action plan for preventing and combating of water pollution caused by oil, and the 1995 action plan for the protection and remediation by oil pollution.

Most fishery resources are mobile and are not visible except upon capture. The consequence has been that fishery resources have been regarded as common property. The common property characteristics of fishery resources have led to over-exploitation of the resources. The United Nations Third Conference on the Law of the Sea attempted to mitigate this common property problem by enabling coastal states to establish Exclusive Economic Zones (EEZs). However, the ambiguity of the international laws have caused conflict of water area intrusion.

With respect to marine pollution control, Thailand has recently completed the assessment of the establishment of pollution control at its sea port and ratified the Basel Convention on the Control of Transboundary Movement of Hazardous Wastes and their Disposal. Considerations are also given to ratify the International Convention on the Prevention of Pollution from Ships to identify criteria and measures for controlling pollution from ships and marine vessels.

4.1.2 Water Pollution Agenda Setting

Water pollution usually emerges on the political agenda when the effects of river and sea contamination are severe and clearly evident, with serious implications on human health. Generally, it has been expected that government authorities would set standards on water quality and monitor the state of the environment. However, the recent deterioration of river and marine sources have led many to question how well these laws are actually observed and to what degree local environments are monitored.

The media is probably the major actor in placing water pollution issues on the political agenda. Water pollution where particular industries can be pinpointed as the culprit is frequently publicised in the media. More recently, there are increasing cases where local community groups have voiced their concern about the deterioration of their standard of living as a result of river and marine pollution. In May 1993, when the Phoenix Pulp and Paper factory was accused

by the nearby villagers of polluting Nampong River by discharging effluent that was not adequately treated, it was widely publicised in the media.

According to Prapertchob (1997), the river has experienced intermittent bouts of pollution, strong odours and death of river fish since the 1980s. However, the problems have been sporadic and have occurred on a limited scale; only local residents have perceived the problems. It is not until the 1990s when local community groups lobbied against the running of the Phoenix factory. This public uprising can be a result of rising consciousness on environmental quality among the public and the enactment of the 1992 Environment Act.

This incident brought affected villagers together into a group named the "People's Committee for Nampong River Conservation." It is comprised of villagers, school teachers, housewives and youngsters who are aware of the need for environmental protection. They have organised their own workshops and participated in seminars organised by government authorities, academic institutions and NGOs. During the same year, an NGO called "Conservation and Rehabilitation of Nampong River Project" was formed serving as a bridge between the people's organisation, academics and government authorities (Prapertchob, 1997).

4.1.3 Water Pollution Implementation

In general, the Ministry of Agriculture and Cooperatives has the main responsibility for the protection of water resources (MOSTE, 1997). Agencies within the Ministry that play a role in water pollution include:

- the Royal Forest Department, responsible for all protected forest areas and coastal resources that are vital for water resources protection;
- the Royal Irrigation Department, responsible for fresh and sea water fisheries and aquaculture; and
- the Department of Land Development, responsible for land and soil conservation.

In addition, MOSTE, Ministry of Public Health and the Ministry of Interior house agencies that are responsible for monitoring and controlling water quality (MOSTE, 1997).

Specifically, in relations to industries, the Department of Industrial Works (DIW) under the Ministry of Industry retained its role in 1992 as the primary environmental enforcement agency. However, under the 1992 Environment Act, the PCD is empowered to intervene, if the DIW is considered not to be enforcing environmental regulations firmly enough.

A wide range of ministries and government agencies has jurisdiction over more than 70 environmental laws, which have developed since the 1920s. This overlapping of responsibilities has created cross-jurisdictional problems and inter-agency tensions in certain areas.

For example, one of the weaknesses of the monitoring system is the unclear water quality standard. For example, two different government agencies in Thailand implement two different regulations with respect to the BOD. OEPP indicates that the BOD should be no more than 60mg per litre. However, the DIW allows up to 100mg per litre of water discharged.

During the past decade, as many as forty central wastewater treatment plants have been constructed throughout the country largely by the government sector in cooperation with international agencies and the private corporations. However, only eleven wastewater treatment plants have been in operation; nine in the final stage of construction, and the rest in various stages of construction.

For those plants which are in operation, only a few can operate properly. Most plants are confronted with budgetary constraints; thus, cannot afford the operational and maintenance (O&M) costs. This is due to the fact that while the construction costs are financed by the central budget (including the Environmental Fund after the promulgation of the Environmental Act of 1992), O&M costs are the responsibility of local authorities. In order for wastewater treatment to be properly managed, it is important to improve the financial and human resources capacity of the authorities in charge of the treatment.

In order to provide central wastewater treatment system and collection facilities, and to operate and maintain existing wastewater treatment systems particularly in the Bangkok Metropolitan Region (BMR), by collecting fees from customers, the Wastewater Management Authority (WMA) was set up by the Royal Decree as a state-owned enterprise under MOSTE, in 1995.

To perform its duties efficiently, WMA participates with the private and public sectors and international organizations in investing in wastewater management, where they may hold shares not exceeding 30 per cent. For WMA and other agencies in charge of wastewater treatment, a right pricing corresponding to cost-recovery and consumer's acceptability has to be properly designed.

With respect to coastal and marine environmental management, Thailand has not only established requirements for EIA reports and promoted central treatment plants for organic and toxic wastes, but has also declared many coastal areas such as Phuket, Phi Phi island, Pattaya and Samut Prakarn as EPZs and PCZs.

Samut Prakarn, a major industrial province in Thailand located on the mouth of the Chao Phraya River, is also a PCZ. This entails the formulation of a Pollution Control Action Plan for the province as part of the country's Provincial Action

Plan for Environmental Quality Management.

The wastewater management component of Samut Prakarn's Pollution Control Action Plan proposes a central wastewater treatment system for the province which will treat water from both industrial and domestic sources. This project is managed by the Pollution Control Department (PCD) under MOSTE, and is financed by the government budget, the Environment Fund and a loan from the Asian Development Bank (ADB). Construction began at the beginning of 1998 and the scheme is expected to be fully operational by the year 2001. Once operational, it is expected that the WMA will be a responsible body for its O&M (PCD, 1997).

This wastewater management project involves a public-private partnership that includes the contracting of the design, construction, operational and maintenance processes to a range of companies. Once the project is operational, it is expected that industries will join the scheme because it will be cheaper to do so than to build and operate their own wastewater treatment plants (PCD, 1997).

In Samut Prakarn, a partnership between the provincial government and the business sector has been in existence and institutionalized at both the provincial and national levels. In every province in Thailand, the Joint Public Private Consultative Committee (JPPCC) has been established. The Committee is chaired by the provincial governor and made up of provincial level ministerial officials, provincial leaders of the Federation of Thai Industry and provincial members of the Chamber of Commerce. Moreover, the National Economic and Social Development Board (NESDB), the national planning agency, has a division that deals with JPPCC issues.

However, in the Samut Prakarn Wastewater Management Project or any other projects, stakeholders are not limited to the governmental, industrial and commercial sectors. Residents, workers and students are also affected by projects implemented by the government. In the meantime, the Eighth National Plan, mentioned in the previous section, has promoted a new form of governance in Thailand to include the participation of civil society.

At the same time, the persisting dissatisfaction of government's development planning process has triggered bottom-up lobbying. In 1997, for example, Samut Prakarn communities protested against plants in Bangphli, Samut Prakarn, for releasing hazardous waste into public area causing eye irritation and respiratory problems to nearby local residents. The Bangphli district and the provincial office negotiated with the plants in question and demanded the halt of the practice (Thairat, 15 August 1997).

4.2.1 Air Pollution

Concern about the acid rain problem in Thailand is greatly influenced by growing

concern of the country's development path and associated systems of energy consumption and production. The rapidly increasing use of fossil fuels whose combustion is ultimately responsible for the emission of sulphur dioxide and nitrogen oxides, leading to acid precipitation. A coal utilisation and development study by the World Bank estimated that total domestic demand for all types of coal in Thailand would increase from 7.6 million tonnes in 1988 to 38 million tons in the year 2000. This corresponds to an annual increase of 17 per cent (Chongpeerapien, *et. al.*, 1990).

The possibility that acid rain deposition can occur in Thailand has only recently begun to be addressed about two decades ago. It is known that acid deposition can damage freshwater ecosystems, terrestrial systems including crops and forests, building structures and human health. The effects of acid precipitation in Europe and North America have spurred much scientific research and many policies to mitigate against further damage. However, in Thailand, there is little information available on the monitoring and impact of acid rain.

However, this does not mean that acid rain is less of a problem in Thailand than in developed countries. The increasing demand for energy has resulted in a continuing increase of acidic gases from anthropocentric sources over the past decade. The tables below show that emissions of acidic gases are increasing at a rapid rate in Thailand in comparison with the United States and Japan where figures actually show a decrease in acidic gases emissions.

Table 1: Emission of Sulphur Dioxide from Anthropocentric Sources
(000 metric tonnes)

	1970	1975	1980	1985	1990	% change
United States	28,400	25,900	23,400	21,100	21,100	-10
Japan	-	2,570	1,600	1,180	1,140	-29
Thailand	-	224	420	507	612	46

Source: UNEP, 1993

Table 2: Emission of Nitrogen Dioxide from Anthropocentric Sources
(000 metric tonnes)

	1970	1975	1980	1985	1990	% change
United States	18,300	19,200	20,400	19,800	19,800	-3
Japan	-	2,330	2,130	1,950	1,940	-9
Thailand	-	182	255	327	384	51

Source: UNEP, 1993

With respect to sulphur dioxide emissions, specifically, electric power plants are responsible for approximately 45 per cent of the sulphur dioxide emissions, industry 26 per cent and transport 23 per cent. The annual growth of sulphur dioxide emissions between 1980 and 1990 was 3.0 per cent and 3.6 per cent in the electricity and industrial sectors respectively, 12.3 per cent in the transportation sector and zero in the residential / agricultural / commercial (RCA) sectors (Chongpeerapien, *et. al.*, 1990).

Emissions growth in the power generation sector reflects the increasing use of high-sulphur lignite in the Electricity Generating Authority of Thailand's (EGAT) Mae Moh power plant. Mae Moh plant emits 1,900 microgrammes of sulphur dioxide per cubic metre (ug / cu m) averaged over an hour, exceeding the acceptable standard of 1,300 ug / cu m (Bangkok Post, 24 July 1998).

In the transport sector, the sulphur dioxide growth is largely from high diesel consumption. The share of diesel in the total fuel use of the transportation section increased from 42 per cent in 1979 to an estimated 54 per cent in 2011 (Chongpeerapien, *et. al.*, 1990).

Since the 1970s, the growth of vehicle ownership in Thailand means that motor vehicles have become a major source of nitrogen oxides emissions. Other sources contributing to growing nitrogen oxides emissions include the industrial and agricultural sectors.

The impetus for controlling emissions of sulphur dioxide and nitrogen oxides over the past decade or so has stemmed not so much from the threat of acidic deposition on the national and regional environment but more as concerns for human health risks. Studies have shown that these health risks can include direct health impairment to sensitive populations (*i.e.* children and the elderly, and those with existing respiratory problems and bronchial illness), visibility impairment, skin inflammation and cancer.

There have been no direct policies enacted to tackle the problem of acid rain despite attempts made to reduce acidic gases emissions through international agreement (for example, the UN ECE Convention on Transboundary Air Pollution and its related Protocols). Acid rain issues have only been indirectly acted upon through isolated cases, often through villagers' and community groups protest against power plants and industries emissions of acidic gases.

Climate Change, on the other hand, has received greater national attention from the Thai public. In response to the global warming threat, Thailand, in 1990, has formed a National Sub-committee on Climate Change (NSCC) and a Climate Change Expert Committee (CCEC) at the ministerial level. Thailand has also advanced its studies on the inventory and mitigation of greenhouse gases (GHGs) as part of an obligation under the United Nations Framework Convention on Climate Change (UNFCCC) which Thailand ratified in December 1994. The

ratification took effect on 28 March 1995.

Equally significant is the inclusion of climate change concerns into its Eighth National Economic and Social Development Plan. In addition, an annual budget has been committed by the government to support studies and capacity building as well as promote Thailand's participation in international affairs related to climatic change.

Thailand has also conducted a preliminary vulnerability and adaptation study, which has revealed potential shifts in seasons, average temperature, precipitation, and forest patterns which may threaten the future development of Thailand. Specific projects and policies in Thailand related to climate change place special emphasis on the Kingdom's major GHG emitters in deforestation and land use change, energy production and consumption, industrialisation, transportation and agriculture.

The three most important greenhouse gases are carbon dioxide (CO_2), methane and nitrous oxide. In 1990, total CO_2 is 164 million tonnes, 0.63 per cent of global emission (TEI, 1997b). In 1992, Thailand is rated the 31st in industrial emissions of CO_2 (World Resources Institute, *et. al.*, 1996). Other GHGs emissions include methane, 58 million tonnes of CO_2 equivalent and nitrous oxide, 3 million tonnes of CO_2 equivalent (TEI, 1997b).

Table 3 shows that Thailand's emission of carbon dioxide has been growing at a very rapid rate, in comparison with the United States and Japan, and probably has the potential for even greater growth if a 'business-as-usual' scenario is adopted by Thailand.

Table 3: National Emission of Carbon Dioxide from Anthropocentric Sources, 1960-1990
(000 metric tonnes)

	1960	1970	1980	1990
United States	799,544	1,165,477	1,259,281	1,310,341
Japan	63,997	202,973	254, 881	289,288
Thailand	1,012	4,190	10,921	25,535

Source: UNEP, 1993

The top seven sub-sector contributors to the national warming effect in 1990, were (Boonpragob, 1996: xvii):

- Rice cultivation, 108 million tonnes (33 per cent)
- Utilisation of woody biomass, 90 million tonnes (27 per cent)
- Transport, 33 million tonnes (10 per cent)
- Power, 28 million tonnes (9 per cent)
- Industry, 12 million tonnes (4 per cent)
- Livestock, 12 million tonnes (4 per cent)

Other activities, including oil and natural gas, industrial process, combustion, agricultural soils, waste, wetland, field burning and solid fuel, contribute to 2 per cent of the warming effect.

TEI's study on Thailand's vulnerability and adaptation to climate change concluded that (Boonpragob, 1996):

- The changing climate scenarios simulated by various General Circulation Models, demonstrates that global climate change has the potential to affect the future distribution and health of forests in Thailand.
- It is likely that climate change will reduce the availability of water by 5-10 per cent, which will affect overall agricultural production.
- A rise in sea level caused by global warming may result in the slower drainage of rainwater from the low-lying central plains. This can lead to flooding of low-lying areas and salt water intrusion into the rivers which can severely damage crop production.
- Climate change has also been predicted to reduce coastal resources, including, the disappearance of narrow fringing beach; the reduction of mangrove ecosystems and salt marshes; and the submergence and erosion of lowlands. They, in turn, have severe socio-economic impacts relating to aquaculture agriculture, tourism and loss of coastal land.

4.2.2 Air Pollution Agenda Setting

The media occasionally discusses climate change (see for example, The Bangkok Post, 18 September 1996; 11 April 1997; 13 December 1997), providing the main forum in which the public gain information on the causes and consequences of global climate change and Thailand's responses to such issues in various conferences such as the 1992 Earth Summit in Rio de Janeiro and the 1997 Climate Change Convention Conference in Kyoto.

However, the primary actor in getting climate change on the agenda is the government sector as a commitment to the UNFCCC. Since the 1990s, studies

related to climate change impacts and greenhouse gas inventory have been conducted by various research and academic institutes such as TEI and the Thailand Development Research Institute (TDRI). They are often supported by the Thai government and by funds provided by developed countries and international organisations.

CCEC helps screen all information and provides information and opinions to support NSCC in recommending national policies on climate change issues. The NSCC is chaired by the Permanent Secretary of MOSTE, while the CCEC is headed by the General Secretary of OEPP.

Currently, government initiatives to tackle climate change initiatives are mostly top-down and are at the policy and planning stages. Policy options to reduce the emissions have been developed since the 7th National Plan. They include (MOSTE, 1997):

- switching from fossil fuels to gases
- improving mass transit systems in urban areas
- implementing demand-side management in power use
- accelerating reforestation of degraded forest lands
- protecting conservation forests and watershed areas
- carrying out public campaigns on global environment protection

Rounds of meetings between NSCC and CCEC have led to subsequent policies and projects. Initiatives include (TEI, 1998):

- An establishment of the National Energy Promotion Office (NEPO) which channels a 7 satang (cent) per litre of gasoline into the Oil Fund for research and development in energy-related technology. NEPO's work has been expanded to fund the private sector's implementation of energy saving projects with emphasis on renewable energy sources.
- A major step to reform curricula at the primary and secondary school levels to integrate energy and environment conservation elements into the curricula. This is a three-year project, a collaboration of efforts between a local NGO and the Ministry of Education, funded by NEPO.
- A new regulation to waive import duties of cleaner technology which protects the environment or abates environmental problems. The tax rate has been reduced radically from as high as 70-80 per cent to the minimum 5 per cent of import value.

Nonetheless, in practice, actions taken rarely aim to tackle global climate change

directly. Projects carried out are sectorally defined and may include the reduction of GHG emissions in their project rationale and objectives but local air quality improvement for the health and well-being of the people is probably the primary goal.

For example, with regard to the transport sector, Thailand has acknowledged that the improvement of traffic systems in urban areas, especially in Bangkok can reduce fuel consumption and improve fuel efficiency considerably, thus, reducing air pollution levels (MOSTE, 1997). Thailand is now constructing its first elevated train system. The expressway system allowing more rapid flow of vehicles, is already in its third stage of development. It is estimated by MOSTE (1997) that mass transit systems in Thailand have the potential to reduce CO_2 emissions by as much as 20 to 100 thousand tonnes per annum.

Similarly, in the case of acid rain, projects are sectoral, with emphasis on introducing clean technology. With regard to the energy production sector, Star Petroleum Refining Company (SPRC) claims to be the only refining firm in Thailand which has equipped its plant with sulphur-trapping technology, due to be effective in 1998. This investment in an environmentally-friendly production process is believed to reduce sulphur content in its diesel fuel to 0.05 per cent by weight compared to the official standard 0.25 per cent (Bangkok Post, 3 March 1997). Standard high-sulphur diesel is a well-known contributor to acid rain. However, the project's success will probably depend on consumer's awareness and choice of the fuel, and consumer's acceptance and willingness to use this new fuel.

The main concern about acid rain is the effect of sulphur dioxide and nitrogen oxides gases emission on people's health rather than on the damage of regional terrestrial and freshwater ecosystems or building structures.

In the case of the Mae Moh lignite-fired power plant in Lampang, the Electricity Generating Authority of Thailand (EGAT), the operator of the plant, has been accused by villagers in the area of emitting toxic sulphur dioxide gas causing respiratory problems, skin and eye irritation and other health problems. EGAT vows to install sulphur dioxide filters to minimise its emissions but they have yet to be completed and put in operation (Bangkok Post, 24 July 1998).

4.2.3 Air Pollution Implementation

As mentioned previously, acid rain and climate change initiatives remain at the policy and planning stages. A number of organisations, both governmental and non-governmental, sometimes in partnership with each other, have begun to devise implementation plans as the next phase in pursuing Thailand's commitment to air pollution problems.

The TEI has been entrusted by the Government of Thailand to undertaken most

climate change studies for Thailand. One of the studies is the Asia Least-Cost Greenhouse Gas Abatement Strategy (ALGAS), financed by the Global Environment Facility (GEF) through the United Nations Development Program (UNDP) and executed by the Asian Development Bank (ADB). This project has proposed an action plan for Thailand and a number of projects such as fuel switching in city buses; market development for the solar cell industry; and collaborative forest management.

The ALGAS study has also applied the economic least-cost principle to the analysis of options for reduction of greenhouse gases, making it easier for policymakers to gauge the magnitude of cost associated with their prescribed policy options.

The five-year demand-side management master plan, launched by the Electricity Generating Authority of Thailand (EGAT), is noted as a unique model to reduce electricity wastage by increasing end-use efficiency. The introduction of fluorescent straight-tube and refrigerator codes are expected to decrease electricity and fuel demands and ease global warming in the long run. However, studies have shown that what EGAT has initiated has not caught the interest of the general public as a means to curb global warming. Despite increased public awareness of the fluorescent straight-tube and refrigerator codes, the public remain oblivious to the effects of the GHGs. This can be seen as a weakness in government's educational and public relation programmes. Furthermore, it can be pointed out that there is little concern among the media, which seems to pay more attention to local problems related to dam construction, air pollution and natural resources management rather than global climate change (Pradubraj & Nicro, 1997).

As a joint implementation with forestry, Thailand is strengthening its forest policy to protect local environments as well as reduce GHGs in the atmosphere. Thailand is currently implementing a large scale public reforestation programme in degraded conservation forest areas. The project is to honour the 50th Anniversary of His Majesty the King's accession to the throne, targeting 5 million rai (952,380 hectares) for rehabilitation. This will be further discussed in the section below.

4.3.1 Deforestation

Forest area in Thailand has rapidly been reduced from 35.9 million hectares or about 70 per cent of the total land area of Thailand in 1910 to 13.6 million hectares in 1991 (RFD, 1993), about 25 per cent of the total land area of Thailand. With the continuation of the reduction in forest area by an estimated 0.25 to 0.5 million hectares each year, it is recently calculated that in 1996, there is only around 12.8 million hectares of forest left (MOSTE, 1997). This total forest area is the responsibility of the Royal Forestry Department (RFD) of the Ministry of Agriculture and Cooperatives.

According to Puntasen (1997) the most rapid rate of reduction in forest area in Thailand took place since 1961. In 1961, the forest in Thailand was found to be 53.3 per cent of total land area or about 27.4 million hectares. Within a period of three decades, in 1991, the forest area was reduced to 28.0 per cent of the total land area or about 14.4 million hectares, that is approximately half of the forest area available in 1961 (MOSTE, 1997).

Incidentally, the year 1961 marked the beginning of the first five-year National Economic and Social Development Plan (1961-1966). The first two National Plans emphasised investment in industries and infrastructure by using funds from agricultural and timber exports (Puntasen, 1997). Deforestation rate accelerated when the Thai government undertook the management of Thailand's forests for commercial purposes to serve the industrial needs of the developed industries.

The clearing of forest was also caused by the expansion of agricultural land. In 1967, while the forest area was reduced to 48 per cent of the total land area, agricultural land was increased to 28 per cent (Puntasen, 1997). High population growth, coupled with the inequitable distribution of productive agricultural lands, results in strong pressures to convert forests and occupy logged-over sites. Other causes of deforestation include conversion of forests to recreation areas and high demand for wood products, especially overseas, resulting in illegal logging.

Another factor contributing to forest destruction is land speculation. A growing urban middle class wishing to generate more of their economic wealth has turned to the accumulation of land, particularly in the rural areas. As a result, rural land has been transformed from merely a factor of production into a commodity or an asset for speculative purposes, rapidly raising land prices. Within a period of less than 30 years, land prices in many rural areas increased more than 100-fold. This great increase has generated very strong pressure for small farmers to sell their lands and illegally encroaching on forest areas safeguarded by the RFD causing conflict between government authorities and the local communities.

At a time when most world's unpopulated land areas were covered by forest, wood or timber was considered the only major product form forest. This traditional thinking still continues today in spite of the fact that many forest areas have already been eliminated and replaced by deserts, agricultural land and / or human settlements. Under such circumstances, the major forest products especially from tropical rain forests are no longer wood or timber. They are the assurance for a continual supply of water for farmers and city dwellers; their function as regulators of a steady flow of water supply all year round; providing continual natural fertilisers to the top soil of the forest; keeping the top soil from being eroded; absorbing carbon dioxide and simultaneously countering the adverse effects of global warming; releasing oxygen vital to all life on earth; and maintaining and generating biodiversity. Timber is perhaps the less significant

product in comparison with all the others mentioned above.

In the 4th National Plan period (1977-1981), a more comprehensive and extensive forest management plans were drawn up, and a National Forest Policy Committee was established under the 5th National Plan. A National Forest Policy was approved in 1985. Despite the policy guidelines, deforestation continued. It was argued that the failure to protect forest resources in the 6th National Plan period was due to a neglect in the importance of the economics of forest resources to local communities and a neglect of the role of communities and support from NGOs in managing forest resources. In a further effort to halt deforestation, prompted by a series of mud slides and floods killing many people in southern Thailand, the government announced a logging ban in 1989.

However, despite the 1989 logging ban as well as the intensification of reforestation and afforestation through economic incentives and public campaigns during the past decade, Thailand has continued to lose forest areas. Moreover, a ban on commercial logging has increased Thailand's reliance on imported timber, thus, contributing to deforestation in neighbouring countries. One of the main factors for deforestation can be pointed at ineffective enforcement of forest laws and policies.

The most recent statement on forest policy can be found in the Eighth National Plan which revises the 1985 national forest policy in relation to the 1989 logging ban. The Eighth National Plan's principle policy statement regarding forest policy is that:

Thailand aims to achieve a 40 per cent forest cover for the whole country with 25 per cent as protected forest.

Probably, the most comprehensive forest law is the Forest Act 1941. This has been amended a number of times, in 1948, 1982 and 1989. In 1964, the National Reserved Forest Act was enacted to reduce the rate of deforestation, by incorporating all forest areas into national Reserved Forest. To date, there are 1,221 forest reserves. Legal measures such as the notification of forest conservation zone to be National Parks or Wildlife Sanctuaries are also prescribed.

Thailand's forestry policy is partially influenced by global efforts towards tropical forest resources protection. In 1990, the International Tropical Timber Organisation (ITTO) established guiding principles for the sustainable management of natural tropical forests, and set the year 2000 as the target by which time all these forests should be managed sustainably (also known as The Year 2000 Objective of ITTO). Thailand is a member of ITTO and is, thus, nominally committed to the Year 2000 Objective.

Thailand is in the process of restructuring its forest management system from central control to more community-based forest management systems. It is

preparing a new community forest law. Once the differences between the concerned parties have been reconciled, the government will submit it to Parliament for approval. Under this new law, communities will have rights to forest resources and will be responsible for managing the forest resources in their jurisdiction. This new initiative in forest management, if successful, may become a model for the South East Asian region (MOSTE, 1997).

Furthermore, the RFD has established guidelines to overcome forest resource deterioration through promoting public participation in forest resource conservation, forest rehabilitation and career development for people in rural areas. Nonetheless, it remains to be seen whether the RFD will be willing to give up power to forest communities and allow them to manage forests and participate in decision-making processes that are related to their livelihood in forests.

4.3.2 Deforestation Agenda Setting

All forest lands and forest resources in Thailand are considered property of the state. To protect and manage the forests, the RFD was established in 1896 to manage and control all forest lands. Initially, the RFD was a department within the Ministry of Interior. Today, the RFD is part of the Ministry of Agriculture and Cooperatives. The financial resources of the RFD are derived solely from government contribution.

The initiation of a total logging ban in 1989 changed the forestry industry in Thailand. Not only did the organisational structure of the RFD changed from a forest industry to a conservation organisation, but at the same time, a large number of labourers were out of work. This logging ban was enacted even though the export of forest products was a major foreign currency earner for the Thai economy. Thus, this redundant workforce and the demand for timber created numerous problems which threatened the long term sustainability of forest management in Thailand.

As a result of the redirection of forest policy, the Thai Forestry Sector Master Plan was produced. This plan attempts to reorganise the management of Thai forest resources so that they are sustainably productive but also preserve the biological resources contained within. Although this valuable work was completed in 1991 with technical and financial assistance from the Government of Finland, the plan itself is now defunct.

The ideology of the RFD owes some of its roots to the Food and Agriculture Organisation's (FAO) "classical" analysis of deforestation. FAO establishes that the main reasons for tropical forests deforestation are population pressure of the poor in the South and slash and burn agricultural methods. This analysis of deforestation has been used as a basis for solutions by governments in many developing countries with the assistance of United Nations agencies, international

organisations and major development banks and financial institutions. Often, these efforts have led to the further erosion of the natural resource base and threatened the survival of rural communities.

This conventional analysis fails to consider the deforestation resulting from business groups and governments in both 'industrialised' and 'industrialising' economies. Moreover, solutions to problems of deforestation include rapid reforestation of large areas through "the participation of the local people". This includes participation of the local people in commercial tree plantation projects which have not only failed to bring any real social or environmental benefits, but have been faced with strong opposition from rural people in Thailand.

The increasing marginalisation of the people and the destruction of their survival resource base have in many instances led to protests and uprisings by rural communities. These instances contrast sharply with the conventional ideology which claims that local people are destroying the forests. In reality, these local people, especially in agricultural communities, are those who have shown the greatest initiative and enthusiasm in preserving their forests (Leungaramsri & Rajesh, 1992).

Local people's resistance to destruction of their forests has been cited since the mid-1970s. In 1975, 500 villages of Baan Luang sub-district, Nan province in the North of Thailand gathered to blockade the Khun See-Pun Forest, the watershed of the villages, to halt logging activities by outside business interests.

Political constituencies on deforestation issues at the community level rose in numbers in the late-1980s prior to and after the logging ban. In 1988, 5,000 villagers of Chiangmuan district, Phayao province in Northern Thailand occupied the local district office and protested for five days and nights demanding that the government revoke the logging concession in Huay Mae-Yad Forest which is a watershed area. The protest forced the government to suspend the concession.

In another case, from 1987 until the present, villagers in eight provinces in the Northeastern region have been resisting eucalyptus plantations promoted by the state and commercial reforestation companies, which have destroyed forests and fertile farming land. In some places, escalating tensions have resulted in villagers setting fire to eucalyptus nurseries in plantation projects.

In 1989, in what could be viewed as a culmination of previous protests to save their forests from being destroyed, villagers from all over the country united in demanding the government to immediately halt logging concessions in Thailand's forests. They were supported by students, the mass media, academics, NGOs and the general public. The strong opposition to commercial logging has been a great influence in forcing the government to declare a nation-wide logging ban.

Many of these events have been media-publicised, enabling a shift in public perception of local people and their relationships with natural resources. This has contributed to an increase in public awareness of the value of local knowledge in forest conservation. This increased awareness has also strengthened villagers' self-confidence in conservation efforts and their belief in the power of local forest management (Leungaramsri & Rajesh, 1992).

4.3.3 Deforestation Implementation

The major reforestation project currently in operation is the 50th year anniversary tree planting to honour His Majesty the King of Thailand's accession to the throne. Government authorities have prompted a 5 million rai (952,380 hectares) reforestation project nationwide within 5 years. This project started in 1994 and has now been extended until the year 2002. The total target for this project is to plant 800,000 hectares by the year 2002 of which 480,000 hectares occurs in conservation areas and the remaining area in degraded forest in national forest reserves.

However, this extremely ambitious target is unlikely to be met. In between 1996-1997, various companies and public groups expressed their willingness to reforest more than 2.5 million rai, but the actual area reforested came to less than 30 per cent of this amount, due to shortages of suitable sites for planting. Even this 30 per cent was planted under inappropriate conditions, with many of the saplings dying soon after they were planted (MOSTE, 1997).

An important secondary objective of this project is to include the business sector in the tree planting effort. The business sector are requested to select and sponsor tree planting areas, to provide financing to cover replanting costs and to provide adequate funds for management of the areas for post planting. Due to the current economic downturn, the areas being sponsored have rapidly decreased during the last year (McQuistan, 1998).

In addition, numerous non-governmental initiatives at local and international levels are attempting to use trade incentives to improve forest management. The most notable being the ISO14000 guidelines for sustainable forest management produced by the Canadian Standards Association and the Forest Stewardship Councils (FSC) forest certification scheme.

Nonetheless, the main challenge is the large human population occupying forest lands. An estimated 22 per cent of Thailand's villages are located in national forest reserves, with some 8 million people living and farming there (Sadoff, 1991 in McQuistan, 1998). Trees planting is a popular activity because it is neutral, in that it does not challenge the status quo. However, reforestation programmes fails to address the root causes of forest degradation in Thailand and until these issues are being tackled, deforestation will probably continue.

The Thailand Environment Institute (TEI) has initiated a pilot project which begins to facilitate cooperation between government officials and local communities in creating a balance between conservation and resource use in its 'Sustainable Forest Management through Collaborative Efforts' Project. Initiated in July 1994, this three year project in two protected areas of Thailand, is funded by the Government of the Netherlands through the International Tropical Timber Organisation (ITTO), in collaboration with the Society for the Conservation of National Treasure and the Environment (SCONTE).

The project has facilitated the planting of 660 hectares of trees and has secured the involvement from twenty two village communities. In addition, more than four hundred villagers have received formal training in areas focused on income generation, environmental education and forestry techniques. For example, three nurseries have now been built each with a capacity of 50,000 seedlings. These nurseries are managed and operated by villagers who have been trained by the project. Project activities have been focused on strengthening local communities and on ensuring that project activities are sustained in the long-term. Village organisations have been established and are active in implementing project activities in their locality. Moreover, environmental education camps have been undertaken and an active programme of raising public awareness is continuing.

Another project funded by the Petroleum Authority of Thailand (PTT) called the 'Sustainable Forest Management Action Research' project aims to coordinate sustainable environmental restoration within five recently replanted forest areas. In cooperation with the RFD and local communities, project activities have included trees planting, biodiversity measurements to determine the degree of ecological restoration achieved, and the provision of guidelines for other forest regeneration projects. Upon completion of this pilot project, recommendations will be presented to the Ministry of Agriculture and Cooperatives for consideration regarding future sustainable forest management policies and initiatives.

In a sense, the future of sustainable forest management in Thailand rests on the actions of the Royal Forest Department and therefore, ultimately upon government policy. Reforestation is an important component of forest management in Thailand, but planting targets must be set realistically and should reflect the capacity of public and private sector participants to ensure its sustainability.

Furthermore, the importance of the human-forest interface in Thai forestry is such that local populations must be involved in forest management and conservation. They certainly cannot be excluded, because to do so would not only be inequitable, but also short-sighted. Thailand does not have the resources or capability to maintain all forest lands under state management, and must at some time enroll the assistance of individuals, local communities and other

interest groups.

4.4 Policy Recommendations

After an introduction to environmental governance mechanisms in Thailand and a summary of the nature and development of environmental problems and policies in Thailand, this section endeavours to examine Thailand's environmental governance from a regional perspective in the agenda setting and implementation of environmental concerns.

The developing countries of the Asia-Pacific region suffer from a myriad of complex environmental problems which are incapable of resolution by the actions of individual nations alone. The government sector in most developing countries lacks the resources to implement even the most rudimentary of environmental management regimes. Further, as many of the environmental issues transcend national boundaries, it would be nonsensical for any state to unilaterally attempt to protect its environment. Therefore, it is through regional and international relations that environmental protection can be assured.

Environmental policies and law, in general, should facilitate the sharing of regional experiences, establish regional centres and networks for research and development of environmentally-friendly technology and for monitoring the environment; encourage flexible and region-wide support to develop national environmental programmes, promote regional briefings and training; and urge the carrying out of regional studies and trends. The exchange of information, scientific research and technical assistance that assist lawmakers and policymakers, are and will continue to be a critical aspect of environmental protection in the future.

In a globalising world, many developmental and environmental policies have been adopted from international organisations such as the World Bank and the United Nations; and applied to Thai policies with little regard for the different cultural, economic, political and social contexts.

Some may argue that these policies, in fact, exploit the resources of 'developing' countries, including Thailand, for the benefit of the 'developed' countries, and is a causal factor of the Asian financial crisis.

Some academics like Pasuk Phongpaichit and Chris Baker (1998), believed that this prolonged Asian crisis is a blessing in disguise. It will enable people in the affected countries to think more deeply and question the future path to 'development'; and rediscover and strengthen the resources and culture of one's own society. This is so that the country will not be consumed by globalisation, but instead, flourish within it.

The uprising of the South East Asian financial and economic crisis together with

the 'haze problems' originating in Indonesia, have demonstrated growing regional interdependence, thus, recognising the increased need for regional cooperation in accountable policymaking and implementation of projects and programmes, and in the monitoring of the environment.

Thailand is a part of many regional alliances. They include:

- the Association of South East Asian Nations (ASEAN), under which is the Asean Senior Officials on the Environment (ASOEN);
- the Asia-Pacific Economic Cooperation Forum (APEC);
- the Greater Mekong Subregion (GMS);
- the Bangladesh, India, Sri Lanka, Thailand - Economic Cooperation Forum (BIST-EC);
- the Indonesia-Malaysia-Thailand Growth Triangle (IMT-GT); and
- The Asia-Europe Meeting (ASEM).

However, economic concerns predominate in these regional alliances. ASEAN, for example, is considering the establishment of the ASEAN Free Trade Area and the ASEAN Investment Area. APEC which joins Asia with the United States, Canada, Australia and Latin America countries, aims to create one vast free trade and investment zone by 2020. GMS recent projects include Route 9 in the Thailand-Laos-Vietnam East-West Transport Corridor and the Mukdahan Bridge Project over the Mekong River.

Trade policy, however, can be a powerful measure to accommodate implementation of climate change efforts. Trade has been used to control and mitigate negative environmental impacts. One such initiative is the Montreal Protocol to Protect the Ozone Layer (Jesdapipat, 1996). International standards and restrictions in trade policies have sometimes been accused of imposing trade barriers on 'developing' countries. However, at the regional level where economic, political and cultural characteristics are less diverse, trade policies that are environmentally sensitive may be an effective tool in environmental protection.

What is crucial with respect to regional environmental governance is the mainstreaming of the environment into the above regional development agendas of trade, tourism, industry and infrastructure development.

Protests of the actions carried out by these regional groups, by NGOs and community-based organisations (CBOs) have taken place but often only in parallel to and separate from the regional groupings' annual meetings and conferences (Kimura, 1997). Nevertheless, such gatherings can be seen as a way

to voice objects of economic regional cooperation and receive international media attention.

In November 1996, at APEC's annual leaders' meetings in Manila, many civil society groups lobbied their country's respective APEC delegations to push them to recognise environmental and human costs to trade, in addition to raising the issue of economic sustainability. Protesters demonstrated in the streets, marched to the official meeting venue and delivered a joint letter to APEC officials noting objections to the institution.

Regional initiatives to address environmental issues are often top-down with little local government and civil society participation, especially at the decision-making level. For example, in 1996, the GMS countries (Thailand, Myanmar, Cambodia, Lao PDR, Vietnam and Southern China), in cooperation with ADB agreed to rehabilitate the Tonlae Sap or Great Lake which is being threatened by deforestation in upstream countries. The project has set up objectives to stop traditional slash and burn cultivation by incorporating an estimated 60 million farmers into the market economy and providing them with basic necessities (Bangkok Post, 4 Aug 1996).

This is decided upon without the public participation of farmers and residents in the watershed area about what their needs and wants are, and what their capacity and constraints are. This may have severe implications upon the effectiveness and sustainability of the project in safeguarding the environment.

It has generally been found in Thailand and other countries that participation provides an effective mechanism for 'good environmental governance' that ensures the accountability, transparency and sustainability of a project, programme or policy. However, it is important to recognise that people's participation is not the panacea to environmental protection. As mentioned in the Thailand Environment Institute's 1995 Annual Conference:

" The majority is not always right, particularly in a case where technical expertise is involved. Nonetheless, people's participation is a mechanism by which the most accurate conditions of an environmental problem in each location can be reflected, as environmental problems are to a great degree contextual in time, space and taste of people." (Nicro, *et. al.*, 1995: 12)

By involving people's participation, decisions will more accurately be based on the better use of resources and the various actors' potential to implement the decision. The participation process can also increase accountability and minimise corruption.

What is required is the establishment of a public consultation process during the planning phase of any regional projects. They should include environmental and social impact assessments and the involvement of all stakeholders including

not only national governments and multinational corporations, but also local and provincial governments, small and independent businesses, NGOs, CBOs, academics and the media.

Critics of neo-classical economics claim that current regional cooperation forums, along with the North America Free Trade Agreement (NAFTA) and the World Trade Organisation (WTO) represents an unsustainable model of economic development based on neo-classical notions of unregulated free trade. This disregards the reality of the political economy, that governance and economics are inseparable (Kimura, 1997). Moreover, these organisations represent the supremacy of trade policy at the expense of environmental, labour and human rights issues.

To foster effective regional cooperation, good governance must first be practised at the national level. Following analysis of the case studies, common problems can be identified. In order to improve the agenda setting and implementation processes in Thailand, there needs to be institutional reform particularly in relations to the changing role of the state to enable and facilitate decentralisation, participation, capacity building and conflict management at all stages of development.

Facing an economic and financial crisis, environmental policies that present a cost to industry may be delayed. In addition, capital spending programmes for environmental programmes in Thailand and other crisis countries have been reduced as they rely heavily on imported technology and services for key components of their environmental projects, particularly in the promotion of clean technology.

The OEPP has cut the government's budget for environmental infrastructure in the wake of the crisis, by one third to 3 billion baht. Moreover, the collapse of the private-sector environmental market has led many environmental companies to refocus their business strategies towards aid-funded projects (Acid Rain Newsletter, June-July 1998).

However, the crisis can also mean that the projects to be implemented will be more selective. Furthermore, the efficiency, effectiveness and sustainability of the project becomes more crucial as resources are scarce. Priority setting is thus important in government policy and planning for environmental governance.

A cost-benefit analysis often excludes the personal value of the environment. Priorities are best set as the result of a process involving both technical and public inputs and taking into account scientific, economic and medical evidence as well as the intensity of public concern over risk (Brandon & Ramankutty, 1993).

Since the attempt to conserve the forest is believed by many to be more effective at the local level, the presence of strong and sustainable organisations formed

by people in the area is a prerequisite for such effort to be successful (Puntasen, 1997).

The incorporation of local communities into sustainable management may require changing the way they are viewed by forest authorities (McQuistan, 1998). Rather than being regarded as illegal encroachers, the farmers can be more usefully viewed as partners in forest conservation and management. This will mean direct responsibility for managing forests being transferred to individuals, communities and other interest groups. The expertise to initiate, support and guide local management of forest land is probably needed from the RFD, although this necessitate a reorientation in the role of the RFD from a 'command-and-control' approach to extension and facilitation. Any realignment of the RFD's traditional roles will entail the training and capacity-building of forestry officials to equip a greater number with social and environmental skills to work with local communities.

Members of the community should be encouraged and given as much support as possible from outside, such as from government officials and other related organisations, in order to assist them to function effectively. Their organisational strength, in turn, depends in part on some form of ownership over the property to be protected. In this case, the forest conserved by the community should be managed using the "common property" concept.

However, if the forest involved is a reserved forest, legally, it belongs to the government and the community has no right to ownership. Nevertheless, some forms of ownership should be given to the community in order to generate the incentive for the community to look after it (McQuistan, 1998; Puntasen, 1997). An acceptable form of ownership is for the community to be able to make rules and regulations for forest protection as well as to police those rules. Equally important is that the community must be able to collect and distribute benefits among its members generated through their sustainable conservation efforts. Such form of ownership is crucial to the organisational strength of the community that wishes to protect the forest for its long-term benefits.

A successful community forest management process requires strong support from government officials by, for example, formally recognising the group's efforts; legalising the groups' activities; providing financial, material and technical supports necessary for forest protecting activities; and taking decision measures against all groups of outsiders who try to make direct gain out of the forest protected (Puntasen, 1997).

At the policy level, it is important to design cost-effective policy instruments that minimise costs and economise on scarce administrative skills. Environmentally appropriate policies are not inconsistent with policies that foster growth and trade, but they do attempt to correct the bias of market and policy

failures that lead to overexploitation of non-priced and under-priced environmental resources (Brandon & Ramankutty, 1993).

Pricing reform, involving the removal of subsidies and the internalisation of externalities imposed by the resource use or pollution emitted, is an example of economic instruments to prevent and control environmental degradation. Taxes or tradeable permits levied on pollution and congestion are equivalent to raising the price on air, water and land resources. Tax-based policies will lead to some increase in financial flows to the "owner" of the resource - which is often the government. These revenues should be reinvested in the resources itself. In addition, both price increases and fiscal instruments can help stimulate technological adaptation that favours greater efficiency and reduced pollution.

Economic instruments are not entirely unfamiliar to Thailand. There are a few examples of how they are already being applied to specific problems. One is the differential excise tax on leaded versus unleaded gasoline designed to encourage drivers to choose the no-lead alternative. Another is the treatment charges levied on users of the Bangkhuntien hazardous waste treatment center.

However, application of these pollution charges has, in most cases, little incentive effect. In other words, they have not proven especially effective in inducing polluters to reduce their pollution loads, partially because the charges are usually set at a low rate and are insufficient even to recover the investments made. On the other hand, some believe that these pollution charges are served primarily as a revenue raising device. All in all, increased efforts and resources need to be focused on realistic standard setting and standard enforcement, as well as on environmental awareness raising. These processes could benefit from inviting broader stakeholder participation.

At the institutional level, it is important that Thailand has the institutional capacity to accomplish the important steps of priority setting and policy reform. Institutions can constrain the choice of policies. The policy mix must be weighed not only against an analysis of the efficiency of the approach but against a country's ability to implement (Brandon & Ramankutty, 1993).

The accustomed governance structure for environmental management in Thailand is one in which powers and responsibilities are divided among a number of ministries and departments at the level of the central government, while lower levels of government have traditionally had limited powers. Despite the enactment of the 1992 Environment Act and the accompanying reorganisation of the national environmental management bureaucracy, the problems of multiple centers of responsibility and overlapping jurisdictions have not been adequately resolved. For example, while, in theory, the PCD has overall responsibility of setting environmental standards, in practice, the Ministry of Industry sets point source standards for industry, while PCD is left to deal with all other point

sources. At the regional level, the differing national environmental standards need to be addressed in regional environmental governance, particularly in the monitoring of the regional environment.

The 1992 Environment Act has altered the national-local power balance to a degree but granting greater regulatory enforcement powers and environmental planning responsibilities to provincial and local governments. This is a positive development from the perspective of ensuring greater accountability of decision-makers to their constituents. Yet, there are serious problems in giving substance to this new commitment. Most provinces and municipalities lack both the professional competence and the financial resources to assume major responsibility for environmental management. In short, a partial transfer of power has occurred without a corresponding transfer of resources to the local level.

One way of strengthening local capabilities may be through a greater decentralisation of structure of government departments like the PCD, so that over time, PCD would come to have a presence in most provinces and municipalities so as to provide close technical support for local environmental management efforts (Phantumvanit, *et. al.*, 1994).

A coordinated effort to gather and analyse information about the environment for effective policymaking is lacking. In fact, contributions to environmental protection in Thailand and other Asia-Pacific countries have largely been independent of one another, or are often products of specific, isolated cases. There is a lack of any coordinated effort to develop effective regional policy strategies for long-term sustainable development.

Recently, at the policy coordination level, United Nations agencies such as the Economic and Social Commission for Asia and the Pacific (ESCAP) have already been performing a catalytic role, helping countries to cooperate on regional environmental programmes. More specific technical issues are already handled effectively by specialised international agencies such as the Food and Agriculture Organisation (FAO) and the World Health Organisation (WHO), and by other regional bodies, including the International Board for Soil Research and Management (IBSRAM), which specialises in land resources, and the International Centre for Living Aquatic Resources management (ICLARM), for marine resources. In addition there are numerous regional projects on forest resources such as the ASEAN Institute of Forest Management and the ASEAN Timber Technology Centre.

What is lacking is a networked and integrated coordinating body with representatives from the wide ranging and inter-related environmental issues. Such a mechanism would facilitate the transfer of environmental information and policy strategy options among countries. It is not intended to be a funding organisation. Incorporated in this system, there should be a civil society network,

preferably initiated, operated and maintained from the bottom-up by civil society groups. This could be an arena in which civil society can voice their concern, collect and disseminate information and provide alternative means of development and environmental protection at the regional, national and local levels, to private and government sectors.

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Comments

Kimihiko Hyakumura

1. Introduction

Dr. Somrudee Nicro's report consists of 4 parts. The first section gives an overview of environmental protection in Thailand, and refers to its legal aspects. The second section gives a contextual overview of Thailand, and refers to the recent economic crisis. The third section analyses the current state of environmental governance mechanisms. The fourth section presents detailed case studies on water pollution, air pollution and deforestation.

2. The Economic Situation in Thailand

Thailand has been able to miraculously develop its economy since 1985. Thai people were dubbed "Asian Tigers" and the country has been enjoying a reputation as a model for neighboring developing countries. From the middle of 1997, however, the economical development of Thailand suffered a severe financial crisis.

Dr. Nicro points out characteristics of Thailand's economy. She thinks the drastic economic growth and investments made in Thailand were all focused around urban and service industries. Half of the total income produced during the era of economic expansion, she says, comes from these two industries.

Thai economists and experts on international markets blame weaknesses of governance in Asian countries including Thailand for the Asian Economic Crisis. Dr. Nicro further points out that the poor governance in Thailand was caused by priviledged families, or their political and business connections.

Thailand accepted almost all the advice it received from the International Monetary Fund (IMF), unlike other South-East Asian countries including Malaysia.

As an economic recovery policy, the Thai Ministry of Finance and the Central Bank decided to reduce and combine finance companies and to nationalize small commercial banks.

In a movement towards the world standard, i.e. the western standard, it was said that the "best prescription for reforming banks is to get rid of bad loans". This advice given by the IMF to get rid of badly performing loans appeared to be quite a harsh policy to the Thai people, and some did not even support this governmental decision. Some were against the idea of using a western-style policy

to recover their country's economy. In addition, the revision of the law that controls foreign business in Thailand was approved by the congress on August 18 1998, which made it possible for greater investment and business invasion from foreign countries.

This series of actions is likely to bring about drastic changes in national economic policies in Thailand. It seems that if the concept of "Self-Reliance" in good governance which comes as the result of financial crises, will have yet more effects on this change.

3. The Current Situation of Environmental Governance

Regarding the current status of environmental governance in Thailand, Dr. Nicro states that local people have the right to manage natural resources without government intervention over a long period of time. According to her, such autonomy of resources has been termed "local wisdom".

This kind of concept is widely acknowledged as "commons". Japan also has a history of natural resource management by local people during the Edo era, such as Iriai-Rin (community forest) and Iriai-Umi (community sea). The difference in this case, however, is that local people had control of natural resources, that the Edo government had entrusted to them.

Dr. Nicro also points out that drastic destruction / degradation of natural resources began when the governmental management of natural resources was put into practice. This is particularly true with the destruction of forests, water pollution caused by factory waste, and air pollution caused by factory smoke and automobile exhaust fumes.

Under such circumstances, the Environment Act of 1992, a revision of the Environment Act of 1975, had a significant role in regulating pollution / destruction of the environment in Thailand. In addition, the 8th National Economic and Social Development Plan (1997-2001) encouraged participation of local people in decision-making processes at prefectural, district and sub-district levels. These arrangements are expected to enhance bottom-up planning which reflects local people's opinions. A number of environmental NGOs are also fairly active in Thailand.

It is worth noting that Dr. Nicro sees much significance in the development of a bottom-up decision-making process. It is highly likely that such participatory decision-making will become an indispensable part of environmental governance.

4. Case Studies

Dr. Nicro reported various cases of air pollution, water pollution and deforestation in detail. I was especially interested in the case studies on

deforestation, because in 1994 I worked as a Japanese volunteer for JICA in the Nakon Ratchasima Nursery Center of the Royal Forest Department which is located in North-East Thailand. Four years have passed since then, and her reports made me aware of forest-related economic and social changes in Thailand.

Since 1961, deforestation in Thailand has accelerated drastically. Forest areas of 27.4 million ha in 1961 (53.3% of total land use) have decreased to 14.4 million ha in 1991 (28 % of total land use). That is, the forest area has nearly halved in three decades. This low forest coverage of 28% is noteworthy even in comparison with Lao P.D.R.'s 47% in 1991, which is suffering from serious deforestation mainly triggered by slash and burn cultivation.

Dr. Nicro identifies the following three factors as major causes of deforestation. Firstly, the government favored logging and engaged in commercial forest management. Secondly, there was strong demand for the expansion of agricultural land due to population increase. Thirdly, the urban middle class exploited the forestland through investment.

The first factor, logging, has been carried out in various regions such as Northern, Southern and North-East Thailand, but was most common in North-Thailand. The target was useful timber trees, mainly teak (*Tectona grandis*). Most of the logging, including many cases of illegal logging, was for commercial purposes.

The second factor, expansion of agricultural land, has drastically accelerated since 1961. There seems to have been two reasons. One is population increase, as Dr. Nicro has indicated. Another is cultivation of forestland triggered by the introduction of commercial crops. The introduction of corn, kenaf and cassava was especially encouraged in North-East Thailand. In order to grow those commercial crops, a large area of forestland was converted into agricultural land, and thus forest coverage has rapidly decreased to 12% in North-East Thailand.

The third factor, investment in forestland, is a rather recent problem compared with the first two causes. It came about after the Thai middle class had emerged and could afford to invest in land, including forestland. Therefore, this phenomenon has drastically decelerated as Thailand started to suffer from the economic crisis.

As Dr. Nicro pointed out, forests do not exist only to provide timber and forest products. Forested areas also have functions such as supplying water for people in downstream regions, producing oxygen, absorbing CO_2, and sustaining bio-diversity. These environmental aspects of forests are very important as well.

It was after the flood in the South in 1988 when deforestation started attracting considerable attention of the people in Thailand. There were many victims of this flood. King Bhumibol Adulyadej expressed sincere regret for it. There was also massive media coverage of this issue. Awareness of forest conservation has

increased since this incident, and many conservation plans have been put into practice so far.

In coping with this problem, the most drastic countermeasure is a logging ban enacted in 1989. On the other hand, there are also reforestation projects in process, represented by a project to mark the fiftieth year anniversary to honor His Majesty the King(so called “King Project”). In addition, there is a new effort by the government to establish a community forestry law, which transfers some forest management rights from the central government to local communities. The aim of this bill is sustainability of forest through management by the local people. It has some similarities with the land-forest allocation policy implemented in Lao P.D.R. and Vietnam.

However, there are some problems arising. The logging ban led to increased illegal logging. Timber manufacturers who observe the law are now dependent on neighboring countries such as Lao P.D.R., Myanmar and Cambodia for timber supply.

In reforestation projects as well, there are some problems such as shortage of suitable land. The five-year King Project is also suffering from this, and had to be prolonged to an eight-year plan.

The large population of inhabitants inside conservation forests is another serious obstacle in terms of forest conservation. There are reports of local people having been mistaken as illegal loggers, although they had lived in the ‘conservation forest’ before the implementation of the prohibition law.

Lastly, the economic crisis in Thailand is discouraging costly efforts of reforestation and sustainable forest management.

5. Conclusion

Dr. Nicro reported that environmental problems are not occurring independently in each country. In fact, many environmental issues are trans-boundary in nature. Considering this reality, it is not an issue that can be solved by Thailand (or other developing countries) alone. It has been suggested that it is necessary to address “good environmental governance” from a “globalism” point of view.

On the other hand, participation in environmental governance by the public, i.e. a scheme for “bottom-up” approaches, needs to be encouraged. In this case, of course, enough consideration by the administrative sector is also required.

I think the issues of environmental governance in Thailand will improve, having taken into account both “globalism” and “bottom-up” views.

Environmental Governance in India with Special Reference to Freshwater Demand and Quality Management Strategies

Jyoti Parikh, Tata L. Raghu Ram, and Kirit Parikh

1. Introduction

Environmental governance should extend to all environmental resources, namely, air, water, forests, biodiversity and so on. Environmental governance should include issues ranging from supply, demand and quality management and should encompass all stakeholders ranging from users, regulators, suppliers and so on at village, district, region, state and national levels. India has a long history of environmental conservation. The constitution of India contains a direct commitment to environmental protection. Article 48-A of Indian constitution stipulates that the "state shall endeavor to protect and improve the environment and to safeguard the forests and wildlife of the country". Under Article 51-A(g), citizens are requested to protect and improve the natural environment, including forests, lakes, rivers and wildlife. The directive principle under Article 49 and 51-A(f) also recognize the importance of protecting the sites of cultural heritage as part of the total environment. Thus, the Indian constitution provides the necessary support for framing and enforcement of environmental legislation.

Schedule VII of the constitution classifies the various legislative subjects into three categories, viz. union list, state list and concurrent list. The legislations in the union list are enacted by Indian parliament, while in case of the state list the state legislatures are empowered to enact the necessary legislation. The concurrent list specifies the subjects that are to be looked after jointly by the central and state governments. For example, while water supplies, irrigation and canal drainage are state subjects, the regulation and development of inter-state rivers and river valleys are central subjects. Examples of subjects in concurrent list are forests and protection of wild animals and birds.

The need to integrate environmental concerns into the process of economic development is voiced as far back as late sixties, i.e., during the formulation of the fourth five year plan (1969-1974), which stated "planning for harmonious development is possible only on the basis of a comprehensive appraisal of environmental issues". Integrating the management of environmental resources with national economic planning started with the sixth five year plan. The seventh and eighth five year plans have recognized the issues of preservation of environmental resources and sustainability as important as many other developmental objectives. The policies enunciated in the "***National Conservation Strategy and Policy Statement on Environment and Development, MOEF, GOI,***

1992" and "***Policy Statement on Control of Pollution, 1992***", are being pursued in the Ninth Five-year plan (1997-2002). The ninth five-year plan takes a comprehensive approach by integrating environmental and economic considerations into development planning.

The government has furthered the cause of environmental protection through institution building and strengthening, planning for environmental matters and enactment of many legislations and guidelines. So far more than 75 Acts relating to environment and pollution control have been promulgated under state and central enactment. The last two decades have witnessed a spate of governmental legislation creating environmental laws to protect environmental resources and the interests of the general public. The important environmental laws, regulatory and promotionary measures enacted by Government of India are:

- **Water (Prevention and Control of Pollution) Act, 1974**

  The Water Act (1974) has resulted in the creation of Central and State Pollution Control Boards (CPCB and SPCBs) with the aim of prevention, abatement and control of water pollution. The PCBs can demand information from any person or industry to guarantee compliance with the Act.

- **Water (Prevention and Control of pollution) Cess Act, 1977**

  The Water Cess Act, 1977 as amended in 1992 provides for imposing a levy on water consumed by certain industries and by local authorities. The main aim of this levy is to increase the resources of the Central and State Pollution Control Boards for the prevention and control of water pollution.

- **Air (Control and Prevention of Pollution) Act, 1981**

  CPCB and SPCBs have been empowered to deal with air pollution control also. No person is permitted without prior consent of a state board to establish or operate any industry in an air pollution control area.

- **Indian Forest Act, 1927; The Wildlife (Protection) Act, 1972 and The Forest Conservation Act, 1980**

  These are the laws promulgated to deal with forests and biodiversity in India. Many wildlife sanctuaries and national parks are set up under these laws to conserve threatened species or ecosystems. Under the Forest (Conservation) Act, 1980 - rules and guidelines as amended in 1992, comprehensive afforestation is one of the most important conditions stipulated for screening proposals for diversion of forest land to non-forest use. Where non-forest land is available, compensatory afforestation to be done in equivalent area. Where non-forest land is not available, compensatory plantation to be done in degraded forest in twice the area.

- **Environment (Protection) Act, 1986**

  Is an umbrella law that empowers central government to decide emission / effluent standards, restricting industrial sites, laying down procedures and safeguards for accident prevention and handling of hazardous waste, investigations and research on pollution issues, on-site inspection, establishment of laboratories and collection and dissemination of information.

- **Environmental Impact Assessment Notification, 1994**

  In operation since early 1970s, but notified in 1994, it empowers central government to impose restrictions and prohibitions on the setting, expansion and / or modernisation of any activity or new project (covering 29 diciplines) unless an environmental clearance is granted. These include mining, hydro power, major irrigation and flood control projects, ports and harbours (excluding minor ports) and prospecting and exploration of major minerals in areas above 500 hectares. Projects must submit an EIA and an Environmental Management Plan. Depending on the type or size of the industry, MOEF or state governments have assessing jurisdiction.

- **Environmental Audits**

  It is mandatory for all major polluting industries to submit annual environmental audits to the concerned pollution board. The basic aim is to make industries accountable and self-monitoring, thus, reducing burden on pollution boards.

- **Ambient Air and Water Quality Standards**

  Set by the Central Pollution Control Board, standards are site and receptor specific (industrial, urban, residential, ecologically sensitive zones etc.). State boards can impose stricter standards.

- **Emission and Effluent Standards**

  Sector specific and are dependent on best available pollution control technology.

- **The Public Liability Insurance Act, 1991**

  The measure mandates that business owners operating with hazardous waste take out insurance policies, to compensate persons injured by accident.

2. Fiscal Incentives for Control of Pollution

The legal provisions in the various legislation listed above are mostly command and control type of regulatory measures. In additions to the legal provisions, the

government also provides fiscal incentives to the industries for pollution control. Some of the fiscal incentives currently available to the industry for pollution reduction are depreciation allowance, rebate in water cess, concessional custom and excise duties and soft loans from financial institutions (see Box 1).

Box 1: Fiscal Incentives Offered by Government for Pollution Prevention

- **Depreciation Allowance:** A depreciation of 100% is provided on devices and systems installed by manufacturing units to control pollution. Specific equipments have been notified by Government Of India for this purpose.
- **Water Cess:** There is a provision for a rebate of 70% in the water cess levied on water use if the industry concerned has installed equipment for treatment of sewage or effluent.
- **Concessional Custom Duty:** Custom duty at reduced rates of 35% + 5% auxillary charges levied on notified equipment and spares for pollution control.
- **Excise Duty :** Excise duty at reduced rate of 5% on manufactured goods that are used for pollution control. For example, in 1989 manufacture of fly ash bricks containing more than 50% of fly ash was completely exempted from excise duty.
- **Financial Institutions:** Financial institutions have the provision for extending soft loan facilities for installation of pollution control equipment. Financial assistance towards capital investment upto 25% or Rs. 5 million, whichever is less is given as subsidy to small scale industries for setting up of common effluent treatment facilities.

Source: Annual Report, Ministry of Environment and Forests, Govt. of India (1994-95).

Despite these efforts of the government the environment scenario in India has deteriorated considerably in recent times. This is because implementation of environmental laws is week, partly due to ineffectiveness of pollution control boards and partly because most people find environmental standards expensive to implement. The main environmental problems in India are related to air and water pollution, degradation of common property land resources and threats to biodiversity due to forest degradation. India is a vast county with a wide range of environmental problems. Covering all the environmental problems in one paper may dilute the contents and may loose focus. For that reason, in this paper we discuss issues related to biodiversity and air pollution briefly and water pollution issues exhaustively.

3. Biodiversity

India has rich heritage of species and genetic strains of flora and fauna. Overall six percent of world's species are found in India. It is estimated that India is tenth among the plant rich countries in the world, eleventh in terms of number of endemic species of higher vertebrates and sixth among the centers of biodiversity and origin of agrodiversity. The total number of living species identified in India so far is 150,000. Out of the total twelve biodiversity hot spots in the world, India has two, one in the north-east and the other in the Western Ghats along the west coast of the country. However, the ecological balance of flora, fauna and forests is being drastically disturbed by the rapid increase in human population. India's population has increased from 370 million in 1947 to 880 million in 1994, constituting 18% of world population. India has 15% of world's livestock, but only 2% of geographical area, 1% of forest area and 0.5% of pasturelands.

India has a forest area of 64 million hectares, which is 19.5% of the country's total land area. Per capita availability of forests in India is 0.08 hectares which is much lower than the world average of 0.8 hectares. Even if no further net deforestation takes place, merely due to the population increase, the per capita forest availability will go down to 0.07 ha by the year 2000 (Govt. of India). Most of these forests is threatened by anthrapogenic pressures leading to degradation. As per recent estimates (FSI, 1996), only 11% of the forest has crown cover of more than 40%. With increasing population of humans and livestock, Indian forests and along with them a rich biodiversity they support are under great pressure. Other threat to Indian forests is diversion of forest land for non forestry uses. Since promulgation of Forest Conservation Act in 1980, 11,804 km^2 of forest land has been diverted to non forestry purposes. The serious depletion of forests is attributed to a host of factors. These include ever increasing

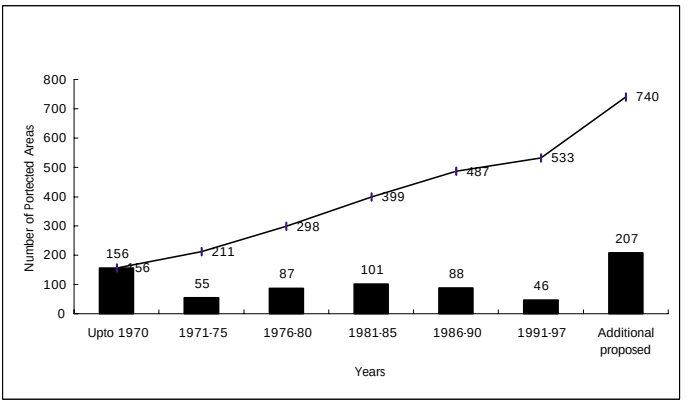


Figure 1 Establishment of Protected Area Network in India

demand for fuel wood, fodder and timber, population increase of both humans and livestock, inadequacy of protection measures, diversion of forest land for non-forest activities and tendency to look upon forests as revenue earning resource.

The main instruments for the biodiversity conservation in India are the Wildlife (Protection) Act, 1972; National Wildlife Action Plan, 1983 and the National Forest Policy, 1988. The Wildlife (Protection) Act, 1972 provides for creation of National Parks and Sanctuaries, aimed at total protection to the biodiversity. As of 1995, there are 441 wildlife sanctuaries and 80 national parks, covering an area of 148,849 km^2, which is about 4% of India's geographical areas. There are additional proposals to add another 207 protected areas to the network to raise geographical areas under protected areas to 5% of India's geographical areas (see Figure 1).

The overall biodiversity conservation program in India can be divided into three main areas viz. creation and management of protected areas, protection of biodiversity in managed forests (forests outside protected area network) and control and management of trade in biodiversity. While the control and management of trade in biodiversity is just a question of effective law enforcement, the first two involve, in addition to law enforcement, complex socio-economic and political issues. These issues arise from the conflict between biodiversity and human communities sharing their habitats. The conflict arises from the loss of access to the resources locked up inside the PAs and the damage caused by the wildlife to human property and lives.

The strategy of total protection and focused attention on national parks and sanctuaries have been the two main pillars of India's biodiversity conservation policy. Invariably, the forests included in the PAs also support local communities and economies, which are adversely impacted as a result of the mandatory acquisition of rights for creating a PA. A case study (Kothari *et al*, 1989) reported that most national parks (56%) and sanctuaries (72%) support human settlements inside. The legal process of creating a PA requires the extinction of all, or most, private rights and privileges over notified lands. This in essence means wholesale relocation of human settlements, which fall within the bounds of such areas. This is a highly unpopular, costly and consequently, politically inexpedient and slow process. As a consequence, it is reported that completion of legal process is achieved only in 40% of the national parks and 8% of the sanctuaries. The principles of reducing human dependence on natural resources, and winning their trust and participation through ecodevelopment in buffer zones of protected areas were incorporated in the National Wildlife Action Plan (1983). But still, the communities surrounding it perceive protected areas as a problem, rather than an asset, as the communities tend to lose their crops, cattle and lives due to depredation by wild animals. While the society at large enjoys the benefits of conservation, the rural communities bear all the costs.

We have to devise new strategies to resolve conflicts between local communities and PAs to attain the greater objective of biodiversity conservation. Relocation of human settlements from within the PAs alone does not ensure biodiversity conservation, as there are far more number of human settlements around the PAs which are dependent on the PA resources. The fact that biodiversity and humans can coexist harmoniously is to be acknowledged. The local communities need to be made party to the PA management with clearly spelt out responsibilites and accountability. Ecodevelopment, ecotourim and environment friendly economic activities should be encouraged not only in and around the PAs but also in the managed forests so as to ensure long term conservation of biodiversity in the country. Concerted, targeted awareness campaigns for all the concerned stakeholder groups and creation of conflict resolution fora at PA level can go a long way in assisting biodiversity conservation in the country rather than having ineffective conservation laws and policies.

4. Air Pollution

4.1 Urban Air Quality

India has 23 cities of over one million people, and ambient air pollution levels exceed WHO health standards in many of them. Urban air pollution is worsening due to upward trends in vehicle use, power consumption, industrialisation and household fuels. Six of the ten largest cities in India - Mumbai, Calcutta, Delhi, Ahmedabad, Kanpur and Nagpur - have severe air pollution problems, with annual average levels of suspended particulate matter (SPM) at least 3 times higher than the WHO standards. In Delhi, Calcutta and Kanpur annual average SPM values are over 5 times the standards. Nation wide, over 90% of the monitoring stations in urban areas for which annual mean concentrations are reported by the Central Pollution Control Board (CPCB), exceeded $75\mu g/m^3$ of particulates - the midpoint of the WHO recommended standard.

However, annual average concentrations of SO_2 and NO_x are generally low in relation to typical ambient standards. There does not appear to be any clear correlation between a city's population and air pollution, and many medium sized cities have air pollution levels as high or higher than the mega-cities.

4.2 Indoor Air Quality

In India high concentrations of indoor air pollution arise because unprocessed biofuels such as cow-dung, fuel-wood, and crop residues are burnt within the kitchen. Mineral coal also causes such pollution in a few Indian households. While majority of these fuels are used in rural areas, in urban areas also the use is substantial. Indoor air pollution -particularly in rural householdes has so far been neglected. It is recently estimated that 82% of SO_2, 38% of NO_2, 88% of

volatile organic compound and 96% of particulate matter emissions in the country come from household sector.

4.3 Impact of Air Pollution

Air pollution causes many health problems, impacts economic productivity - especially agricultural productivity, damages material property such as buildings and land and causes ecological changes that increase the risks of environmental disasters. The flight schedule of air lines get routinely disrupted in winter due to smog in Delhi that leads to shutdown of airport for want of visibility. In terms of health impacts, total suspended particulates and PM10 (particles less than 10 microns in diameter, which more easily penetrate the lung and therefore more relevant than total particulate matter for human health) have been associated with both premature mortality (death from respiratory illness and cardio-vascular diseases) and increased morbidity (increased prevalence of chronic obstructive lung disease, especially bronchitis, and to increased incidence of upper and lower respiratory tract infections). Ozone contributes to incidences of respiratory hospital admissions, restricted activity, asthma, eye irritation, and heart disease. Carbon monoxide (CO) reduces the amount of oxygen carried by the blood, but dissipate rapidly in the environment and effects are reversible. High levels of atmospheric lead contribute to both hypertension and neurological damage, including intelligence quotient (IQ) loss, in children (B.Ostro, 1994).

As per a World Bank study (Brandon and Homman, 1995), ambient air pollution levels (PM10, SO_2, lead and NO_x) exceeding WHO standards in 36 major Indian cities / towns account for 40,350 premature deaths, 19,805 thousand hospital admissions and sickness requiring medical treatment and 1,201 million incidence of minor sickness annually.

A case study by Kirit Parikh *et.al*, 1994, estimated cost of health damages due to air pollution in Mumbai for every 10 microgram per cubic meter increase in SO_2 concentration, the social costs could exceed Rs.100 million, which includes only dyspnea and mortality effects. The study also estimated cumulative loss in property value in Chembur for every 100 μg / cu.m increase in SPM concentration at Rs.2,000 million. Another case study (NEERI, 1998) estimated human health damages due to air pollution in National Capital territory, Delhi at Rs.1,168 million per year. It is evident from these case studies that the country is paying a heavy price due to air pollution.

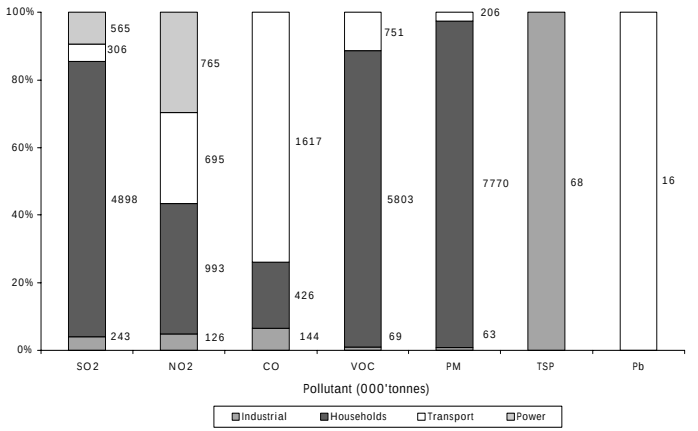
High exposure to indoor air pollutants have been shown to cause serious health problems like acute respiratory infections (ARI), chronic obstructive lung disease (COLD), lung cancer, and possibly tuberculosis (TB), blindness and heart disease (Mishra *et.al*, 1997; Smith, 1987). The silent sufferers are those who spend most time indoors viz., the women, children under 5 years of age, and senior citizens. They are regularly and severely exposed. Therefore, a major portion of India's

population is at risk. It is estimated that 0.41 to 0.57 million premature deaths per year are caused by indoor air pollution and for each death, there are about 6 years of illness in the population. Efforts are urgently needed to investigate this problem more thoroughly and to promote clean stoves and clean fuels.

4.4 Who Pollutes Air?

Activities that cause air pollution are many. They include the use of fossil fuels, industrial processes and burning of bio-fuels. Sectoral air pollution emission accounts for 1989/90 are estimated by IGIDR (Jyoti Parikh and Kirit Parikh, 1999) as presented in Figure 2. It is reported that emissions from household sector (indoor air pollution) contributed substantially (82% SO_2, 39% NO_2, 19% Nitrous Oxide, 88% Volatile Organic Compounds (VOC) and 97% of Particulate Matter) to the air pollution in the country. Transport sector contributed most of the pollution load (27% NO_2, 74% CO, 11% VOC and 100% lead) in urban areas of the country. India's vehicle population registered a phenomenal growth in the last two and half decades - from mere 2.1 million registered vehicles in 1973 to 25.2 million registered vehicles in 1993 (Ministry of Surface Transport, 1993). Vehicular emission loads in 1994 are estimated at 3,596.8 tonnes per day in 12 major Indian cities(Jyoti Parikh and Kirit Parikh, 1999).

Pollution load from industrial sector in 1995 contributed 2 million metric tonnes of pollutants (Down to Earth, 1999). Some of the most air polluting industries are industrial chemicals, rubber, textiles, iron and steel, non-metal products, food products, paper, printing-publishing, metal products and leather.



Source: Jyoti Parikh and Kirit Parikh, 1999.

Figure 2 Air Emission Accounts for 1989/90

5. Water Quality

5.1 Main Problems

5.1.1 Water Availability

In India, despite an estimated 2,228 m^3 per capita per year freshwater availability (World Resources Institute, 1996), severe water shortages occur in many regions seasonally, particularly as a result of uneven distribution of water resources over time and space. Thus the main problem is inadequate availability of water where and when it is needed. Provision of clean drinking water to all is a major policy goal, which is yet to be realized. As in March 1993, 78% of rural and 85% of urban Indians had access to potable water. That still leaves some 200 million persons without safe drinking water. On the other hand, sanitation services are available only to 48% of the urban and about 3% of the rural population (Central Statistical Organization, 1997).

5.1.2 Water Quality

The other main concern is water quality. In recent times, water quality has deteriorated due to rapid industrialization, population growth and intensive agriculture as they generate increasing quantities of industrial wastewater, domestic wastewater and agricultural run-off respectively. Water quality in major rivers is shown in Table 1. Pathogenic water pollution due to domestic and human waste is the cause of many water borne diseases. Water quality degradation is increasingly becoming a source of conflict among upstream and downstream users.

Several diseases like diarrhea, hepatitis (jaundice), ascariasis (roundworm), hookworm infection, trachoma, and dracunculiasis (guinea worm) have been linked to human contact with polluted water. The World Bank and World Health Organization (World Bank, 1993) have estimated that in India, 21% of all communicable diseases (11.5% of all diseases) are water related. The specific diseases included in this number are diarrhea, trachoma, intestinal worms, hepatitis and the tropical cluster (schistosomiasis, leishmaniasis, lymphatic filariasis in India) of diseases. It is estimated that every year, 1.5 million children under five years die in India of water-related diseases and the country loses 1,800 million person hours (over 200 million man days) each year due to these diseases (Ministry of Rural Development, 1993). A quantitative measure that integrates premature deaths and temporary disability due to diseases is Disability Adjusted Life Years (DALYs). About 30.5 million DALYs are lost each year in India due to poor water quality, sanitation and hygiene as illustrated in Table 2.

Table 1 Status of Water Quality in Major Rivers

River	Designated best use category *	Quality category (1994)	Critical parameters
Baitarani	C	D	BOD
Brahmani	C/B	D	BOD
Brahmaputra	C	D	T.Coliforms
Cauvery	A/B/C	C/D	pH, T.Coliforms, DO, BOD
Ganga	A/B/C	C/D	T.Coliforms, BOD
Godavari	B/C	D	BOD
Tributaries of Indus Beas, Satluj, Ravi, Chenab, Jhelam, Tawi, Parwati & Largi	A/C/	B/C/D	T.Coliforms, BOD
Krishna	C	D	BOD
Mahi	A/C	B/C/D	BOD, T.Coliforms
Mahanadi	D/C	B/D	BOD
Narmada	A/B/C	D/C	BOD, T.Coliforms
Sabarmati	A/C/D	D/E/E	BOD, T.Coliforms
Tapi	A/C	B/D	BOD, T.Coliforms

Source: CPCB, 1996

* A=Drinking water source without conventional treatment but after disinfection; B=Outdoor bathing; C=Drinking water source with conventional treatment followed by disinfection; D=Propagation of wildlife, Fisheries; E=Irrigation, Industrial cooling, controlled Waste Disposal.

Table 2 Burden of Water related Diseases in India, 1990
(In millions of DALYs)

Disease	Female	Male	Total
Diarrheal Diseases	14.39	13.64	28.03
Intestinal Helminths	1.00	1.06	2.06
Trachoma	0.07	0.04	0.11
Hepatitis	0.17	0.14	0.31
Total water-related diseases	**15.63**	**14.88**	**30.51**

Source: World Development Report (World Bank,1993), pp. 216-219.

Using the human capital approach, the statistical value of one DALY is equal to the annual average productivity of Indian workers (since one DALY implies one year in which a worker can not work due to either sickness or premature death). If we take merely the economic value of life year at the average per capita GDP of Rs. 12,000 per person, the annual loss of 30.5 million DALYs is worth Rs. 36,600 crores. Thus the country should be willing to spend that much annually to provide clean drinking water to all. Improvements in water supply and sanitation can substantially reduce the incidence and severity of these diseases, as well as the infant mortality associated with diarrhea as shown in Box 2.

Box 2

Reduction in morbidity from better water supply and sanitation is estimated to be 26% for diarrhea, 27% for trachoma, 29% for ascariasis, 77% for schistosomiasis, and 78% for dracunculiasis. Mean reduction in diarrhea-specific mortality can be 65%, while overall child mortality can be reduced by 55%.

Source: Esrey et.al., 1991

5.1.3 Ground Water

In India an estimated 80% of the population use ground water for their domestic needs (UNICEF, 1998). India's total replenishable ground water resources are estimated at 431.8 km^3 (Central Statistical Organization, 1997). The ground water availability is not uniform throughout the country varying from most potential aquifers of Indo-Gangetic-Brahmaputra alluvium to the comparatively low yielding hard rock formations of peninsular India. Ganga basin has the maximum utilizable ground water resource base, 39% of the country's total. Godavari basin is the next in terms of availability of utilizable ground water resources, accounting for 10% of the country's resources. Average level of groundwater development in India is 32%. Some states (*e.g.*, Punjab 94%, Haryana 84%, Tamil Nadu 60%, Lakshadweep 64%, Rajasthan 51%) have exploited ground water resources to a greater extent than some other states (*e.g.* Gujarat 41%, UP 38%, Andhra Pradesh 24%, Bihar 19%,) (Central Statistical Organization, 1997). Irrigation is using 90% of the ground water abstracted whereas domestic needs use just 6% of the total volume pumped.

The third most important problem is the overexploitation of ground water in many parts of the country. There are 4.79 million electrical and 3.7 million diesel pumps in the minor irrigation sector withdrawing water from the groundwater aquifers in the country (CWC, 1993). This is reflected in the lowering of the water table. This is the result of too many private tube wells pumping water from the same aquifer. The depths of water table at which these tube wells draw water are increasing and bring inorganic pollutants such as fluoride and arsenic etc, which cause health hazards. One of the reasons for over exploitation is the system of "water rights" under common law in India, which effectively gives the ownership of groundwater to the landowner, despite the fact that ground water is a shared resource from a common pool of aquifers. An important policy issue here is how to manage ground water as a common property resource.

5.1.4 Land Degradation

The fourth important issue in water policy is that of land degradation due to inappropriate water use. The farmers at the head of the canal irrigate their crops intensively, use much more water then they are entitled to and required by crops, causing water logging and salinity. The electricity rates for most farmers are very low and most often are only imposed as a lump sum charge, so that their marginal cost of pumping water is zero. Irrigation water charges are also low, not reflecting the scarcity value of water. In some states water charges are lower than the operation and maintenance cost of the irrigation projects. The farmers thus overuse water leading to both lowering of ground water table and also water logging of soil.

Many regions of India have adequate water resources, but as the quality is deteriorating, the supply of water required for certain purposes with required quality is not available. Therefore, conflicts over water availability and water quality are growing. Taken for granted when supplies are plentiful, water is the focus of increasing controversy as supplies now appear to be inadequate to meet demands in many regions of the country. Incentives for wise and conservative use of the resource or for effecting an efficient allocation among competing demands are not there.

Table 3 Water Resources of Some Countries in 1995

Country	Annual internal renewable resources* (km^3)	Water per land area (m^3 per square km)	Water per capita (m^3)
Canada	2901	290944	98462
Brazil	6950	816494	42957
Russian Federation	4498	263426	30599
United States	2478	264659	9413
China	2812	292917	2292
India	2085	700840	2228
World	**41022**	**301988**	**7176**

Source: World Resources Institute, 1996; World Bank (1997)

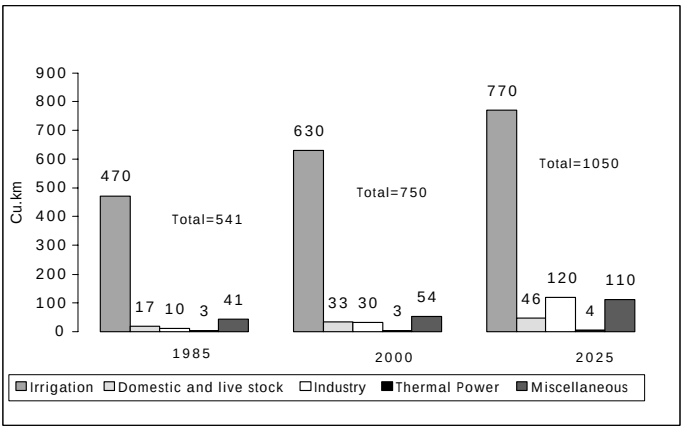
** Annual internal renewable water resources refer to the average annual flow of rivers and recharge of groundwater generated from endogenous precipitation.*

5.1.5 Water Resources: Availability and Needs

India's water resources per square kilometer are large but on a per capita basis they are relatively small as shown in Table 3.

The average per person per year consumption of water for all uses (agriculture, household, industrial and civic) in India is estimated at 612 m^3 as against the

average annual availability of 2,228 m^3. As per projections for year 2000, the agriculture sector would require 630 km^3 of water, which is 84% of the total water requirement in the country. 33 km^3 of water is required for domestic sector (4.4%). Whereas, utilization in industrial sector (30 km^3), thermal power (3 km^3) and miscellaneous uses (54 km^3) add up to the remaining 12% as illustrated in Figure 3. The total utilization amounts to 630 km^3 of water. The demand for water is increasing. By the year 2025, demand for water in irrigation and industry is projected to reach 770 km^3 and 110 km^3 respectively (CWC, 1993).



Source: CWC (1993)

Figure 3 Sectoral Water Demand in India

5.1.6 What is Adequate Quantity?

Whether available water is adequate to meet the requirement or not depends on many factors. The distribution of rainfall or inflows over time and possibilities of storing water to carry it from periods of surplus to scarcity determines the amount of usable water. The requirement depends on population, irrigation requirement and its distribution over time, industrial demand and ecological needs.

It is claimed that between 1,000 and 1,700 m^3 per person water availability, a region confronts water stress, where water shortages are more pervasive, and water management becomes more important (Falkenmark and Widstrand, 1992; UNEP, 1997). India is among the countries projected (UNEP, 1997) to fall into the water-stress category before 2025.

To meet growing demand for water, large investments would have to be made in water harvesting projects and also we would have to revive / revitalize some of the traditional water harvesting methods to augment water resources at local levels. Augmentation of supply at the local level through water harvesting, water

recharge and reduction of water losses in distribution and in agriculture, domestic and industrial sectors can be quite cost effective. Significant scope exists to reduce requirement of water through demand side management as shown in see Box 3.

The problems of management of surface irrigation and equitable distribution of water across farmers have been studied by many (Minhas *et.al.*,1972; Dhavan, 1988), and we do not deal with them here. Our purpose is to examine the problems and policies concerning water quality.

Box 3

- Water saving by sprinkler irrigation in comparison to gravity flow system is about 25% and increase in yield is about 15%.
- Drip irrigation can profitably be employed for orchards, vegetables, cotton and sugar cane. The saving in water is of the order of 25 to 50% and increases in yield ranges from 5 to 25%.
- Benefit-cost ratio of the needed investment can be very attractive. Incentives for such investment need to be provided as some of the benefits of water saved may accrue to other users.

Demand Management Programmes for Municipal Water Supply

In their efforts to limit the need for increased water supplies, many municipalities have employed demand management programmes.

- The city of Bogor, Indonesia was faced with high investment costs to developing additional water supplies. The municipal authorities decided to substantially cut the water consumption levels of domestic and commercial consumers. Water fees were increased initially by approximately 30%, resulting in an average decrease in consumption by 29%. This action was followed by a campaign to reduce water use further, particularly among consumers with monthly consumption of more than 100 m^3. Consumers were given advice, as well as necessary devices, to reduce consumption. Three months after the campaign started, average monthly water use had decreased another 29%
- In its efforts to cut water use per capita by one-sixth, Mexico City has replaced 350,000 toilets with smaller six-liter models. This has saved enough water to meet the household needs of 250,000 residents.
- A new pricing system in Beijing links charges to the amount of water

used. New administrative regulations set quotas on consumption and authorize fines for excess use.

- The use of water-saving devices, leak detection and repair, and more efficient irrigation in its parks helped Jerusalem to reduce its use of water per capita by 14 %, between 1989 and 1991.

- A water conservation programme in Waterloo, Canada, included higher prices, education, and the distribution of water-saving devices. Volunteers distributed water conservation kits to nearly 50,000 homes. Water use per capita declined by nearly 10%.

Water Saving Potential through Demand Management

- Overall savings from efficient water management from various sectors can help to reduce future demands. Proper water management has the potential to save up to 63 km^3 in agriculture sector, 2 km^3 in domestic and 25 km^3 in industrial sector by year 2025, from the projected demand of 800 km^3 in agriculture, 52 km^3 in domestic and 120 km^3 in industrial sector respectively.

Source: Central Water Commission (1998); World Bank (1995); Z. Hasan and R.N.P. Singh (1997).

5.2 Water Pollution

5.2.1 Who Pollutes?

Freshwater quality is impacted directly by natural and human activities, such as land-use practices, erosion, and deforestation. Three major sources of water pollution are domestic wastewater, industrial wastewater and agricultural run-off.

Water pollution from domestic and human wastewater is the most problematic and the cause of many severe water borne diseases. In India, the organic loading of the water bodies is enormous due to gross inadequacy of domestic sewage treatment plants in rural as well as urban areas. Domestic and municipal effluents are estimated to constitute 75% of India's wastewater by volume (MOEF, 1992). As per Central Pollution Control Board (CPCB, 1988), out of 212 class I cities (population more than 100,000) only 48 cities (22.6%) have some wastewater collection, treatment (primary, secondary or partial primary, partial secondary) and disposal facilities. Of the 241 class II towns (population more than 50,000 but less than 100,000) only 19 towns have wastewater collection system, of which only 10 towns have some treatment facility. Class I cities generated 12,146 MLD of wastewater whereas class II towns contribution was 1,298 MLD. Bombay

(1,714 MLD) or Delhi (1,480 MLD) individually generated more wastewater in 1988 than 241 class II towns put together. 20% of all the wastewater generated in class I cities and only 2% of all wastewater generated in class II towns was treated. Estimates of wastewater generated in the rural sector are not available, where only 3.15% of the population had access to sanitation services in 1993 (Central Statistical Organization, 1997). Put together, the receiving water bodies are under great stress.

Indian industry has registered substantial growth in the past four decades. Of the 2,901 large water polluting industries discharging effluents into rivers and lakes, only 841 (29%) have adequate effluent treatment plants (ETP) and 2,026 industries (69.8%) do not have adequate treatment facilities and remaining 34 industries have been closed (MOEF, 1997).

The green revolution ushered by the development of high yielding varieties and associated development of water resources and application of agricultural chemicals has made India self sufficient in food grains. But the negative impacts of use of agricultural chemicals, often used indiscriminately, on water environment are being felt now. The fertilizer ($N+P_2O_5+K_2O$) consumption has increased from 7.7 million tonnes in 1984 to 13.9 million tonnes of nutrients in 1995-96. Use of technical grade pesticides has increased from 24,305 tonnes in 1971 to 85,030 tonnes in 1994-95 (Central Statistical Organisation, 1997). The fertilizer run off leads to nutrient enrichment in the receiving water bodies resulting in eutrophication. The pesticides get accumulated in the food chain, with increasing concentrations along the food chain (biomagnification). This in turn effects various species in the food chain, including man.

5.2.2 Why Water is not Treated Adequately?

In the domestic sector, which contributes 75% of effluents by volume, collection and treatment of wastewater is the responsibility of the municipal authority or the village panchayat. Absence of basic amenities like sewerage systems and sanitary services are the main reasons for non-treatment of domestic sewage. Non-implementation of legal stipulations, lack of financial resources to provide these amenities and in some cases lack of awareness also contributes to the problem.

In the industrial sector, polluting industries are generally not resistant to a one-time investment in setting up an Effluent Treatment Plant (ETP) especially if the investment is small relative to the revenue generated. However, operating costs can be high depending on the constituents of wastewater. Hence a firm may set up an ETP and not run it if the operating and maintenance cost is substantial. Non operation of ETPs is also encouraged by the fact that the monitoring agencies like central and state pollution control boards relay on “initial compliance”, *i.e.* verifying that pollution control devises are installed, rather than on their regular

operation. This is due to the fact that dynamic monitoring (continuous monitoring of ETP's effectiveness) demands adequate manpower and substantial financial resources, which may not be available with the monitoring agencies.

It is also interesting to note the pattern in the type of ownership of the non-complying industries. As shown in Figure 4, about 48% of the total non-complying units are in the state public or cooperative sector, and 9% are Central Public Sector Units. Thus, more than half (57%), of the non-complying units belong to the public sector, while remaining 43% are in the private sector(CPCB, 1995).

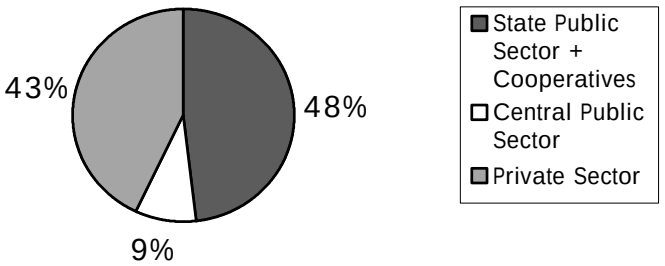


Figure 4 Ownership Regime of Water Polluting Industries
(2,026 industries with inadequate treatment facilities)

The large number of small-scale industrial facilities (including unorganized and household units) is not adequately addressed in the current pollution abatement policy. With regard to providing fiscal incentives, such as financial assistance for setting up Common Effluent Treatment Plant (CETP), or for the adoption of clean technologies, the main problem is the lack of an incentive mechanism to induce firms to take advantage of these schemes. In the absence of strict enforcement of discharge standards, there is no reason for polluting industries to voluntarily avail of the fiscal incentive schemes.

In the agricultural sector, so far there are no restrictions on the use of fertilizers and pesticides. Awareness campaigns among farmers to promote integrated pest management practices, and introduction of environment friendly farm practices (vermiculture, biomanures) should be the future direction.

5.2.3 What should be the Level of Treatment and at What Cost?

Currently, the effluent standards prescribed by CPCB are based on where the effluent is being released, after treatment. Even if all the industries comply with the standards, the ambient water quality may deteriorate if there are many industries. Further more there is no classification of pollutants based on their impact on the environment. Prescription of uniform compliance norms for all

industries is also not cost effective.

The cost of waste treatment depends on the waste characteristics (volume, concentration etc.), limiting standards for discharge and the treatment technologies adopted. The annualized costs of water pollution abatement in major water polluting industries in India range from 0.01 percent (in cement) to 3.9 percent (in chemical) of the annual turnover (Kirit Parikh *et al*, 1999).

With increasing understanding of the limited waste assimilation capacities of water bodies, the environmental standards are getting stricter. More stringent regulations imply that the waste treatment facilities have to become increasingly efficient. As a result the costs escalate steeply: an ETP of 99% efficiency can cost almost twice as much compared to one of 90% efficiency for certain critical pollutants such as colour or total dissolved solids (Prasad Modak, 1995). Industries in India, may have to spend around 2-5% of the capital investment of the industry for pollution control assuming satisfactory treatment and handling of effluents, emissions and solid wastes. The costs of operating the facilities are anywhere between 15-30% of the investment made on the treatment facilities, on an annual basis (Prasad Modak, 1995).

5.3 Water Resource Management Policies in India

Government initiatives for water resource management are outlined in ***National Water Policy,1987; National Conservation Strategy and Policy Statement on Environment and Development, 1992; and Policy Statement for Abatement of Pollution, 1992.***

Box 4: Major Water Pollution Management Policy Statements of Government of India

Technological Measures

- Use of clean fuels and clean technologies, energy efficient devises and water pollution control systems
- Incentives for environmentally benign substitutes, technologies and energy conservation
- Internalizing the environmental safeguards as integral component of the total project cost

Zoning Strategy

- Setting up of source specific and area wise water quality standards and time bound plans to prevent and control pollution

- Proper location of projects to minimize the adverse impact on people and environment
- Priority to compatible industries so that, to the extent possible, wastes from one could be used as raw material for the other thus minimizing the net pollution
- Location of industries as per environmental guidelines for siting of industry

Fiscal Incentives & Economic Instruments

- Incentives for environmentally clean technologies, recycling and reuse of wastes and conservation of natural resources
- Operationalization of "polluter pays principle" by introducing effluent / emission tax, resource cess for industry and implementation of standards based on resource consumption and production capacity
- Public liability insurance against loss or injury to life or property
- Internalizing the environmental safeguards as integral component of the total project cost

Command and Control

- Enforcement of pollution control norms in various types of industrial units depending on their production processes / technologies and pollution potential; particular attention to be paid to highly polluting industries
- Introduction of "Environmental Audit"
- Environmental Impact Assessment from the planning stage and selection of sites for location of industries
- Clearance by MOEF of all projects above certain size and in fragile areas.

Source: National Conservation Strategy and Policy Document on Environment and Development (1992). Ministry of Environment and Forests, Government of India, New Delhi.

6. How to Improve Air and Water Quality

The very poor quality of air and water in many parts of the country prove that these policies have not worked. The reasons for this failure are obvious. Legislation, which is not or can not be implemented, is ineffective. Over the last

two decades the pollution control boards have initiated thousands of cases against polluting industries but have obtained only a handful of convictions. For example in Rajasthan only 2 convictions have been obtained from nearly 7,000 cases. The pollution control boards are poorly staffed, lack technical facilities to measure and monitor, have meager financial resources and are also subjected to political pressures.

For pollution control in industrial sector, the present policy relies on industry specific emission / effluent standards, based on best available technology. Naturally, the industries do not reveal what is possible and manage to get a lax standard. In case of water pollution, the cess levied is on the volume of water and not on the concentration of pollutants in the effluent. This also does not give incentive to reduce pollutant concentrations. An appropriate policy would be to measure the quantities of pollutants and levy tax on it at a rate that rises with the quantity. This will provide industries incentives to do what they can to clean up their emissions / effluents. Such a simple economic solution is objected on the grounds that it requires effective measurement and monitoring. However, our experience has shown that in the absence of such monitoring even our present policy is ineffective, as the pollution control boards are unable to obtain many convictions in the courts. So we must have effective measurement and monitoring of all major polluting firms. Once we have it, we might as well use the economically more efficient pollution tax.

Experience in the industrialized countries has also shown that firms react to popular pressure. To generate such pressure, citizens should be given a right to information. Effluent quality measurements of all firms should be publicly available so that citizens could know who is damaging their air and water and by how much. Environmental quality management through social pressures have succeeded in countries like Indonesia (see Box 5).

To improve water quality in our rivers, besides taking care of pollution by large polluting firms, we need to take care of effluents by small polluting firms and municipal sewage often dumped untreated into our water bodies. Small firms will have to be relocated together where a common effluent treatment plant is required for them. Municipal sewage must be treated. There is no alternative. The cost of poor quality water on the population is so large that sewage treatment is economically justified. Municipalities and corporations must be required to do so.

Box 5: Pollution Management through Social Pressures: Indonesia's PROPER Program and Application to India

In Indonesia, it was observed that environmental performance of a firm depends on where it is located and the socio-economic status of the region. BAPEPAL (Indonesian Environmental Impact Management Agency) came up with an innovative program called PROPER to encourage factories to reduce pollution. The PROPER program proposed a 5 colour rating system for grading firms. Compliance levels were subdivided into gold, green, blue, red and black ratings, the latter the non-compliance category in decreasing order of level of compliance, gold being the best among compliance and black being the worst. The ratings are published. The colour rating system met several objectives. First by collapsing complex data into a single rating, the system made it possible to compare the water pollution performance of very different firms. Secondly, the final ratings were simple and their implications easily understood. The idea behind the new program was simple: by providing information about pollution in a form that non-specialists could understand, the initiative sought to tap the growing power of the media and public opinion to promote cleaner industry.

The first partial announcement of results, in June 1995, was given a heavy media coverage. Five factories were awarded the green rating (no factories were rated gold). Of the remaining 182 plants, only the distribution of the color ratings was disclosed: 61 were blue, 115 were red, and 6 were black. BAPEDAL gave plants rated red or black until December 1995 to improve their performance before their names and ratings were publicly disclosed. Under the threat of public disclosure, ten factories managed to improve their rating to red or blue within six months. Conversations with plant owners and other evidences suggest that the primary force driving these improvements was concern about potentially strong negative responses from local communities and markets. In December 1995, full disclosure got under way. Disclosure included plants' color ratings, names and locations, managers and parent companies. A fresh round of ratings, announced in September 1996, revealed additional improvements.

The movement of firms from non-compliance to compliance was remarkable. In June 1995, 65% of the factories were rated red or black. By September 1996, non-compliant firms accounted for just 47% of the total. Moreover, number of firms in compliance increased by 50% in this period.

The new approach to pollution regulation in Indonesia showed that local communities, the media, and market forces could be powerful allies in

the struggle against industrial pollution. Encouraged by the results BAPEDAL is planning to rate 2,000 plants by the year 2000. Several other countries like Philippines, Colombia and Mexico have also launched similar programs. PROPER has mainly been applied to large enterprises. However it remains to be seen whether small and medium sized enterprises, which are not very well known to the public, can also be included in this program. Besides the environmental performance was much worse in poorer communities. Does this mean that PROPER was likely to work better in affluent and well educated parts of Indonesia? Also, will BAPEDAL be able to sustain PROPER's effectiveness once the program's novelty wears off and the media move on to other stories?

How can this idea be tried in India? Can we use financial markets to sustain long term interest in environmental performance by requiring that the firms report their environmental risks to their shareholders? After all, delay of a project and even closures on environmental grounds are definitely possible and affect a firm's profitability. This would require periodic environmental audits which may be done by chartered environmental auditors (CEA) (on the line of chartered accountants). Guidelines, manuals and training programmes will be needed for certified environmental auditors.

The colour rating agency and the Pollution Control Boards (PCBs) complement each other. PCB has the technical competence and administrative authority. Unfortunately, it is locked up in legal battles and does not work through by societal pressures as rating agencies can. The two agencies can serve as a watch dog on each other, giving competition and confirmation to their findings. Can we link the colour-rating scheme to environmental audits, which should be mandatory?

To reduce water pollution from agriculture, use of chemicals have to be curtailed. Appropriate pricing would encourage more effective use of chemicals. But new technologies have also a role to play here. Integrated pest management practices should be vigorously encouraged. Special markets can be created for eco-friendly farm products. To reduce fertilizer use and resultant nutrient run-off, environment friendly practices like vermiculture and use of biomanures should be encouraged. Fertilizers may be delivered through drip irrigation to minimize water use, fertilizer use and effective crop management.

Finally, special measures are needed to control vehicular emissions in the urban areas. It has been demonstrated that through proper interventions in transport sector, overall pollution levels can be substantially reduced. Some of the measures are needed urgently, to cut the pollution levels immediately and some are long

term measures as shown in Box 6.

Box 6: Vehicular Pollution Management Measures

Immediate Measures

- Phase out old vehicles from urban areas
- Introduce catalytic converters for vehicles
- Introduce unleaded petrol in all urban areas
- Tax diesel vehicles for fuel use as well as for pollution

Long Term Measures

- Introduce four stroke engines (for fuel efficiency and low emissions)
- Improve fuel quality
- Improve public transport systems in the urban areas
- Urban planning with proper traffic management

Air and water pollution impose an enormous burden on people's health. The costs of cleaning them up are comparatively small. Clean air and water are not a luxury they are a necessity. With sensible policies, right to information, citizen awareness and lot of investment we should and we must clean up our air and water.

7. Strategies for Water Quality Management

The extent to which water resources development contributes to economic productivity and social well being is not usually appreciated, although all social and economic activities rely heavily on the adequacy of the supply and quality of freshwater. In India, as populations and economic activities grow, many regions are rapidly reaching conditions of water scarcity or facing limits on economic development. Water demands are increasing rapidly, with an estimated 80-90% required for irrigation, less than 20% for industry and domestic consumption. The holistic management of freshwater as a finite and vulnerable resource, and the integration of sectoral water plans and programmes within the framework of national economic and social policy, are of paramount importance for action. The fragmentation of responsibilities for water resource development among sectoral agencies is proving to be an impediment to

promoting integrated water management. Effective implementation and coordination mechanisms are required for achieving truly integrated water resources management (UN-DTCD / IBRD / UNDP, 1991; UN-DTCD, 1991).

A prerequisite for the sustainable management of water as a scarce vulnerable resource is the need to acknowledge, in all planning and development, its full costs. Planning considerations should reflect on the one hand all types of benefits, both direct and indirect, and on the other all investment, environmental protection and operational costs, as well as the opportunity costs reflecting the most valuable alternative use of water (Jyoti Parikh *et.al*, 1998). In this chapter, strategies to manage freshwater quality are discussed. Demand management strategies are also discussed as reducing demands ultimately lead to future pollution load reduction. A multipronged approach comprising of command and control, technological interventions, fiscal and economic instruments are being suggested to achieve sustainable supply, demand and quality management here.

7.1 Industrial Pollution Management

Economic Instruments

- Reduce water use through pricing mechanisms
- Investment in treatment facilities
- Operationalize Polluter Pays Principle
  - Tax based on pollution load rather than on water consumption
  - Environmental externalities to be reflected in tax structure
  - Environmental externalities to be accounted in cost-benefit analysis, at EIA level
  - Make environmental audits binding on the industry to encourage self monitoring and to reduce burden on the monitoring agencies.
- Expand the scope of public liability insurance to cover 17 major water polluting industries
- Mandatory clean technologies, reuse, recycling in new industries
- Fiscal incentives for old industries to shift to clean technology
- Higher credit rating for green industries

7.2 Domestic and Agricultural Pollution Management

Typically, most attention goes to industrial use of water and the effluents but in

the urban areas, it is the domestic and commercial water use that is predominating. In rural areas it is the agricultural use that is very large. Agricultural run off, mixed with fertiliser and pesticides, can harm the human health. Health impacts and resultant economic losses due to poor water quality and inadequate sanitation are of major concern.

- Options for private sector entry / public-private partnerships in domestic water supply and sanitation and wastewater treatment in class I cities and class II towns should be vigorously debated and implemented in time bound programmes.

- As conventional treatment of wastewater is cost intensive, options for biological treatment of domestic effluents should be explored.

- While there is a framework in place to deal with industrial pollution, such as effluent standards and pollution control agencies, domestic and agriculture sectors do not have any such mechanisms. These non-point sources of pollution affect surface water and can also reach ground water aquifers. Standards should be prescribed for domestic sewage water.

- New institutional mechanisms should be explored to monitor and manage domestic and agricultural pollution. Responsibilities should be either vested with the central and state pollution control boards or existing institutions (PWD, municipalities and gram panchayats) should be empowered with exclusive charge to manage domestic and agricultural pollution.

- Integrated pest management practices should be vigorously encouraged. Special markets can be created for eco-friendly farm products.

- To reduce fertilizer use and resultant nutrient run-off, environment friendly practices like vermiculture and use of biomanures should be encouraged. Fertilizers may be delivered through drip irrigation to minimize water use, fertilizer use and effective crop management.

7.3 Stakeholders and Externalities

Different people are affected in different ways by water issues. Since water is so widely used in society, the list of stakeholders is long and diverse. Environmental economics can help study the impacts / costs each group incurs from decreases in water quantity or quality. This can help in mediating conflicts among different users. Involvement of local communities in conservation practices to achieve sustainability is now generally considered essential. It is the approach preferred by the NGOs, and it has been incorporated by the United Nations Conference on Environment and Development (UNCED) in the Rio declaration as one of the approaches to be considered for environment protection. Traditional water conservation practices were effective but failed due to increasing pressure on

resources due to increased population and its increased economic activities. Tinkering with the system, mostly through government intervention, that came in the form of regulations or economic activities have also sometimes contributed to their failure. In this light, involvement of local communities and local self-governments in decision making will greatly enhance the success rate of conservation efforts.

Most of the effects of water problems that the various stakeholders face are external to the water market. This means that the impacts are not reflected in the price of water, and that those stakeholders suffering consequences are not the ones causing the problems. The undesirable externalities include health damages, reduced agricultural output, and more costly industrial operations. Usually, the polluter affects some other party, and is not held accountable. This also leads to conflicts among various stakeholder groups. Quantifying and monetizing these effects, and then incorporating them into the decision making process is one way to resolve such problems.

7.3.1 Public Participation

- Communities and farmers associations' involvement is crucial for success of water quality management policies and programmes. This can be achieved through creation of water user forums at appropriate levels.

- Participation of all stakeholders in decision-making at local, regional, state and national levels needs to be ensured.

Water quality management through social pressure should be encouraged, as similar programmes have succeeded in countries like Indonesia.

7.3.2 Spreading Awareness

- Sustained targeted awareness campaigns can ensure public participation in water resource management. All citizens especially women, children, farmers and senior citizens need to be targeted.

7.4 Demand Management Strategies

Main issues in demand management are balancing between competing demands and resolving resultant conflicts and demand reduction through minimization of misuse. The strategies for demand management should use managerial, technological, conflict resolution and by application of pricing policies.

7.4.1 Managerial Strategies

- Rational physical resource allocation practices need to be inculcated in all

the concerned institutions - decisions should be based on optimizing benefits of allocation.

- Planning should be based on limitations put by water availability, whether in deciding cropping pattern /cropping intensity or in selecting industries suitable for the region.

7.4.2 Technological Interventions

- Major technological interventions are needed to reduce misuse or overuse of scarce water resource in all competing sectors - agriculture, industry and domestic

- In agricultural sector, farm channel layouts should be scientifically planned. Irrigation through drip and sprinkler technologies should be encouraged, particularly in regions poor in water resources. Drip and sprinkler irrigation also reduces farm water run-offs, reducing pollution loads on the receiving water bodies.

- In industrial sector, water efficient and clean technologies should be made mandatory, particularly in all new upcoming industries. All old industries should be given fiscal incentives to shift to water efficient technologies. Water reuse and recycling should be made mandatory for all water intensive industries initially and extended to all industries in a time bound programme.

- In domestic sector, water losses can be curtailed through proper maintenance and management of pipelines. Over use of water should be curtailed through less water consuming devices and awareness campaigns.

- As domestic sector contributes approximately 75% of effluents by volume, reuse and recycling for agricultural and industrial purposes should be vigorously pursued. This can be done by proper water allocation management - by swapping freshwater assigned for agriculture and industry to domestic sector and diverting recycled domestic effluents for agriculture and industrial use.

7.4.3 Pricing Mechanism

Pursuant to the recognition of water as a social and economic good, the various available options for charging water users have to be further evaluated. Proper pricing should be applied in all water use sectors - agriculture, industry and domestic, so as to reduce demand.

In all sectors, volumetric based water rates should be adopted. The water rates should reflect the scarcity value of the resource and should cover opportunity costs and environmental externalities.

8. Conclusions

The efforts similar to rural electrification are needed to cover all the towns with water supply, sanitation and sewage treatment plants.

Pollution control boards need to be strengthened technically, by well-equipped pollution measurement laboratories and mobile vans are needed to measure all-important pollutants. Systematic efforts to strengthen them are required.

- Financially, by supporting all the desired functions with modern equipment and skilled manpower.
- Managerially, by enabling them with training and promoting cooperative work culture with accountability.
- Legally, by giving them sufficient power to manage pollution within flexible guidelines.
- Streamlining multiplicity of data collection and monitoring responsibilities.

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Comments

Bishnu Bhandari

1. Some Observations

The paper co-authored by Professors Jyoti Parikh, Tata L. Raghu Ram and Kirit Parikh begins with the review of constitutional obligation of the Government of India in protecting its environmental system. As part of translating this obligation, the Government of India has promulgated over 75 legislation relating to environment and pollution, together with the establishment of institutions in carrying out environmental management and strategic planning. These laws range from mandatory insurance policies on hazardous accidents to biodiversity conservation. Also the government provides to industries such fiscal incentives as depreciation allowance on, and soft loans for, the installation of pollution control devices, reduction in custom and excise duties for notified equipment and spares for pollution control and rebate in water-cess to install equipment for treatment of sewage or effluents. The government, through its five-year plans, has been integrating environmental and economic concerns into the process of development planning. Despite this command and control type of measure, the conditions of environment is deteriorating across the country. Air and water pollution is rampantly growing in the cities; per capita availability of forest is going down and most of the forest is threatened by anthropogenic pressures and the forests that support rich megadiversity are under great threat. The growing depletion of forests is attributed to high demand of fuel wood, fodder and timber, increasing population of human as well as livestock, inadequacy of protection measures, conversion of forest lands into non-forest activities, weak implementation of environmental law, under-staffed implementing agencies and expensive environmental standards. The paper focuses on issues related to biodiversity conservation, air pollution and water pollution.

1) Biodiversity Conservation: Despite 441 wildlife sanctuaries and 80 national parks covering 5% of total land of India, the paper argues that the surrounding communities still perceive the protected areas (PAs) as the center of wildlife depredation. They argue that “while society at large enjoys the benefits of conservation, the rural surrounding communities bear all the costs”. However, recent development of eco-development, eco-tourism, park and people program and buffer zone management have been effective in changing local people’s attitudes towards protected areas and wildlife conservation.

2) Air Pollution: The problems of urban and indoor air pollution are of grave concern in India. Many of its cities have average suspended particulate matter (SPM) several times higher than the WHO standard. It has a direct impact on

health, economic activities, material damage and the increased risk of environmental disasters. Women and children are the silent sufferers of household pollution. The paper suggests the phasing out of old vehicles from urban areas, high credit to green industries, biological treatment of domestic effluents and so forth. However, political and economical implications of phasing out there vehicles without any alternatives may cause serious social problems because these vehicles have been the quickest means of transportation and livelihood for a large proportion of population.

3) Water Pollution: The availability of fresh water both in quantity and quality is a nationwide problem. The available water is also vulnerable to rapid industrialization, population growth and agricultural run-off. Excessive use of water has caused land degradation in many parts of the country. The paper suggests the use of drip and sprinkle irrigation, awareness campaign in water reduction, use of small toilets, setting quotas on consumption, sanctions for excess use and use of water saving devices. The negative impact of green revolution on water and food chain system is equally note-worthy. The paper suggests the promotion of eco-friendly practices and organic (eco) farming. Adopting eco-friendly farming practices is the best way for environment protection. However, we need to think about a poor farmer, for whom it would be extremely difficult to switch to drip and sprinkle irrigation systems without any external support. Another point I would like to mention is the capability of this technology to cater to the needs of the growing population and then common man's affordability to organically grown products.

The above scenarios on environmental situation of India give rise to three key questions, which I believe, are challenging to the sustainable utilization of resources. They are:

- How can community reduce the overuse of common resources such as underground water, forests, etc.?
- What would be the extent of damage caused by air pollution to other parts of region?
- Are the command and control system really effective in protecting the environment?

2. The Way Ahead

The authors have rightly pointed out that "environmental governance" is a broad term and should comprise the management of environmental resources such as earth, air, water, forests, energy, biodiversity and so forth. It should include issues ranging from supply and demand to quality management directed to users, regulators, suppliers, policy makers and so forth because environmental

governance deals with how environmental problems are managed by the society. Onchan (1999) argues that "governance encompasses the traditions, institutions and processes which define how power is exercised; how important decisions are made; and how various interests are accorded roles or voices in the decision making process." Kato (nd) mentions that governance is concerned with the interactions of formal and informal institutions and includes actors as well as processes. Since environmental governance is complex and broad in scope, it needs to be promoted in a thoughtful way. My thoughts on promoting it are briefly undernoted and I believe that these points are the heartland of a successful environmental governance program.

1) Think "glocally": The concept of glocalism is primarily derived from the popular expression "Think Globally, Act Locally". It means global localization. Hempel (1996) opines

   Global change in ecology and political economy (e.g. expanded cross-boarder trade and investment) are beginning to foster a devolution of power and authority away from the nation-state and toward greater reliance on supranational, regional and local level of governance. A new and environmentally oriented world order is likely to emerge as a result of either by design or by force of circumstances. Its political institutions will be "glocal" in character, this dual nature reflecting both global and grassroots implications of a bioshpere in crisis and an economy that is straining to expand world market... Establishing a competent glocal political order is the central challenge of environmental governance of the 21st century.

When we talk of supranational power or authority, we need to think of a new framework of institutions that is capable of ensuring smooth functioning of environmental governance at the supranational level.

2) Promote environmental education: The contemporary environmental problems are the outcome of human intervention. We need to change or modify human behaviors to mitigate these problems. Environmental education plays a key role in bringing out desirable changes in human awareness, knowledge, attitudes, skill and participation in the society (Bhandari, 1999). So education should be the thrust in promoting environmental governance. The authors also have placed an emphasis on the importance of awareness and training to ameliorate environmental problems.

3) Forge partnership between government and civil societies: Since the environmental governance comprises actors as well as processes, it is crucially important to forge partnership between government and civil societies. They can compliment each other and avoid duplication and fragmentation of amelioration measures.

4) Encourage participatory management: Regular dialogue and interaction

among all affected elements of society are vitally important in promoting environmental governance. This will facilitate active and informed participation of stakeholders and help develop trust and confidence among themselves. Once the trust is developed, then the participation becomes inevitably spontaneous.

- Show political will and determination: A sound and sustainable environmental development can not be achieved without firm political will and determination, which is a key to the success of any program. The concerned agencies should show their political will and determination, not by words only but by deeds as well.

In the end, let me conclude this presentation by offering my congratulation to the authors for their articulate paper on environmental governance in India. I hope and trust that the deliberations of this workshop will provide a firm basis for the Environmental Governance Project to develop a sound and realistic framework of actions in the region.

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Summary of Discussion

The International Workshop on Environmental Governance in Asia was held on 18 March, 1999. Organized by the Institute for Global Environmental Strategies (IGES), the workshop presented country reports on environmental governance in China, Japan, Thailand, and India. Presentations were made by environmental experts from a number of countries: Prof. Kazu Kato, Nagoya University, Japan (chairperson); Dr. Miranda A. Schreurs, University of Maryland, USA; Ms. Xin Zhou, Policy Research Center for Environment and Economy of the State Environmental Protection Administration (PRCEE/SEPA), China; Dr. Mineo Kato, Yokohama National University, Japan; Ms. Phakatip Chunghivat, Thailand Environment Institute (TEI), Thailand; Prof. Jyoti Parikh, Indira Gandhi Institute of Development Research (IGIDR), India; Prof. Kenji Kamino, Nagoya Univeristy, Japan; Dr. James E. Nickum, University of Tokyo, Japan; Mr. Kimihiko Hyakumura, IGES, Japan; Dr. Bishnu Bhandari, IGES, Japan; Mr. Santosh K. Sharma, Development Alternatives, India; and Dr. Yohei Harashima, IGES, Japan.

Approximately 70 people attended the workshop, and joined in a lively discussion.

The conclusions from the discussion during the workshop on environmental governance in the four Asian countries can be summarized as follows:

1) In the four Asian countries, many positive trends can be found in environmental governance. Environmental laws have been strengthened, particularly in the 1970s and again in the 1990s. Many new environmental actors have emerged, and environmental awareness has grown at the local, national, and Asian regional levels.

2) In these countries, environmental policy formation and policy implementation still tends to be top-down. However, the role of local governments and civil society has been gradually expanding in each country, and we can observe the pluralization of environmental policy processes. It is increasingly recognized that informal, community based, NGO-driven solutions are needed for environmental protection, and that public participation in environmental policy processes should be enhanced in order to take local conditions adequately into account.

3) The four societies have been placing emphasis on the need for basic environmental information and its disclosure. In each country, the Environmental Impact Assessment (EIA) system has been adopted, and improvement of the EIA will contribute to environmental information disclosure. Moreover, environmental monitoring in the developing Asian countries remains limited, and has been a major problem for effective environmental policy implementation.

4) In the four Asian countries, environmental policy still tends to be separate from the economic planning process. Integrating environmental thinking into economic planning is necessary. The key issues for achieving this are how economic / fiscal instruments can be used for environmental purposes, and how inter-ministerial co-operation can be built in each country.

5) In these countries, the role of industries in environmental governance has been increasing. Small firms in particular have been large sources of environmental pollution. Serious attention should be paid to the problems of bringing small firms into compliance. In developing Asian countries, the adoption of clean technologies in small firms should also be promoted.

With regard to these conclusions, all workshop participants agreed that there is a necessity for more in-depth analysis of environmental governance mechanisms in Asian countries, and also recognized that such analysis will contribute to increasing regional / sub-regional environmental institutional capacity. This is important considering the extreme diversity of the Asian region and the many environmental problems that must be solved.