

# **Environmental Management and Sustainable Development in Vietnam**

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As a result of the Asian currency crisis, wishful thinking about a future leading role of the East Asian economies in the world economy has lost momentum. The currency crisis has had a great impact on Vietnam, which adopts the 'Doi Moi' policy, and negative changes in regard to the outlook towards economic growth and foreign investment are becoming noticeable. However, since Vietnam joined ASEAN in 1995, improvement of hard and soft infrastructures, which contributes to Vietnam's economic development, is well underway, and industrialization and urbanization are rapidly progressing. This has caused the gravitation of population towards cities, and the impoverished conditions of rural communities. The citizens are now facing the difficulty created by widening earning differentials between city and rural communities.

The serious environmental pollution such as air pollution (CO<sub>2</sub>, SO<sub>x</sub>, NO<sub>x</sub>), waste disposal, and water pollution occurred in urban area. There is a need to work out a countermeasure to this situation, need for the sound economic development of Vietnam. It is necessary to perceive environmental and social effects precisely and to learn from the experience of environmental destruction in the Japanese economy which is described as "noneconomic mindedness of economy inconsiderate of environment" in order to achieve sustainable development.

The objective of this paper is to grasp the relationship between industrialization/urbanization and environmental pollution, to examine the appropriate environmental management in Vietnam compared to the Japanese environmental management system.

## **1. Environmental pollution by industrialization and urbanization in Vietnam**

### **1-1 Present social and economic conditions in Vietnam<sup>1)</sup>**

Under the 'Doi Moi' policy, economic reform (To introduce a market economy) was fostered. From about 1989, Vietnam has begun to show concrete results sustaining 8~9% economic growth over recent years. At the 8th Vietnamese Communist Party's congress "Industrialization Modernization" through the year 2020 was set as the goal. Vietnam endeavoured to cope with social dislocation in the reform process and parliamentary activities, and provisions of law were implemented in order to enhance the rule of law. Furthermore, Vietnam formally joined ASEAN in July 1995, and the ASEAN heads of government meeting was held at Hanoi in December 1998. Major industries like the production and export of agricultural and marine industries is going smoothly, and the export of crude oil is also in a favourable condition. GDP growth for 1996 was 9.34% and per capita GDP was about US\$300. Yet, in the 1997 financial year Vietnam's economy tended to decelerate due to a fall in the price of commodities, decline in farmers' purchasing power, a lack of company funds, and the problem of balance of payments. It is hard for Vietnam to avoid the impact of the ASEAN currency fear, but the impact of the ASEAN currency crisis is handled by maintaining sustainable development. In particular, the trend of direct investment in Vietnam is rapidly decreasing and the volume and quality of investments are changing. In Vietnam under the 'Doi Moi' policy, investment from the US, Europe and Japan was rapidly increased and the movement towards a market economy is accelerated. Especially, in Vietnam the factors such as the existence of abundant natural resources, development of rice farming, the high educational standard of the Vietnamese people and their diligence contribute to the

potential of economic development. To be sure, we can identify a number of problems in Vietnam's economic development. It is predicted that rapid industrialization and urbanization will cause the concentration of population in urban areas and the impoverishment of rural areas, and increase the income gap, and inflation will result in various difficulties in the lives of the Vietnamese people. Addressing these urban, environment, and energy problems is important for Vietnam, which is to undergo major economic development. Thus, the formulation of comprehensive policies is required.

### 1-2 The background and magnitude of the environmental pollution

The environmental pollution caused by the industrialization and urbanization are becoming serious social problem in Vietnam. The background and magnitude of the environmental pollution in Vietnam are summarized by the report of the World Bank as follows<sup>2)</sup>.

#### A) Wastewater Discharge

Lack of water treatment makes water contamination a major health threat, and aquatic ecosystems are threatened by the high amounts of untreated sewage and industrial wastewater generated in urban centers.

#### B) Air Pollution

Industrial emissions, coal combustion and increasing numbers of vehicles using dirty fuels are main cases of loss of air quality in urban and industrial areas. Overall exposures to particulates, CO, CO<sub>2</sub>, SO<sub>2</sub> and NOx exceed permissible levels at many urban locations.

#### C) Solid Waste Treatment and Disposal

The volume of urban and solid waste collected in Vietnam amounts to about 9,100m<sup>3</sup> per day, of which 44% is collected. Collected solid waste is generally brought to landfills. Current disposal sites in urban areas are not properly designed and do not operate as sanitary landfills but simply as dump sites.

### 1-3 The state of environmental pollution in Vietnam<sup>3)4)</sup>

#### A) Wastewater Discharge

The urban water pollution in Vietnam has become a serious problem. The almost factories in Vietnam located near the river, industrial disposal directly discharge to river 290,000t per year (1992). The volume amount of discharge of load is shown as Table 1-1. The untreated water discharge of industrial factories has been 300 million m<sup>3</sup> per year.

Table 1-1 The Discharge of Water Contamination (unit:t/y)

Location	H <sub>2</sub> SO <sub>4</sub>	HF	H <sub>2</sub> S	COD	LIGNIN	GREASE	N	P	SS
Viet Tri	2,000	542	45	2,000	362				
Bac Giang			212			20	447	126	1,219
Hai Phong						70			13,940
Hanoi						317			
Ho Chi Minh			65		68.5	796	4,045	763	45,691

Source:Ref.No.3,

Vietnam has two big rivers, the Red river (Northern Part of Vietnam) and the Cuu Long river (Mekong River, Southern Part of Vietnam)<sup>5)</sup>. The water quality of the two rivers are shown in Table 1-2. River water is polluted by organic substances and heavy metals, and water quality levels exceed permissible value.

Table1-2 The Water Quality of the River(unit:mg/l)

Location	DO	BOD <sub>5</sub>	NO <sup>3-</sup>	PO <sub>4</sub> <sup>3-</sup>	
Red River					Red River
Hanoi	5.19	3.05	1.31	0.100	86,660km <sup>2</sup> (Catchment area in VN)
Viet Tri	6.31	2.75	1.98	0.051	137bcm(Total Discharge)
Trung Ha	6.23	2.87	0.76	0.010	
Son Tay	6.35	3.01	1.56	0.016	
Co Tuyet	6.73	3.58	1.12	0.041	
Mekong River					Mekong River(Cuu Long River)
Hong Ngu	6.6	12	0.10	0.10	72,000km <sup>2</sup> (Catchment area in VN)
Thah Binh	6.8	8	0.10	0.10	520bcm(Total Discharge)
Cao Lanh	6.2	15	0.10	0.10	
My Tho	6.0	15	0.10	0.10	

Source: Ref.No.3,Time of sampling,13/6/1993

#### B) Air Pollution

Table 1-3 is shown the total amount of emission of pollutants in some locations calculated by the Center for Management and Control of Air and Water Environment. About 90% of SO<sub>2</sub> is caused by the combustion of fossil fuel.

Table 1-3 Amount of emission pollutants into air(unit:ton/year,1990)

Location	Dust	SO <sub>2</sub>	NOx	CO
Hanoi	77,927	11,583	24,724	48,738
Hai Phong	84,437	11,569	24,735	47,858
Thanh Hoa	159,167	6,790	12,670	14,238
Viet Tri	80,118	4,424	11,415	11,415

Source:Ref.No.3

Air environmental quality in northern Vietnam Cities is shown in Table 1-4. Especially, the level of dust in Hanoi is highly exceeding the permissible value.

Table1-4 Air Environmental Quality in the City of Northern Part of Vietnam

Location	Dust		SO <sub>2</sub>		NH <sub>3</sub>	
	Max	Min	Max	Min	Max	Min
Hanoi	45.8	2.1	0.098	0.001	0.005	0.002
Viet Tri	1.9	0.4	0.100	0.003	0.034	0.001
Bac Giang	19.0	1.0	0.0001	0.002		

Source:Ref.No.3

## 2. The Urban Environmental Management and the tasks ahead of developing environmentally sound and sustainable cities in Vietnam

### 2-1 Urban environment

Urban environmental problems in Vietnam have worsened over the past ten years. Chronic poor environmental service and infrastructure as well as the decay of natural resources and the outbreak of health problems due to the deterioration of the environment are evident in Vietnam. There is a vicious cycle of accelerative deterioration in the urban environment due to these factors. Examples of such deterioration include waste from factories and cities, water contamination in rivers, lakes, and sea areas, air pollution in urban areas and areas along major roads, the deterioration of environment including the collapse of historical and cultural environment due to the construction of new houses and large size hotels.

The deterioration of urban environment today is considered more serious than the destruction that occurred in urban areas during the Vietnam War. As a result, the condition of public health, air pollution, residential environment, traffic, public safety, and education in cities is deteriorating and cities are becoming more and more difficult places to live. What follows is the present conditions of urban environmental problems in the metropolitan areas of Hanoi city and Ho Chi Minh city.

#### (1) Hanoi City

##### (A) Overview.

Hanoi city is the capital of the Socialist Republic of Vietnam with a population of 2.1 million and an its administrative area is 914km<sup>2</sup>. It consists of four central city districts and five surrounding provinces. Hanoi city has the oldest history among Southeast Asian countries since the 3rd century BC. Yet the initial urban planning, which was designed by French urban planners, aimed to accommodate a population of 150,000. Thus, it does not have the capacity to cope with the rapid increase in its population. Furthermore, infrastructure development is insufficient. The deterioration of housing quality, an increase in the number of the slums, and the underdevelopment of roads and water supply are conspicuous.

##### (B) Traffic Environment

Urban transportation: With Bus service only by antiquated buses, "Cyclo" has become a convenient transportation measure for the citizens of Hanoi city. Traffic control is still not accomplished. Most roads are not paved.

##### (C) Residential environment

Housing: Housing conditions are poor with only 30~40m<sup>2</sup>/per house.

Water supply: Water sources are abundant, but water pipes are outdated. Also, water is not supplied to the Red River's old city area and the area across from the Red River.

Drainage: Construction work for drainage improvement is necessary. During the rainy season, the city area is often flooded.

Hygiene: Domestic sewage and other waste are often dumped directly into rivers. Waste disposal is insufficient.

##### (D) Disposal of waste

The total capacity treatment centre for ordinary solid waste which have been operated since 1990 and are due to reach their limit by 2005, is about 1.9 million ton (4.6million m<sup>3</sup>). The volume of solid waste production in the Hanoi Metropolitan area in 1991 was 1.993m<sup>3</sup>/d or 83.7 tons per day(t/d), 0.7 kg/d per person. The estimated volume of solid waste production in 1996 was 1,178t/d. Approximately 570t/d(48.3%) of solid waste production has been collected to the present. Among the volume of waste generation, 50.3% comprises vegetables, fruits and so forth. URENCO(City Environment Company, 2,000 employees) is in charge of collection and disposal.

(2) Ho Chi Minh City

(A) Overview.

Ho Chi Minh city has 300 years of history. It is the biggest city in Vietnam and is the center of its economy. It is also politically important as it is a city administered by a central government. Ho Chi Minh city consists of 12 districts in the central area and 6 surrounding provinces. Its population is 4.8 million (1995). The size of the city is 2,056 km<sup>2</sup>.

(B) Traffic environment

Urban transport: Car and motorcycle ownership is high.

Road: Roads in the city are upgraded. Traffic congestion is also under control.

(C) Residential environment

Housing: Redevelopment of the city is necessary. Prevention of disasters in the Cholon district is important. New housing development is necessary.

Water supply: The water supply capacity is deficient.

Drainage: Water contamination in rivers near urban areas, rivers and lakes is occurring due to urban and industrial sewage.

(D) Waste disposal

Waste disposal has become a social problem in Ho Chi Minh city. The major problem is that about 2000 tons of waste per day is thrown away by 600~700 trucks at Don Tain waste treatment center, resulting in pollution and underground water contamination. Also, the residents living in the surrounding area are involved in waste collection and they suffer from deteriorating working conditions.

## 2-2 Industrial Pollution

As a result of rapid industrialization, today, factories that used to be located far from densely-populated areas are included in urban areas. Likewise, factories in Ho Chi Minh city cause air pollution and pose a serious threat to people's health. In the areas of Ho Chi Minh city and Hanoi city, SO<sub>2</sub> and CO and so on exceed international environmental standards. Suspended particulate matter (SPM) in Hanoi city averages 0.15~1.0 mg/m<sup>3</sup>, and in Ho Chi Minh city 0.5~1.5 mg/m<sup>3</sup> (WHO standard 0.07 mg/m<sup>3</sup>). In Hanoi city 70% of industrial plants fail to meet environmental standards (Hanoi Environmental Committee, 1992). There is a serious problem of water contamination at the center of the city. About 70% of the source of contamination is from domestic sewage and 30% from industrial sewage. In Viet Tri, industrial sewage from pulp, paper, fabric, food, chemicals is 35 million m<sup>3</sup>/y and contains 100 ton's sulfuric acid, 4000 ton's hydrochloric acid. Air pollution, water contamination, and damage to health by waste can be identified as symptoms of industrial pollution. Also, the damage to eco-system is perceived as the impact of industrial pollution.

## 2-3 Vietnam's urban development and economic condition

Since the late 1980's Vietnam has been achieving economic growth by implementing rapid industrialization. Simultaneously, this phenomenon means rapid urbanization. In 1989, already 12,740,000 people, about 19.8% of Vietnam's population, resided in cities. Amongst them, 1,080,000 people (8.5%) lived in Hanoi city, and 3,170,000 people (24.9%) lived in Ho Chi Minh city. Both cities also have big cities in their vicinity and the expansion of the metropolitan area is in progress. In these metropolitan areas, the ratio of urban population increased, then the ratio of the population who stay in the city changed 15.9% in Hanoi city and 31.0% in Ho Chi Minh city in 1994 respectively. Precise estimates of urban population is difficult to measure due to statistical problems and the problem of demarcation of city districts, but urban population is undoubtedly increasing. Hence, the cause of the increase in poverty widening of income gaps and the deterioration of the residential environment can be attributed to the growth of urban population. As Vietnam's income

groups in different areas are shown in Table 2-1, income gaps clearly exist in Vietnam.

This gap of poverty between urban and rural areas contributes to the concentration of population in urban areas, and the poverty gap within the district will become the cause of more serious social problems. The rate of satisfaction among residents about this change is evident in the fact that 47.3% in urban areas and 52.7% in rural areas (1990/1993) expressed improvement in environment.

On the other hand, 19.9% of the population in urban areas and 17.0% in rural areas respectively said that the environment deteriorated. Sustainable development, which fulfils people's demands in relation to poverty, environment and society, at the same time is necessary for a country with rapid economic growth.

Table-2-1 Average Monthly Income in Vietnam(1000VDN)

Class	Total	Urban	Rural
Rich	530.2(4.1)	615.0(12.4)	429.8(2.3)
(Very Rich)	743.7(1.8)	834.2(6.3)	607.1(0.9)
Upper middle	118.9(17.2)	218.4(33.2)	173.5(13.7)
Middle	100.7(36.4)	130.0(26.3)	96.3(38.7)
Lower Middle	65.8(22.3)	92.0(18.0)	61.4(23.2)
Poor	40.9(20.0)	56.9(10.1)	39.3(22.1)
(Very Poor)	27.5(4.4)	42.1((3.3)	25.2(4.6)
All	119.0(100.0)	220.3(100.0)	94.4(100.0)

Source:GSO(1995)Statistical Yearbook 1994,

Statistical Publishing House,Hanoi

### 3. Lessons from Japanese experience and challenge for environmental management of Vietnam<sup>6)</sup>

#### 3-1 The Overview of Japanese Environmental Policy(1950~1996)

Japan has a long history of environmental pollution from old times such as Nara era (about 1300 years ago), but environmental disruption associated with industrialization appeared in 1880s. After the World War II (1945), the history of the Japanese environmental policy can be divided into the following five phases.

1950s-1967	Japanese four big pollution cases (Mianamata diseases, Itai-Itai diseases, Yokkaichi Asthma, Niigata Mianamata diseases)
1967-1972	Basic Law for Environmental Pollution Control(1967) Established Environmental Agency(1971)
1972-1982	UNCHE in Stockholm. (1972) OECD Environmental Committee(1976-1977)
1982-1992	Regional environmental problems to global environmental issues WCED(1984-1987)
1992-Present	UNCED(1992) The Basic Environmental Law(1993)

#### 3-2 The characteristics of Japanese environmental policy

In 1976-1977, OECD Environmental Committee conducted a review of environmental policies in Japan<sup>7)</sup>. It summarized the characteristics of Japanese environmental policies with the following four points.

- (a) The Japanese approach to pollution abatement appears to be largely non-economic.  
 “The P.P.P.(Polluters Pay Principle) immediately became very popular in Japan, and it is often referred to by the government officers and environmental economist. But the economic objectives of the principle, and the mechanisms by which they are achieved, are not always well understood.”
- (b) Japanese policy was focused on certain types of pollution, namely on pollution by mercury, cadmium, polychlorinated biphenyls, sulphur dioxide, and nitrogen oxides. These pollutants were responsible for the worst cases of pollution experienced in Japan.
- (c) Japan has preferred direct administrative controls to indirect economic incentives. Japan does not rely upon market mechanisms to reduce pollution; price signals and incentives are considered not to be sufficient.
- (d) The role played by local government is important. One of the most impressive achievements of local governments is in the field of air pollution monitoring.

After the report of OECD, Japanese environmental policy drastically changed, then after UNCED(1992), The Environmental Basic Law (1993) introduced the economic instrument as a positive measure to create more comfortable environment.

### 3-3 Comparative study of environmental policy of Japan and foreign countries

The international comparison of environmental levels is important to establish environmental policy for its country. The environmental state is summarized as Table3-1 using OECD Report (1977).

Table3-1 Air Pollution Level(Japan:1965~1974) and  
 Air Quality Objectives(1975); Japan,USA,West Germany

	SO <sub>2</sub> (ppm)	Particulates(mg/m <sup>3</sup> )	NO <sub>2</sub> (ppm)
Pollution Level			
Japan(1965)	0.057		
Japan(1970)	0.043		0.032
Japan(1971)	0.037		0.033
Japan(1972)	0.031		0.029
Japan(1973)	0.030		0.038
Japan(1974)	0.024		0.040
Quality Objectives			
Japan(1975)	0.04	0.10	0.02
USA (1975)	0.14	0.26	0.13
W Germany(1975)	0.06	n.a.	0.15

Source:Ref.No.7

The air pollution level of SO<sub>2</sub> has rapidly decreased due to the countermeasures, but NO<sub>2</sub> could not be improved. The air quality objectives(1975) were more severe than the objectives of U.S.A. and West Germany. To achieve these objectives, Japanese government and enterprises had made effort, in particular automobile emission standards were set up as shown in Table 3-2. The trend of pollution, such as SOx, NOx, and Municipal Waste, was estimated as Table 3-3. These numbers indicate that, Japan was pressured to make more countermeasures for air pollution than U.S.A. and West Germany, while West Germany made remarkable progress in the reduction of the municipal waste.

Table3-2 Automobile Emission Standards; Japan,USA,Sweden

	CO(g/km)	HC(g/km)	NOx(g/km)
Japan(for1976)	2.10	0.25	0.60
Japan(for1978)	2.10	0.25	0.25
USA(F.G,75)	9.30	0.93	1.93
USA(California)	5.60	0.56	1.24
Sweden(for1976)	24.20	2.10	1.90

Table3-3 Trend of Pollution in Japan,USA,West Germany (1000t/year)

	SOx		NOx		Municipal Waste	
	75	85	75	85	75	85
Japan	1,682 (100.0)	1,070 (63.6)	1,550 (100.0)	1,416 (91.4)	38,074 (100.0)	41,530 (109.1)
USA	26,000 (100.0)	21,600 (83.1)	19,100 (100.0)	19,800 (103.7)	140,000 (100.0)	178,000 (127.1)
W Germany	3,325 (100.0)	2,345 (70.5)	2,532 (100.0)	2,924 (115.5)	20,423 (100.0)	19,387 (94.9)

In Japan, to achieve these objectives, the Japanese government had given administrative guidance to the Japanese enterprises. The antipollution investment of enterprises are as shown in Table3-4.

Table 3-4 Calculation of Investments(1974) (unit:b.yen/year)

	Total Investments	Antipollution Investments	Ratio(%)
MITI enterprises	5,761	818	14.2
Other manufacturing Ent	6,867	515	7.5
Non manufacturing Ent.	10,302	-	0.0
Total	22,929	1,333	5.8

The ratio of MITI enterprises was very high compared to other enterprises. This is one of Japanese characteristics. The Economic Planning Agency assessed the changes in macro-economic variables such as GNP, Productive Investment, and Prices as shown in Table 3-5. Because, it was necessary need to estimate assess the macro-economic impact of stricter pollution abatement policies. And the variables generated over time by stricter environmental policy are reported in Table3-6. Fortunately, the estimation turned out wrong. The change of macro-economic variables did not depend on the stricter pollution abatement policies as indicated by the actual results. It depended more on land prices, petroleum prices, and other factors. Economic activity rose in spite of enforced antipollution investment.

Table 3-5 The Changes in Macro-Economic Variables(Estimation) (%)

Economic variables	After 5 Years	After 10 Years
GNP	-0.3	-2.8
Productive Investment	-0.4	-7.7
Prices(GNP Deflation)	+3.1	+2.9

Table 3-6 The Changes in Macro-Economic Variables(Result) (%)

Economic variables	After 5 Years	After 10 Years
GNP	3.3	4.6
Productive Investment	-0.3	0.3
Prices (GNP Deflation)	+7.6	+1.9

In order to ensure the rational and efficient use of environment and resources, goal-oriented actions such as Japanese planning and management ought to be promoted in an innovative and creative manner. To be more precise, planning for an urban area involves the clarification of what are the planning goals, who can undertake the planning exercise, what are the major planning variables, where the planning is directed, how long the planning period is, and what method of planning is to be used. On the other hand, management involves a decision to minimize the gap between the planned actions and the actual state of resources use. Finally, creative actions towards urban area involve a task of discovering, in an innovative manner, a possible breakthrough against the unprecedented situation where creation of new resources are increasingly called for as a result of resources depletion as well as the changes in production methods and lifestyle. In order to enhance the economic value of resources and the environment, it is necessary to define an optimal state of resource and environment use as well as to develop a system whereby that state can be achieved. For the purpose of addressing these tasks, a clear understanding of the relationship among resources, the environment and humankind is essential.

In addition, a rational rule of decision making among interests groups has to be established in order to guide the resource and environment-use practices to an optimal state. What is called for at present is therefore not to seek an advantageous position over others in regard to resource and environment-use, but to search for a long-term collective management approach directed to conserve the urban area.

It is useful to examine the Japanese experience for the sake of the making environmental management plan in developing countries. The relationship between environment and economy should be consciously examined, but the more important task is to make clear the importance of the environmental conservation.

## 4. Institutional Framework for Environmental Management and Urban Solid Waste Management

### 4-1 Institutional Framework for Environmental Management<sup>(9)</sup>

The Vietnamese government formed the Ministry of Science, Technology and Environment (MOSTE) in October 1992. Within the MOSTE, after the enactment of the National Law on Protection on Environment (NLEP) in December 27th 1993, the National Environment Agency (NEA) was started. Environmental legislation in Vietnam is comprised of (a) NLEP, (b) Sector-specific Law and Regulations, (c) Provincial Environmental Regulations and Standards. The NLEP identifies the following nine key environmental management functions for MOSTE:

1. Formulation of policies and legal documents.
2. Elaboration of strategies and long-term programs.
3. Planning budget for research and development.
4. Development and management of environmental information.
5. International cooperation and coordination environmental activities.
6. Coordination and supervision of inter-sectoral environmental protection activities.
7. Technology transfer management and technological appraisal of investment projects.
8. Study institutional improvement and renovation.
9. Inspection of the implementation of legislation and policies.

Moreover, NEA performs the following tasks to increase public awareness of environmental issues.

1. Formulation of policies, strategies, bills and legal documents.
2. Taking measure on environmental protection and coordinating the implementation of the "National Action Plan on Environment and Sustainable Development."
3. Appraising and assessing environmental impact of projects.
4. Managing national monitoring system and pollution controlling systems.
5. Organizing and guiding public activities on environmental activities.

The institutional framework for environmental management of Vietnam is formulated by MOSTE and NEA. The most important task is to make a more precise human development plan which contribute to the environmental management.

The second task is to examine the concept of "Sustainable Development in Vietnam." Because the meaning of the "Sustainable Development" is different according to the economic, social and natural conditions. Especially, we should consider the influence of the Vietnam War.

#### 4-2 Environmental Assessment in Vietnam<sup>10)11)</sup>

The concept of Environmental Impact Assessment (EIA) was introduced to Vietnam on 1984 by the National Resources and Environment Research Programme (NRERP). The EIA is a well-known method to assess the environmental impact of proposed development projects. The history of introducing the EIA in Vietnam is summarized as follows.

1984: Introductory Course organized by NRERP.

Initial Environmental Examination (Tri An Water Reservoir)

1985: Decision No. 246/HDBT of The Council of Ministers

(Amelioration of Resources Investigation and Environmental Protection)

1986: Case Study (Hoa Binh Reservoir)

1987: EIA is taught as one compulsory subject in a regular Post-graduate program on Environmental Management organized by Hanoi University.

1988: Teaching EIA (Hanoi University)

1989: Teaching EIA (Hanoi University)

1990: EIA Procedure in Vietnam (NRERP)

1991: Real EIA (Quan Lo- Phung Hiep Project: By Canadian Company)

Teaching EIA (Hanoi University)

1992: EIA Technical Training Courses were organized in Hanoi and Ho Chi Minh Case Study (Hoa Binh Reservoir, Bai Bang Pulp and Paper Factory, Thach Nham Irrigation System, Tri An Water Reservoir)

Real EIA (Yali Hydropower Plant Project: By Swiss Company)

Real EIA (Thac Mo, Son La, Song High Hydropower Plants)

Preliminary EIA (Oil and Gas Exploration Drilling in Vietnam's Offshore)

1993: EIA Technical Training Coursees were organized.

Workshop with EP, East West Center (USA) (EIA Methodologies).

Case Study (Nam Uong Bi Project)

Preliminary EIA (Oil and Gas Exploration Drilling in Vietnam's Offshore)

Order Nr. 73-TTG (The urgent task of environmental protection)

Guidelines No 1485-Mtg for EIA implementation

1994: EIA Course in Central VN IDRC

Real EIA (Vat Cach Steel Factory, Trang Kanh Cement Factory)

Laws on Environmental Protection (No.29-L/CTN)

Interministerial Circular No.142/MTg, "Guidelines on organization, authority and scope of activities of the Inspection of Environmental Protection"

1995: MOSTE Minister's Decision No.229-QD/TDC, The Issuance of Vietnamese Standards

The perspectives of Vietnamese on EIA development are categorized by Prof. Le Tac Can (Chairman, National Research Programme for Environmental Protection) as follows<sup>12)</sup>.

1. Legislation must include a chapter concerning requirement for EIA.
2. National environmental standards and criteria have to take into consideration the real natural, economic and social conditions of Vietnam.
3. Environmental monitoring network activities should be more strengthened.  
Database on natural resource/environment should be systematically collected.
4. Development planning should be combined with environmental planning that considers EIA.
5. EIA expert must be trained, and various types of institutions concerned about the implementation of EIA procedure have to be created.
6. International cooperation in EIA must be developed.

The following study should be executed in EIA.

- (1) Assessment of the current and potential impacts of the acceleration of economic development and industrialization in urban areas in Vietnam.
- (2) Analysis of the relationship between industrialization and natural resources and environmental quality degradation in urban area in Vietnam.
- (3) Identification of environmental issues that will be created by acceleration of economic development and industrialization in urban area in Vietnam.
- (4) Estimation of the economic value of the natural resources and environmental quality degradation in urban area in Vietnam.
- (5) Establishing an international network of cities concerned about appropriate technologies for environmentally sound and friendly exploitation of industrial and natural resources.

#### 4-3 Urban Solid Waste Management -Refuse and Recovery Systems in Ha Noi<sup>13)</sup>

Urban solid waste management is an important environmental work. Categories of urban solid wastes in Vietnam are generally divided into 1. Markets, 2. Shop-houses, 3. Residences, 4. Institutions, 5. Hotels and restaurants, and 6. Industries.

The refuse disposal system is operated by Hanoi's URENCO (a publicly funded corporation under the Hanoi City People's Committee). URENCO (4 Environment Enterprises, 2 Refuse Transport Units, Nightsoil Collection Unit, Street Washing Unit, Mechanical Workshop, Landfill Treatment Unit: See Fig. 4-1) is Hanoi's primary refuse handler. URENCO employs more than 2,000 persons. Daily solid waste generation in 1991 and 1996 is estimated at 837 ton/day, and 1,178 ton/day respectively. Estimated collection rates in 1991 and 1996 are 45.7% and 48.3% respectively. The remainder of refuse is classified under junk that people scavenge estimated illegal systems such as reuse and recycling (37.1% in 1991, 36.7% in 1996), the remainder is unaccounted.

The composition of refuse is mainly, ① Leaves, fruit, roots, vegetables, and dead animals, 50.27%, ② Tile, stone, earthenware, 7.43%, ③ Bags, sticks, and wooden pieces, 6.27%, ④ Paper, 2.72%.

Because the environmental management of urban solid disposal site is non-existent, soon it will become a big social and environmental problem. All environmental problems are deeply connected the solid waste management, and substantial international cooperation between Japan and other Southeast Asian countries should be examined.

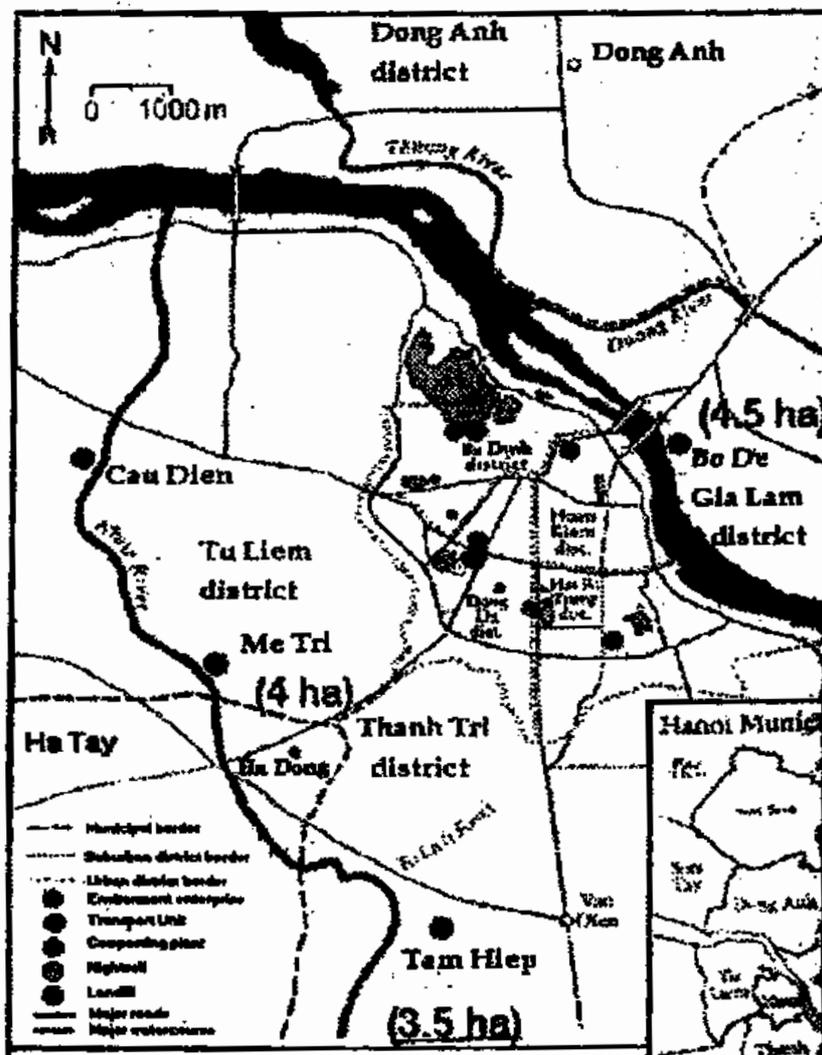


Fig 4-1 URENCO Activity Map

Source:Ref.No9

## 5. Red River Development Master Plan and Sustainable Urban Development

### 5-1 Characteristics of the Red River Basin

There are 2,345 rivers in Vietnam. The Vietnam river systems are mainly replenished by rainwater source. The Mekong river (Cuu Long River) has the largest water volume with about 520km<sup>3</sup>/year, and the Red and Thai Binh rivers system is 137km<sup>3</sup>/year. The hydrological features of the Red river is summarized Table 5-1 as follows<sup>(14)(15)</sup>.

Table 5-1 The Characteristics of the Red River

Factors	Value
Catchment Area (km <sup>2</sup> )	169,000 (Inside 86,660 Outside 82,340)
Annual Discharge (km <sup>3</sup> /year)	137.00 (Inside 92.88 Outside 44.12)
Monthly Discharge (km <sup>3</sup> /year)	
Max	24.6 (Max/Ann: 18.0%)
Min	2.4 (Min/Ann: 1.8%)
Water Level (Son Tay) (cm)	1,141
Water Velocity (m/s)	2.61 (mean) 3.45 (highest)
Water Level Rising Rate (cm/day)	188
Peak Discharge (Son Tay) (m <sup>3</sup> /s)	37,400 (Max: 1971)

Source: WATER RESOURCES IN VIETNAM, World Bank, ADB, IWRM, MAY 1995

Prof. NGUYEN VIET PHO, Dr. VU VAN THUAN, Evaluation, Management and Protection of Climate and Water Resources in Vietnam 1994

### 5-2 The Framework of the Red River Master Plan<sup>16)</sup>

There is a Red River Master Plan (Vietnam Government (MOSTE), UNDP, WB, April 1993 to June 1995), which covers northern parts of Vietnam, to overcome various issues such as imbalance in the economy, social injustice, urbanization, investment balance, capital and to support economic development.

The basic features of the Red River basin delta are as follows.

- (a) Location/Northern Vietnam/20.00N~21.30N, 105.30E~107.00E
- (b) Area/16,644km<sup>2</sup>/10 provinces (total area 27,898km<sup>2</sup>)
- (c) Topography/The Red River delta consists of the following three rivers;
  - Da, Thao, Lo/Areas where the height is 0.4m~12m, less than 2m constitute 56% of the whole (territory)
- (d) Population/17,050,000 people (1993), Education: Literacy rate 87% among the people whose age is more than 10 years old, the people who have received more than 9 years education is 40%.
- (f) Employment/Agriculture (75.4%), Manufacturing (9.5%), Trade/Commerce (3.8%) Construction (2.5%), Education (2.4%)
- (g) Amount of production in 1993: 29,863 billion VND, GDP/capita US\$148

The Master Plan (Project VIE/89/034) consists of Overall Strategy, Scenarios, Investment Programme, Components of the Master Plan (water resources, water management and control, agriculture, transport, urban development, rural development, electricity supply, industry, and environmental issues), and Institutional Aspects. The overall strategy of this project is to implement rapid growth in regional policies, promoting energy, mineral resources, harbours, airports, transportation, trade, financial services, and human resource development; and to develop important areas such as Hanoi, Hai Phong, Quang Minh, along the road network (National Route 10). GDP by the year 2010 is expected to be triple the 1995 rate as a result of this project. This project involves water resource development, (water management and control), agriculture, transport, urban development, regional development, electricity supply, manufacturing, and environmental measures. Moreover, the Master Plan raises policy problems, for example project techniques, fundraising/human resource development, and project assessment such as expense advantage/contribution to the nation.

In July 1995, the Government entrusted the MOSTE with the task of setting up a Master Plan (adopted by the government in Decision 677/TTg, 23, August, 1997) for the socio-economic development of the Red River Delta comprising 7 provinces and 7 other regions in the country.

The Master Plan embraces the whole spectrum of development and protection of the environment. It provides an

overall strategy and guidelines for future development. The Red River Delta Socio-economic Master Plan has following general objectives of development<sup>17)</sup>.

- 1) Transform the driving force in regions of industrial and agricultural development
- 2) Economic growth rate is 1.2-1.3 times higher than the national average
- 3) Implement electrification (Production force) for the whole region
- 4) Economic structure transformation in the direction of increasing share of industry and service in overall GNP
- 5) Build an equitable society: reduce the living standard gap
- 6) Ensure national development with preservation of resource/environment
- 7) Ensure economic growth with the national defense and security

In March 1998, Scientific Workshop on the Economic Development and Environmental Protection of Red River was held in Hanoi, Vietnam. In the Workshop, Dr. Le Dinh Thuy reported the assessment about impacts of socio-economic development activities, and discussed the Protection Zone which covers the comb-like belt area of the remaining mangroves<sup>18)</sup>. In making their Master Plan, each development project should examine the combination with environmental planning.

### 5-3. The task ahead of developing environmentally sound and sustainable cities in Vietnam<sup>19)</sup>.

It is important to contribute to the promotion of developing environmentally sound and sustainable cities in Vietnam through elaboration on rational policy and strategies of industrialization, as well as dissemination of relevant knowledge on appropriate environmentally sound and friendly industrial and natural resources exploitation technologies.

The following four conditions are considered essential to guarantee the urban environmental and social considerations of urban development projects.

- [1] To identify the environmental and social considerations for each issue and clarify the position of environmental and social measures in the urban development project cycle;
- [2] To expand the scope of environmental and social consideration from a local district to the regional and the national levels and further to the global system.
- [3] To set a financial condition harmonizing with the advantages and disadvantages among generations.
- [4] To evaluate the environmental and social impacts and sustainability of urban development projects at regular intervals.

Lastly, I propose some ideas relevant for the conservation of the urban environment from the view point of the environmental economic system.

- 1) To examine the relationship among human-beings, environment and economics as a holistic issues.  
[Example: To establish environmental criteria]
- 2) To generate data on environmental resources at regional, national and the global levels.  
[Example: To make a list of environmental resources]
- 3) To design a framework for the economic system of the urban environment  
[Example: To evaluate economic growth based on the preservation of the urban environment]
- 4) To develop a social decision making system for the conservation of the urban environment  
[Example: To make the public decision making system on a urban scale]
- 5) To develop a system of synthetic evaluation of activities for urban environmental preservation  
[Example: To establish an institution through international action]

## 6. Vietnam's Environmental Protection-oriented Development and International Environmental Cooperation

The following matters require consideration in order to correctly grasp the impact of Vietnam's industrialization on environment and society, achieve environmental protection-oriented development and advance sustainable development.

### (1) Technical consideration of a comprehensive environmental protection system

The point of environmental monitoring is to monitor not only simple contaminated substances but also environmental factors which are necessary for the creation of urban environment. Furthermore, environmental monitoring aims to remove urban pathology, and create specific prescriptions for improved urban environment. Comprehensive environmental protection systems have been developed from environmental impact assessments which have already been legislated. A comprehensive environmental protection system is required in order to draw up specific prescriptions for an improved urban environment.

### (2) Japanese economic aid for Vietnam and human resource development.

The aim of economic interaction between Japan and Vietnam should not be to build a simple industrial park but to promote investment which would support environmental protection-oriented economic development. In regard to the implementation of Official Development Assistance (ODA), it should also be promoting a spontaneous economic development which fosters a closer relationship between ASEAN countries and develop a program of human resource development which supports ODA for the master plan.

### (3) The establishment of a conceptual framework of international environmental technology policy.

It is necessary to make suggestions to APEC Environmental Technology Exchange Virtual Centre and establish environmental policies which aim to promote environmental protection and sustainable development. To establish the conceptual framework of international environmental technology policy is new task ahead for the 21st century.

#### [References]

- 1) Kenichi Nakagami, "Environmental policy and sustainable development in Vietnam", RITSUMEIKAN UNIVERSITY IRCED Working Paper Series, No.13, October, 1998
- 2) Agriculture and Environment Operations Division, Country Department I, East Asia and Pacific Region, World Bank, "Viet Nam Environmental Program and Policy Priorities for a Social Economy in Transition Vol- I "Report No.13200-VN, WB February 27, 1995
- 3) Do Hoai Duong, et al, "SCIENTIFIC BACKGROUND OF ENVIRONMENTAL MONITORING SYSTEM OF AIR AND WATER IN VIETNAM", "ENVIRONMENTAL PROTECTION AND SUSTAINABLE DEVELOPMENT" Proceeding of the National Seminar on Environmental Protection and Sustainable Development Research, October, 1993
- 4) Kenichi Nakagami (1998), *ibid.*
- 5) Lawrence Egan and Rudi Kohnert and NGO Water Resources Sectoral Group "SMALL-SCALE WATER RESOURCES DEVELOPMENT AND MANAGEMENT NGO EXPERIENCES" December, 1994
- 6) Kenichi Nakagami, "Developing Environmentally Sound and Sustainable Cities", RITSUMEIKAN UNIVERSITY IRCED Working Paper Series, No.4, June, 1997
- 7) OECD, "ENVIRONMENTAL POLICIES IN JAPAN", OECD, 1977
- 8) World Bank (1995), *ibid.*
- 9) Pollution Control Division, National Environmental Agency, Vietnam, "Urban Solid Waste Management in Viet Nam -Executive Summary-", July, 14, 1997
- 10) Le Tac Can "DEVELOPMENT OF ENVIRONMENTAL IMPACT ASSESSMENT IN VIETNAM ", "ENVIRONMENTAL PROTECTION AND SUSTAINABLE DEVELOPMENT", Proceeding of the National Seminar on Environmental Protection and Sustainable Development Research, October, 1993
- 11) Nguyen Hong Thao, Consultant of ERM Programme, "VIETNAMESE ENVIRONMENTAL LAWS AND STATUTES" 1997

- 12) Le Tac Can (1993), *ibid.*
- 13) PCD, NEA (1997), *ibid.*
- 14) Nguen Viet Pho, Vu Van Tuan, "EVALUATION, MANAGEMENT AND PROTECTION OF CLIMATE AND WATER RESOURCES IN VIETNAM", International Hydrological Programme Vietnam National Committee, UNEP, 1994
- 15) Lawrence Egan and Rudi Kohnert and NGO Water Resources Sectoral Group (1994) *ibid.*
- 16) MOSTE, "RED RIVER DELTA MASTER PLAN VOLUME 1 SUMMARY", MOSTE, June 1995
- 17) Chu Ai Luong, "THE INTRODUCTION OF THE RED RIVER DELTA MASTER PLAN", SCIENTIFIC WORKSHOP ON THE ECONOMIC DEVELOPMENT AND ENVIRONMENTAL PROTECTION OF THE RED RIVER-NGUYEN RIVER BASIN, March, 1998
- 18) Le Dinh Thuy, "SOME PRELIMINARY ASSESSMENT THE IMPACTS OF SOCIO-ECONOMIC DEVELOPMENT ACTIVITIES ON THE FAUNA AND ENVIRONMENT OF THE COASTAL ECOSYSTEM IN RED RIVER ESTUARINE ZONE", SCIENTIFIC WORKSHOP ON THE ECONOMIC DEVELOPMENT AND ENVIRONMENTAL PROTECTION OF THE RED RIVER-NGUYEN RIVER BASIN, March, 1998
- 19) Kenichi Nakagami (1997), *ibid.*
- 20) Kenichi Nakagami (1998), *ibid.*

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