2.6 Water Resources

Water resource includes surface and ground water. The total amount of surface water running through Vietnam's land toward the sea is 880 billion m^3/year, including the 550 billion m^3 of water from neighboring countries, as indicated in Table 2.6.1.

Table 2.6.1
Mean Annual Water Discharge

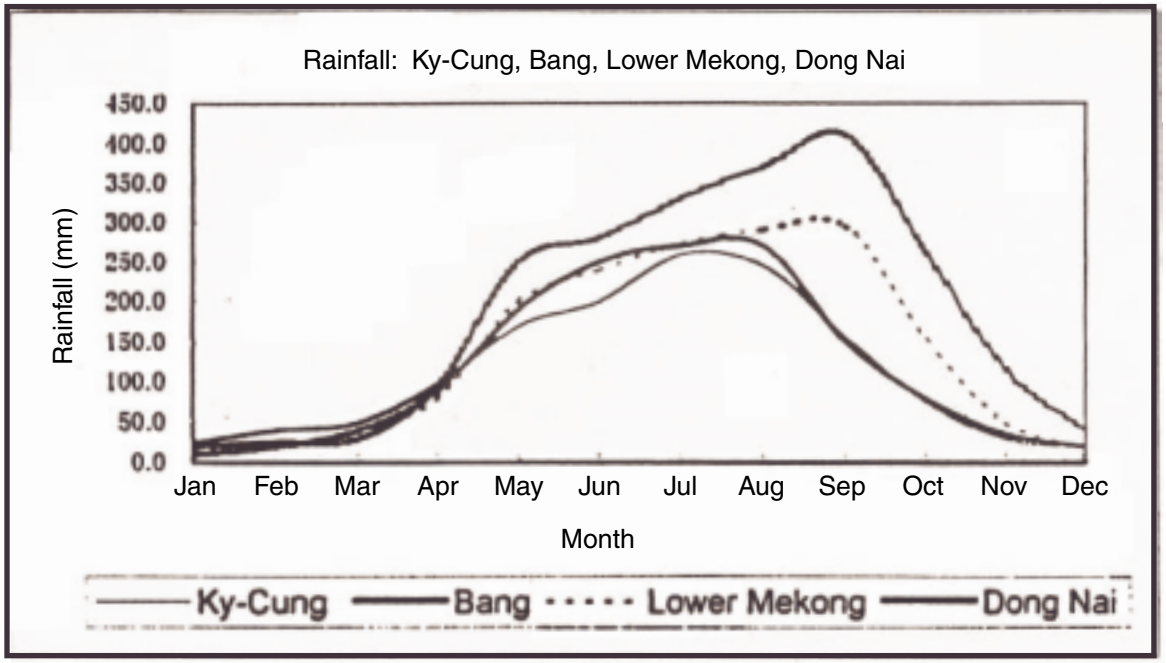
No.	River Basin	Generated in VN		Total Discharge	
		Billion Ton	% of Basin Total	Billion Ton	% of VN
1	Bang-Ky Cung	7.2	81	8.2	1.0
2	Tien Yen	---	100	---	---
3/4	Red/Thai Binh	92.9	68	137.0	15.6
5	Ma	15.8	78	20.1	2.3
6	Muc	---	100	---	---
7	Ca	19.4	80	24.2	2.7
8	Gianh/Tri/Huong	17.0	100	17.0	1.9
9	Thu Bon	19.3	100	19.3	2.2
10	Tra Khuc	6.6	100	6.6	0.8
11	Ba	10.4	100	10.4	1.2
12	Cai-Luy	---	100	---	---
13	Dong Nai	29.2	95	30.6	3.5
	Mekong	50.5	10	520.6	59.2
14	(Mekong delta)	(20.6)	100	n.a.	n.a.
15	(Srepok-Mekong)	(13.9)	100	n.a.	n.a.
16	(Upper Mekong)	(16.0)	100	n.a.	n.a.
	Others	85.28	100	85.28	9.7
	Average	353.5	40	880.0	100.0

Source: Modified from "Assessment of Water Resources and Water Uses in Vietnam" NHS/IHP,1992

The distribution of water resource is highly variable due to unevenly distributed monsoon rainfall. High rainfall variation, combined with limited storage facilities and flood control infrastructure account for two features of water resources: devastating flood in the rainy season and extreme low flow in the dry season.

Seasonal variations in discharge from rivers follow those of rainfall, with small time lag. Figure 2.6.1and 2.6.2 illustrate the monthly rainfall patterns in several river basins and the close correlation between the rainfall distribution and that of runoff. Seasonal variation is the leading factor causing flood and water shortage. About 70-75% of the annual total runoff is generated within three to four months, 20-30% in one peak month and 1-2% in one off-peak month as indicated the Table 2.6.2.

Figure 2.6.1
Monthly Rainfall Distribution in Selected River Basins



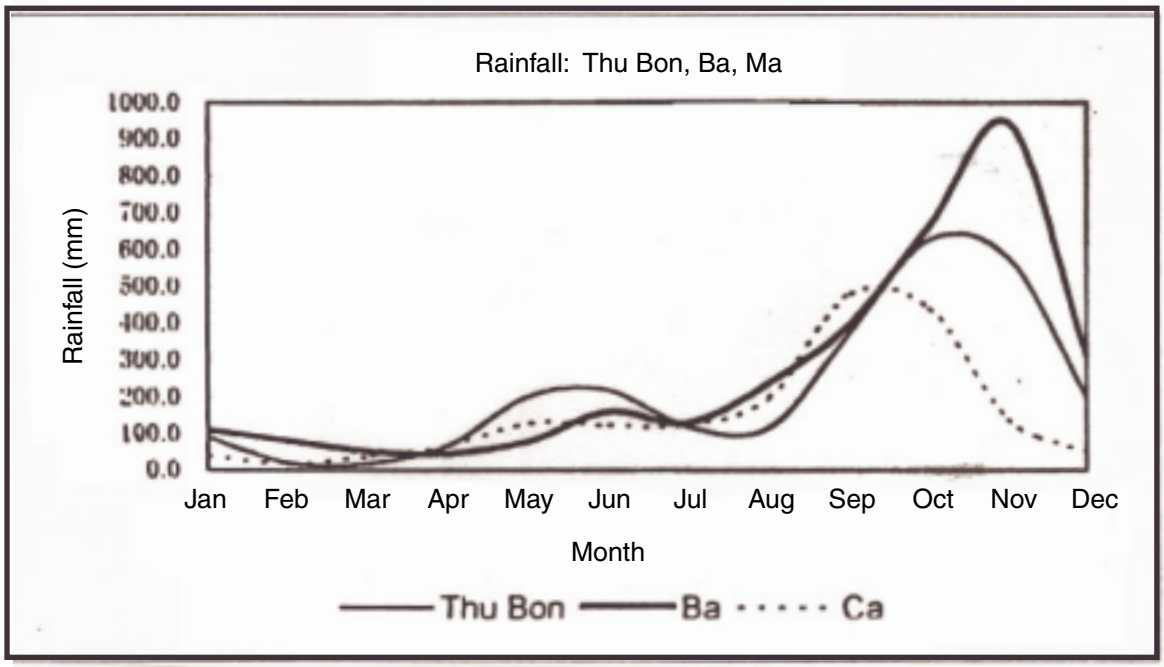
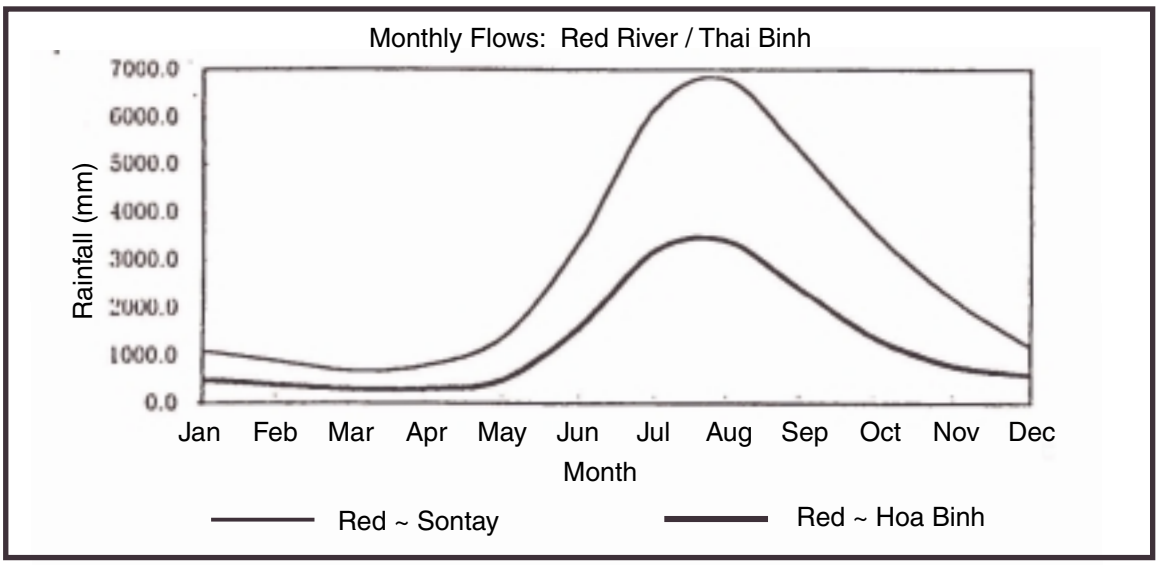
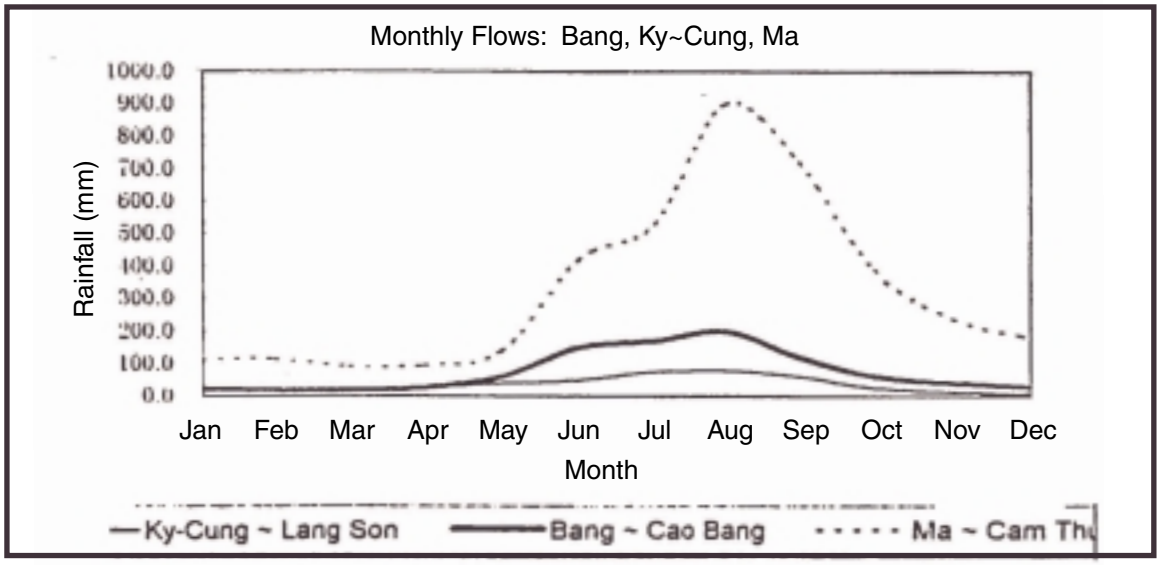


Figure 2.6.2
Patterns of Monthly Discharge





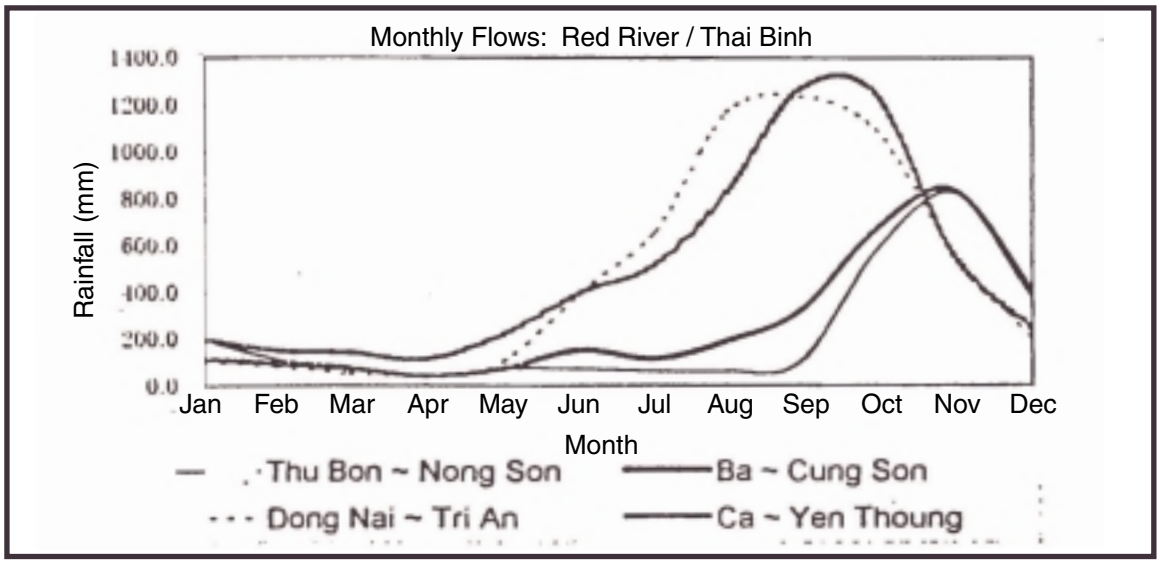


Table 2.6.2
Maximum/minimum Monthly Discharge

No.	River Basin	Monthly Discharge (Million tons)				
		Maximum	Minimum	Driest month	Max./yr (%)	Min./yr (%)
1	Bang-Ky Cung	2,030	175	Feb.	22.8	2.0
2	Tien Yen	---	---	---	---	---
3/4	Red/Thai Binh	24,600	2,420	Feb/March	18.0	1.8
5	Ma	4,190	448	March	20.8	2.2
6	Muc	---	---	---	---	---
7	Ca	5,360	526	March	22.1	2.2
8	Gianh/Tri/Huong	6,350	760	April	37.3	4.5
9	Thu Bon	5,750	122	April	29.8	0.6
10	Tra Khuc	1,830	96	April	27.6	1.4
11	Ba	2,630	291	April	25.4	2.8
12	Cai-Luy	---	---	---	---	---
13	Dong Nai	3,890	145	March	12.7	0.5
	Mekong				18.3	1.2
14	(Mekong delta)	91,800	6,175	April	---	---
15	(Srepok-Mekong)	3,490	86	April	---	----

Source: Modified from "The Sector Review Study for the Water Resources Development" MWR/NK Co. Ltd., 1992

High content of mud, sand and nutrition is the typical characteristic of river and stream flows in Vietnam.

Some 400 medium-size and large man-made reservoirs (dams) have been built that can contain 23.1 billion m^3 of water for irrigating 0.5 million ha of field and generating electricity of 3,500 megawatt (MW).

According to assessment by geologists, the total supply in ground water reservoirs is very huge. Ground water flow reaches 1,513 m^3/s. Reservoirs are equally capable of supplying water to support production and daily life. Vietnam also has plenty of mineral water sources and hot springs, some of which have been exploited.

The quality of water however is diminishing. Most rivers and lakes near large industrial zones and dwelling areas are suffering from serious pollution, especially in Hanoi and Ho Chi Minh City.

2.7 Marine Resources

Vietnam's territory covers a large part of the sea with an immense continental shelf, a coastline 3,260 km long and two 100-m deep gulfs of Thailand in the south and Tonkin in the north. Its islands are many with the largest being Cat Ba, Phu Quoc and Phu Quy. It also claims ownership over the group of

outlying islands of Paracel and Spratly, the latter being claimed wholly or in part by other countries like China, Malaysia and the Philippines.

Typical biosystems like sand, dunes, marshes, estuaries, mangroves, coral reefs, and rock cliffs are mostly found along the coast and lagoons. Ha Long bay, including Bai Tu Long, Lan Ha, and thousand of small islands, is one of the world's cultural heritage sites and a tourist center.

Its coral reefs are rich with a remarkable number of species. As fish haven, coastline protection and tourist site, Vietnam's coral reefs are distributed from north to south, becoming more extensive, structured and diverse in the south.

There are three kinds of river mouths along the coast -- estuaries, deltas and lagoon river mouths. They are most numerous in the north from Mong Cai to Thanh Hoa and in the south from Vung Tau to Ha Tien and found at an average of every 20 km along the coastline as indicated in Figure 2.7.1.

Typical coastal lagoons occupy 5% of coastline and are in the central region from Hue to Phan Rang (Ninh Thuan), where sand is abundant and tidal range is small (0.5-2.5m). These lagoons, 280-21,600 ha in area, are enclosed by 2-25-m high sand barriers or dunes, and are connected to the sea through narrow inlets, which often vary in width and position according to season. Coastal lagoons are productive ecosystems due to their high nutrient levels, which exceed those of the sea, even in dry season. Fish, shrimps and mollusks are abundant here.

The country's total area of tidal marsh covers about 300,000 ha, 70% of which has mangroves, with nearly 100 species, and sea grass. They are mainly distributed along the northern coast from Mong Cai in Quang Ninh to Thanh Hoa Province and in the south from Vung Tau to Kien Giang (see Table 2.7.1). In the central region, there are few tidal marshes. Nonvegetated tidal marshes are mainly found in the Red River and Mekong Delta, extending seaward from large mangrove stands.

Mangrove forests play an important role in coastal protection, land reclamation and as nursery for a large number of marine species. Along the coast they buffet the impact of waves, slow down erosion and provide a natural dike. They are also suitable habitats for marine resources, including species with a high commercial value such as *penaeid spp.* shrimp and the mangrove crab, *scylla serrata*. As mangrove density increases, so do fish and shellfish production in mangroves and adjacent waters.

Figure 2.7.1 Coastal Ecosystem of Vietnam

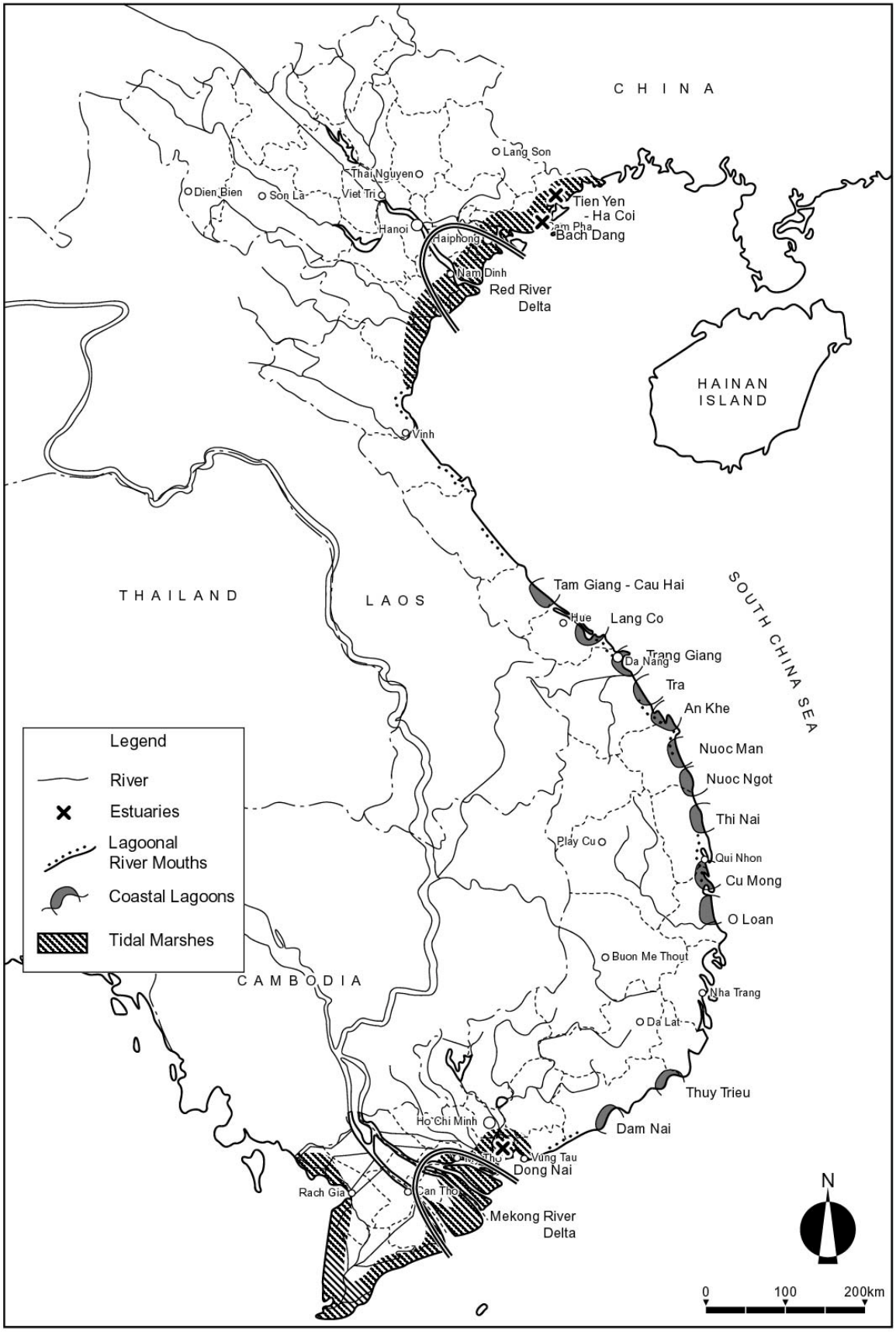


Table 2.7.1
National Distribution of Tidal Marsh and Mangrove

Region	Area (Ha)		
	Tidal Marsh	Natural Mangrove	Replanted Mangrove
Mong Cai – Thanh Hoa	74,520	46,400	4,200
Tanh Hoa – Vung Tau	18,000	14,300	
Vung Tau – Kien Giang	207,480	191,800	42,450

Source: "Biodiversity Action Plan for Vietnam" GSRV/GEFP, 1994

Over 60 species of fish, 146 of mollusks, 107 of crustaceans and many water birds and mammals inhabit tidal marshes. These area are also economically vital as they provide the spawning ground and nursery for numerous fish, prawns and mollusks. Table 2.7.2 compares the biodiversity of six important tidal marshes.

Table 2.7.2
Biodiversity Comparisons of Six Important Tidal Marshes

No. of Species	Duyen Hai	Ca Mau	Xuan Thuy	Tien Lang	Yen Hung	Tien Yen Ha Coi
Mangrove	105	46	8	6-7	45	23
Mollusk	55	52	38	26	30	24
Crustacean	19	30	30	28	32	30
Birds	33	50	40	23	32	36

Sources: "Biodiversity Action Plan for Vietnam" GSRV/GEFP, 1994

The environmental problems faced by lagoons include resource overexploitation, land reclamation for agriculture and aquaculture and water pollution. Most have been exploited in varying degrees to culture seaweed, fish and shrimp using traditional and extensive farming methods. The sandy soil however limits the potential for aquaculture.

2.8 Biodiversity and Ecosystem

Endowed with a diverse terrain, including submerged deltas, Karot limestone, long coast, high mountains, highland, wetland and large basins, Vietnam has many ecosystems: seven terrestrial and 16 aquatic. It has 12,000 plant species, 273 animal species, 1,000 bird species, 180 reptile species, 500 species of freshwater fish, 2,000 species of saltwater fish and several thousand species of animals without backbone.

Vietnam's Red Book lists 365 animal and 356 plant species that need protection. Table 2.8.1 lists the number of endangered, vulnerable, threatened, and rare species by major animal group. These lists are incomplete in

particular for insects which so far merit only three inclusions. The number of species included for most groups do however raise concern. The total number of threatened species is quite high for a single country and reflects the seriousness of the threats to wild habitats in Vietnam. Of the 150 species and subspecies of fish and invertebrates listed in the Red Book, 83 are marine including 37 fish and 46 corals, mollusk, crustacean and echinoderm. There are also some 40 species of rare and endangered fresh and brackish water fish.

Table 2.8.1
Red Book Categories (Animal species) in Vietnam

Category	Endangered	Vulnerable	Threatened	Rare	Undeter-mined
Mammals	30	23	1	24	
Birds	14	6	32	31	
Reptiles/Amphibian	8	19	16	11	
Fish	6	24	13	29	3
Invertebrates	10	24	9	29	3
TOTAL	68	97	71	124	6

2.9 National Park, Nature Reserve and Historical, Environmental Reserve

National parks are protected areas that provide immense value to nature conservation, research, cultural heritage, and tourism. They should be located within a strictly protected area where all activities are prohibited. Within this protected area are a rehabilitation zone for regenerating forest plants and animals under threat of extinction and a recreational zone for showcasing to visitors the park's beautiful landscapes and inhabitants. National parks should be surrounded by buffer zones where restricted production activities are monitored by the park management board.

Nature reserves are protected areas meant to conserve plant and animal species. Here, research is acceptable while tourism and recreation are not encouraged.

Culturally and environmentally protected areas contain historical and cultural monuments and items with aesthetic or environmental value and tourism and recreation potential.

The Council of Ministers promulgated Decision No 194/CT dated 9 August 1986 setting up 73 protected areas and extended these to 87 in 1993 as indicated in Table 2.9.1 and Figure 2.9.1.

Figure 2.9.1 National Park, Nature Reserve, World Heritage and Cultural, Historical and Environmental Reserve

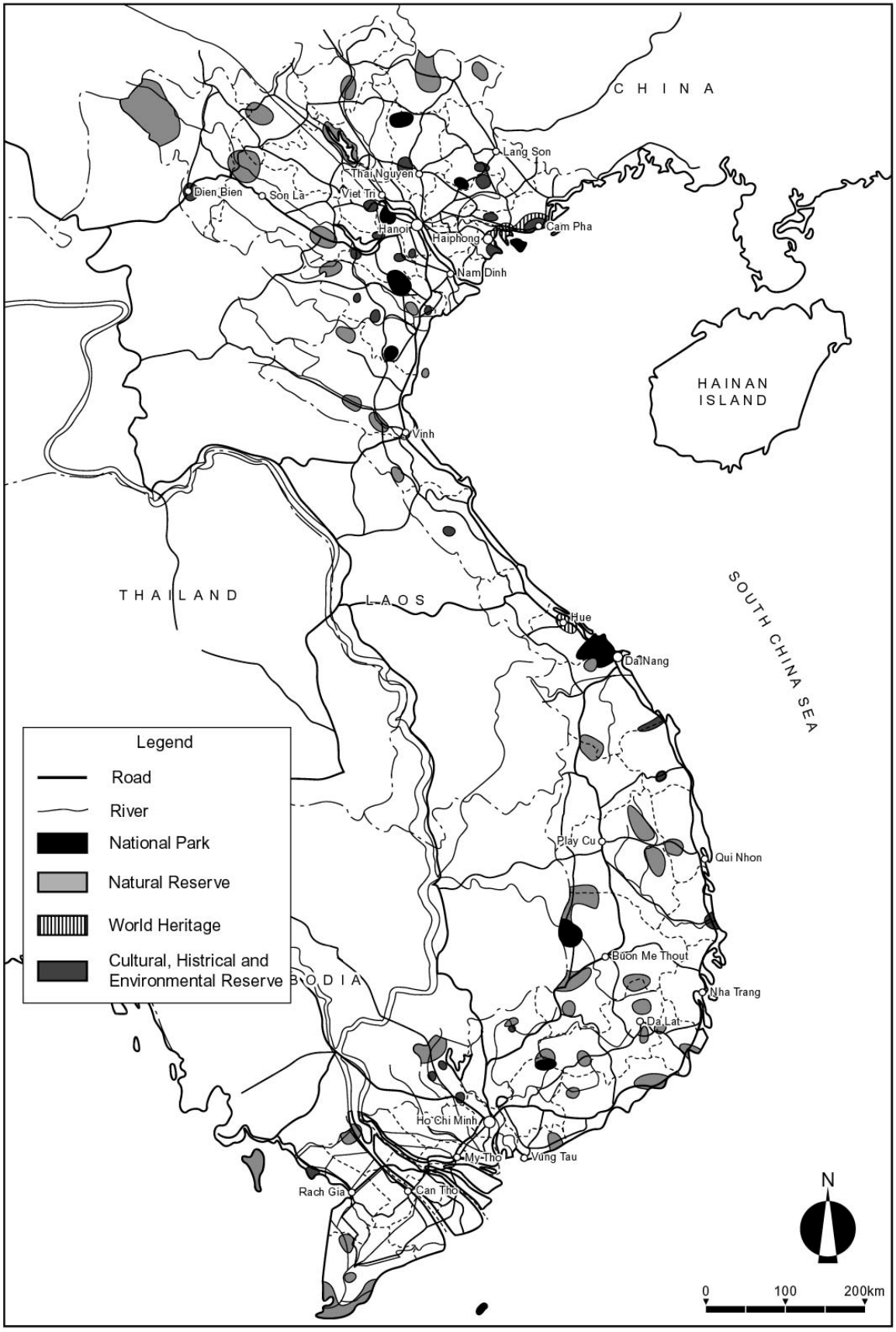


Table 2.9.1
List of Protected Areas in Vietnam: Cher

No	Name of Protected Areas	Characteristic of Resources	Area(ha)
1	Ai Chi Lang	Historical Relic	1,000
2	Ba To	Historical Relic	500
3	Bac Son	Historical Relic	4,000
4	Bai Chay	Environment and Tourist Service	582
5	Son Tra Peninsula	Environment and Historical Relic	4,000
6	Ha Long Bay islands	Tourist and Recreation	1,000
7	Boi Loi Base	Historical Relic	2,000
8	Huong Tich Pagoda	Historical-Cultural Relic	500
9	Con Son	Historical Relic	282
10	Da Reservoir island	Environment and Tourist Service	3,000
11	Ca pass-Hon Ron	Environment and Tourist Service	10,000
12	Ba Trieu Temple	Historical Relic	300
13	Hung Vuong Temple	Historical Relic	285
14	Do Son	Environment and Tourist Service	267
15	Phong Nha Grotto	Environment and Tourist Service	5,000
16	Duong Minh Chau	Historical Relic	5,000
17	Da Lak lake	Environment and Tourist Service	10,000
18	Ho Nui Coc	Environment and Tourist Service	6,000
19	Hon Chong	Environment and Tourist Service	3,000
20	Lam Son	Environment and Tourist Service	300
21	Muong Phang	Environment and Tourist Service	1,000
22	Ngoc Trao	Historical Relic	300
23	Ngu Hanh Son	Environment and Cultural Relic	400
24	Ba Den Mountain	Historical Relic	2,000
25	Bara Mountain	Environment and Cultural Relic	940
26	Tham Dao Mountain	Environment and Tourist Service	19,000
27	Thanh Mountain	Historical Relic	1,500
28	Pac Po	Historical Relic	3,000
29	Tan Trao	Historical Relic	1,081
	TOTAL		86,237

Table 2.9.2
List of National Parks in Vietnam

No	Name of Protected Areas	Characteristics of Resources	Area
1	Ba Be	Mountain forest, Trachypithecus francoisi, Phinopithecus avunculus	5,000
2	Ba Vi	Forest close to the capital, Spotted deer,bear	2,144
3	Bach Ma- Hai Van	Forest streches down to the sea, Pygathrix nemaeus, Gibbon, Cynocephalus variegatusi, Phasianus clochicus,Lophura sp.	40,000
4	Cat Ba	On-island limestone carst forest, Trachypithecus francoisi poliocephalus, Chamois, Eretmochelys imbricata	27,700
5	Con Dao	On-inland forest, Bubalus bubalis, Ratufa bicolor condorensis, Eretmochelys imbrica	6,043
6	Cuc Phuong	Evergreen-rain forest, Trachypithecus francoisi delacouri, Flying squirrel	25,000
7	Southern Bai Cat Tien	Deciduous broad-laeved forest, Rhinoceros sondaicus, Elephas maximus, Pygathrix nemaeus	36,000
8	Yokdon	Dry dipterocarp forest, Bos sauvely, Bos gaurus, Babulus babulis, Cervus porcinus, Crocodilus siamensis	57,500
	TOTAL		199,887ha

Table 2.9.3
List of Protected Areas in Vietnam: Nature Reserves

No	Name of Protected Areas	Characteristics of Resources	Area
1	Anh Son	Evergreen Tropical Forest, Hylobates concolor Leucogenis	1,500
2	Ba Mun	On-island forest for rehabilitation of mammals, Rhesus monkey, Macaca arctoides	1,800
3	Ba Na Chua Mountain	Tropical rain forest, Pygathrix nemaeus, Gibbon, Monkey	5,217
4	Ben En	Watershed forest, Elephant, Bear	12,000
5	Binh Chau Phuoc Buu	Coastline deciduous forest, Bos gaurus	5,474
6	Bu Gia Map	Dipterocarp forest, Rhinoceros sondaicus, Bos gaurus, Gibbon, Pygathrix nemaeus	16,000
7	Bu Huong(Que Phong)	Fokiena hodoginsis and cuminghamia sinensis	5,000
8	Chiem Hoa Na Hang	Watershed forest, Rhinopithecus avunculus, Macaca assamensis	20,000
9	Chu Yang Sinh	High mountain forest, Pinus krempfii, Gibbon, Pygathrix nemaeus, Rhinoceros sondaicus	20,000
10	Cu Lao Cham	On-island forest, Monkey, Swallws	1,535
11	Ngoan Muc Pass	Steep-slope forest, Pinus krempfii	2,000
12	Phu Quoc island	On-island forest, Hylobates lar, Callosciurus finlaysoni	5,000
13	Nam Can Rhizophora	Mongrove forest, Long-tail monkey, Aquatic products, Bird sanctuaries	4,000
14	Hon Me	On-island forest	500
15	Huu Lien	Limestone carst forest, Moschus berezovski, Hylobates concolor	3,000
16	Kalon Song Mao	Dipterocarp forest, Cervus porcinus, Long-tail monky	2,000
17	Thac Ba islands	Animal rearing islands	5,000
18	Kon Ka Kinh	Wet mountain forest, Flying squirrel, Gibbon	28,000
19	Kon Cha Rang	Podocarpus imbricatus forest, Rheinartia ocellatta, Lophura nycthemera, Gibbon, Flying squirrel, Wolf	16,000
20	Lang Bian plateau	High mountain forest, Pinus krempfii, Flying squirrel, Pygathrix nemaeus, Gibbon	4,000

Table 2.9.3 cont'd

No	Name of Protected Areas	Characteristics of Resources	Area
21	Lo Go Samat	Deciduous forest Affected by chemicals, Pygathrix nemaeus, Monkey	10,000
22	Mom Rey	Border mixed forest, Elephants, Bos sauvely, Pygathrix nemaeus	45,000
23	Muong Cha	Subtropical border forest, Elephants, Bos gaurus, Rhesus monkey	182,000
24	Nam don	Forest completely gone out	18,000
25	Nam Lung (Dac Min)	Broad-leaved forest, Bos gaunus, Bubalus bubalis, Elephants	20,000
26	Ngoc Linh	High mountain forest, Special Ngoc Linh Ginteng, Flying squirrels, Pygathrix nemaeus	20,000
27	Ba Mountain	Pinus krempfii, Flying squirrels, Pygathrix nemaeus	6,000
28	Cam Mountain	Deciduous forest in delta area	1,500
29	Dai Binh Mountain	High-mountain forest, Pygathrix nemaeus, Rhinoceros sondaicus, Gibbon	5,000
30	Hoang Lien Mountain	Subtropical forest, High mountain, Forkienia hodginsii, Petaurista elegans, Gibbons, Macaca arctoides	5,000
31	Pia Hoac Mountain	Lime-stone carst mountain forest, Trachypithecus francoisi, Capricornis sumatraensis, Rhinopithecus	10,000
32	Yen Tu Mountain	avunclus	5,000
33	Paco-Hangkia	Mixed forest, Bear, Capricornis sumatraensis	1,000
34	Quang Xuyen	Lime-stone carst forest, Flying squirrels, Trachipithecus phayrei crepusculus, Bears	20,000
35	Phan Rang Dry forest	Deciduous forest, Elephant, Bubalus bubalis, Monkeys, Trachypithecus sp.	1,000
36	Sop Cop	Dry forest, Sand-dune animals	5,000
37	Suoi Trai (Tay Son)	Mountain forest, Elephants, Bos gaurus, Gibbons, Bears, Lophura sp.	19,000
		Deciduous forest, Cervus eldi, Cervus porcinus, Crocodylus sp.	

Table 2.9.3cont'd

No	Name of Protected Areas	Characteristics of Resources	Area
38	Tam Quy	Pure Madhuca pasquieria forest	350
39	Tanh Linh	High mountain forest, Pavo muyicus imperator, Lophura sp.	2,000
40	Western Bai Cat Tien	Mixed forest, Elephants, Rhinoceros sondaicus, Bos gaurus, Trachypithecus sp.	10,000
41	Thanh Thuy	Evergreen forest, Elephants, Bos gaurus, Cynocephalus variegatus	7,000
42	Upper Da Nhim	High mountain forest, Pinus krempfii, Monkey, Gibbons	7,000
43	Thuong Tien	Wet tropical forest, Gibbons, Manis pentadactyla, Trachipithecus phayrei crepusculus	1,500
44	Tieu Teo Easup	Dry Dipterocarp forest, Elephants, Bos gaurus, Bubalus bubalis, Pavo sp., Lophura sp.	20,000
45	Tram Chim	Melaleca forest, Grus antigone sharpii, Xenorhynchus asiaticus	5,500
46	Trung Khanh	Limestone carst forest, Moschus berezovski, Capricornis sumatraensis, Flying squirrels	3,000
47	U Minh	Rhizophora forest, Long-tail monkeys, Mangrove wildlife	2,000
48	Vu Quang	Watershed forest, Saola, Gibbons, Cynocephalus variegatus	16,000
49	Xuan Nha	Border forest, Elephants, Bos gaurus, Petaurista elegans	60,000
50	Xuan Son	Limestone carst forest, Trachypithecus franscoisi, Gibbons, Macaca actoides	4,585
	TOTAL		70,467

2.10 Environment in Urban Areas and Industrial Zones

Although urbanization and industrialization in Vietnam remain low with only two towns having more than 1 million population each, the environment in cities and industrial zones is already suffering. In future should there be no adequate countermeasures to reverse the situation and with the forecast rapid growth in urbanization and industrialization, the environment will turn even worse.

These are the cities of Hanoi, Ho Chi Minh City, Haiphong, and Danang, and the industrial zones of Lao Cai (appetite mine), Lam Thao (basic chemicals, fertilizers, paper, and battery factories), Viet Tri (electric plant and paper, textile and basic chemicals factories), Thai Nguyen (steel plant), Bac Giang (nitrogen fertilizer factory), Quang Ninh (coal mine), Pha Lai (thermoelectric plant), Bien Hoa (machinery, food processing, battery, chemical and metallurgical plants), and Vung Tau (oil mine and gas plant).

Water contamination is the most serious. Water in Hanoi, Ho Chi Minh City and Haiphong is highly polluted. Wastewater from factories and residential areas discharge directly to water bodies (river, lake and sea) as Vietnam has no wastewater treatment plant. In the rainy season, the cities' drainage systems are overloaded, flooding the cities with a mixture of wastewater and rainwater.

Solid waste in cities is another pollutant. Two pilot factories were built in Hanoi and Ho Chi Minh City for composting but their capacities are very small.

Air (dust and toxic gas) and noise pollution are very common in urban areas and industrial zones where the rate of motorization has increased. Besides, vehicle emission which mainly causes air pollution, Vietnamese cities, like Hanoi and Ho Chi Minh, are faced with many transport problems that contribute significantly to the degradation of air quality, to wit:

1) Inspection and maintenance system of vehicles are not satisfactory.
2) There is no traffic control system to ensure a smooth traffic flow and the traffic signal system is not complete.
3) Traffic congestion occurs frequently due to the rapid increase of motorbikes.
4) Mass transit system is poor and inadequate.
5) Roads cannot accommodate actual traffic flow.
6) Transport terminals function poorly.
7) There is no comprehensive urban transport system.

2.11 Environmentin Rural Areas

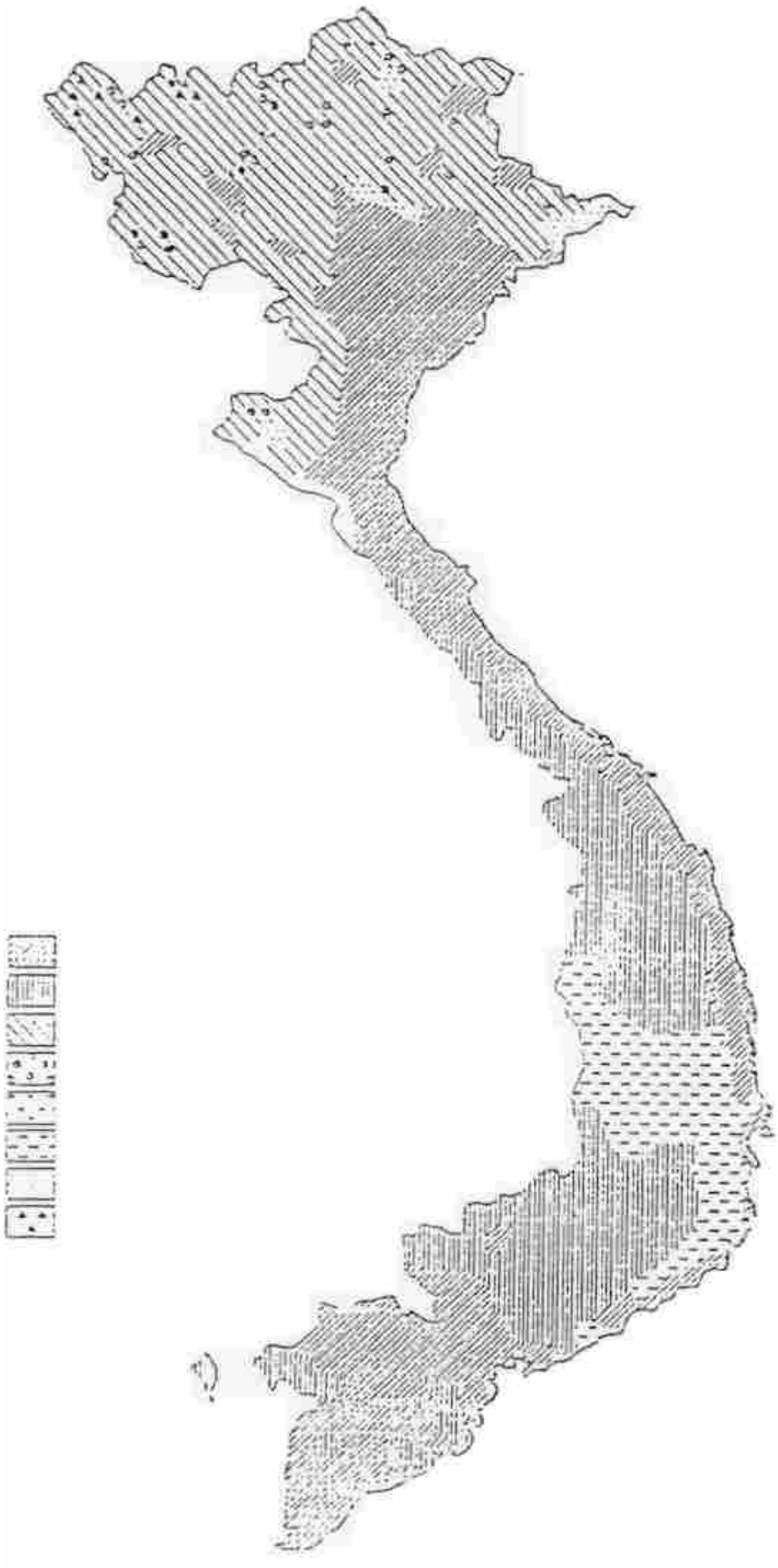
A majority of the population (approx. 80%) lives in rural areas. About 89% of this is made up of Kinh lowland Vietnamese and Muong people who occupy the two great agricultural deltas and the narrow coastal strip (see Figure 2.11.1). The remaining 11% of the population is made up of more than 50 different cultural communities living in communes in the mountains.

Almost all of these communes are isolated; only narrow foot trails connect them. To upgrade the lives of these groups it is necessary to improve rural roads between main roads (provincial and national roads) and commune roads to at least allow small trucks to pass.

Another threat to the environment is the number of new "economic zones" being established in the heart of the country, seriously affecting some of the most critical areas in Vietnam. The frequent use of forest fires to clear forests for resettlement has greatly reduced the evergreen forest cover of lower mountains.

Then too the rural population has recently faced a serious problem: Potable water supply can only be available to 30% of the people. Sanitation is likewise very poor too, especially in the Mekong River delta. Highly infectious diseases frequently and continuously occur.

Figure 2.11.1
Distribution of Cultural Communities in Vietnam



3 INSTITUTIONAL FRAMEWORK FOR ENVIRONMENTAL PROTECTION

3.1 Laws and Regulations on Environmental Protection

Pursuant to Article 29 and 84 of the 1992 Constitution of the Socialist Republic of Vietnam, providing for the protection of the environment, the National Law on the Protection of the Environment was enacted in December 1993. To implement this law, Government Decree 175/CP was released in October 1994. The objective of the law is to raise the effectiveness of state management and define the responsibilities of government in all levels, of state agencies, of socio-economic organizations, of units of the Force, and of all individuals in protecting the environment and using its resources in a sustainable manner.

Following are the related laws, instructions, directives, and others documents that promote environmental protection and conservation:

1) Government Decree on providing guidance for the implementation of the law on environmental protection (No.175/CP)
2) Guidelines on preparing and appraising the environmental impact assessment (EIA) report of foreign direct investment projects (No. 715/QD/MTG)
3) Instructions on environmental planning and assessment of environmental impacts on businesses and foreign direct investment projects (Interministerial Circular No. 155/TTLB)
4) Introduction of the EIA process to operating units (No. 1420/QD/MTG)
5) Decision of the Minister of the Ministry of Science, Technology and Environment (MOSTE) on the promulgation of regulations, the organization of the Appraisal Council on EIA and on the issuance of environmental permits (No. 1806/QD/MTG)
6) Regulation on the organization of the Appraisal Council on EIA Report and issuance of environmental permits (No. 1807/QD/MTG)
7) Instructions on the preparation and appraisal of EIA report of an investment project (No. 1100/TT/MTG)
8) Guidelines on pollution control for production and trading units after EIA appraisal (Circular No. 276/TT/MTG:6/5/1997)
9) Decision of the Prime Minister approving the action program on biodiversity protection in Vietnam (No. 845/TTG:22/12/1995)
10) Directive No. 359/TTG (29/5/1996) on urgent measures to be taken to protect wild animals
11) Decision making public the sanctions for violating environmental protection laws (No. 1118/QD:28/5/1996)
12) Decision of the MOSTE Minister (No. 2920/DQ/MTG dated 21 December 1996) on the application of the Vietnam National Environmental Standards
13) Guidelines on the implementation of Clause 2, Article 71 of the regulation on Road Safety and Urban Traffic Safety

Other legal documents concerning environmental protection are as follows:

- Law on Maritime Navigation
- Land Law
- Law on Forest Development and Preservation
- Law on Water Resources
- Regulation on Road Safety Urban Traffic Safety
- Ordinance on the Protection of Aquatic Resources

3.2 Environmental Administration

According to the law, the MOSTE is responsible for the management of the nationwide and integrated environmental protection program and for the organization and direction of its activities.

The MOSTE coordinates at the ministerial level according to the scope of its responsibilities and duties and in accordance with the provisions of the National Law on Environmental Protection. At a lower level, the Department of Science, Technology and Environment (DOSTE) under the People's Committee of each province supports the MOSTE in carrying out its tasks.

3.3 Environmental Impact Assessment

The National Law on Environmental Protection stipulates the submission of an EIA report of existing and new socio-economic activities.

Organizations and individuals constructing and/or renovating production areas, population centers or economic, scientific, technical, health, cultural, social, security, and defense facilities; owners of foreign investment or joint venture projects; and owners of other socio-economic development projects shall submit an EIA report to the MOSTE for appraisal.

The result of the appraisal shall be one of the bases for authorities to approve the projects or authorize their implementation. Government will stipulate in detail the formats for the preparation and appraisal of EIA reports and will issue specific regulations with regard to special security and defense establishments.

The National Assembly will consider and make decisions on projects with major environmental impacts. The standing committee of the National Assembly will determine a schedule of such types of projects.

Organizations and individuals in charge of the management of economic activities, which began operation prior to the promulgation of this law, are also obliged to submit an EIA report of their respective establishments for appraisal by the MOSTE. Moreover, the utilization and exploitation of national parks,

natural reservation areas, areas of historical and cultural value, and natural sceneries shall be permitted by the management body of the concerned branch.

3.4 Conditions for EIA

EIA Instruction No. 1100/TT/MTG groups projects according to their need for an EIA. These projects either (1) need no EIA, (2) need two-step EIA or (3) need to present an environmental analysis in feasibility report. Projects falling under the second group are required to carry out an EIA study.

In addition, the Instruction provides for the decentralization of EIA report appraisal (see. Table 3.4.1). The MOSTE will be responsible for projects with an investment cost exceeding VND 200 billion. For projects with a lower investment cost, the responsibility falls on the DOSTE.

Table 3.4.1
Decentralization of EIA Report Appraisal

Operating Projects and Enterprises	MOSTE	DOSTE
Railway, motorway with grade 1,2,3	Over 50 kms	Rest
Resettlement area	Over 500 households	Rest

3.5 Procedure for EIA Appraisal

Together with the MOSTE, a project proponent shall prepare an environmental agreement consisting of study contents, after which they will commence with the preliminary EIA study in conjunction with the feasibility study. After receiving the investment license from the Ministry of Planning and Investment (MPI), a full EIA study shall be carried out following the same procedure as the preliminary EIA. An Appraisal Council hired by the MOSTE shall appraise the study result and issue an Environmental Appraisal License to the proponent.

The composition of the Appraisal Council will include scientists, officials and possibly, representatives of social organizations and citizens. The number of Council members will not exceed nine.

The duration of EIA appraisal and assessment will not be longer than two months from the date all related documents are received.

3.6 Imposition of Penalties

In case of failure to meet environmental standards, the MOSTE will give the proponent a period to take remedial measures. If the proponent still fails to meet the requirements of the MOSTE, the latter will report the results to the next higher state authority which will decide on the penalties for the proponent.

3.7 Environmental Standards

In June 1995, Vietnam formally established the environmental standards for atmosphere, soil, water, noise, and vibration to serve as a basis for the management of the environment.

3.7.1 Air

1) Air Quality Standard

The standard values of basic substances in ambient air quality are not stringent values compared with Japanese standards, except for CO. The value for NO_2, SO_2 and SPM are almost double the values for Japan.

These standards regulate critical limit of basic parameters (including suspending dust, CO, NO_2, SO_2, O_3 and lead) in ambient air. These standards assess ambient air quality and the status of air pollution (see Table 3.7.1).

Table 3.7.1
Ambient Air Quality Standards

(mg/m^3)

No.	Substance	Average (1 h)	Average (8 h)	Average (24 h)
1	CO	40	10	5 (4.3 ppm)
2	NO_2	0.4	-	0.1 (0.05 ppm)
3	SO_2	0.5	-	0.3 (0.11 ppm)
4	Pb		-	0 .005
5	O_3	0.2	-	0.06
6	SPM	0.3	-	0.2

Source: MOSTE, VIETNAM TCVN 5937/1995
Note: The sampling method and analysis to determine the parameter values was regulated in the corresponding TCVN (Vietnamese Standard), CO: carbon monoxide, NO_2: nitrogen dioxide, SO_2: sulfur dioxide, Pb: lead, O_3: ozone, SPM: suspended particulate matter.

These standards regulate the maximum allowable concentration of hazardous substances in ambient air including organic and inorganic substances generated by human activities (see Table 3.7.2). These standards are used to assess the level of air quality and to determine the

nature of supervision required to control or minimize ambient air pollution. These standards shall not be applicable to air in the area of industrial production facilities.

Table 3.7.2

Maximum Allowable Concentration of Hazardous Substance in Ambient Air

(mg/m^3)

No	Name of Substance	Chemical Formula	Average Level (24 h)	Maximum (1 h)
1	Acrylonitri	CH_2=CHCN	0.2	-
2	Amoniac	NH_3	0.2	0.2
3	Anlin	$C_6H_5NH_2$	0.03	0.05
4	Anhydric vanadic	V_2O_5	0.002	0.05
5	Asen	As	0.003	-
6	Asen hydrua (Asin)	AsH_3	0.002	-
7	Acid axetic	CH_3COOH	0.06	0.2
8	Acid clohydic	HCl	0.06	-
9	Acid nitric	HNO_3	0.15	0.4
10	Acid Sulfuric	H_2SO_4	0.1	0.3
11	Benzen	C_6H_6	0.1	1.5
12	Dust contains SiO_2			
	Dianas 85-90% SiO_2		0.05	0.15
	Brik 50% SiO_2		0.1	0.3
	Cement 10% SiO_2		0.1	0.3
	Dolomit 8% SiO_2		0.15	0.5
13	Dust contains amiang		none	none
14	Cadmi (Smoke included ocid and metal) upon Cd		0.001	0.003
15	Carbon Disulfua	CS_2	0.005	0.03
16	Carbon Tetraclorus	CCl_4	2	4
17	Cloroform	$CHCl_4$	0.02	-
18	Tetraetyl lead	$Pb(C_2H_5)_4$	none	0.005
19	Clo	Clo	0.03	0.1
20	Benzini	$NH_2C_6H_4C_6H_4NH_2$	none	none
21	Crom Metal and compound	Cr	0.0015	0.0015
22	1,2 – Dicloetan	$C_2H_4Cl_2$	1	3
23	DDT	$C_8H_{11}Cl_4$	0.5	-
24	Hydroflorua	HF	0.005	0.02
25	Formaldehyt	HCHO	0.012	0.012
26	Hydro Sulfua	H_2S	0.008	0.008
27	Hydrocyanua	HCN	0.01	0.01
28	Mangan and compound	Mn/MnO_2	0.01	-
29	Niken (metal & compound)	Ni	0.001	-
30	Naphta		4	-
31	Phenol	C_6H_5OH	0.01	0.01
32	Styren	C_6H_5CH=CH_2	0.003	0.003
33	Toluen	$C_6H_5CH_3$	0.6	0.6
34	Tricloetylen	$ClCH$=CCl_2	1	4
35	Quicksilver (metal & compound)	Hg	0.0003	-
36	Vinylclorua	$ClCH$=CH_2	-	13
37	Petrol		1.5	5.0
38	Tetracloetylen	C_2Cl_4	0.1	-

Source: MOSTE, VIETNAM TCVN 5938/1995

Note: Method of sampling, analysis, computation, and determination of specified parameters will be regulated in adequate standards of Vietnam.

2) Emission Standards

Construction and operation of all transportation modes of land, railway and water are not allowed to emit smoke, dust, oil, and gas containing toxins, exceeding the defined standards. The emission standards are shown in the table below.

Table 3.7.3
Emission Standard for Vehicles

Reference Weight (RW) [3]	A (g/veh-km) [1]			B (g/veh-km) [2]		
	CO	HC	NOx	CO	HC	NOx
RW<750	65	6.0	8.5			
750<RW<850	71	6.3	8.5	58		
850<RW<1020	76	6.5	8.5			
1020<RW<1250	87	7.1	10.2	67		20.5
1250<RW<1470	99	7.6	11.0	76		22.0
1470<RW<1700	110	8.1	12.3	84		23.5
1700<RW<1930	121	8.6	12.8	93		25.0
1930<RW<2150	132	9.1	13.2	101		26.5
2150<RW	143	9.6	13.6	110		28.0

Source: MOSTE
Note: 1) Vehicle using gasoline
2) Vehicle using diesel
3) Reference weight of empty vehicle is 100 kg.

Two-wheel vehicles must have the following emission standards:
- Hydrocarbon (HC) less than 5 g/veh-km
- Carbon monoxide (CO) less than 12 g/veh-km

The HC standard for two-wheel vehicles is almost the same as that for small cars, while the CO standard is almost 1/6 of that for small cars. In addition to the above standards, there are standards concerned with air quality as follows:
- Maximum allowable concentration of hazardous substances in ambient air (TCVN 5938/1995, see Table 3.7.2)
- Industrial emission standards/inorganic substances and dust (TCVN 5939/1995, see Table 3.7.4)
- Industrial emission standards/organic substances (TCVN 5940/1995, see Table 3.7.5)

These emission standards regulate the maximum concentration value of inorganic substances and dusts in industrial emission (mg/m^3) in ambient air (see Table 3.7.4). Industrial air emission mentioned here shall refer to gas and dusty gas generated from manufacturing, business, service process, and activities. These standards shall be used to control the

concentration of inorganic substances and dusts in industrial emission proportion before discharging in ambient air. The list, concentration and critical limits of inorganic substances and dusts in industrial emission discharged into the atmosphere shall be complied with the regulations listed in the table. Critical limits under column A shall be applied on facilities. Critical limits under column B shall be applied on all facilities from the date of issuance of regulations by the environment supervision unit. Air emission by businesses, production activities, particular services, discharged into the atmosphere shall be regulated based on proper standards.

Table 3.7.4
Industrial Emission Standards of Inorganic Substances and Dusts

No.	Parameters	A	B
1	Smoke dusts		
	- melting metals	400	200
	- concrete asphalt	500	200
	- cement	400	100
	- other source	600	400
2	Dust		
	- contained silic	100	50
	- contained amiang	none	none
3	Antimone	40	25
4	Asenic	30	10
5	Cadmi	20	1
6	Lead	30	10
7	Copper	150	20
8	Zinc	150	30
9	Clorine	250	20
10	HCl	500	200
11	Fluor, acid HF (from various sources)	100	10
12	H_2S	6	2
13	CO	1,500	500
14	SO_2	-	-
15	NOx (from various sources)	2,500	1,000
16	NOx (acid facilities)	4,000	1,000
17	H_2SO_4	3,000	35
18	HNO_3	2,000	70
19	Ammonia	300	100

Source: MOSTE, TCVN 5939/1995
Note: Method of sampling, analysis and computation to determine the concentration value of specific inorganic and dust in industrial emission shall be identified based on Vietnam's standards.

These standards regulate the maximum concentration value of organic substances in Industrial emission (mg/m^3) if discharging into ambient air. Industrial emission mentioned here refers to gas from service, business, manufacturing, and other activities. These standards shall be used to control the concentration of organic substances in industrial emission proportion before discharging into ambient air.

Table 3.7.5
Industrial Emission Standards of Organic Substances

No.	Name	Chemical Formula	Maximum Limit
1	Axeton	CH_3COCH_3	2400
2	Axetylen tetrabromua	$CHBr_2CHBr_2$	14
3	Axetaldehyd	CH_3CHO	270
4	Acrolein	$CH_2=CHCHO$	1.2
5	Amilaxetat	$CH_3COOC_5H_{11}$	525
6	Anilin	$C_6H_5NH_2$	19
7	Anhydric axetic	$(CH_3CO)_2O$	360
8	Benzidin	$NH_2C_6H_4C_6H_4NH_2$	none
9	Benzen	C_6H_6	80
10	Benzil clorua	$C_6H_5CH_2Cl$	5
11	Butadien	C_4H_6	2200
12	Butan	C_4H_{10}	2350
13	Butyl axetat	$CH_3COOC_4H_9$	950
14	n-Butanol	C_4H_9OH	300
15	Butylamin	$CH_3(CH_2)_2CH_2NH_2$	15
16	Creson (o.m.p)	$CH_3C_6H_4OH$	22
17	Clorbenzen	C_6H_5Cl	350
18	Cloroform	$CHCl_3$	240
19	β-Clopren	$CH_2=CClCH=CH_2$	90
20	Clopicrin	CCl_3NO	0.7
21	Cyclohexan	C_6H_{12}	1300
22	Cyclohexanol	$C_6H_{11}OH$	410
23	Cyclohexanon	$C_6H_{10}O$	400
24	Cyclohexen	C_6H_{10}	1350
25	Dietlamin	$(C_2H_5)_2NH$	75
26	Diflodibrommetan	CF_2Br_2	860
27	o-Diclobenzen	$C_6H_4Cl_2$	300
28	1.1-Dicloetan	$CHCl_2CH_3$	400
29	1.2-Dicloetylen	$ClCH=CHCl$	790
30	1.2-Diclodiflometan	CCl_2F_2	4950
31	Dioxan	$C_4H_8O_2$	360
32	Dimetylanilin	$C_6H_5N(CH_3)_2$	25
33	Dicloetylete	$(ClCH_2CH_2)_2O$	90
34	Dimetylomamit	$(CH_3)_2HOCH$	60
35	Dimetylsunfat	$(CH_3)_2SO_4$	0.5
36	Dimetythydrazin	$(NH_3)_2NNH_2$	1
37	Dinitrobenzen (o.m.p)	$C_6H_4(NO_2)_2$	1
38	Etylaxetat	$CH_3COOC_2H_5$	1400
39	Etylamin	$CH_3CH_2NH_2$	45
40	Etylbenzen	$CH_3CH_2C_6H_5$	870
41	Etylbromua	C_2H_5Br	890
42	Etylendiamin	$NH_2CH_2CH_2NH_2$	30
43	Etylendibromua	$CHBr=CHBr$	190
44	Etanol	C_2H_5OH	1900
45	Etylacrilat	$CH_2=CHCOOC_2H_5$	100
46	Etylen clohydrin	CH_2ClCH_2OH	16
47	Etylen oxyt	CH_2OCH_2	20
48	Etylete	$C_2H_5OC_2H_5$	1200
49	Etyl clorua	CH_3CH_2Cl	2600
50	Etylsilicat	$(C_2H_5)_4SiO_4$	850

Note: Method of sampling, analysis, computation for determination of concrete organic concentration value in industrial emission shall be identified in standards of Vietnam accordingly.

Table 3.7.5 cont.

No.	Name	Chemical Formula	Maximum Limit
51	Etanolamin	$NH_2CH_2CH_2OH$	45
52	Fufural	C_4H_3OCHO	20
53	Fomadehyt	$HCHO$	6
54	Fufuryl	$C_4H_3OCH_2OH$	120
55	Flotriclometan	CCl_3F	5600
56	n-Heptan	C_7H_{16}	2000
57	n-Hexan	C_6H_{24}	450
58	Isopropylamin	$(CH_3)_2CHNH_2$	12
59	Isobutanol	$(CH_3)_2CHCH_2OH$	360
60	Metylaxetat	CH_3COOCH_3	210
61	Metylacrylat	$CH_2=CHCOOCH_3$	35
62	Metanol	CH_3OH	260
63	Metylaxetylen	$CH_3C=CH$	1650
64	Metylbromua	CH_3Br	80
65	Metylcyclohecxa	$CH_3C_6H_{11}$	2000
66	Merylcyclohecxanol	$CH_3C_6H_{10}OH$	470
67	Metylcyclohecxanon	$CH_3C_6H_9O$	460
68	Metylclorua	CH_3Cl	210
69	Metylenclorura	CH_2Cl_2	1750
70	Metylcloroform	CH_3CCl_3	2700
71	Monometylanilin	$C_6H_5NHCH_3$	9
72	Metanolamin	$HOCH_2NH_2$	31
73	Naphtalen	$C_{10}H_8$	150
74	Nitrobebzen	$C_6H_5NO_2$	5
75	Nitroetan	$CH_3CH_2NO_2$	310
76	Nitroglycerin	$C_3H_5(NO_2)_3$	5
77	Nitrometan	CH_3NO_2	250
78	2-Nitropropan	$CH_3CH(NO_2)CH_3$	1800
79	Nitrotoluen	$NO_2C_6H_4CH_3$	30
80	Octan	C_8H_{18}	2850
81	Bentan	C_5H_{12}	2950
82	Bentanon	$CH_3CO(CH_2)_2CH_3$	700
83	Phenol	C_6H_5OH	19
84	Phenylhydrazin	$C_6H_5NHNH_2$	22
85	Tetracloetylen	$CCl_2=CCl_2$	670
86	Propanol	$CH_3CH_2CH_2OH$	980
87	Proplyaxetat	CH_3-COO-C_3H_7	840
88	Proplyendiclorua	CH_3-$CHCl$-CH_2Cl	350
89	Proplyenoxit	C_3H_6O	240
90	Proplyenet	$C_3H_5OC_3H_5$	2100
91	Pyrindin	C_5H_5N	30
92	Pyren	$C_{16}H_{10}$	15
93	Quinon	$C_6H_{34}O_2$	0.4
94	Styren	$C_6H_5CH=CH_2$	420
95	Tetrahydrofural	C_4H_8O	590
96	1.1,2.2-Tetracloetan	$Cl_2HCCHCl_2$	35
97	Tetraclometan	CCl_4	65
98	Toluen	$C_6H_5CH_3$	750
99	Tetranitrometan	$C(NO_2)_4$	8
100	Toluidin	$CH_3C_6H_4NH_2$	22
101	Toluen-2, 4-diisocyanat	$CH_3C_6H_3(NCO)_2$	0.7
102	Trietylamin	$(C_2H_5)_3N$	100
103	1.1.2-Tricloetan	$CHCl_2CH_2Cl$	1080
104	Tricloetylen	$ClCH=CCl_2$	110
105	Triflo Brommetan	$CBrF_3$	6100
106	Xylen (o.m.p)	$C_6H_4(CH_3)_2$	870
107	Xilidin	$(CH_3)_2C_6H_3NH_2$	50
108	Vinyclorua	$CH_2CH=CHCl$	150
109	Vinyltoluen	$CH_2=CHC_6H_4CH_3$	480

Note: Method of sampling, analysis and computation to determine the organic concentration value in industrial emission shall be based on Vietnam's standards.

3.7.2 Soil

TCVN 5941/1995 provides for the standards regulating the maximum allowable level of pesticide residues in the soil (see Table 3.7.6). These standards shall be used to control and appraise the pollution level of pesticide chemicals in the soil.

Table 3.7.6
Maximum Allowable Limit of Pesticide Residues in the Soil

(mg/m^3)

No.	Chemicals	Chemical Formula	Effect	Allowable Content
1	Atrazine	$C_8H_{14}ClN_5$	Burbicide	0.2
2	2.4 – D	$C_8H_6Cl_2O_3$	"	0.2
3	Dalapon	$C_3H_{14}Cl_2O_2$	"	0.2
4	MPCA	C9H9ClO3	"	0.2
5	Sofit	$C_{17}H_{26}ClNO_2$	"	0.5
6	Fenxaprop	$C_{16}H_{12}ClNO_5$	"	0.5
7	Simazine	$C_7H_{12}ClN_5$	"	0.2
8	Cypemethrin	$C_{22}H_{19}Cl_2NO_3$	"	0.5
9	Satum (Bethiocarb)	$C_{12}H_{16}ClNO_5$	"	0.5
10	Dual (Metorlaclor)	$C_{15}H_{22}ClNO_2$	"	0.5
11	Fuji – One	$C_{12}H_{18}O_4S_2$	Mushroom exterminating insects killing	0.1
12	Fenvalerato – ethyl (whips)	$C_{25}H_{22}ClNO_3$	"	0.1
13	Lidan	$C_6H_6Cl_6$	"	0.1
14	Monitor (Methamidophos)	$C_2H_8NO_2PS$	"	0.1
15	Monocrotophos	$C_7H_{14}NO_5P$	"	0.1
16	Dimethoate	$C_5H_{12}NO_3PS_2$	"	0.1
17	Metyl Parathion	$C_8H_{10}NO_5PS$	"	0.1
18	Triclofon 9clorophos	$C_4H_8Cl_3O_4P$	"	0.1
19	Padan	$C_7H_{16}N_3O_3PS$	"	0.1
20	Diazinon	$C_{12}H_{21}N_2O_3P$	"	0.1
21	Fenobucarb (Bassa)	$C_{12}H_{17}NO_2$	"	0.1
22	DDT			0.1

Note: As to cultivated land, the sampling focused to determine that pesticide residues reduce upon harvest.

3.7.3 Water

Standard values of basic substances in surface water (TCVN 5942/1995) are shown in Table 3.7.7. Besides these, there are related standards on water quality as follows:

- Coastal water quality standard (TCVN 5943/1995, see Table 3.7.8)
- Ground water quality standard (TCVN 5944/1995, see Table 3.7.9)
- Industrial wastewater standard (TCVN 5945/1995, see Table 3.7.10)

Table 3.7.7
Surface Water Quality Standard

No	Substance	Unit	Classification	
			A	B
1	pH	Mg/l	6 to 8.5	5.5 to 9
2	BOD5 (200C)	mg/l	<4	<25
3	COD	mg/l	>10	>35
4	Dissolved Oxygen (DO)	mg/l	6	2
5	Suspended Solids (SS)	mg/l	20	80
6	Asen	mg/l	0.05	0.1
7	Bari	mg/l	1	4
8	Cadimi	mg/l	0.01	0.02
9	Lead	mg/l	0.05	0.1
10	Crom (VI)	mg/l	0.05	0.05
11	Crom (VII)	mg/l	0.1	1
12	Copper	mg/l	0.1	1
13	Zinc	mg/l	1	2
14	Mangan	mg/l	0.1	0.8
15	Niken	mg/l	0.1	1
16	Iron	mg/l	1	2
17	Mercury	mg/l	0.001	0.002
18	Thiec	mg/l	1	2
19	Amoniac (as of N)	mg/l	0.05	1
20	Floura	mg/l	1	1.5
21	Nitrat (as of N)	mg/l	10	15
22	Nitrit (as of N)	mg/l	0.01	0.05
23	Xianua	mg/l	0.01	0.05
24	Total phnol	mg/l	0.001	0.02
25	Oil	mg/l	none	0.3
26	Cleaning substance	mg/l	0.05	0.5
27	Coliform	MPN/100ml	5000	10000
28	Total chemicals (other than DDT)	Mg/l	0.15	0.15
29	DDT	mg/l	0.01	0.01
30	Tong hoat do phng xa α	Bq/l	0.1	0.1
31	---------- β	Bq/l	1.0	1.0

Source: MOSTE
Note: Column A: Surface water used as potable water.
Column C: Surface water used for other purposes
Method of sampling, analysis and computation to determine every concentration and substance shall be identified based on Vietnam's standards.

Table 3.7.8 lists the standards on allowable concentration of contaminated substances in coastal water. These standards shall be used to appraise the quality of coastal water.

Table 3.7.8
Coastal Water Quality Standard

No.	Substance	Unit	Classification		
			Beach	Agriculture	Other Place
1	Temperature	^{0}C	30		
2	Smell		none		
3	pH		6.5 – 8.5	6.5 – 8.5	6.5 – 8.5
4	Dissolved oxygen	mg/l	≥4	≥5	≥4
5	BOD5(200C)	mg/l	<20	<10	<20
6	Suspending solids	mg/l	25	50	200
	Asen	mg/l	0.05	0.01	0.05
7	Amoniac (as of N)	mg/l	0.1	0.5	0.5
8	Cadmi	mg/l	0.005	0.005	0.01
9	Lead	mg/l	0.1	0.05	0.1
10	Crom (VI)	mg/l	0.05	0.05	0.05
11	Crom (VII)	mg/l	0.1	0.1	0.2
12	Clo	mg/l	-	0.1	-
13	Copper	mg/l	0.02	0.01	0.02
14	Florua	mg/l	1.5	1.5	1.5
15	Zinc	mg/l	0.1	0.01	0.1
16	Mangan	mg/l	0.1	0.1	0.1
17	Iron	mg/l	0.1	0.1	0.3
18	Mercury	mg/l	0.005	0.005	0.01
19	Sulfua	mg/l	0.01	0.005	0.01
20	Xianua	mg/l	0.01	0.01	0.02
21	Total phenol	mg/l	0.001	0.001	0.002
22	Oil film	mg/l	none	none	0.3
23	Oil emulsion	mg/l	2	1	5
24	Total chemical	mg/l	0.05	0.01	0.05
25	Coliform	MPN/100ml	1000	1000	1000
26					

Source: MOSTE
Note: Method of sampling, analysis and computation to determine every concrete concentration and parameter shall be identified based on Vietnam's standards.

The table below lists the limit on allowable concentrations of contaminating substances in ground water. These standards shall be used to appraise the quality of a ground water source.

Table 3.7.9
Ground Water Quality Standard

No.	Substances	Unit	Critical Limits
1	Ph		6.5 to 8.5
2	Colour	Pt-Co	5 to 50
3	Firmness (as of $CaCO_3$)	mg/l	300 to 500
4	Total solids	mg/l	750 to 1500
5	Asen	mg/l	0.05
6	Cadimi	mg/l	0.01
7	Clorua	mg/l	200 to 600
8	Lead	mg/l	0.05
9	Crom (VI)	mg/l	0.05
10	Xianua	mg/l	0.01
11	Copper	mg/l	1.0
12	Florua	mg/l	1.0
13	Zinc	mg/l	5.0
14	Mangan	mg/l	0.1 to 0.5
15	Nitrat	mg/l	45
16	Phenola	mg/l	0.001
17	Iron	mg/l	1 to 5
18	Sulfat	mg/l	200 to 400
19	Mercury	mg/l	0.001
20	Selen	mg/l	0.01
21	Fecalcoli	MPN/100ml	none
22	Coliform	MPN/100ml	3

Source: MOSTE
Note: Method of sampling, analysis and computation to determine every concentration and substance shall be based on Vietnam's standards.

Table 3.7.10 lists the critical limits of polluting substances in wastewater from industries. This standard shall be used to determine industrial wastewater quality prior to draining into water bodies. Industrial wastewater with concentrations of component substances equal or less than the regulated values under column A may be drained into water bodies used as source of potable water supply. Industrial wastewater with concentrations of component substances equal or less than the regulated values under column B shall be allowed to drain into water bodies used as waterway, irrigation, swimming, and aquaculture. Industrial wastewater with concentrations of component substances more than the regulated values under column B, but not exceeding those under column C shall be

allowed to drain into specified areas. Industrial wastewater with concentrations of component substances more than the regulated values under column C shall not be allowed to be discharged.

Table 3.7.10
Industrial Wastewater Discharge Standards

No.	Substances	Unit	A	B	C
1	Temperature	°C	40	40	45
2	pH		6 – 9	5.5 – 9	5 – 9
3	BOD (200C)	mg/l	20	50	100
4	COD	mg/l	50	100	400
5	Suspending solids	mg/l	50	100	200
6	Asen	mg/l	0.05	0.1	0.5
7	Cadimi	mg/l	0.01	0.002	0.5
8	Lead	mg/l	0.1	0.5	1
9	Chlorine (surplus)	mg/l	1	2	2
10	Crom (VI)	mg/l	0.05	0.1	0.5
11	Crom (VII)	mg/l	0.2	1	2
12	Mineral oil	mg/l	KPHD	1	5
13	Edible oil	mg/l	5	10	30
14	Copper	mg/l	0.2	1	5
15	Zinic	mg/l	1	2	5
16	Mangan	mg/l	0.2	1	5
17	Niken	mg/l	0.2	1	2
18	Organic photpho	mg/l	0.2	0.5	1
19	Total photpho	mg/l	4	6	8
20	Iron	mg/l	1	5	10
21	Tetratoetylen	mg/l	0.02	0.1	0.1
22	Tin	mg/l	0.2	1	5
23	Mercury	mg/l	0.005	0.005	0.01
24	Total Nitro	mg/l	30	60	60
25	Tricloetylen	mg/l	0.05	0.3	0.3
26	Amoniac (as of N)	mg/l	0.1	1	10
27	Florua	mg/l	1	2	5
28	Phenola	mg/l	0.001	0.05	1
29	Sulfua	mg/l	0.2	0.5	1
30	Xianua	mg/l	0.05	0.1	0.2
31	Total α radioactivity	mg/l	0.1	0.1	-
32	Total radium β radioactivity	mg/l	1.0	1.0	-
33	Coliform	MPN/100ml	5000	10000	-

Source: MOSTE
Note: KPHD not identified. Method of sampling, analysis and computation to determine every concrete substance shall be based on Vietnam's standards.

3.7.4 Noise

The noise standards (TCVN 5949/1995) in Vietnam are shown in Table 3.7.11. Values of noise are not stringent, about 5-10 decibels (dB) higher than the Japanese standard. According to the regulation, all vehicle owners have to ensure that the noise level and vibration of their vehicles do not surpass the stipulated levels. However, since traffic noise is caused by the volume of vehicles, road administrators need to apply countermeasures in road design, speed control or vehicle type control if possible to keep the noise level down. To date, no effort has yet been done to achieve this.

Table 3.7.11
Noise Standards

Areas	6:00-8:00 (dB(A))	18:00-22:00 (dB(A))	22:00-6:00 (dB(A))
Category T	55	50	45
Category U	65	60	50
Category V	70	65	55
Category W	75	70	60
Category X	80	75	65

Source: MOSTE
Note: Category T: Areas that need quiet such as hospitals, kindergarten schools, libraries, research institutes
Category X: In heavy industrial manufacturing areas, where background noise is higher than the standard mentioned in the table above, the vehicle's noise should not be more than 5 dB(A) higher than the background noise.

Table 3.7.12
Noise Standards for Vehicles

Vehicle Type	Permitted Noise (dB(A))	
	New Vehicle	Old Vehicle
2-wheel vehicle, engine under 125 cc	79	92
2-wheel vehicle, engine over 125cc and 3-wheel motor vehicle	83	92
Tourist car under 12 seats	83	92
Light-lorry	84	92
Lorry and bus under 10,000cc	87	92
Lorry and bus over 10,000cc	89	92

Source: MOSTE

3.7.5 Vibration

The acceleration of vibration of the whole body should not exceed the values set in Table 3.7.13.

Table 3.7.13
Permitted Vibration

Category	Permitted Acceleration (m/s2)		Permitted Line Acceleration (m/s2)
	Vertical Vibration	Horizontal Vibration	
Category V	0.081 (78dB)	0.057	0.066
Category W	0.054 (75dB)	0.038	0.045

Note: Category V: Vibration from industrial workshops, from surrounding areas and 15 meters from the main road
Category W: Vibration in areas besides those under Category V.

3.7.6 Resettlement

According to regulations, the relocation program shall be based on the following laws:

- Government Decree No. 87/CP (1994) stipulates the prices of land (see Appendix A).
- Government Decree No. 89/CP (1994) provides for the collection of payment for land use and service fees by government.
- Government Decree No. 90/CP (1994) stipulates the compensation for recovering land by the State for military purposes and public use.

Regarding the approval of transfer of land use rights, the Prime Minister shall grant the certificate for the transfer of the right to land use for areas over three hectares. The People's Committee approves the transfer of land use if less than three hectares. The following laws provides for the compensation:

- Decision No. 2951/QD/UB (1994) on implementing Government Decree No. 87/CP stipulates the price table of various kinds of land.
- Decision No. 3455/QD/UB (1995) presents the compensation in case the State has to use private land for military purposes and for public benefit.

Compensation for urban land can be another parcel of land and house or a certain amount of money. In case the State will not be able to give the owner a fair compensation or a satisfactory replacement for his property, compensation is in monetary terms.

The Compensatory Council for Resettlement is presided by the chairman of the People's Committee of each province or district and has the responsibility to decide on the compensation for each particular case.

Resettlement with compensation has been undertaken to implement public projects that require land acquisition. The problem is that resettlement reduces the income of affected inhabitants. Further, the compensation is not enough to allow them to build houses with the same standard as their former residences.

4. PRELIMINARY ENVIRONMENTAL CONSIDERATIONS

4.1 General

In implementing transport sector projects in Vietnam, careful consideration must be made for both the natural and social environment surrounding the project areas. Though Vietnam has a wealth of natural beauty and resources, much has been destroyed during the Vietnam War, as well as with the development accompanying rapid economic growth. Today, the Vietnamese situation demands that the improvement of infrastructure in the transport sectors should be implemented while considering the way of life of the Vietnamese people, with natural abundance and a formidable traditional culture.

It is therefore desirable that projects of the transport sector consider the environmental impacts in the following areas:

- The necessary areas for the preservation of soil (areas damaged by chemical bombs)
- Tropical forest areas
- The important areas for biodiversity, such as in lagoons, mangrove forests, tidal marshes and reefs
- The areas of prime landscapes and historical reserves as those determined as World Heritage Sites (Ha Long Bay and Hue)
- The habitats of rare ethnic races

Items under the social environment include resettlement of inhabitants, economic activities, traffic & public facilities, (community disorganization) historical & cultural property, water rights & commons, public health conditions, wastes and hazards. Items of natural environment are topography & geology, soil erosion, underground water, hydrological situation, coastal zone, flora and fauna, meteorology and landscape. Items of living environment are air pollution, water quality, soil contamination, noise & vibration, land subsidence, offensive odor.

4.2 Social Environment

This paragraph considers that the impacts on the social environment in Vietnam will be anticipated by the implementation of the projects of the transport subsectors, such as roads, railways, air ports and civil aviation, inland waterways, maritime systems (including port and shipping), rural transport and cross-border transport.

These considerations are summarized in Table 4.2.1.

Table 4.2.1
Result of Preliminary consideration to Social Environment by Implementation of Transport Sector Projects

No	Items	Contents	Evaluation					Remarks
			Road	Rail	Air	Inland water	Maritime	
1	Resettlement of inhabitant	Resettlement due to site occupation (transfer of rights of residence and land use)	B-C	B	B-C	A-B	B-C (new port)	Necessary of large land area of implementation
2	Economic activities	Loss of land or other production opportunities	Positive Impact	Positive Impact	Positive Impact	Positive Impact	Positive Impact	Improvement of local economic activities
3	Traffic, public facilities	Impact of traffic congestion and accidents on traffic conditions, schools and hospitals etc.	B-C	B	B-C (noise)	A	B	Occurrence of traffic accident
4	Split of Communities	Divisions in local society due to traffic obstructions	B	B	B-C	A-B	A	Division of cultural, economical, ethnical area
5	Historical & cultural property	Loss and depreciation of valuable shrines, temples, cultural property, etc.	B	B	B-C	A	B-C (C: Cai Lan port)	Destruction of ruins in implementation of projects
6	Water-right & common	Obstruction of fishing right, right of water usage, mountainous forest commonage	A-B	A-B	B-C	B	C	Loss of fishing right, etc. after accomplishment of projects
7	Public health condition	Deterioration of health environment due to waste and vermin outbreaks	B	B	B	A	B	Occurrence of livelihood waste from each areas after accomplishment
8	Waste	Outbreak of construction waste, waste dust & solid wastes	C	C	C	B	C	Occurrence of construction waste, dust and solid waste under construction
9	Hazards	Increasing of accidents of landslides, floods & cave-in	C	C	C	B	B	Occurrence of natural disasters with attack the facility on operational stage

Note: A: Marginal (no need IEE and EIA)
B: Moderate
C: Substantial

1) Resettlement of inhabitants

Impacts such as the resettlement of inhabitants occupying large tracts of land will be caused by large land-reclamation initiatives but they will be marginal for the inland waterway sub-sector. The impacts from the improvement/construction of roads, airports and the maritime subsector will be large. Railway subsector projects will consist only of the improvement of currently used lines and the reclamation of older lines. Except for the construction of new stations and the improvement of terminals, the impacts for this subsector will be small.

2) Economic activities

The impacts of projects surrounding all transport sub-sectors on economic activities will be positive and help spur both local and national economic activities.

3) Traffic and public facilities

Traffic congestion, noise and accidents will be greatly affected by traffic and pubic facilities. The road subsector will be a major source of traffic accidents, congestion and noise. The airport subsector will cause noise from aircraft. Therefore, the impacts of the road and airport subsector will be significant. The maritime subsector, especially port projects, is anticipated to bring traffic congestion and noise during the construction and operation stage. The impacts of the railway subsector will be small because improvement of railway contributes to decreasing accidents and noise. Impacts of the inland waterway sector are nonexistent.

4) Community disorganization (split of communities)

Development of new transport infrastructure especially road, rail and airport may bring divisions of cultural, economic and ethnic areas.

5) Historical and cultural property

Except for the inland waterway subsector, the impacts of transport sector's projects on historical and cultural property, such as the loss or the depreciation of valuable shrines and temples, will come from to the destruction of valuable ruins. In Vietnam there are many valuable ruins and cultural properties. Thus, large impacts will be expected during the implementation of the projects in the road and airport subsectors. The impacts from projects in the railway and maritime subsectors will depend upon the conditions in the project areas. The development of the Cai Lan port in a large scale will affect the environment of Ha Long Bay, being a World Heritage site (14 Dec. 1994).

6) Water rights or the rights of commons

The impacts on water rights or rights of commons, such as the obstruction of fishing rights, rights covering water usage or mountainous forest commonage, will occur due to the loss of these rights after the accomplishment of projects.

Substantial impacts are especially anticipated after the accomplishment of projects in terms of the airport and maritime subsectors. The projects under the inland waterway sector may have significant impact on water rights. Regarding the road and railway transport subsectors, their impacts are unclear.

7) Public health condition

The impacts on public health, such as the deterioration of health environment mainly caused by improper waste disposal and vermin outbreaks, will be mainly due to the increase in traffic and unawareness of the people.

8) Wastes

Wastes including construction waste, waste dust and solid wastes, will affect public health conditions and water quality. These wastes may contaminate the soil in the rivers, marshes, lagoons and seacoasts around the project areas. This kind of concern especially comes from the projects in the road, railway, airport and maritime sub-sectors including big construction works and even during the operation stage, because of the discharge of livelihood wastes. The projects of inland waterway transport subsectors will bring marginal effects.

9) Hazard

Heavy rains and typhoons during the operational stage of the different subsector projects can increase the possibility of the occurrence of natural hazards such as landslides, floods and cave-ins.

4.3 Natural Environment

Preliminarily considerations made on the impacts on natural environment by the transport sector projects are briefly summarized as follows: (see Table 4.3.1)

1) Topography and geology

Reformation of valuable topographical and geological areas caused by excavation works or banking of soil will have significant impacts on a factor of topography and geology. These kinds of impacts are expected mostly to be provoked by road, airport and maritime sub-sectors since many of these are located in coastal zones and natural reservation areas. Railway and inland waterway sub-sectors will have comparatively marginal impacts.

Table 4.3.1
Result of Preliminary Consideration to Natural Environment by Implementation of Transport Sector Projects

No	Items	Content	Evaluation					Remarks
			Road	Rail	Air	Inland water	Maritime	
1	Topography & Geology	Reformation of valuable topographical and geological lands by excavation works or banking of soil	B-C	B	B-C	A-B	C	Necessity of soil inspection especially near the biodiversity areas
2	Soil erosion	Surface soil washed away by rain after land reclamation works and deforestation	B-C	B	B-C	B	C	Reconstruction with large reclamation
3	Underground water	Deterioration of water pollution due to construction and decrease of underground water caused by excessive pumping	C (tunnel)	C (tunnel)	B-C (construction stage)	A	B	As Hai Van tunnel and commercial ports, big construction affected to underground water
4	Hydrological situation	Changes in flow volume and river beds due to land reclamation or flow of its drainage	A-B	A-B	B	A	C	Big land reclamation as air port, port and commercial areas
5	Coastal zone	Coastal erosion and decrease of coastal biodiversity due to land reclamation or change of sea current	C	A-B	C	B	C	Big land reclamation as air port, road at coastal zone and ports
6	Flora and fauna	Breeding obstructions and extinction of species due to changing their habitant conditions	C	A-B	C	B	C	Abundant biodiversity in Vietnam as National Park, Nature Reserve, Lagoon and mangrove
7	Meteorology	Changes in temperature and wind due to large scale reclamation	A	A	A	A	A	Meteorological impact is rare, but there are disasters by meteorological phenomena as typhoon
8	Landscape	Topographic changes due to reclamation and obstruction harmony due to bridge	B (bridge)	A	B	A	B (C: Ha Long Bay)	Big bridge is important for landscape itself. Cai Lan port affected

Note: A: Marginal (No need IEE and EIA)
B: Moderate
C: Substantial

2) Soil erosion

Soil erosion will be caused by large reclamation activities. Unless suitable counter-measures are taken, the surface soil will be washed away by rain after land reclamation works and deforestation. Road, airport and maritime sub-sectors are among sources of these concerns. The projects of the railway, inland waterway and rural transport subsectors will be of small impacts.

3) Underground water

Factors related to underground water, such as the deterioration of water quality due to construction and the decrease of underground water caused by the excessive pumping will be caused by the reconstruction with large reclamation activities. This is expected to be caused mainly by road and railway sub-sectors which include the construction of the Hai Van tunnel. The airport subsector projects will require large land reformation during construction and bring various impacts during the operation stage. The projects of the maritime subsector will not be serious except for those within industrial zones.

4) Hydrological situation

Factors related to hydrological situation, such as the changes in flow volume and the riverbeds due to land reclamation or the changes in the flow of its drainage, will affect lakes, marshes, lagoons and rivers. Especially substantial impacts are expected from maritime and inland waterway subsectors. Meanwhile, airport sub-sector will have marginal impacts on it. The impacts of road and railway sectors are not manifest.

5) Coastal zone

Factor related to coastal zone, such as coastal erosion and the decrease of coastal biodiversity due to land reclamation or to the changes in sea current, will be caused largely by the transport subsectors. Especially substantial impacts are from the projects of the maritime subsector. Regarding road and airport sub-sectors, they could do harm to the coastal zone, if their projects are implemented in or near it. Also, inland water sub-sector could bring serious disadvantages to the coastal zone, if its projects are set in the river mouth of the Red River and the Mekong River. It is not clear to what extent railway sector will have impacts on it.

6) Flora and fauna

The impacts on flora and fauna, such as the breeding obstructions and extinction of valuable species due to changes in their habitat, will be caused by improvements in the transport sectors in biodiversity-rich areas such as National Parks, Nature Reserves, as well as Lagoon and Mangrove forests. Road, airport and maritime transport sectors will have serious impacts on biodiversity areas.

The impacts of the inland waterway sub-sector will be small except for the improvement of river mouths. It is not clear to what extent railway will have impacts.

7) Meteorology

Meteorological impacts including changes in temperature or wind due to large-scale reclamation will be rare for all the transport subsectors. But there could be disasters by meteorological phenomena.

8) Landscape

Road and airport sub-sectors could have serious impacts on landscape. For instance, the construction of bridges or airport could bring topographic changes and, as a result, destruction of landscape. On the other hand, maritime sub-sector will have marginal impacts except Cai Lan Port project which has a considerable potential to destroy beautiful landscape of Halong Bay, one of the World Heritage site.

4.4 Living Environment

The impacts of the transport sector on the living environment of the transport sub-sector are briefly summarized as follows (See Table 4.4.1):

1) Air pollution

Air pollution, such as the deterioration of air quality due to harmful exhaust caused by both the construction and operation of the transport subsectors except the railway subsector. Especially substantial impacts are expected to come from the road subsector, due to the increase in the number of vehicles. Air, inland water and maritime sub-sectors will also have impacts on air pollution but their impacts are not as substantial as those of road sector. On the contrary, railway subsector will contribute to the improvement of air quality.

2) Water quality

The impacts on water quality, such as the deterioration of water quality due to inflow of soil and wastewater in the construction and operation stages, could be caused by the transport sub-sectors projects created by the implementation of the projects of the transport sub-sectors. Road, air, inland waterway and rail sub-sectors will have substantial impacts mostly while their construction. Especially significant is the impacts of projects in semi-closed sea areas such as the Cai Lan port, where the worst impact will be anticipated.

Table 4.4.1
Result of Preliminary Consideration to Living Environment by Implementation of Transport sector Projects

No	Items	Contents	Evaluation					Remarks
			Road	Rail	Air	Inland water	Maritime	
1	Air pollution	Degradation of Air Pollution due to harmful exhaust gases from vehicles, shipping and airplane	C	A Good Affected	B	B	B	Depend up on comprehensive transport system for improvement of air pollution
2	Water Quality	Degradation of Water Quality due to inflow of soil and wasted water on construction and operation stage	B-C construction stage	B construction stage	B-C construction stage	B	C	Affected to water quality on construction and operation of road, rail, air port and sea port, especially closed sea port
3	Soil Contamination	Contamination due to coarse dust and asphalt emulsion etc. on construction and operation stage	B construction stage	B construction stage	B construction stage	A	B	Affected to soil contamination on construction and operation of road and sea port, especially yard in seaport and cargo depo.
4	Noise and vibration	Noise and vibration generated by vehicles facilities on construction and operation stage	C	B But will improve	C	A	B construction stage	Noise and vibration generated by all transport sector on construction and operation stage, especially air port area on operation stage
5	Land subsidence	Sinking of land surface accompanying geological changes or a drop in ground water level	A	A	B	A	B	Sinking of the land surface affected by port with reclamation
6	Offensive odor	Production of exhaust gases and malodorous substances	B	A	A	A	B	In semi-closed sea port area affected offensive odor

Note: A: Marginal (No need IEE and EIA)
B: Moderate
C: Substantial

3) Soil contamination

Both construction and operation of all the transport sub-sectors will have significant impacts on soil contamination mainly die to coarse dust and asphalt emulsion. Especially significant are the impacts of road, rail and air sub-sectors though they occur in the construction stage. Maritime sub-sector will have marginal impacts on it.

4) Noise and vibration

Noise and vibration generated by vehicles and facilities during the construction and operation stages will be mostly affected by all the transport sub-sectors except inland water sub-sector. Especially road, air and maritime sub-sectors will be major sources of noise and vibration because of increasing vehicles on roads, increasing landing/take-off (LTO) cycles at airports and a lot of constructions at seaports. Meanwhile the impact of rail sub-sector has decreased because of improvement of track and carriage.

5) Land subsidence

Land subsidence including sinking of land surface accompanying geological changes or a drop in ground water level is partly caused by pumping of underground water. Air and maritime sub-sectors can somewhat affect it particularly with reclamation activities.

6) Offensive odor

Offensive odor produced by production of exhaust gases from vehicles and the malodorous substances from waster could be caused by projects of the transport sub-sectors. The projects of rod sub-sector will considerably cause such impacts mainly due to the increase in traffic volume. The projects of maritime sub-sector can bring offensive odor by the eutrophication of the semi-closed sea surfaces at seaports such as Cai Lan port

APPENDICES

APPENDIX A
GOVERNMENT DECREE NO 87-CP

THE GOVERNMENT

- Pursuant to the Law on Governmental Organization on 30/9/1992;
- Pursuant to the Law on Land on 14/7/1993;
- According to requirements of the Minister of Finance; of the Minister of Construction; of the General Director of the General Landed Office and of the Chairman of Government Pricing Committee.

DECREE:

Article 1:
Hereinafter promulgated the price range of various land types, along with this Decree.

Article 2:
The price range of various land types is determined as follows:

1. For agricultural and industrial lands, the price is fixed for each type of agricultural land, on which is imposed tax according to the three categories of communes, i.e. plain, midland and mountain.

2. For residential lands in rural areas, the price is determined for each type of land and by commune category.

3. For residential lands in the suburbs, near transport junctions, main transport routes and commercial, tourism and industrial areas, the price is defined for each type of land and according to commune category.

   Land category to fix the price of residential lands in rural areas, suburbs, edge of transport junctions and main transport axles, and in commercial, tourism and industrial areas is based on the profitability, land-use value, location and actual land price.

4. For urban lands, the price is fixed for five urban land categories and is according to current State regulations. In each urban category, there are three to four types of roads and streets and four or five types of land locations.

   Types of roads and streets in urban areas are categorized based on location, profitability, level of infrastructure, and actual land price.

   Land locations in urban areas are determined based on profitability and actual land price of each area.

5. Provincial People's Committees (PPCs) and Municipal People's Committees under the central level (hereinafter referred to as Provincial People's Committees) classify residential lands in rural areas and decide the types of roads, streets and land locations of urban areas in local based on types of urban land under current regulations and actual situation of local area as basis for fixing price of lands.

Article 3:
Leasing land to foreign organizations and individuals or to enterprises with foreign investments is applied according to government regulations.

Article 4:
1. Based on the price frame chart of government, PPCs regulate prices of land as basis for imposing tax on land transfer, for collecting money when allotting and leasing land, for fixing a value when allotting lands, and for compensating landowners in case government uses the land in the name of national interest.

   In case of the same type of urban but different land profitable ability, different perfect level of infrastructures, locals are allowed to use the regulation factor of price frame (K) to regulate from 0.8 to 1.2 times the price of the same type of urban, same type of roads & streets and land locations stated in the Urban land Price Frame Chart. (Price Chart No 4 promulgated along with this Decree).

2. Prices of land types regulated by the local must not be lower than the minimum price and higher than the maximum price of the price frame and the regulation factor which are promulgated along with this Decree.

3. In case the land is allotted under the form of auction, the land price is decided by the PPC for each specific case.

Article 5:
PPCs are allowed to re-regulate fixed land prices so that the price conforms to actual situations in case of having fluctuation prices due to investments in the infrastructure construction, in new industrial zone, business area and tourism area.

Article 6:
In case land prices applying to the cases of: imposing tax on transferring right of land use; collecting land use fees when allotting lands & leasing lands; fixing value of assets when allotting lands; and compensating losses on land in case of land resumption arising since 15th, October 1993 have not been solved, they are now applied according to land prices regulated by PPCs in conformity with the price frame of land types of this Decree.

Article 7:
This Decree is enforced from the signing day and is applied in stead of the Decree No 8-CP on 6th, November 1993 of the Government.

Article 8:
The MOF coordinates with the Ministry of Construction, General Landed Office, and Government Pricing Committee to give guidance and examine the execution of this Decree.

Ministers of ministries, directors of ministerial level agencies and gov. agencies, chairmen of PPCs and Municipal People's Committees are responsible for executing this Decree.

PRICE CHART BY LAND TYPE
(promulgated along with Government Decree No 87-CP on 17 August 1994)

1. Agricultural and forest lands

a. Agricultural lands and those with water supply feeding aquaculture ponds

Unit: VND/m^2

Land categories	Plain communes		Midland communes		Mountain communes	
	Min. price	Max price	Min. price	Max price	Min. price	Max. price
Class 1	1,100	19,300	-	-		
Class 2	920	16,100	690	12,100	560	9,800
Class 3	740	13,000	555	9,700	370	6,500
Class 4	560	9,800	420	7,400	280	4,900
Class 5	360	6,300	270	4,700	180	3,150
Class 6	100	1,750	75	1,300	50	870

b. Lands for planting perennial trees, forestry lands

Unit: VND/m^2

Land categories	Plain communes		Midland communes		Mountain communes	
	Min. price	Max price	Min. price	Max price	Min. price	Max. price
Class 1	800	14000	600	105000	400	7000
Class 2	680	11900	510	8920	340	5950
Class 3	490	8550	370	6450	245	4280
Class 4	250	4350	190	3300	125	2180
Class 5	70	1250	55	920	35	610

2. Residential lands in rural areas

Unit: VND/m^2

Land categories	Plain communes		Midland communes		Mountain communes	
	Min. price	Max price	Min. price	Max price	Min. price	Max. price
Class 1	1,100	19,300	-	-		
Class 2	920	16,100	690	12,100	560	9,800
Class 3	740	13,000	555	9,700	370	6,500
Class 4	560	9,800	420	7,400	280	4,900
Class 5	360	6,300	270	4,700	180	3,150
Class 6	100	1,750	75	1,300	50	870

3. Residential lands in the edge of urban, transport junctions and main transport axes, business areas, tourism areas, industrial zones

Unit: VND/m²

Land categories	Category I		Category II		Category III	
	Min. price	Max price	Min. price	Max price	Min. price	Max. price
Class 1	600	1,500	420	1,050	250	625
Class 2	380	950	266	665	150	375
Class 3	230	570	160	400	72	180
Class 4	140	350	98	150	32	80
Class 6	42	100	30	75	12	30

4. Urban lands

Unit: 1000 VND/m²

Urban Type		Road & Street Type: Standard Price according to Land Locations							
		Location 1		Location 2		Location 3		Location 4	
		Min. price	Max. price	Min. price	Max. price	Min. price	Max. price	Min. price	Max. price
Class 1	1	4,600	11,500	2,760	6,900	1,380	3,450	460	1,150
	2	2,700	6,750	1,620	4,050	810	2,025	270	675
	3	1,800	4,500	1,080	2,700	540	1,350	180	450
	4	900	2,250	540	1,350	270	675	90	225
Class 2	1	2,600	6,500	1,560	3,900	780	1,950	260	650
	2	1,950	4,875	1,170	2,925	580	1,450	190	475
	3	1,800	4,500	780	1,950	390	975	130	325
	4	710	1,775	420	1,050	210	525	70	175
Class 3	1	1,600	4,000	960	2,400	400	1,000	130	325
	2	1,200	3,000	720	1,800	300	750	100	250
	3	800	2,000	960	1,200	200	500	70	175
	4	400	1,000	720	600	100	250	30	75
Class 4	1	800	2,000	480	1,200	200	500	70	175
	2	600	1,500	360	900	150	373	50	125
	3	400	1,000	240	600	100	250	30	75
	4	200	500	120	300	50	125	16	40
Class 5	1	600	1,500	330	825	150	375	50	125
	2	400	1,000	250	550	100	250	30	75
	3	200	500	110	275	50	125	16	40