

COUNTRY PROFILE
ON
ENVIRONMENT

LAOS

November 1999

JAPAN INTERNATIONAL COOPERATION AGENCY

FOREWORD

Composition and the Contents of this Report

This report presents information on the Environment of the Country in the following arrangement

1. KEYWORDS

Keywords to understand features of the country and major environmental issues are presented briefly on a page, which helps to overview the whole figures.

2. FACT SHEET

Major significant index of economy, demography, society and natural resources of the country as well as the characteristics of the natural and social environment are presented.

3. ORGANIZATION AND LEGISLATION

3.1 Organization

Organizations in charge of each environmental issues stated in Chapter 4 and their duties are shown in the matrix. Responsibility, organization and duties of the relevant organizations are also described. For NGO, name and their main activities are shown.

3.2 National Policy on Environment

National policy on the environment such as national environmental action plan is stated.

3.3 Legislation

Laws and regulations on the environment and their coverage are presented.

4. CURRENT ENVIRONMENTAL ISSUES

This chapter summarizes the current status of the following environmental sectors and presents the organization in charge, applicable standards, past cases and relevant laws and regulations are presented. In the Chapter 4.3, current environmental issues to be considered are described based on the Local Consultant's report.

4.1 Air Pollution	4.7 Wastewater Management
4.2 Water Pollution	4.8 Forest Conservation and Desertification
4.3 Other Environmental Issues	4.9 Biodiversity
4.4 Solid Waste Management	4.10 Natural Resources Management
4.5 Energy Conservation and Renewable Energy	4.11 Natural Disaster
4.6 Water Supply	4.12 Environmental Education

5. INTERNATIONAL RELATIONS

Economic and technical assistance by the foreign donors in the country are reviewed. Chapter 5.1, "International Convention on the Environmental Protection" list up the conventions ratified or signed by the country. Chapter 5.2, "International Donor's Project on the Environment" list up the assistance project on the environment by the bi- or multilateral donors with the information on the project. Japan's assistance project are mapped.

6. INFORMATION SOURCES

Contact persons of the organizations in the country concerning the environment are listed.

7. REFERENCES

References quoted in this report are listed.

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1. Keywords

1.1 Keywords to understand the Environment

Relevant Pages

• <u>Gross Domestic Product or Gross National Product (97)</u> GNP per capita : 330 US\$ (Japan 32,380 US\$; China 750 US\$) Total GNP: 1.64 billion US\$ (Japan 4,090 billion US\$; China 928 billion US\$)	
• <u>After Civil War, Laos People's Democratic Republic was established</u> • <u>Agro-forestry country of which more than 60 % of GNP by Agro-forestry sector</u> • <u>Largely affected by Thai economy</u> •	
• <u>New Economic Development Policy (Cintana Kaan Mai) Policy adopted</u> • <u>Assistance from Former Soviet Union, greatest donor, rapidly decreased since 1991</u> •	

- 2. Fact sheet p.2

1.2 Keywords in the Environmental Issues

Relevant Pages

• Deforestation

- Illegal logging
- Slush and burn, shifting cultivation
- Excessive commercial logging
- Large scale forest fires

4.8 Deforestation p. 18

• Water Supply

- Insufficient water supply system
- Occurrence of water-borne diseases such as diarrhea
- Insufficient capacity of existing water supply system

4.6 Water Supply p. 16

• Wastewater

- Insufficient sewerage system

4.8 Wastewater Management p. 17

• Solid Waste

- Lack of waste collection system
- Illegal dumping of uncollected waste

4.4 Solid Waste Management p. 14

2. Fact Sheet

2.1 Socio-Economic Indicators

Indicators	Data	Year of data	Ref.
Population	5.41 million (Average annual growth: 2.74 % in 1999 estimation)	1999	d)
Ethnic Groups	Lao Loum (lowland) 68 %, Lao Theung (upland) 22 %, Lao Soung (highland including Meo, Yao 9%, ethnic Vietnamese/Chinese 1%	1999	d)
Religion	Buddhism (Theravada) 60 %, Aminist and other 40 %	1999	d)
Literacy	60 % (estimated)	1998	d)
Urban Population	22 % (Share in total population)	1997	b)
Life Expectancy	53 years	1997	b)
Child Mortality	98 (Mortality of children under five years old against 1,000 birth)	1997	b)
GNP* ¹	1.64 billion US\$ (330 US\$ per capita)	1998	c)
GDP* ¹	1.75 billion US\$ (352US\$ per capita)	1998	c)
GDP Composition	Agriculture: 52 % Industry: 21 % Manufacturing : 16 % Services: 26 %	1997	b)
Industry	Tin and gypsum mining, timber, electric power, agricultural processing, construction, garments	1997	d)
Natural Resources	Timber, hydropower, gypsum, tin, gold, gemstone	1997	d)
Access to the Safe Water * ²	51%	1995	g)
Access to the Sanitation * ³	%		
Human Development Indicators (HDI)	0.491 (140th in the world, GDP was 180th in the same year)	1997	e)

*1: GNP was converted from that in the national currency, and calculated by using the average exchange rate for these three years. GDP is indicated in US dollars using the exchange rate in 1997

*2: Access to Safe Water is the percentage of the population with reasonable access to an adequate amount of safe water including treated surface water and untreated but uncontaminated water, such as from springs, sanitary wells and protected boreholes.

*3 : Access to Sanitation is the percentage of the population with reasonable access the pit latrine, flush toilet with sewage, septic tanks and other suitable facilities to dispose and prevent human from contact with excreta.

2.2 Geological and Geographical Features

Area: Total: 147,500 km ² (0.39 times that of Japan)
Geological Features: Laos locates in the center of Indo-China peninsula and is an inland country facing to Thailand in the west, Myanmar in the northwest, China in the northeast, Vietnam in the East and Cambodia in the south. 80% of the country is covered by hilly and mountainous area. Mekong river runs along with the border to Thailand.
Highest place : Phu Bia (Xiengkhuang Province) 2,820 m Phu Xao (Xiengkhuang Province) 2,690 m Phu Xamxum (Xiengkhuang Province) 2,620 m

Sources: Ref. a)

2.3 Meteorological Features

Climate: Tropical monsoon
Season: Rainy season from May to September,
Average Temperature: 26.5°C (Vientiane), highest in May (29.3°C) and lowest in January (22.2°C)
Annual Rainfall: Annual averages are 1,600mm in Vientiane, 1,180mm in Luang Prabang, 1,335mm in Savannakhet, 1,500 to 2,000mm in mountainous area and 2,000 to 3,000mm in western highland of Annan Mountains.
Climate Type: Tropical monsoon and sub-tropical in hilly area

Source: Ref. a)

2.4 Ecological Features

The country is classified into three geographical categories.

- 1) Northern mountains: 1,000 to 1,500 m in altitude
- 2) Central and Southern mountains: 600 to 1,000 m in altitude, western slope of Annan mountains and Boloven plateau.
- 3) An alluvial plain along with the Mekong river and the tributaries: 100 to 200m in altitude

Sources: Ref. g)

2.5 Hydrological Features

Main rivers:

Mekong river

Nam Ngum river

Main Lakes:

Nam Ngum Reservoir

Sources: Ref. a)

3. Organization and Legislation

3.1 Organization

3.1.1 Governmental Organisation

(1) Environmental Issues and the Relevant Governmental Organisation

Governmental Organization	Environmental Issues (No. indicates the relevant chapter)											
	4.1 Air Pollution	4.2 Water Pollution	4.3	4.4 Solid Waste	4.5 Energy	4.6 Water Supply	4.7 Waste Water Treat	4.8 Forest and Desert	4.9 Biodiversity	4.10 Natural Resources	4.11 Natural Disaster	4.12 Env. Education
Science, Technology and Environment Agency	○	○		—	—	—	—	na	na	—	na	—
Ministry of Agriculture and Forestry	○	○		—	—	—	—	○	○	—	—	—
Ministry of Industry and Handy Crafts	—	—		—	○	—	—	—	—	—	—	—
Ministry of Communication, Transport, Post and Construction	—	—		○	—	○	○	—	—	—	—	—
Ministry of Public Health	—	—		○	—	○	○	—	—	—	—	—
Ministry of Education	—	—		—	—	—	—	—	—	—	—	○
Vientiane City	—	—		○	—	—	—	—	—	—	—	—

Note:1) : ○ → Relevant Organization — → No responsible na → No Information

(2) Environmental Organisation

Science, Technology and Environment Agency (STEA) is an agency in charge of environmental management. The STEA organizes a monthly base working group called Interministerial Working Group on Environment. Representatives from all the ministries concerning environment (i.e. Ministry of Education, Ministry of Agriculture and Forestry, Ministry of Industry and Handicrafts, Ministry of Information and Culture, Ministry of Science and Technology etc.) gather and discuss the up-to-dated topic of environment.

(3) Science, Technology and Environment Organization (STENO)

Science, Technology and Environment Organization (STENO) was established in 1993 as an agency in charge of environmental planning and management. The name of STENO was changed to Science, Technology and Environment Agency (STEA) in July 1999. Major function of the STEA are environmental monitoring and examination of environmental impact assessment. It has three departments and three institutes.

Department of Environment

Department of Science and Technology

Department of Intellectual Property

Environment Research Institute

Science Research Institute

Technology Research Institute

(4) Other Organisations relevant to the Environment

The Ministry of Agriculture and Forestry's Department of Forestry is the key agency in the area of natural resource management (The World Bank, 1993). The Ministry of Industry and Handicrafts with its Department of Electricity holds the overall responsibility for the national power sector development (Christ, 1997). The Department of Planning in State Planning Committee within the Prime Minister's Office is responsible for macro-economic and sectoral planning activities and reviews sectoral policies. It plays a significant role in policy formulation and as coordinator between the different line ministries.

Organization	Relevant Department	Activities
Ministry of Agriculture and Forestry	Dpt. Agriculture and Extension	Achieving self-sufficiency in food requirements Diversification into cash crops through research and development Establishing a system of land use and land rights Streamlining transfer rights Determining suitable agricultural taxes Providing agricultural credit Establishing a national research capability over a wider range of disciplines Strengthening of the recently established extension service Reducing the area under shifting cultivation

Organization	Relevant Department	Activities
	Dept. Forestry and Environment	Implementing of national regulatory mechanism Reorganizing concession management implementing export parity taxation implementing a national program of conservation management including a protected area network deforestation water pollution and water shortage air pollution soil erosion, sedimentation and flash flood
	Dpt. Meteorology and Hydrology	
	Dpt. livestock and Veterinary Service	Accelerating commercial production of cattle Delivering phased regional programs of disease control Promoting the production of fish through research and development
	Dpt. Irrigation and Micro-hydropower	Curtailing the investment on large scale irrigation Encouraging farmer organizations to manage irrigation schemes Rehabilitation of existing infrastructure Diverting investment to small scale schemes that are easily operated by farmers themselves
	National Agricultural Research Center	Coordination of agricultural research Preparing master plan for research in agriculture and forestry Upland Agricultural Development Project
	Soil Survey Center	Soil classification Land use mapping
Ministry of Industry and Handicrafts	Dept Geology and Mines	Mineral exploitation over the entire country Promoting small scale mining Preparing a mining code Encouraging foreign collaboration in large scale operations
	Electricite du Laos	Introducing a resource rent Developing medium and large scale generation Minimizing distribution losses
	Dept of industrial Management	
Ministry of Communication, Transport, Post and Construction	Institute of Urban Planning and Technical Studies	Guiding growth of the major urban centers
	Nampapa Lao (Lao Water Supply Company)	Providing potable water to the country's urban centers
Ministry of Public Health	National Institute for Hygiene and Epidemiology	Supplying safe water in the rural areas Supervising waste management in urban areas

Organization	Relevant Department	Activities
	Research Institute for Medicinal Plants	Surveying availability of medicinal plants in the provinces Promoting traditional medicine Phyto-chemical analysis and processing of drugs Establishing collections of medicinal plants
Ministry of Education	National Polytechnic Institute	
	Technical Colleges	
	Medical School	

Sources: Ref. a)

3.1.2 NGOs

NGO activities in Lao PDR increased after the adoption of the New Economic Mechanism by the government in 1986. There are more than 60 international NGOs working in Laos (STE A, date unknown).

Organization	established	Major activities
a)		
b)		
c)		
d)		
e)		
f)		
g).		
h)		

Source: Ref. a)

3.2 National Policy on the Environment

Policy	Formulated	Purpose	Authority
Environmental Action Plan	1994	- Development of planning and management framework for environmental aspects; - Forestry resources management; - Biodiversity conservation; - Land resources management; - Water resources management; - Industrial, mining and access infrastructure development; - Institutional, legal and regulatory framework.	STEA

Source: Ref. a)

3.3 Environmental Law

Laws and relevant Regulation	Description	Authority
Environment Protection Law	No.02/99, adopted in April 1999	
Forestry Law	Adopted in 1996, defining the forest classification as Protection forest, Conservation forest, Production forest, Regeneration forest	
Forestry and Land Use Management Decree	Providing framework for forest management zoning and forest land use, community management of forestry resources	Ministry of Justice, Ministry of Forestry
Prime Ministerial; Land Decree No.99	Promulgated in December 1992, superseding Decree 117 and providing first comprehensive land use / ownership coverage	
Council of Minister Decree 117 Management and Use of Forests and Forest Land	Promulgated on 5 October 1989 and to be superseded by New Forestry and Land Use Law. First Decree aimed at implementing the Directives of the National Conference on Forestry	
Council of Minister Decree 118 Management and Protection of wild animals Fisheries and Hunting and Fishing	Promulgated on 5 October 1989. Aims at defining protection of wildlife and fisheries	
Decree No 66 Prime Minister's Decision on the approval of the Tropical Forestry Action Plan of Lao PDR	Promulgated on 7 September 1991. Defines the medium term priorities of the Forestry Sector	
Council of Minister Decree No67 Cessation of wood exploitation	Promulgated on 26 August 1991. Concerns the operations of a national logging, ban and the accompanying inventory and audit activities	
Council of Ministers Decree No91 on Tourism	Promulgated on 4 October 1986. Defines the responsibilities for protection of scenic value and the environment	
Council of Ministers Decree No52	Promulgated on 7 September 1990. Establishes the Forestry Police	
Council of Ministers Decree No 185	Promulgated on 21 October 1991. Defines the prohibition of exports of certain species of wild animals	
Council of Ministers Decree No14 Order of the Council of Ministers Concerning Wood and Forest Business	Promulgated on 26 September 1990. Defines the annual quota logging for 1991 at 400,000 cu. Meter	
Council of Ministers Decree No74 Concerning the Protection of Forests	Promulgated on 17 July 1989. Defines the responsibilities for forest protection including the requirements for logging , hunting, livestock raising and related forest activities allowed to be undertaken by communities.	
Council of Ministers Decree No001 Prohibition of Wood species for Cutting	Promulgated on 29 November 1985. Defines which species of trees are prohibited for cutting.	

Laws and relevant Regulation	Description	Authority
Council of Ministers Decree No24 Forest and related resources protection	Promulgated on 2 February 1981. Defines the responsibilities for safeguarding the forest, animal and fisheries during the dry season of 1981.	
Ministry of Agriculture and Forestry Execution of Council of Minister's Decree No118 on the Management and Protection of Wildlife, Hunting and Fishing	Promulgated in November 1989. Provides implementation instructions of Decree No118	
Guidelines for Hospital Waste Management	Promulgated on 21 October 1999	
Industrial Waste Discharge Regulation	No. 180/ MIH, promulgated on 3 November 1994	
Regulation on the Monitoring and Control of Waste Water Discharge	No. 1122/STENO, promulgated on 29 May 1998	
The Water and Water Resources Law	Promulgated on 14 October 1996	
The Electricity Law	Promulgated on 12 April 1997	
Regulation on Environment Assessment	Promulgated in 1999	

Sources: Ref. a)

4. Current Environmental Issues

4.1 Air Pollution

It is reported that open burning of waste in backyards causes air pollution that endanger the health or the citizens of Vientiane. However, it seems no serious pollution.

Sources: Ref. a)

Relevant Organization
STEA; Science, Technology and Environment Agency Department of Forestry and Environment, Ministry of Agriculture and Forestry

Source: Ref. a)

Laws and Regulations	Existence	Title or References
• Law on air pollution	?	
• Ambient air standards	?	
• Emission std. (fixed or mobile)	?	
• Result of air monitoring	?	
• Guidelines	?	

Notes) ○ : Exist × : No exist ◐ : under development ? : Not identified

4.2 Water Pollution

According to the water quality analysis of rivers by the Water Quality Laboratory of STEA, it comply with the environmental standards.

It is reported that salt mining appears to affect water quality of surface water in local areas. It is also reported that untreated effluents from a beer factory, paper mill, dye works and hospitals might cause water pollution.

As a well known case of water pollution, wastewater from Asia Paper Mill Factory in Vientiane destroyed 7 ha of rice fields. The factory compensate the farmers 400,000 Kip for the damage. Some small factories were ordered to improve their facilities.

Source: Ref. a)

Relevant Organization
STEA; Science, Technology and Environment Agency Department of Forestry and Environment, Ministry of Agriculture and Forestry

Source: Ref. a)

Laws and Regulation	Existence	Title or References
• Law on water pollution	○	The Water and Water Resources Law
• Water quality standard	×	
• Effluent standard	○	Wastewater Control and Management Law
• Drinking water quality standard	?	
• Result of water monitoring	?	
• Guideline for water quality control	?	

Notes) ○ : Exist × : No exist : under development ? : Not identified

4.3 Other pollution

No relevant information was obtained.

Source: Ref.

Relevant Organization

Source: Ref.

Laws and Regulation	Existence	Title or References
	?	
	?	
	?	
	?	

Notes) ○ : Exist × : No exist : under development ? : Not identified

4.4 Solid Waste Management

In Vientiane, **Cleansing unit under the Department of Communication, Transport, Post and Construction of Vientiane City** collects solid waste from public institutions, hospitals and commercial enterprises. The department also collects household waste and market waste in cooperation with private companies for waste collection. It also is in charge of road sweeping. The collection rate is 13 % in residential areas and 22 % (in 1996) in commercial and business areas. Uncollected waste is illegally dumped into rivers, drainage or vacant lot in the city

At present, Ministry of Public Health and the WHO jointly promote the Project for treatment of hazardous and infectious waste.

Source: Ref. a)

Relevant Organization
Ministry of Communication, Transport, Post and Construction National Institute for Hygiene and Epidemiology, Ministry of Public Health Vientiane City

Source: Ref. a)

Laws and Regulation	Existence	Title or References
Solid Waste Management Law	○	Decree on the Management of Solid Waste, the Cleaning of Public and Residential Areas
Hazardous Waste Management Law	×	
Guideline for Solid Waste Management	○	Guideline for Hospital Waste Management (Oct.21,1997) Industrial Waste Discharge Regulation (No.180/MIH,Nov.3,1994) Regulation on the Monitoring and Control of Waste Water Discharge (No.1122/STENO, May.24,1998)

Notes) ○ : Exist × : No exist : under development ? : Not identified

4.5 Energy Conservation and Alternative Energy

The principal renewable resource of Laos is and hydroelectricity. Electricite du Laos is in charge of electricity generation and distribution in the country as well as export to Thailand

Hydropower potential is estimated as high as 18,000MW (MIH), however, less than 625MW of the resources is now being used. Major hydropower statins are Theun Hin Boun (210MW), Nam Ngum (150MW), Houay Ho (150MW), Nam Leuk (60MW), Xe Set (45 MW) and Selebam (5 MW). These hydro power plants are developed as a means of earning foreign currency.

Source: Ref. a), g)

Relevant Organization
Electricite du Laos, Ministry of Industry and Handy Crafts

Source: Ref. a)

Laws and Regulation	Exist	Title or References
Law on Energy Conservation and Energy Use	○	The Water and Water Resources Law (14 Oct. 1996) The Electricity Law (12 April 1997) Regulation on Environmental Assessment (1999 STEA)

Notes) ○ : Exist × : No exist : under development ? : Not identified

4.6 Water Supply

The main source of water supply is rivers (Lao National Mekong Committee, 1998).

Only 51 % of urban population have access to piped water. Piped water system is supplied in major cities such as Vientiane, Savanakheth, Luang Prabang etc... In Vientiane, among 400,000 of the population, only 130,000 people can access to the piped water. Consumption amount reaches 90 % of supplying capacity and water may fall in short in the near future. Lack of water supply system causes diarrhea and high mortality rate of infant.

Water supply development project, which costs 13 million US\$, is in progress in 7 cities in northern Laos. 75% is a target of water supply coverage in this project.

The natural water supply is under the responsibilities of Nam Saad, Department of Hygiene and Prevention, Ministry of Public Health. Access to clean water is still limited in the rural areas.

Source: Ref. a)

Relevant Organization
Nampapa Lao (Lao Water Supply Company), Ministry of Communication, Transport, Post and Construction Institute of Clean Water, Ministry of Public Health

Source: Ref. a)

Laws and Regulation	Existence	Title or References
• Water Resources Management Law	○	The Water and Water Resources Law
• Water Resources Control Law	○	The Water and Water Resources Law

Notes) ○ : Exist × : No exist : under development ? : Not identified

4.7 Wastewater Management

Sewerage system is not yet developed except for a part of urban area. The government set 45% of coverage as a current target. In order to achieve this, EU implemented waste water management of That Lang Marshes and the project will be completed in 1997. The project provides canal, a collection pond and a treatment pond. Collection from each households is not included and the treatment operation is limited only during dry season.

In Thakek, Pakse, Savannakhet and Luang Prabang, ADB financed the sewage treatment project.

At present, Ministry of Communication, Transport, Post and Construction initiated the project “Improvement of water and waste water facilities”.

Source: Ref. g)

Relevant Organization
Ministry of Communication, Transport, Post and Construction
National Institute for Hygiene and Epidemiology, Ministry of Public Health

Source: Ref. a)

Laws and Regulation	Existence	Title or References
Sewerage Law	×	
Laws and Regulation on Industrial Wastewater Control	×	
Effluent Standards	×	
Monitoring Results	?	

Notes) ○ : Exist × : No exist : under development ? : Not identified

4.8 Forest Conservation and Desertification

Forestry is a major industry in Laos. However, the forest has been decreasing significantly. This is due to illegal logging, large-scale forest fires, population pressure in certain areas increasing the intensity of slash-and-burn agriculture, wartime turmoil around 1975 and excessive commercial logging (JICA, 1998). It is said that 50 years ago, 70 % of the areas used to be forests but it only consists of 47 % of the whole area in 1989. The government of Laos attempted to ban the logging in 1991, due to shifting cultivation and illegal logging, however, forest areas continue to decrease and this causes loss of biological diversity and soil degradation.

The government classifies the forests into such five categories as protection forest, conservation forest, production forest, regeneration forest and degraded forest land or barren land. Under these classification, the government of Laos promotes a zoning system. There are twenty zones assigned according to this classification, the total area of which is about 3,170,000 ha or 12.85% of the whole country or accounts for 25% of the total forest areas (Department of Forestry, date unknown).

Forest Area and coverage

	1940	1963	1973	1989
Forest Area (million ha)	17	15	13	11.2
Forest coverage (%)	70	64	54	47

Forest Coverage and Decreasing Rate by Region

Region	Forest coverage (%)		Lost Area (1,000 ha)	Decreasing rate (%)
	1982	1989		
Northern region	38.8	36.3	202.6	2.1
Central region	54.3	51.7	187.7	2.6
Southern region	59.5	58.3	78.6	1.2
Total	49.1	47.2	468.9	2.0

Source: Ref. a)

Relevant Organization
Department of Forestry and Environment, Ministry of Agriculture and Forestry

Source: Ref. a)

Laws and Regulation	Existence	Title or References
Forest Conservation Law	○	Forestry Law 1996, Forestry and Land Use Management Decree, Council of Minister Decree 117 Management and Use of Forests and Forest Land, Decree No 66 Prime Minister's Decision on the approval of the Tropical Forestry Action Plan of Lao PDR, Council of Minister Decree No67 Cessation of wood exploitation, Council of Ministers Decree No52, Council of Ministers Decree No14 Order of the Council of Ministers Concerning Wood and Forest Business, Council of Ministers Decree No74 Concerning the Protection of Forests, Council of Ministers Decree No001 Prohibition of Wood species for Cutting, Council of Ministers Decree No24 Forest and related resources protection
Laws and Regulation on Protected Area	○	Animal and Plant Protection Law
Laws on Prevention of Desertification	?	

Notes) ○ : Exist × : No exist : under development ? : Not identified

4.9 Biodiversity

The exceptional biodiversity remaining in Laos could be the country's premiere natural characteristic: e.g., two new genera of large mammals were recently identified from regions along the Lao-Vietnam boarder (UNDP, 1997). However, according to UNDP (1997), these rich biodiversity are being exploited.

Although Lao PDR has special conservation area of wildlife called National Biodiversity Conservation Areas which consist of 12.5 % of the land areas, these conservation areas are "likely to yield over to hydropower, to high-impact tourism (i.e., casinos and golf courses), to logging, to roadways, to agriculture or livestock, and possibly even to mining and industrialization" (UNDP 1997:4). It is also reported that there is an extensive illegal trade in wildlife taking place across the border with Thailand (Ministry of Science and Technology, 1991).

Excessive logging caused loss of 70% of wildlife's habitat. 2/3 of water shed is endangered. According to "Wildlife and Mekong project" published by the Mekong Committee, 212 species of mammals, 696 species of birds, 213 species of reptiles live in the Mekong basin. 34 species are indigenous to the basin. 3 species of Gibbons and 10 species of Monkeys are included. For example, Douc Langur is endangered.

Indigenous animals in the Mekong basin are the followings

Mammals: Northern Smooth-tailed Treeshrew, Marshall's Horseshoe Bat, Bourret's Horseshoe Bat. Douc langur, Francois Langur, Lesser Slow Loris, Pileated Gibbon, Lao Marmoset Rat, Owston's Civet, Kouprey

Birds: Chestnut-headed Partridge Sooty Babbler, Imperial Pheasant, Short-tailed Scimitor Babblers, German's Peacock-pheasant, Gray-faced Tit-babbler, Red-vented Barbet, Bar-bellied Pitta, Yellow-billed Nuthatch, Collared Laughing Trush, Gray-crowned Crocias, White-cheeked Laughing Trash

Number of Known Species and Endangered Species in 1998

Category	Known Species	Endangered Species
Mammals	172	25
Birds	651	23
Reptiles	66	15
Amphibian	37	1
Fish	244	3
Higher Plants	9,743	3

Source: Ref. a), g)

Relevant Organization
Department of Forestry and Environment, Ministry of Agriculture and Forestry

Source: Ref. a)

Laws and Regulation	Existence	Title or References
General Law for Conservation of Fauna and Flora	○	Council of Ministers Decree No24 Forest and related resources protection, Ministry of Agriculture and Forestry Execution of Council of Minister's Decree No118 on the Management and Protection of Wildlife, Hunting and Fishing
Laws and Regulation on the Conservation of Species	○	Council of Ministers Decree No 185
Laws and Regulation on Hunting	○	Council of Minister Decree 118 Management and Protection of wild animals Fisheries and Hunting and Fishing
Laws and Regulation on Protected Area	○	
Definition in the Red Data Book	?	

Notes) ○ : Exist × : No exist : under development ? : Not identified

4.10 Natural Resources

(1) Land Use

Area and shares by land use category is shown in the table below.

Area and Shares by Land Use Category (1996)		
Category	Area (km ²)	Share (%)
Cropland	8,490	4
Pasture land	14,490	6
Forest	111,680	47
Others	102,190	43

Source: Ref. a)

Relevant Organization

Source: Ref.

Laws and Regulation	Existence	Title or References
General Law on Natural Resources Management	?	
Laws on Mineral Resources Management	?	
Laws on Grand Resources Management	?	
Laws on Fishery Resources	?	

Notes) ○ : Exist × : No exist : under development ? : Not identified

4.11 Natural Disaster

Droughts and floods are major natural disasters. Floods occur mainly in the central plain where 65 % of the population live. Damage tends to expand in recent years because of the urbanization.

Droughts tend to occur in the northern region such as in Luang Namtha, Bokeo, Oudomxay, Xayabury, Xieng Khouang, where country's 20 % of the population gather. In these areas, shifting cultivation is popular and harvest is small. Once droughts occur it causes serious problem.

Destroyed rice area by natural disaster (ha)

Name of provinces	1996	1997
Vientiane Mun	269	2,860
Phongsaly	393	800
Luangnamtha	...	45
Oudomxay	...	5,030
Bokeo	128	...
Luangprabang	177	540
Huaphanh	1,046	2,020
Xayabury	49	110
Xiengkhuang	...	...
Vientiane	185	4,730
Borikhamxay	3,998	5,870
Khammuane	17,266	6,900
Savannakhet	21,274	8,305
Saravane	2,110	800
Sekong	280	250
Champasack	19,003	5,750
Attapeu	2,327	200
Xaysomboon SR	175	...

Source: Ref. a)

Relevant Organization

Source: Ref. a)

Laws and Regulation	Existence	Title or References
Laws on Natural Disaster Control	?	

Notes) ○ : Exist × : No exist : under development ? : Not identified

4.12 Environmental Education

Awareness raising concerning environment is starting to develop in three target groups: public awareness sector, formal education sector and non-formal education sector (The World Bank, 1993). In the public level, community based resource management and consultation is in progress. In the formal education, curriculum with the contents of environmental issues will be developed in the near future. This will be integrated science curriculum which focuses on the relationship between people, animals, plants and the natural world (The World Bank, 1993).

STEA is organizing workshops upon request in villages to promote environmental awareness among the villagers. However, due to lack of qualified staff and budget, primary plan for environmental education is being delayed.

Source: Ref. a)

Relevant Organization
Ministry of Education

Source: Ref. a)

Laws and Regulation	Existence	Title or References
Education Law	○	Environmental Protection Law, No.02/99, April 1999
Guidelines for the Environmental Education	×	

Notes) ○ : Exist × : No exist : under development ? : Not identified

5. International Relations

5.1 Global or Trans-boundary Issues

(1) Mekong River

Mekong river originates at Tibetan highland and flow through China, Myanmar, Laos, Thailand, Cambodia and Vietnam, and into the South China Sea. Therefore, development activity in the basin should be systematic and sustainable. Cooperation between the relevant countries are required. The Mekong Committee was established with the support of ESCAP, and coordinating the development activities in the Mekong basin. The head office of the Mekong Committee is placed in Bangkok, Thailand. Also, Lao National Mekong Committee was established in Vientiane.

5.2 Conventions Ratified or Signed concerning Environment

Convention	Ratified
1) Convention on Biological Diversity : CBD	1996
2) Framework Convention on Climate Change : FCCC	1999
3) Vienna Convention for the Protection of Ozone Layer	1998
4) Convention concerning the Protection of the World Cultural and Natural Heritage : World Heritage Convention	1972
5) Convention on Combat to Desertification	No data
6) United Nations Convention on the Law of the Sea	No data
7) Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques	No data
8) Treaty Banning Nuclear Weapons Test in the Atmosphere in Outer Space and Under Water	No data

Source: Ref. a), g)

5.3 International Donor's Project on Environment

Donor Country	Duration	Projects and related Institution
NORAD/UNDP	1996-99	Promotion of Environmental Law
NORAD/UNDP	1996-97	Monitoring and control of waste water pollution in urban area
DANIDA/UNDP	1998-00	Formulation project on national biodiversity strategy and action plan
GEF/UNDP	1995-97	Lao national greenhouse gas inventory project
SIDA	1998	Project on solar energy
CIDA	1998	Project on solar energy
GTZ		Environment workshop project
ADB/EVS		Environment workshop project
UNDP/ESCAP		Participatory development program on environment and social issues
NRCT		Protecting resource and environment in Vientiane and Savannakhet Province

Source: Ref. a)

6. Information Sources

Sector	Institution	Contact Person	Address
Air Pollution	Science, Technology and Environment Agency		P.O.Box 2779 Tel: 213470 Fax: 213472
	Ministry of Agriculture and Forestry	Department of Forestry and Environment	Tel: 214455 Fax: 219512
Water Pollution	Science, Technology and Environment Agency		P.O.Box 2779 Tel: 213470 Fax: 213472
	Ministry of Agriculture and Forestry	Department of Forestry and Environment	Lane Xang Rd. Vientiane Tel: 214455 Fax: 219512
Solid Waste	Ministry of Communication, Transport, Posts and Construction	Cleansing Division	
	Ministry of Public Health	National Institute for Hygiene and Epidemiology	
Energy Conservation Alternative Energy	Ministry of Industry and Handy Crafts	Electricite du Laos	Nang Borne Rd. Vientiane P.O.Box 4708 Tel: 214143
Water Supply	Ministry of Communication, Transport, Posts and Construction	Nampapa Lao (Lao Water Supply Company)	
	Ministry of Public Health	Institute of Clean Water	
Wastewater	Ministry of Communication, Transport, Posts and Construction		
	Ministry of Public Health	National Institute for Hygiene and Epidemiology	
Forest Conservation	Ministry of Agriculture and Forestry	Department of Forestry and Environment	Lane Xang Rd. Vientiane Tel: 214455 Fax: 219512
Biodiversity	Ministry of Agriculture and Forestry	Department of Forestry and Environment	Lane Xang Rd. Vientiane Tel: 214455 Fax: 219512
Environmental Education	Ministry of Education		Lane Xang Rd. Vientiane Tel: 214722

Source: Ref. a)

7. References

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- c) World Development Report, 1999, The World Bank
- d) The World Fact Book 1999, CIA
- e) Human Development Report 1999, UNDP
- f) JICA Annual Report, 1999, JICA
- g) Country Profile on Environment, Laos, 1997, JICA