

Profile on Environmental and Social Considerations in Lao P.D.R.

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Abbreviations and Acronyms

ADB	Asian Development Bank
ADPC	Asian Disaster Preparedness Centre
ADRA	Adventist Development and Relief Agency
AIDS	Acquired Immunodeficiency Syndrome
AIPP	Asia Indigenous Peoples Pact
AIT	Asian Institute of Technology
AJC	ASEAN Japanese Center
APPF	Asia Pacific Parliamentary Forum
ASEAN	Association of Southeast Asian Nations
BBC	British Broadcasting Corporation
BCCI	Biodiversity Conservation Corridor Initiative
BOCM	Bilateral Offset Credit Mechanism
CAI-Asia	Clean Air Initiative for Asian Cities
CBD	Convention on Biological Diversity
CCO	Climate Change Office
CDM	Clean Development Mechanism
CEDAW	Convention on the Elimination of All Forms of Discrimination against Women
CHM	Clearing House Mechanism
CI	Conservation International
CIA	Central Intelligence Agency
CITES	Convention on International Trade in Endangered Species
CMS	Convention on the Conservation of Migratory Species of Wild Animals
CRC	Convention on the Rights of the Child
CSEC	Commercial Sexual Exploitation of Children
DESA	Department of Economic and Social Affairs
DHUP	Department of Housing and Urban Planning
DLF	Department of Livestock and Fisheries
DMS	Detailed Measurement Survey
DOE	Department of Environment
DoF	Department of Forestry
DoG	Department of Geography
DoI	Department of Irrigation
DOR	Department of Roads
DOS	Department of Statistics

DONRE	Department of Natural Resources and Environment
DPADM	Division for Public Administration and Development Management
DPRA	Development Project Responsible Agency
EA	Environmental Assessment
ECC	Environment Compliance Certificate
EDL	Electricity du Lao PDR
EFA	Education for All
EIA	Environmental Impact Assessment
EMDP	Ethnic Minority Development Plan
EMMP	Environment Management and Monitoring Plan
EMMU	Environment Management and Monitoring Unit
EPL	Environmental Protection Law
EQMHCC	Environment Quality Monitoring Hazardous Chemical Center
ESD	Environmental and Social Division (under PWTI)
ESDF	Education Sector Development Framework
ESIA	Environmental and Social Impact Assessment
ESP	Environment and Social Program
FAO	Food and Agriculture Organisation
FCPF	Forest Carbon Partnership Facility
FDI	Foreign Direct Investment
FMD	Food Management Division
FPIC	Free, Prior and Informed consultation
GIZ	German Society for International Cooperation
GLs	Government Laws
GMS	Greater Mekong Sub-region
GoL	Government of Lao PDR
GRC	Grievance Redress Committee
GRIP	Global Risk Information Platform
GRM	Grievance Redress Mechanism
HIV	Human Immunodeficiency Virus
IBA	Important Bird Area
ICCPR	International Covenant on Civil and Political Rights
ICEM	International Centre for Environmental Management
ICH	Intangible Cultural Heritage
IED	Industrial Environment Division
IEE	Initial Environment Examination
IFAD	International Fund for Agricultural Development

ILO	International Labor Organisation
IMR	Infant Mortality Rate
INGOs	International Non-Governmental Organisations
INTRACERN	International Trade Centre
IPCC	Intergovernmental Panel on Climate Change
IPP	Indigenous Peoples Plan
IPPF	Indigenous Peoples Planning Framework
IRIN	Integrated Regional Information Networks
ISA	Initial social assessment
ITUC	International Trade Union Confederation
IUCN	International Union for Conservation of Nature
IWGIA	International Work Group for Indigenous Affairs
IWMU	Integrated Watershed Management Unit
JBIC	Japan Bank for International Cooperation
JCM	Joint Crediting Mechanism
JICA	Japan International Cooperation Agency
LDC	Least Developed Country
LDPA	Lao Disabled People's Association
LFNC	Lao Front for National Construction
LGBT	Lesbians, Gays, Bisexual and Transgender
LNCCI	Lao National Chamber of Commerce and Industry
LNMC	Lao National Mekong Committee
LPRP	Lao People's Revolutionary Party
LSFP	Lao-Swedish Forestry Programme
LSMP	Legal Sector Master Plan
LTFU	Lao Federation of Trade Union
MAF	Ministry of Agriculture and Forestry
MDG	Millennium Development Goals
MEK-WATSAN	Mekong Region Water and Sanitation
MIH	Ministry of Industry and Handicrafts
MOEJ	Ministry of Environment Japan
MOFA	Ministry of Foreign Affairs
MoH	Ministry of Health
MoLSW	Ministry of Labor and Social Welfare
MONRE	Ministry of Natural Resources and Environment
MOST	Ministry of Science and Technology
MPI	Ministry of Planning and Investment

MPWT	Ministry of Public Works and Transport
MW	Medical Waste
NA	National Assembly
NAFRI	Natural Agriculture and Forest Research Institute
NAPA	National Adaptation Programme of Action
NATO ASI	North Atlantic Treaty Organisation Advanced Study Institute
NBCA	National Biodiversity Conservation Areas
NBSAP	National Biodiversity Strategy and Action Plan
NCAW	Commission for the Advancement of Women
NCCR	National Centre of Competence in Research
NCEHWS	National Center for Environmental Health and Water Supply
NCRDPE	National Committee for Rural Development and Poverty Eradication
NEC	National Environment Committee
NGO	Non-Governmental Organisation
NGPES	National Poverty Eradication Strategy
NLMA	National Land Management Authority
NMA	National Management Authority
NREO	Natural Resources and Environment Offices
NSEDP	National Socio-economic Development Plan
NTFP	Non-Timber Forest Products
ODA	Official Development Assistance
OSH	Occupational Health and Safety
OSHNET	Occupational Health and Safety Network
PAP	Project Affected Person
PCPD	Public Consultation, Participation and Disclosure
PRF	Poverty Reduction Fund
PMO	Project Management Office
PMU	Project Management Unit
PWTI	Public Works and Transport Institute (of MPWT)
RAP	Resettlement Action Plan
RDC	Rural Development Committee
REDD	Reducing Emissions from Deforestation and Forest Degradation
ROW	Right-of-Way
RP	Resettlement Plan
RRC.AP	Regional Resource Centre for Asia and the Pacific
SA	Social Assessment
SDC	Swiss Agency for Development and Cooperation

SEA	Strategic Environmental Assessment
SEMD	Social Environmental Management Division
SME	Small- and Medium-Sized Enterprises
SMMP	Social Management and Monitoring Plan
SSO	Social Security Organisation
STEA	Science, Technology and Environment Agency
STENO	Science, Technology and Environment Organisation
TG	Technical Guidelines
TGCR	Technical Guidelines on Compensation and Resettlement of People Affected by Development Projects
TOR	Terms of Reference
UDHR	Universal Declaration of Human Rights
UN	United Nations
UN OCHA	United Nations Office for the Coordination of Humanitarian Affairs
UNCRD	United Nations Center for Regional Development
UNCRPD	United Nations Convention on the Rights of Persons with Disabilities
UNDP	United Nations Development Programme
UNDRIP	UN Declaration on the Rights of Indigenous Peoples
UNEP	United Nations Environment Programme
UNEP-WCMC	United Nations Environment Programme-World Conservation Monitoring Centre
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNFCCC	United Nations Framework Convention on Climate Change
UNHCR	UN High Commissioner for Refugees
UNPO	Unrepresented Nations and Peoples Organisation
USDS	United States Department of States
UXO	Unexploded Ordnance
WAD	Waterway Administration Division
VMU	Village Mediation Unit
WASA	Water Supply Authority
WB	World Bank
WCD	World Commission on Dams
WCS	Wildlife Conservation Society
WEPA	Water Environment Partnership in Asia
WHO	World Health Organisation

WRCC	Water Resources Coordination Committee
WREA	Water Resources and Environment Agency
WREI	Water Resources and Environment Institute
WWF	World Wide Fund for Nature

Executive Summary

In 2010, Japan International Cooperation Agency (JICA) announced its new JICA guidelines for environmental and social considerations. The guidelines present JICA's objectives and goals related to environmental and social considerations. The new guidelines address some key points, including the strengthening of the requirements for resettlement, the considerations for indigenous peoples, and information disclosure. According to JICA's Assistance Policy, the Official Development Assistance in Lao PDR should help promote socio-economic development and narrow the development gap with other countries in the region through projects in sectors such as economic and social infrastructure, agriculture, forest conservation, and healthcare services. In order to guarantee that these projects follow JICA's guidelines and local regulations, a country profile for environmental and social considerations in Lao PDR was prepared. The profile is expected to serve as a source of information that can be used to integrate environmental and social considerations into the design of future projects in Lao PDR.

To ensure that all relevant information is covered, a literature review of relevant regulations, a revision of historical projects, interviews with local experts, and consultations with relevant agencies were conducted. A review of other donors' projects was also conducted to identify potential gaps between their safeguard policies and local regulations.

What follows is a key summary of the research conducted on environmental and social considerations in Lao PDR.

1. Summary of Environmental Considerations

The Lao People's Democratic Republic, also known as Lao PDR, is located in central South East Asia. It is a land-locked country surrounded by Cambodia, China, Myanmar, Thailand, and Vietnam. Although Lao PDR has a remarkable range of natural resources and environmental riches such as forestry, minerals, water resources, and biodiversity, it is classified as a poorly developed country (Further details in Section 1.1).

Lao PDR can be divided into three physiographic units with differing agro-climatic characteristics:

- The Northern Highlands with mountainous topography between 500–2,000 m of altitude. This region has a moist-to-dry sub-tropical climate;
- The Annamite Range (Saiphou Louang) with mountainous topography between 500–2,000 m of altitude and a tropical monsoon climate; and

- The Mekong Plain which has a tropical monsoon climate (Section 1.1.2).

The main rivers of Lao PDR dominantly consist of the first and second tributaries of the Mekong River. In addition, the Nam Ma and Nam Ka rivers, located outside of the Mekong river basin drain through Vietnam directly into the South China Sea. In general, the water quality of the rivers within Lao PDR is considered good based on international standards. Since industrial development in Lao PDR is still in its initial stages, there has not yet been any significant impact on the water environment. However, water quality is increasingly deteriorating due to rapid demographic growth, socio-economic development and urbanisation (Section 1.1.4). In Lao PDR, the main use of the water supply is for agriculture, which takes up 82% of total water use; 10% of water is used for industry, and 8% is used for domestic purposes. Groundwater is the main source of water in rural areas. The main sources of pollution include poor sanitation and the lack of sewerage facilities (Section 3.4). The Government of Lao PDR has created several ministries and agencies to deal with water issues (Section 3.4.2).

According to the classification of the Department of Geology, ‘mixed deciduous’ forests covering 37% of the total land area of Lao PDR dominated land use, followed by ‘un-stocked forests’ covering 32% of the land. This type of mixed deciduous land use is equally distributed across the country with higher portions in the northern and southern regions of the country. The northern region of Lao PDR is made up of steep mountain ranges that are mostly covered by forests, while the central region is known for its extensive caves and limestone landscapes. The southern part is dominated by the Mekong delta and includes most of the country’s population and agriculture (Section 1.1.5).

Forest cover has drastically declined from 70% to 43% over the last 50 years. Quality has also deteriorated, with dense forests declining from 29% in 1992 to 8.2% in 2002 and open forests increasing from 16% to 24.5%. The main causes of deforestation are the conversion of forests to plantations and cash crops by commercial companies, hydropower, mining, infrastructure development, illegal logging, and shifting cultivation (Section 3.1).

Rapid urbanisation, increasing industrial pollution, and highway construction pose additional threats to the urban environment. Poor vehicle and road maintenance are the main causes of air quality problems that Lao PDR is currently experiencing. The problems mainly stem from the large percentage of two-stroke-engine motorcycles (78%) on the road, 57% of which are registered in Vientiane (Section 3.3.1). The monitoring of air pollutants and the legal framework for managing air pollution are also unsatisfactory. Outdoor air pollution monitoring is performed for only three consecutive days in a year (Section 3.1). Lao PDR has ambient air quality standards. However, the compilation of emissions inventories is not performed routinely. The last

monitoring was conducted in three sites in Vientiane during the period March–April 2004 (Section 3.3.1).

Lao PDR is the country with the highest Unexploded Ordnance (UXO) contamination per capita in the world, as a result of extensive bombing between 1964 and 1973. Generally, apart from the direct threat UXO poses to human life and people’s activities, it endangers natural resources and the environment through soil, water, and air pollution (Section 3.1)

The Government of Lao PDR, since its establishment in 1975 and the adoption of a new constitution in August 1991, has created a number of laws and regulations to cope with these environmental issues. The 1999 Lao Environmental Protection Law (EPL) established a framework for the management of environmental resources with the objective of conserving and facilitating the sustainable use of natural resources. The Ministry of Natural Resources and Environment (MONRE) is currently responsible for EPL implementation (Section 5.1).

The 1999 EPL was amended on 18 December 2012. It states that persons, households, legal entities, and organisations have commitments to protecting, improving, rehabilitating, controlling, monitoring, and inspecting the environment. It sets regulations to avoid creating impacts on the environment and causing degradation and pollution levels that exceed the Pollution Control Standards and the National Environmental Quality Standards. The law aims to ensure good quality of the environment and sustainable development.

Article 5 of EPL states that investments into cleaner technologies are to be promoted through a variety of policy-based incentives and tax reductions based on new regulations. The article also mentions that the State is to promote the rehabilitation of both social and natural environments through regulations, awareness raising campaigns and in strictly implementing the regulations, policy and measures that seek to protect the environment. The amended EPL also mentions the requirement to implement initial environment examination (IEE), environmental impact assessment (EIA), and strategic environmental assessment (SEA) when applicable. The EIA report including the Environmental and Social Management and Monitoring plans shall be approved by MONRE prior to initiating investment projects and activities.

The IEE or EIA must cover the impacts on antiquities, cultures, and customs/traditions, plan solutions for negative impacts on the environment and society, and encourage the participation of the people who will be affected by the investment project and other stakeholders in the discussion process. (Section 5.2)

While policies in Lao PDR are consistent with international standards, there are marked gaps

between policy and implementation. Coordination among EIA proponents, consultants, relevant ministries, local authorities, planners, decision-makers and other stakeholders is generally weak in Lao PDR. Possible ways forward should consider the institutional framework, the roles of particular actors, and the EIA procedure itself.

2. Summary of Social Considerations

According to the 2005 census, the estimated population of Lao PDR was 5.62 million as of March 2005. The latest estimate by the Central Intelligence Agency (CIA) puts the total population number at 6,695,166 as of July 2013. About 50% of the population was younger than 20 years old in 2005. (Section 1.1.6)

The steady improvement in poverty alleviation and consequent decline in poverty in the past 15 years has been attributed to the robust growth of the country's economy (Section 4.4.1). However, gender inequality remains a significant issue across the country's different geographic areas and ethnic groups. Women in rural areas of Lao PDR face a lack of awareness about maternal health and malnutrition, and education inequality. Low-quality education and consistent dropout rates among girls in rural areas have ranked Lao PDR as one of the lowest performers in the East Asia Pacific region in girls' education. In addition, violence against women is widespread. (Section 4.4.3)

Lao PDR is a very diverse, multi-ethnic country. The 2005 census identified 49 different ethnic groups. About 55% of the population is comprised of Lao people, 11% of Khmu indigenous people, and 8% of Hmong group, while the rest is formed from smaller percentages of the remaining ethnic groups. However, according to the CIA, over 100 minor ethnic groups exist in Lao PDR. The majority of the population are Buddhists, as are the populations of Lao PDR's regional counterparts (Section 1.1.6).

The first constitution was adopted in 1991 and amended in 2003 to meet socio-economic development needs and encourage regional and international cooperation and integration. The constitution clearly established that Lao PDR is a people's democratic state where all powers belong to the people, are exercised by the people and serve the interests of Lao's multi-ethnic people. The rights of Lao's multi-ethnic people are exercised and guaranteed through the political system (Section 1.2). Article 8 of the constitution (2003) guarantees that the state will not discriminate against people based on ethnicity and provides ethnic groups with the right to maintain their traditions and improve their culture. The government of Lao PDR, however, does not recognise the existence of indigenous peoples and refers to all ethnic groups as 'tribal' (Section 7.2). Generally, ethnic Lao receive more development benefits than indigenous peoples

while groups such as the Hmong ChaoFa live in poverty and face arbitrary arrest and torture due to the group's opposition to the Pathet Lao during the Vietnam War, their participation in the 'Secret War', and their collaboration with American forces (Section 7.5.3).

One issue regarding ethnic minorities in Lao PDR is that while state laws are uniform, consistent, and predictable, they cannot be implemented in the same way throughout the country because of a normative gap between state law and customary law, which in some communities, is more compelling than state law (Section 7.5.1)

Another social consideration for project implementation is involuntary resettlement and its negative impacts before the initiation of the project, during its development and after its completion. The constitution states that land is a national heritage. The Land Law (2003) clarifies that groups or individuals can acquire land legally in 3 ways: allocation by the state, transfer (defined as 'sale, transfer, or exchange'), and inheritance (Section 6.1).

In Lao PDR, the compensation principles and policy framework for land acquisition and resettlement are governed by the following laws, decrees, and regulations:

- Constitution (2003);
- Land Law (2003);
- Road Law (1999);
- Forestry Law (2007);
- Decree of the Prime Minister on Compensation and Resettlement of People Affected by Development Projects (Decree 192/2005);
- The new, improved decree 699/PMO-Water Resources and Environmental Agency on Compensation and Resettlement of the Development Projects (2010);
- PM Implementation Decree 101/PM, 20 April (2005);
- PM Decree on the Implementation of the Land Law No 88, 03 June (2008);
- Mining Law (1997);
- Law on Investment Promotion (2009); and
- PM decree 135 on State Land Lease and Concession (2009).

Regarding aspects related to involuntary resettlement involving ethnic minorities, while the legal framework in Lao PDR does not recognise the term indigenous peoples, there are many references on indigenous peoples and ethnic minority groups in Decree 192 and Technical Guidelines on Compensation and Resettlement of People Affected by Development Projects (2010), which was prepared based on international donors' policies such as World Bank or ADB. Contradictions with the donors' policies have been rarely identified; one example is that the legal instruments do not clearly stipulate the requirements for free, prior, and informed consultation

(Section 7.6).

Overall, the legal framework in Lao PDR is very strong and mostly consistent with the multi-lateral donors' safeguard policies, such as World Bank's provisions for information disclosure and monitoring. In addition, Article 13 of Decree 192/PM requires development projects to establish an effective mechanism for grievance resolution (Section 6.3.1). Despite this, implementation and enforcement are reportedly very weak. Major issues and challenges therefore arise mostly during the implementation stage. While capacity-building support for the government has been conducted by several donors, it is still not enough and many projects receive a number of complaints by affected people about issues such as compensation and mitigation measures that were not delivered in a timely manner (Section 6.4).

There is also an initiative to update Decree 192 (Decree of the Prime Minister on Compensation and Resettlement of People Affected by Development Projects). It is expected to be finalised in 2014, after the review of the current EIA decree is completed.

Chapter 1

Country Overview

1 Country Overview

1.1 Overview

1.1.1 Map of the Country



Source: UN (2004)

Figure 1.1.1: Map of Lao PDR

1.1.2 Location and Topography

Lao People's Democratic Republic, also known as Lao PDR, is located between latitudes 13° and 23° N and longitudes 100° and 108° E. It occupies an area of 236,800 km². Situated in central South East Asia, Lao PDR is a landlocked country surrounded by Cambodia, China, Myanmar, Thailand, and Vietnam. Vientiane is the nation's capital and largest city in Lao PDR.

Although Lao PDR has a remarkable range of natural resources and environmental riches such as forestry, minerals, water resources, and biodiversity, the international 'development lexicon' classifies Lao PDR as a poorly developed country because of its low income, low quality of life and economic vulnerability (UN 2011).

Lao PDR can be divided into three physiographic units with differing agro-climatic characteristics: the Northern Highlands, the Annamite Range (known as Saiphou Louang in Lao PDR) and the Mekong Plain (ICEM 2003). These physiographic units are shown in Figure 1.1.2.

The Northern Highlands feature a rugged mountainous topography between 500–2,000 m of altitude. Only 6% of the area has a slope below 20%, while 50% of the area has a slope exceeding 50%. This region has a moist-to-dry sub-tropical climate with annual rainfall between 1,500–2,000 mm. The soil in this region is heavily leached and acidic with a low water retention capacity and generally low fertility (ICEM 2003).

The Annamite Range consists of mountainous topography between 500–2,000 m of altitude and has less rugged terrain than the Northern Highlands. This region has a tropical monsoon climate with annual rainfall between 2,500–3,500 mm. The soil in this region is generally similar to soil in the north (ICEM 2003).

The Mekong Plain is the river plain along the Mekong and its larger tributaries. This region has a tropical monsoon climate similar to the Saiphou Louang but with varying rainfall. The Mekong Plain has flat upper levees with recent alluvial deposits that are acidic and shallow. The younger alluvial soils of the floodplain are fertile but are often subject to wet season inundation (ICEM 2003).



Source: Duckworth et al. (1999)

Figure 1.1.2: Three Physiographic Units in Lao PDR

1.1.3 Climate

The climate in Lao PDR is seasonally tropical, with a pronounced wet and dry season. The lowest levels of mean annual rainfall are about 1,300 mm in the northwest, while the highest levels are well above 4,000 mm in the southern Annamite range. The majority of the lowlands experience between 1,500–2,000 mm of rainfall annually. This amounts to 90.9% of the total rainfall in the rainy season (from May to October) and 9.1% of the rainfall in the dry season (from November to April) (MONRE 2012).

The temperature in Lao PDR changes from the northern region to the central and southern regions. The maximum temperature is approximately 33°C in March and April, and the minimum temperature is approximately 16°C in December and January.



Source: World Weather and Climate Information (2013)

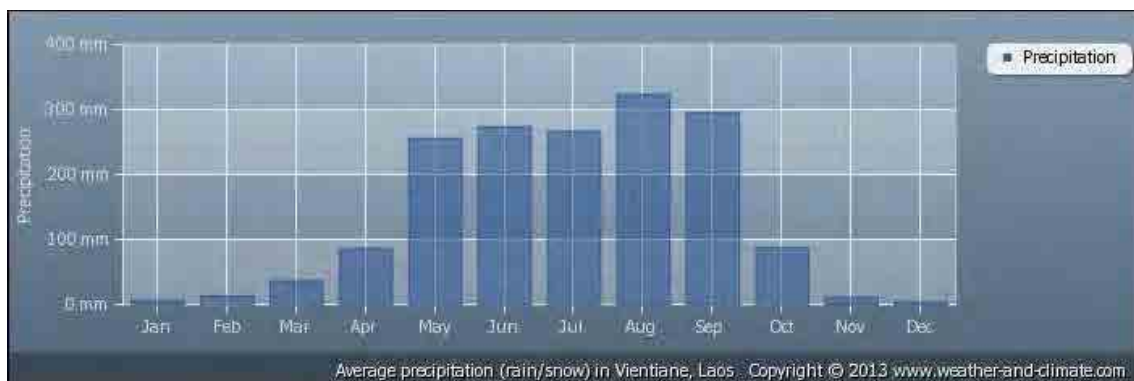
Figure 1.1.3: Average Minimum and Maximum Temperatures



Source: World Weather and Climate Information (2013)

Figure 1.1.4: Average Humidity

Lao PDR has a tropical monsoon climate with a pronounced rainy season from May to October, a cool dry season from November to February and a hot dry season in March and April. Generally, monsoons occur at the same time across the country, although that time may vary significantly from one year to the next. Monthly rainfall also varies regionally.



Source: World Weather and Climate Information (2013)

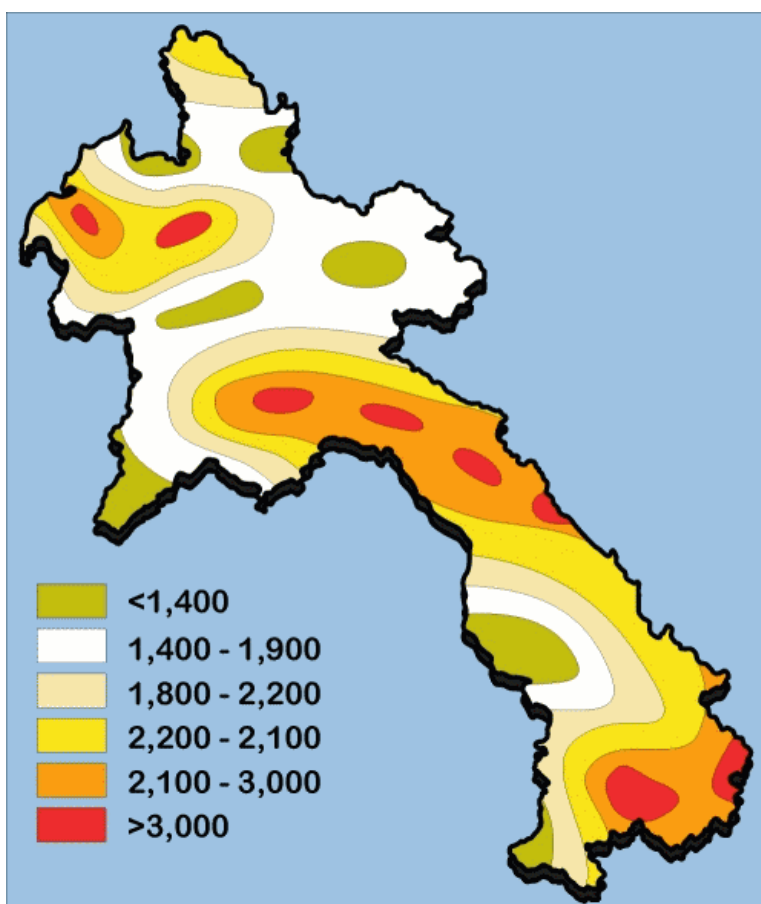
Figure 1.1.5: Average Monthly Precipitation



Source: World Weather and Climate Information (2013)

Figure 1.1.6: Average Monthly Hours of Sunshine

Rainfall measurement stations have recorded that Savannakhet averages 1,440 mm of rain annually, Vientiane receives about 1,700 mm and Luang Prabang receives about 1,360 mm. The northern part of Lao PDR and the highlands are wetter, with more than 3,000 mm of rainfall each year (World Weather and Climate Information 2013).



Source: Bayon Heritage Travel & Tours Co., LTD (2007)

Figure 1.1.7: Distribution of Annual Rainfall

1.1.4 River Systems

The main rivers of Lao PDR dominantly consist of the first and second tributaries of the Mekong River. There are about 39 main tributaries in the Mekong river basin. Main rivers with catchment areas bigger than 5000 km² are: Nam Ou River Basin (located in the Northern region), Nam Suang (Northern region), Nam Khan (Lang Prabang Province), Nam Ngum (the Northern-Central part), Nam Nhiep (Phongsavan in Xiengkhouang province), Nam San (Bolikhamxay Province), Nam Theun/Kading (Bolikhamxay Province), Sebangfay (Khammouane Province), Sebanghieng (Savannakhet Plain), Sedone (the Southern part), and Sekong (the South-Eastern part) (WEPA 2012).

Total watershed area of the main tributaries is estimated at about 183,000 km². Only 2 main rivers, Nam Ma and Nam Ka rivers, are located outside of the Mekong river basin and expand in the eastern area of Houaphan and Xieng Khuang provinces. Both drain through Vietnam directly into the South China Sea. Total watershed area of both rivers is approximately 13,000 km² (WEPA 2012).

General physical and hydrological characteristics of the main rivers and their catchment areas are as follows:

- 1) Nam Ou River is the longest in the northern region of Lao PDR. It originates at Ban Lantoug Gnai Village near the Lao-China border and flows to the south. It has a total length of 390 km up to the confluent point with the Mekong River. The total drainage area is 25,000 km² covering Phongsaly Province, one third of Udomxay Province, and one half of Loang Prabang Province. The annual discharge is 12,276,964,800 m³.
- 2) Nam Suang River with a length of 150 km has a source near Ban Sopkok Village at 1,482 m of altitude. It flows in the south-west direction for about 50 km and then turns to the west and finally south-west ward to enter the Mekong River. The drainage area is 5,800 km² with 76.4% of the catchment classified as mountainous, and 22.9% as hilly. The annual discharge is 3,654,076,320 m³.
- 3) Nam Khane River with a length of 935 km has its origin near Phou Nam Pa at an altitude of 1,828 m. It flows down a steep slope in the east-west direction to meet the Mekong River at Luang Prabang City at an altitude of 300 m. The drainage area is 6,100 km². The annual discharge is 29,454,624,000 m³.
- 4) Nam Ngum River, with a length of 1,403 km and drainage area of 17,000 km², is the largest river of Xieng Khouang and Vientiane Provinces and one of the major tributaries

of Mekong in Lao PDR. The river source is located in the Plain of Jars about 1,000–1,100 m of altitude above mean sea level. After joining with Nam Lik, the Nam Ngum flows down into the Vientiane Plain for about 80 km in a southerly direction to Tha Ngone, and then for another 80 km in an easterly direction to join the Mekong River at Pak Ngum District. The annual discharge is 23,021,280,000 m³.

- 5) Nam Nhiep River is a local name meaning quiet river. It originates from Phonesavanh Village in the Xieng Khuang plateau at an altitude of 1,050 m above mean sea level. The river flows in a southerly direction to meet an important tributary called Nam Siam near Ban Xiang Khong Village and changes to the southeast direction to meet another tributary, Nam Chian. From this point to its outlet near Paksan City, the river flows south for a distance of about 95 km. The length of Nam Nhiep is 156 km and its catchment area is 4,270 km². The annual discharge is 5,885,248,320 m³.
- 6) Nam Sane River, locally known as steep river, originates from Phou Sam Soum Mountain at an altitude of 2,620 m above mean sea level. It flows to the west-northwest through a group of villages around Ban Phouviang Village. It then flows down in the southwest direction to Ban Thathom Village, and continues to the south-southwest to meet the Mekong at Paksan City. The river is 120 km long with a catchment area of 2,230 km². The annual discharge is 4,271,235,840 m³.
- 7) Nam Theun/Kading River's upper part is in Khammouane Province while the middle and lower parts are in Bolikhamxay province in central Lao PDR. It has a number of tributaries. As illustrated in the stream flow map (Figure 1.1.8), the upper reaches in the plateau consist of Nam One, Nam Noy, and Nam Theun. They have a combined length of 138 km and a drainage area of 2,800 km² in total. The annual discharge is 7,027,166,880 m³. Nam Theun and its tributaries have many promising projects for flood control and hydropower.
- 8) Sebangfay River originates from a mountainous area with some peaks higher than 1,500 m. It flows down through a flat land around Mahaxay District of Khammoune Province, where an important 38.5 km long tributary named Nam Gong/ kathang diverges. The tributary drains to Gnommalath District. downstream of the Sebangfay Bridge, an area of up to 70,000 ha. The diistrict has a potential for agricultural activities and contains wetlands, consisting of freshwater lakes, river, ponds, rice paddy, and some freshwater marshes, with an area of around 125 km². It is believed that the constant year round

discharge of 13,623,552,000 m³ released from Nam Theun powerhouse will change the river morphology of the Sebangfay from Mahaxay to the confluence with the Mekong.

- 9) Sebanghieng River is situated in the southern part of Lao PDR, and adjoins the Sebangfay basin which extends immediately to the north. The two basins rank as the largest basins of the country. The Sebanghieng originates in the Lao-Vietnam border at elevations between 1,000–2,000 m. It flows westward with nine major tributaries, and then flows into the Mekong River at a point about 90 km downstream of Savannaket Province. It has a length of about 3,442 km. The total catchment area at the confluence with the Mekong is 21,516 km², and annual discharge is 15,673,392,000 m³.
- 10) Sedone River has a total length of 1,475 km. It originates in the north-eastern side of Bolaven Plateau near Thateng District at 800 m of altitude. The catchment area is 6,170 km², and annual discharge is 5,064,681,600 m³.
- 11) Sekong River originates near the Lao-Vietnam border at an elevation of 1,800 m. The length of the main stream to Attapu is about 170 km. The total catchments area is 10,500 km², and annual discharge is 16,146,432,000 m³ (WEPA 2012).

**Table 1.1.1: River Basin Areas and Annual Runoff
of the Major River Basins in Lao PDR**

No.	River Basin Name	Origin	Watershed/ Catchment area (km ²)	Annual Discharge (m ³)	Length of main stream (km)	Drainage area (km ²)
1.	Nam Ou	Ban Lantoug Gnai Village	19,700	12,276,964,800	390	25,000
2.	Nam Suang	Ban Sopkok Village	5,800	3,654,076,320	150	5,800
3.	Nam Khane	Phou Nam Pa	6,100	29,454,624,000	250	6,100
4.	Nam Ngum	Plain of Jars	16,500	23,021,280,000	1,403	17,000
5.	Nam Nhiep	Phonesavanh Village in Xiengkhuang plateau	4,270	5,885,248,320	156	
6.	Nam Sane	Phou Sam Soum	2,230	4,271,235,840	120	

No.	River Basin Name	Origin	Watershed/ Catchment area (km ²)	Annual Discharge (m ³)	Length of main stream (km)	Drainage area (km ²)
		Mountain				
7.	Nam Theun/Cading	Khammouane province	3,370	7,027,166,880	138	2,800
8.	Nam Sebangfay		8,560	13,623,552,000	190	
9.	Nam Sebanghieng	Lao-Viet Nam borders	19,400	15,673,392,000	370	
10.	Nam Sedone	North-eastern side of Bolaven Plateau	6,170	5,064,681,600	1,574	
11.	Nam Sekong	Lao-Viet Nam borders	10,500	16,146,432,000	170	

Source: WEPA (2012)

In general, the water quality of the rivers within Lao PDR and the Mekong is considered good relative to international standards. The oxygen level is high and the nutrient concentration is low. Sediment is the primary pollutant affecting rivers. Sedimentation loads in tributaries vary considerably from 41 tonnes/km²/year to 345 tonnes/km²/year. Tributaries and river reaches with high sedimentation are Nam Sebanghieng, Nam Sedone, Nam Ou, and the upper and lower stretches of the Mekong. However, water quality is deteriorating due to the pressures of rapid demographic growth, socio-economic development and urbanisation. In 1999, it was estimated that 35% of liquid effluent disposal from all sources to inland surface waters was treated. The actual quantity was unknown (WEPA 2012).

Since developments in Lao PDR are in their initial stages, there have not been any significant impacts on the water environment from industry and other developments yet. Coupled with the abundance of water per capita, the water resource status of the country for quality and quantity is good (WEPA 2012).



Source: Maps of world (2013)

Figure 1.1.8: Map of River Systems in Lao PDR

1.1.5 Land Use

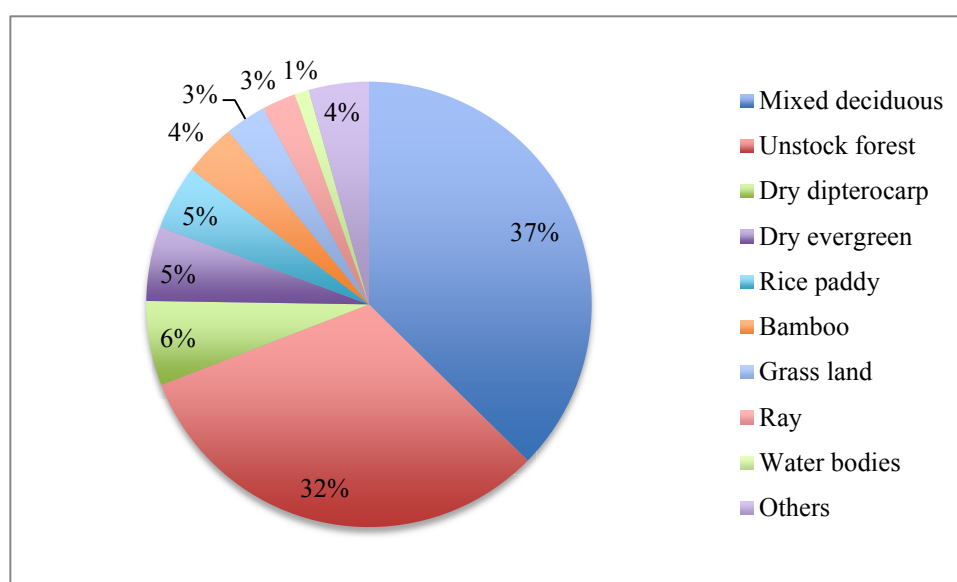
The Department of Geology classified land use/land cover into 19 categories (some of them are shown in Table 1.1.2). Land use is dominated by ‘mixed deciduous’, which covers 37.37% of the total area, followed by ‘un-stocked forest’ with 31.73% of the total area. This type of mixed deciduous land use is equally distributed across the country with higher portions in the

northern and southern regions of the country. The northern region of Lao PDR is made up of steep mountain ranges that are mostly covered by forests, while the central region is known for its extensive caves and impressive limestone landscapes. The southern part is dominated by the Mekong delta. This region includes most of the country's population and agriculture (Asian Disaster Preparedness Center 2010).

Table 1.1.2: Distribution of Land Use Types in Lao PDR

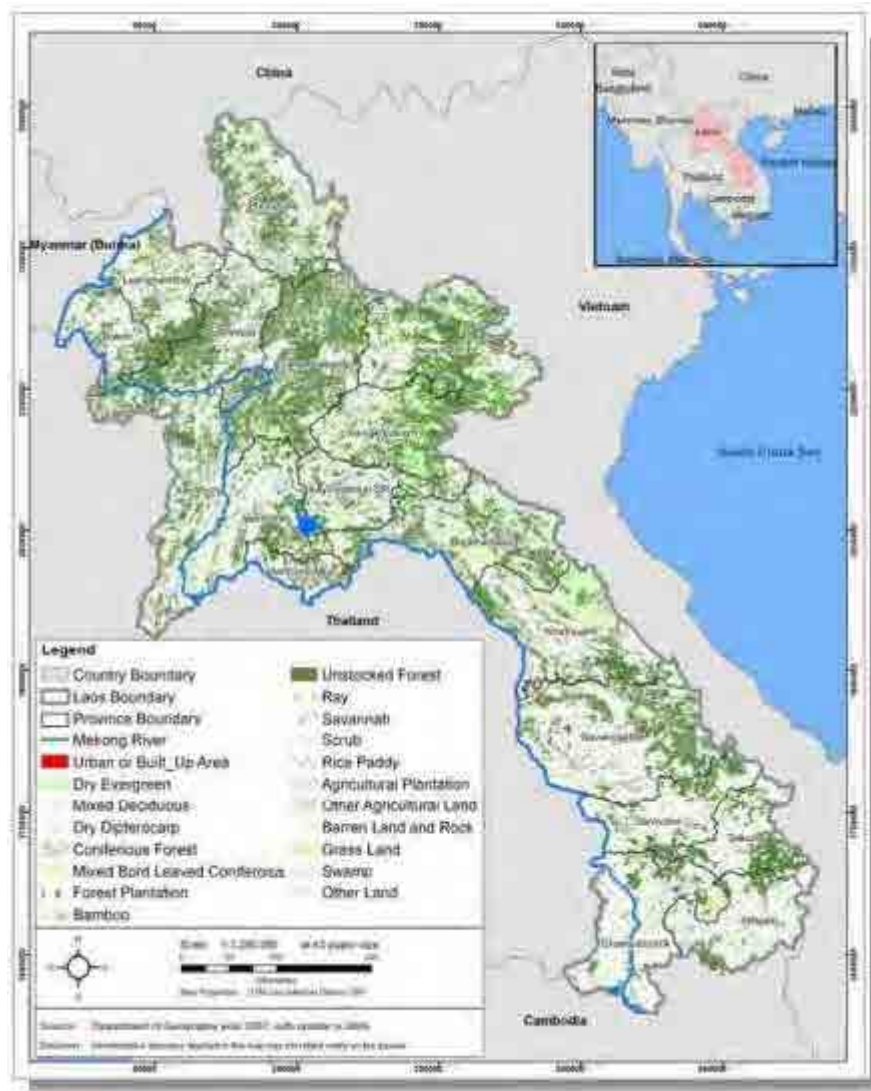
Type of land use	Area (km ²)	%
Mixed deciduous	85,692.54	37.37%
Unstock forest	72,758.53	31.73%
Dry dipterocarp	14,082.72	6.14%
Dry evergreen	12,362.61	5.39%
Rice paddy	10,783.25	4.70%
Bamboo	8,750.21	3.82%
Grass land	6,810.43	2.97%
Ray	5,643.61	2.46%
Water bodies	2,401.89	1.05%
Others	10,008.45	4.35%
Total	229,294.24	100%

Source: Asian Disaster Preparedness Center (2010)



Source: Asian Disaster Preparedness Center (2010)

Figure 1.1.9: Land use Distribution in Lao PDR



Source: Asian Disaster Preparedness Center (2010)

Figure 1.1.10: Land Use Map of Lao PDR

For further information on forests in Lao PDR, refer to Chapter 2.

1.1.6 Demographics

According to the 2005 census, the estimated population of Lao PDR was 5.62 million as of March 2005. The latest estimate by the Central Intelligence Agency (CIA) puts the total population number at 6,695,166 as of July 2013. About 50% of the population was younger than 20 years old in 2005. The population is estimated to have grown at a rate of 1.63% in 2013 (CIA 2013). The national average for population density was 28 people/km². Among provinces, Savannakhet had the largest population (825,879 as of March 2005 census) and the

capital city Vientiane had the highest density with 202 people/km². Lao PDR is a very diverse, multi-ethnic country. The 2005 census identified 49 different ethnic groups. About 55% of the population is comprised of Lao people, 11% of Khmu indigenous people, and 8% of Hmong group, while the rest is formed from smaller percentages of the remaining ethnic groups (Figure 1.1.11). However, according to the CIA, over 100 minor ethnic groups exist in Lao PDR. The majority of the population are Buddhists, as are the populations of Lao PDR's regional counterparts. Of the total population, 67% are Buddhists, 1.5% is Christians and the rest are either Muslims, Baha'is, or 'Other' (Figure 1.1.12). Lao is the official and most widely used language (CIA 2013). French, English and other ethnic languages are also used (APPF 2009, CIA 2013).

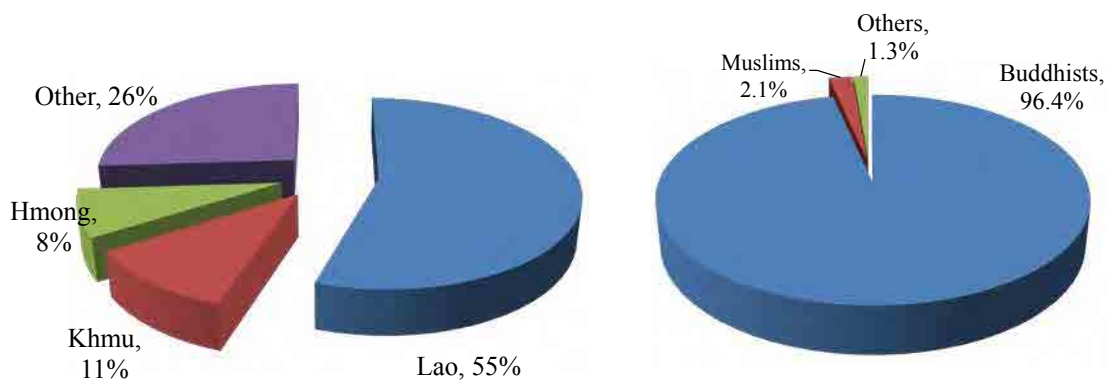


Figure 1.1.11: Ethnic Groups in Lao PDR

Figure 1.1.12: Religion in Lao PDR

1.2 Legal and Political Systems: Environmental and Social Considerations

Lao PDR adopted its first constitution in 1991 and amended it in 2003 to meet socio-economic development needs and encourage regional and international cooperation and integration. The constitution clearly established that Lao PDR is a people's democratic state where all powers belong to the people, are exercised by the people and serve the interests of Lao's multi-ethnic people. The rights of Lao's multi-ethnic people as masters of the country are exercised and guaranteed through the political system. Lao's multi-ethnic people chose this system based on the right to self-determination, through the election of the National Assembly that represents their powers and interests.

The administrative system in Lao PDR consists of organs of state powers, namely the National Assembly, the Government, the People's Courts and the People's Prosecutor Offices. In addition to the organs of state powers, other social and professional organisations operate in

the country, including the Lao Front for National Construction and mass organisations such as the Lao Federation of Trade Unions, the Lao People's Revolutionary Youth Union, the Lao Women's Union and the Federation of Military Veterans. These organisations aim to unite and mobilise Lao's multi-ethnic people of all social strata in carrying out protection and development tasks in the country to protect the rights and legitimate interests of the respective organisations' members.

The National Assembly is a state organ representing the rights and interests of Lao's multi-ethnic people. The National Assembly is the supreme organ of state powers and is the legislative branch with the power to make decisions about fundamental issues facing the country. This organisation also provides oversight for the activities of the executive organs, the people's courts and the offices of the people's prosecutors. The election of National Assembly members is carried out based on the principles of universality, equality, direct suffrage, and secret ballots.

The head of state is the President and is elected by the National Assembly with two-thirds of the votes of all members attending the session. The term of his office is five years, which is the same as the term of the National Assembly.

The government is the executive branch of state powers. The government administers in a unified manner the implementation of the state's duties in all fields, including political, economic, cultural, social, national defence and security and foreign affairs. The local administration is comprised of 16 provinces and the capital, Vientiane.

The head of government is the Prime Minister, who is appointed by the President after the approval of the National Assembly. He leads and manages the government's work, ministries, ministry-equivalent organisations and other organisations related to the government, as well as the work done in the provinces and the capital.

The Lao PDR government consists of 18 ministries and 3 ministry-equivalent organisations:

- 1) Government's Office
- 2) Ministry of National Defence
- 3) Ministry of Public Security
- 4) Ministry of Foreign Affairs
- 5) Ministry of Justice
- 6) Ministry of Home Affairs

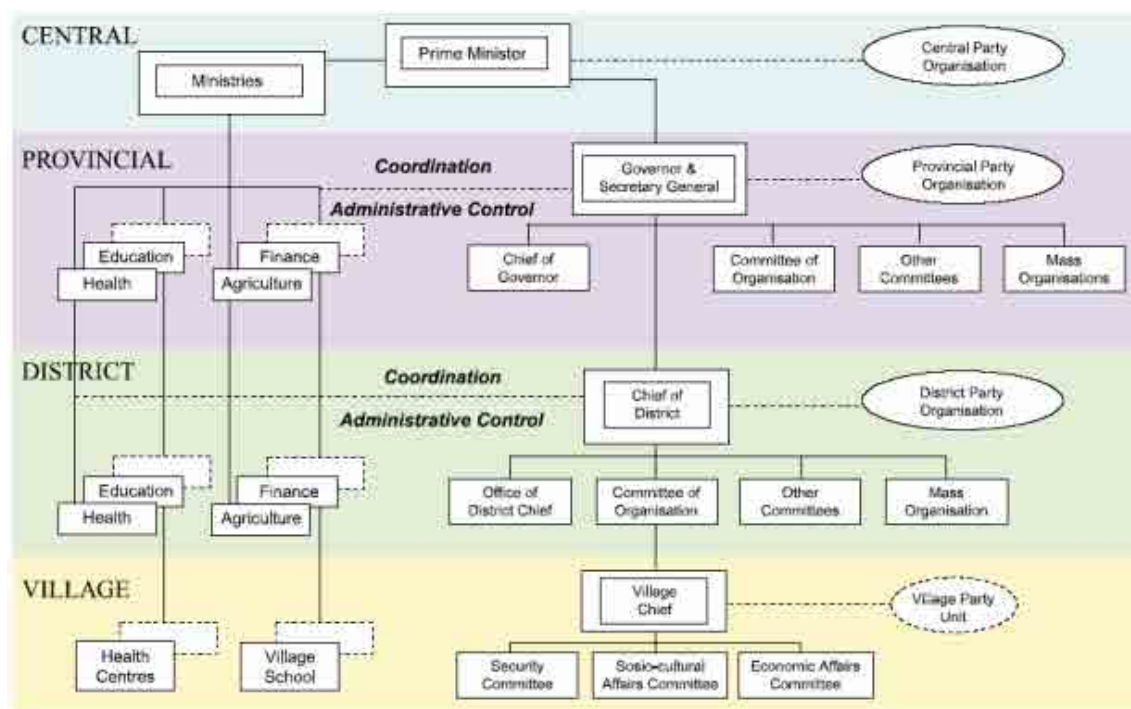
- 7) Government Inspection Authority
- 8) Ministry of Education and Sports
- 9) Ministry of Health
- 10) Ministry of Information, Culture and Tourism
- 11) Ministry of Labor and Social Welfare
- 12) Ministry of Planning and Investment
- 13) Ministry of Finance
- 14) Ministry of Agriculture and Forestry
- 15) Ministry of Natural Resources and Environment
- 16) Ministry of Energy and Mines
- 17) Ministry of Industry and Commerce
- 18) Ministry of Public Works and Transport
- 19) Ministry of Science and Technology
- 20) Ministry of Post, Telecoms and Communication
- 21) The Bank of Lao PDR

The people's courts constitute the judicial branch of the state and include the People's Supreme Court, regional courts, provincial courts, district courts and military courts. The People's Supreme Court is the highest judicial organ of the state. The people's courts make decisions in a collective manner. In their adjudication, judges must be independent and comply strictly with the laws. Final court judgments are to be respected by all organisations of the party, the state, the Lao Front for National Construction, all mass and social organisations, enterprises and all citizens. Individuals and organisations concerned must strictly implement the judgments.

The Office of the People's Prosecutor monitors the implementation of the laws. It consists of the Offices of the Supreme People's Prosecutor as well as regional, provincial, district prosecutors and military prosecutors. It has the rights and duties to monitor and supervise the correct and uniform implementation of laws by the government, the Lao Front for National Construction, mass organisations, social organisations, local administrations, enterprises, civil servants, and citizens. It also exercises the right of public prosecution.

1.2.1 Administrative Divisions

Under the central administration, Lao PDR is divided into three levels of administrative divisions. The first level includes 16 provinces and the Vientiane Prefecture. The provinces are further divided into districts and districts into villages (Oinuma 2010).



Source: DPADM, DESA and UN (2005)

Figure 1.2.1: Overview of Central-Local Party-State Institution

A.2
ການແບ່ງເຂດການປົກຄອງ
Administrative divisions



Source: Lao Statistics Bureau (2008)

Figure 1.2.2: Administrative Divisions of Lao PDR

Table 1.2.1: Provinces and Prefectures in Lao PDR

No.	Province and Prefecture	Capital	Area (km ²)	No. of districts	No. of villages	Population
1.	Attapeu	Attapeu	10,320	5	157	114,300
2.	Bokeo	Ban Houayxay	6,196	5	292	149,700
3.	Bolikhamtai	Paksan	14,863	6	328	214,900
4.	Champasak	Pakse	15,415	10	637	575,600
5.	Hua Phan	Xam Neua	16,500	8	783	322,200
6.	Khammouane	Thakhek	16,315	9	601	358,800
7.	Luang Namtha	Luang Namtha	9,325	5	357	150,100
8.	Luang Prabang	Luang Prabang	16,875	11	792	408,800
9.	Oudomxay	Muang Xay	15,370	7	490	275,300
10.	Phongsali	Phongsali	16,270	7	563	199,900
11.	Sayabouly	Sayabouly	16,389	10	448	382,200
12.	Salavan	Salavan	10,691	8	631	336,600
13.	Savannakhet	Savannakhet	21,774	15	1006	721,500
14.	Sekong	Sekong	7,665	4	239	83,600
15.	Vientiane Pref.	Vientiane	3,920	9	500	726,000
16.	Vientiane Prov.	Phonhong	15,927	13	524	373,700
17.	Xieng Khouang	Phonsavan	15,880	8	502	229,521

Table 1.2.2: Lao PDR's Provinces and Districts

Province and Prefecture	District		
Attapeu	Xaysetha	Samakkeuxay	Sanamxay
	Sanxay	Phouvong	
Bokeo	Huaxai	Tonpheung	Meung
	Phaoudom	Pakthadistrict	
Bolikhamtai	Pakxane	Thaphabath	Pakkading
	Bolikhanh	Khamkeuth	Vienthong
	Xaychomphone		
Champasak	Pakse	Sanasomboon	Bachiangchaleunsook
	Paksong	Pathomphone	Phonthong
	Champasack	Sukhuma	Moonlapamok
	Khong		
HuaPhan	Xamneua	Xiengkhor	Vienthong

Province and Prefecture	District		
	Viengxay	Huameuang	Xamtay
	Sopbao	Add	
Khammouane	Thakhek	Mahaxay	Nongbok
	Hinboon	Nhommalath	Bualapha
	Nakai	Xebangfay	Xaybuathong
LuangNamtha	Namtha	Sing	Long
	Viengphoukha	Nalae	
LuangPrabang	Luangprabang	Xiengngeun	Nan
	Park ou	Nambak	Ngoi
	Pak xeng	Phonxay	Chomphet
	Viengkham	Phoukhoun	Phothong District
Oudomxay	Xay	La	Namor
	Nga	Beng	Hoon
	Pakbeng		
Phongsali	Phongsaly	May	Khua
	Samphanh	Boon neua	Nhotou
	Boontai		
Sayabouly	Xayabury	Khop	Hongsa
	Ngeun	Xienghone	Phiang
	Parklai	Kenethao	Botene
	Thongmyxay	Xaysatha	
Salavan	Saravane	Taoi	Toomlarn
	Lakhonepheng	Vapy	Khongxedone
	Laongarm	Samuoi	
Savannakhet	KaysonePhomvihane	Outhoomphone	Atsaphangthong
	Phine	Sepone	Nong
	Thapangthong	Songkhone	Champhone
	Xonbuly	Xaybuly	Vilabuly
	Atsaphone	Xayphoothong	Thaphalanxay
Sekong	Lamarm	Kaleum	Dakcheung
	Thateng		
Vientiane	Chanthabuly	Sikhottabong	Xaysetha

Province and Prefecture	District		
	Sisattanak	Naxaithong	Xaythany
	Hadxaifong	Sangthong	Mayparkngum
Vientiane Province	Phonhong	Thoulakhom	Keooudom
	Kasy	Vangvieng	Feuang
	Xanakharm	Mad	Viengkham
	Hinherb	Hom	Saysomboun
	Meun		
Xieng Khouang	Pek	Kham	Nonghed
	Khoune	Morkmay	Phookood
	Phaxay	Phathom	

Source: Lao Statistics Bureau (2008)

Although the 1999 Local Self Governance Act gives municipalities and local governments a mandate for environmental protection, that provision has not been fully implemented yet.

1.2.2 National Socio-Economic Plans

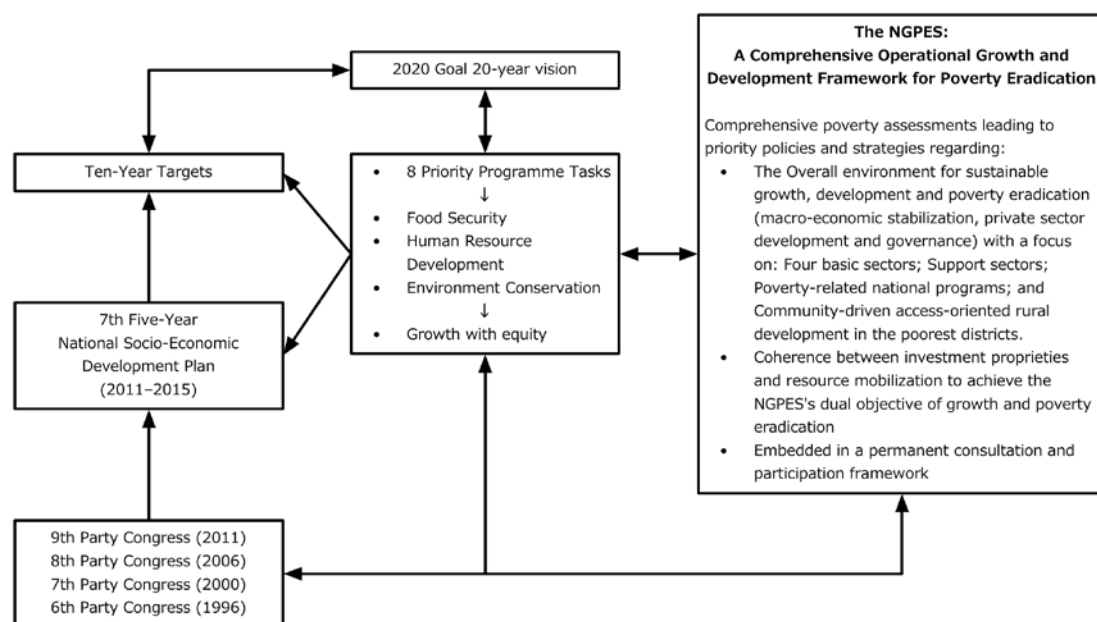
In March of 2001, the seventh Party Congress further refined the 2020 vision by specifying poverty reduction targets for 2005, 2010 and 2020 as well as prioritising industrialisation and modernisation. Five-year National Socio-Economic Development Plans (NSED) were formed based on these redefined targets. These five-year plans are coherent sets of references that will lead the country to the achievement of the 2020 goal of exiting ‘Least Developed Country’ status. The National Growth and Poverty Eradication Strategy (NGPES) 2000–2020 serves as the government’s operational response to this over-arching goal (GoL 2004).

NGPES is a framework under which the government plans to develop and implement initiatives to end poverty in Lao PDR by 2020, particularly in rural areas. NGPES is at the centre of the national development agenda and reflects the government’s policy and strategy framework to achieve the country’s 2020 goal. NGPES policy also clearly states that the government has a firm commitment to gradually lessen the country’s high dependency on official development assistance (ODA) (UNDP 2013).

The government has planned reform to provide a good environment for the country to grow and develop. Some highlights of this reform are as follows:

1. **Private sector development:** The private sector, including trade and domestic and foreign direct investment (FDI), is expected to be a prime factor in driving the economy. Consultations with the private sector will be enhanced and licensing and other regulatory concerns will be streamlined. Further, efforts will be made to ensure that Lao and English versions of all laws are made available.
2. **Regional integration:** NGPES outlines the appropriate conditions needed to further enhance the country's integration into the region. Currently, Lao PDR is a member of ASEAN and is committed to Greater Mekong sub-region integration.
3. **Resource development and growth:** The government has prioritised the hydropower, mining, tourism and wood-processing industries for investments during the implementation of this plan (GoL 2004).

NGPES's medium-term operational framework to eradicate poverty comprises four main sectors along with supporting sectors and several cross-sector priorities. The four main sectors are agriculture/forestry, education, health and infrastructure, particularly rural roads. The supporting sectors include energy and rural electrification, agro-forestry, tourism, the mining and construction materials industries and the financial sector. Cross-sector priorities include the environment, gender, information and culture, population, social security and capacity building (REDD 2013).



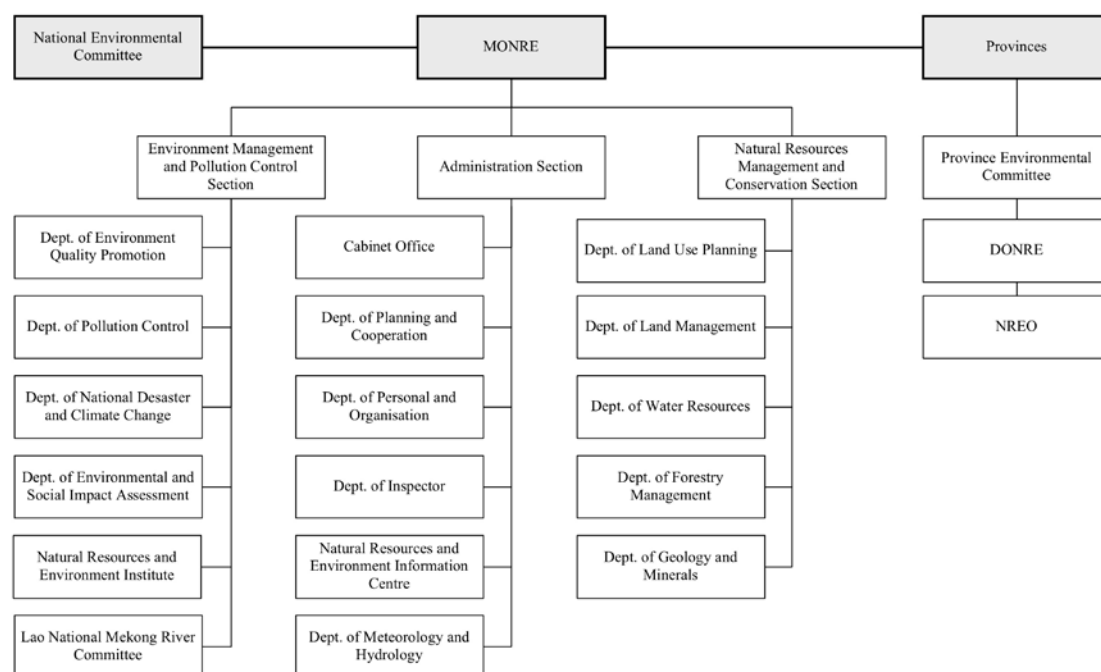
Source: GoL (2004) [modified]

Figure 1.2.3: National Growth and Poverty Eradication Strategy (NGPES) Process

The five-year NSEDP mentioned above is in its seventh term now. The seventh NSEDP (2011–2015) is aimed at sustainable economic growth, the reduction of poverty and inequality and guiding the country away from ‘Least Developed Country’ status by 2020. This plan targets an annual economic growth of 8% and emphasises the importance of achieving Millennium Development Goals (MDGs), protecting the environment and integrating the country into regional and world economies. Sectors such as agriculture, forestry and land management are prioritised.

1.2.3 Relevant Organisations

Lao PDR recently reorganised the ministries and departments related to environmental and social considerations. A number of departments related to environmental and social considerations were aggregated into the Ministry of Natural Resources and Environment (MONRE), as shown in Figure 1.2.4.



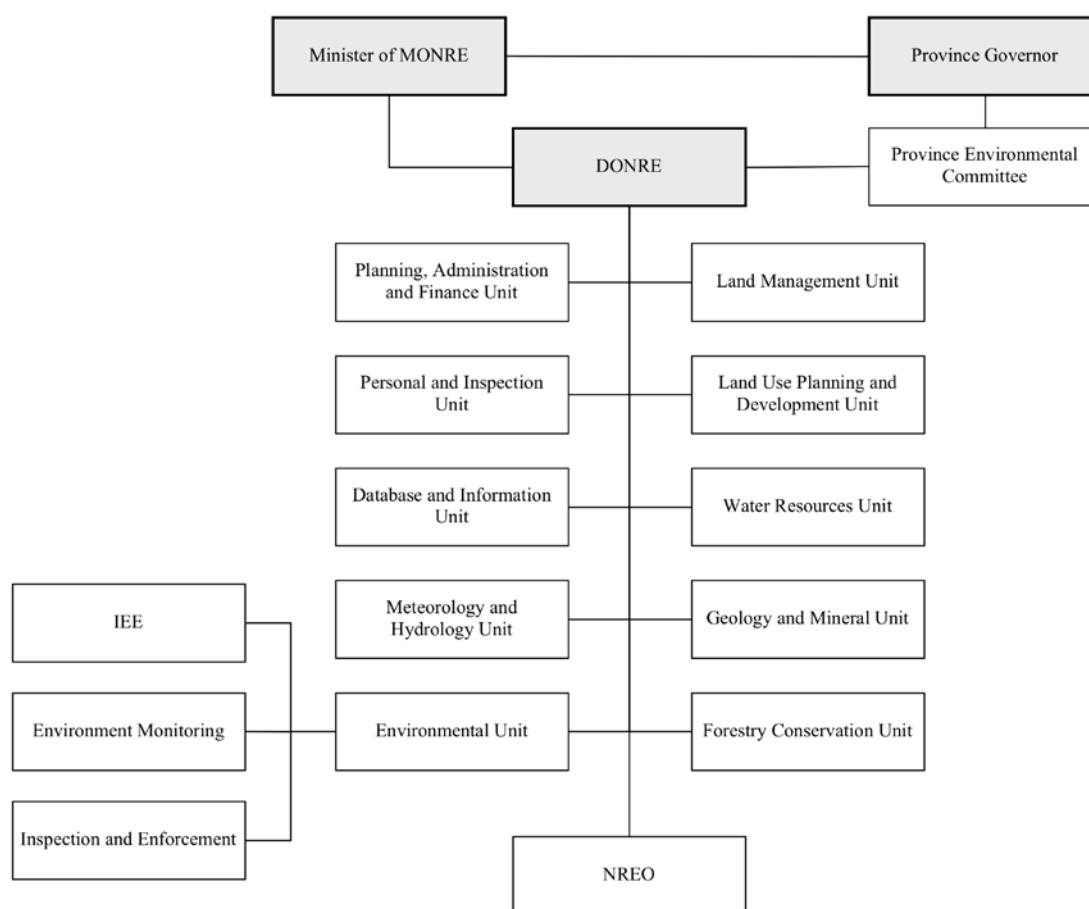
Notes: NREO: Natural Resources and Environment Offices.

Source: Phonvisai (2013)

Figure 1.2.4: MONRE Organisational Chart

While MONRE is in charge of a number of activities related to natural environment protection, pollution control, land management, etc. at the national level, the Departments of Natural Resources and Environment (DONRE) of provinces are in charge at the provincial level. The

organisational arrangement of DONRE is shown in Figure 1.2.5.



Notes: NREO: Natural Resources and Environment Offices.

Source: Phonvisai (2013)

Figure 1.2.5: DONRE Organisational Chart

Besides MONRE and DONRE, other ministries, agencies, and committees are relevant to environmental and social considerations such as the following:

- 1) Ministry of Agriculture and Forestry (MAF),
- 2) Ministry of Science and Technology,
- 3) Lao National Mekong Committee
- 4) Ministry of Labor and Social Welfare
- 5) Ministry of Energy and Mines
- 6) Ministry of Industry and Handicrafts
- 7) Ministry of Communication, Transportation, Post and Construction
- 8) Ministry of Public Health

- 9) National Environmental Committee (NEC)
- 10) The Water Resources Coordination Committee (WRCC)
- 11) The National Steering Committee on Climate Change
- 12) National Committee for Rural Development and Poverty Eradication (NCRDPE)
- 13) Poverty Reduction Fund (PRF)
- 14) Water Resources and Environmental Agency on Compensation and Resettlement of the Development Projects
- 15) Grievance Redress Committee (GRC)
- 16) Ethnic Minorities Committee
- 17) Ministry of Information and Culture
- 18) The National Committee for Advancement of Women

1.3 Overview and Contact Details of Relevant Organisations

1.3.1 Governmental Organisations and Research Institutions

Table 1.3.1 presents a list of governmental organisations and research institutions working in environmental and social sectors in Lao PDR.

Table 1.3.1: Governmental Organisations and Research Institutions related to Environmental and Social Considerations in Lao PDR

Organisations	Assigned Roles	Contact Address
Ministry of Natural Resource and Environment (MoNRE)	Responsible for the environmental management of Lao PDR, the overall development and implementation of REDD+ and the entire forestry sector in Lao PDR; acts as the Designated National Authority for the UNFCCC.	Address: Nahaidyo Road, P. O. Box: 7864, Vientiane Tel/Fax: +856 21 263 799, Email: monre@monre.gov.la URL: www.monre.gov.la/home
Ministry of Science and Technology (MOST)	Focal point for science and technology. In charge of intellectual property, standards and measurement across the country.	Tel: +85621 213470-148/217706 Fax: +856 213 472 Email: most_info@most.gov.la URL: http://www.most.gov.la/index.php/en

Organisations	Assigned Roles	Contact Address
Ministry of Energy and Mines (MEM)		Address: Ministry of Industry, Mines, and Energy #79-89, Pasteur Street (Street #51) Phnom Penh URL: http://www.mem.gov.la/
National Agriculture and Forestry Research Institute (NAFRI)	NAFRI is mandated to perform integrated agriculture, forestry and fishery research to provide technical information, norms and results that help formulate strategies in accordance with government policies. NAFRI has four main functions: carrying out adaptive research; developing methods, tools and information packages; providing policy feedback; and coordinating and managing research.	Address: Nongviengkham Village, Xaythany District, Vientiane Capital, Lao PDR Tel: 021 770094 Fax: 021 770047 URL: http://www.nafri.org.la/
Ministry of Industry and Commerce (MOIC)	Responsible for governing and developing industrial and commercial activities in Lao PDR. It is also responsible for regulating and promoting manufacturing, trade, import, and export activities and for representing Lao PDR and Laotian interests in the international business community.	Address: Phon Xay Rd, P.O. Box 4107 Vientiane Tel: 856-21 911342 Fax: 856-21 412434 Email: moicpsi@yahoo.com URL: http://www.moic.gov.la/default.asp
Ministry of Public Works and Transport (MPWT)	Responsible for public works and transport in Lao PDR. The Ministry is mandated to build, maintain and manage all the transportation infrastructure such as roads, bridges, ports, railways, waterways and buildings in the nation.	Address: Lanxang Avenue, Vientiane Capital Tel: 856-21 412255 Fax: 856-21 412250 Email: webmaster@mpwt.gov.la URL: http://www.mpwt.gov.la/en/
Ministry of Labor and Social Welfare (MOLSW)	The MOLSW was created in 1993 and serves as the basis for policy and programmatic interventions in six core areas: employment promotion and poverty alleviation; human resource development; labour administration, industrial relations and tripartism; workers' organisations, employers' organisations and social security.	Address: Pangkham Road, P.O. Box 347 Vientiane Tel: +856 21 213 005 Fax: +856 21 252 685 Email: twclaos@laotel.com

Organisations	Assigned Roles	Contact Address
National University of Laos (NUOL)	The only national university in the country, founded in 1996. It has played important roles, as called for in its mission, in providing higher education in areas required by the socio-economic development of Lao PDR; promoting and performing research in the natural and social sciences; preserving and expanding the arts, culture and traditions of the multi-ethnic nation; and providing academic services to the society.	Address: PO 7322 Vientiane Tel: +856 (21) 770 720 Fax: +856 (21) 770 069 Email: ch.phuangsk@nuol.edu.la URL: http://www.nuol.edu.la/index.php/en/

1.3.2 Donors

Lao PDR receives external aid from Japan, Australia, South Korea, Germany, Switzerland and other friendly governments. Multilateral organisations, such as the World Bank (WB) and the Asian Development Bank (ADB), and UN agencies, such as the International Fund for Agricultural Development (IFAD), provide significant assistance through loans and grants. In recent decades, Lao PDR has become dependent upon foreign aid and presently has one of the highest per-capita foreign aid levels in the world.

Donors active in the environmental and social sectors in Lao PDR are shown in Table 1.3.2.

Table 1.3.2: Major Donors in Lao PDR

International Donors		
Organisations	Assigned Roles	Contact Address
World Bank (WB) Lao PDR	The World Bank is a vital source of financial and technical assistance to developing countries around the world.	Address: World Bank Office, Vientiane, Patou Xay, Nehru Road, Phonexay Village, P.O. Box 345 c/o UNDP, Vientiane Tel: (+856-21) 266 200 Email: worldbanklaos@worldbank.org Contact Person: Ms. Souridahak Sakonhninhom Telephone: (856-21) 414209 Fax: (856-21) 414210 Email: ssakonhninhom@worldbank.org URL:

International Donors		
Organisations	Assigned Roles	Contact Address
		http://www.worldbank.org/en/country/lao
Asian Development Bank (ADB)	The Asian Development Bank aims for Asia and the Pacific to be free from poverty and has been driven by an inspiration to improve people's lives. The main devices for assistance are loans, grants, policy dialogue, technical assistance and equity investments. ADB's 2012–2016 country partnership strategy for Lao PDR is designed to help the government diversify the economy in a sustainable and inclusive manner through operations in agriculture and natural resources; education; energy, water supply and other municipal infrastructure and services; and public sector management.	Address: Lao PDR Resident Mission Corner of Lanexang Av. and Samsenthai Rd., P.O. Box 9724 Vientiane Tel: +856 21 250444 Fax: +856 21 250333 Email: adblrm@adb.org URL: http://www.adb.org/countries/lao-pdr/main
German International Cooperation, Germany (GIZ)	GIZ offers customised solutions to complex challenges. It is an experienced service provider and assist the German government in achieving its objectives in the field of international cooperation by offering demand-driven, tailor-made and effective services for sustainable development.	Address: GIZ Office Vientiane, P.O. Box 9233 247/19 Watnak Yai Road Thaphalanxay Village Sisattanak District Tel: +856-21 353605 Fax: +856-21 312408 Email: giz-laos@giz.de URL: http://www.giz.de/en/html/index.html
Swiss Development Cooperation (SDC)	The SDC is Switzerland's international cooperation agency within the Federal Department of Foreign Affairs (FDFA). In cooperation with other federal offices, SDC is responsible for the	Address: Swiss Agency for Development and Cooperation SDC, Swiss Embassy, House No. 192/1, Sibounheuang Road, Ban Sibounheuang, Chantaboury District, P.O. Box 5666, Vientiane Capital Tel: +856 21 251 794

International Donors		
Organisations	Assigned Roles	Contact Address
	overall coordination of development activities and cooperation with Eastern Europe, as well as for the humanitarian aid delivered by the Swiss Confederation.	Fax: +856 21 251 797 Email: vientiane@sdsc.net URL: www.swiss-cooperation.admin.ch/mekong/

(1) World Bank

As of January 2012, the World Bank's current portfolio in Lao PDR consists of 19 projects. The World Bank Group (WBG) continues to work with the government as it lays the foundation to graduate from 'Least Developed Country' status. The World Bank Group's operations in the country are guided by the Country Partnership Strategy (CPS) for 2012 to 2016, which was designed in consultation with a range of stakeholders in Lao PDR to support the government's seventh NSEDP and build stronger institutions for sustainable and inclusive development. The CPS for Lao PDR 2012–2016 has three strategic objectives and a crosscutting theme of stronger public sector management. The strategic objectives are as follows:

1. Competitiveness and connectivity: The World Bank Group supports efforts towards improved trade facilitation, economic diversification and a better investment climate through project financing and analytical work;
2. Sustainable natural resource management: Through project financing and advisory services, the World Bank Group assists in strengthening government capacity to make informed decisions on resource-based investments;
3. Inclusive development: The World Bank Group continues to support the government in providing essential maternal and child health services and access to quality primary education in targeted, disadvantaged districts.

The partnership between the government of Lao PDR and the World Bank Group has generated tangible results over the years in various sectors (WB 2013).

(2) ADB

ADB is committed to eliminate poverty in Asia and the Pacific by helping developing member countries turn into thriving, modern economies that are well integrated with each other and the world. ADB's new country partnership strategy (CPS), 2012–2016, for Lao PDR is anchored on the country's Seventh National Socio-Economic Development Plan, 2011–2015. The strategic focus of the CPS is shaped by the country's specific requirements and capabilities. It

is designed to help the government diversify the economy in a sustainable inclusive manner through agriculture and natural resources, education, energy, urban development, and public sector management. Since 1968, ADB has been at the forefront of helping Lao PDR meet its development challenges. ADB supported the government's development efforts in the transport, energy, and agriculture sectors after the war. More recently, ADB assistance has broadened to include strengthening public financial management and improving health and education services. In addition, ADB has provided support to develop the private sector, boost regional links, and manage natural resources. In the power sector, ADB has been supporting the introduction of clean, renewable hydropower generation and climate change adaptation measures (ADB 2013).

(3) GIZ

GIZ operates in many fields: economic development and employment promotion; governance and democracy; security, reconstruction, peace building and civil conflict transformation; food security, health and basic education; and environmental protection, resource conservation and climate change mitigation. German-Lao cooperation was first launched in 1958, and numerous successful programmes and projects have since been implemented. Since 1993 GIZ has been operating in Lao PDR mainly on behalf of the Federal Ministry for Economic Cooperation and Development (BMZ). The two priority areas of GIZ's work in Lao PDR are rural development in poor regions and sustainable economic development. German international cooperation also supports regional bodies including the Association of Southeast Asian Nations (ASEAN) and the Mekong River Commission (MRC) and engages in other projects promoting sustainable infrastructure, social development, and environment and climate change (GIZ 2013).

(4) SDC

The goal of development cooperation is that of reducing poverty. It is meant to foster economic self-reliance and state autonomy, to contribute to the improvement of production conditions, to help in finding solutions to environmental problems, and to provide better access to education and basic healthcare services. The support provided by Swiss Development Cooperation facilitates poverty reduction, regional and global socio-economic integration, gender equality and good governance. SDC has been active in several countries of SE Asia through the Mekong program since the late 1960s. The Mekong region has been a priority area of Swiss Development Cooperation since 1995. Currently, SDC is funding a supra-national Mekong program and country programs in Lao PDR, Vietnam and Myanmar. SDC focuses on four main challenges in the Mekong region; Local Governance and Citizen

Participation; Agriculture and Food Security; Employment and Skills; Economic Development and Trade. Specifically for Lao PDR, SDC responds to the needs of the marginalised rural poor and contributes to the country's efforts to graduate from the Least Developed Countries category by 2020. The program focuses on Local Governance and Citizen Participation, Agriculture and Food Security, and from 2013 onwards on Employment and Skills Development (SDC 2013).

1.3.3 NGOs

Local Non-Governmental Organisations (NGOs) in Lao PDR were able to register officially and operate as independent entities for the first time in 2009. Up until then, more than 100 local organisations of different types had been working in Lao PDR without being centrally registered, in addition to 80 International NGOs (INGOs). INGOs have been present in Lao PDR since 1975, though most of them began their operations during the 1990s.

The major NGOs active in the environmental and social sectors in Lao PDR are shown in Table 1.3.3.

Table 1.3.3: NGOs Active in the Environmental and Social Sectors in Lao PDR

Environmental Considerations		
Organisations	Assigned Roles	Contact Address
IUCN Lao	IUCN's work in Lao PDR supports and contributes to the IUCN global mission and commits to reach Lao's program goal: To ensure that the ecosystems and natural resources of Lao PDR are effectively conserved and sustainably utilised in an equitable manner that contributes to the socio-economic development of the country.	Address: IUCN Lao 082/01 Fa Ngum Road Ban Watt Chan P.O. Box 4340 Vientiane Tel: +856-21 216401 Fax: +856-21 216127 URL: www.iucn.org/lao

World Wildlife Fund for Nature (WWF) Lao PDR	WWF-Laos is building on its achievements to implement a strategy that focuses on sustainable biodiversity and natural resource management – working to gain a long-term economic return for all Lao people, while conserving the biodiversity that makes this part of the world so special. (WWF 2013)	Address: WWF-Laos PO. Box 7871 House no. 39, Unit 05 Saylome Village, Chanthabouly District Vientiane Capital Tel: +856 21 216 080 Fax: +856 21 251 883 Email: (country director) somphone.bouasavanh@wwf.panda.org URL: http://wwf.panda.org/
World Conservation Society	WCS conducts scientific surveys of wildlife populations to determine abundance and works with rural communities to reduce the causes and effects of poaching and habitat loss. In urban centres, WCS collaborates with the Lao government to raise public awareness concerning the problems with wildlife trade and assess wildlife loss, habitat destruction, and human-animal conflict. (WCS 2013)	Address: PO Box 6712, Vientiane
Village Focus International (VFI)	In 2000, VFI became the first international organization to be founded in Lao PDR. VFI emphasize and support local leadership, decision-making and ownership, in both Lao PDR and Cambodia. The Lao program focuses on poor, vulnerable and marginalized communities in the southern uplands.	Rick Reece, Executive Director (based in Laos) rickr@villagefocus.org Phonsavan Tai Village, Unit 14, 207 Sisattanak District, Vientiane P: +856-21 312 519 / 350 740 F: + 856-21-315-841 www.villagefocus.org
HELVETAS	HELVETAS started to work in Lao P.D.R. in 2001 and has been focusing mainly on the agriculture sector, addressing issues related to organic agriculture promotion and food security in the country. Other sectors such as Education and Culture, Civil Society and State which are part of	Program Office PO Box 6367, Ban Phonsavanh Neua, Sisattanak District, Vientiane Capital + (856-21) 263 189 T + (856-21) 486 037 / 038 T + (856-21) 263 190 F

Environmental Considerations		
Organisations	Assigned Roles	Contact Address
	HELVETAS' working areas shall gain more and more importance.	helvetas.laos@gmail.com www.helvetas-laos.org
Sustainable Agriculture & Environment Development Association (SAEDA)	SAEDA aims to support vulnerable communities through sustainable agricultural practices and by improving their capacity to safeguard the environment. It has three main focus areas: Sustainable agriculture, Chemical Pesticide Risk Reduction and Biodiversity Conservation.	http://saedalao.wordpress.com/
Lao Biodiversity Association	Lao Biodiversity Association aims to contribute to biodiversity protection and sustainable development, poverty alleviation and support the country's efforts to address climate change.	Phone number +85621 251665 Email: lba_director@laobiodiversity.org 100 Building, Nahaideaw Village, Chanthabury District, Vientiane Capital

Social Considerations		
Organisations	Assigned Roles	Contact Address
Norwegian Church Aid (NCA)	Norwegian Church Aid cooperates with national government agencies and local communities, implementing programs to ensure development of local capacity and to respond to local needs. Its work in Lao PDR includes programs that deal with livelihood and trade, climate change adaptation, social mitigation of HIV and AIDS and gender-based violence.	Address: Norwegian Church Aid, 338 Donpamai Road Thaphalanxay Village, House No. 150 Unit 08 Ban Vatnak Sisattanak District, P.O. Box 4804 Vientiane Tel: (+856-21) 354 017-19 Fax: (+856-21) 353 370 Email: nlov@nca.no URL: http://www.kirkensnodhjelp.no/en/
World Vision Laos	World Vision is an international Christian organisation engaged to development, relief and advocacy work in order to improve the well-being of children, particularly the vulnerable ones and families who are facing poverty and injustice.	Address: WORLD VISION LAO PDR 333 Nong Bone Road P.O. Box 312 Vientiane 01005 Tel: (856 21) 414 169, 452 100

Social Considerations		
Organisations	Assigned Roles	Contact Address
		Fax: (856 21) 451 101 Email: Laos@wvi.org URL: www.wvi.org/Laos
Cooperative for Assistance and Relief Everywhere (CARE)	CARE is a major international humanitarian agency delivering wide-spectrum emergency relief and long-term international development projects. CARE has provided a number of long-term development programs in Lao PDR. They focus on improving livelihoods, food security and community development in remote rural areas; preventing the spread of avian influenza and other emerging infectious diseases; and supporting vulnerable women and girls.	329/25 Sibounheuang Road, P.O. Box 4328, Ban Sibounheuang, Chanthabouly district, Vientiane, Vientiane Municipality Tel: + (856) 21 217 727 or 212991 Email: info@carelaos.org URL: http://www.care-international.org/
Participatory Development Training Centre (PADETC)	PADETC is a Laotian organization that aims to promote sustainable development in Lao PDR. It works in the areas of Education for Sustainable Development (ESD), capacity building for organizations, service delivery through learning centers and networks, and leadership and advocacy.	Tel & Fax: (+856 21) 219130 Email: padetc@padetc.org Post: PO Box 2147, Vientiane http://www.padetc.org/
Rural Research and Development Promoting Knowledge Association (RRDPA)	RRDPA focuses on rural community development and capacity building to help achieve millennium development goals 1 (mainly), 3, 4, 5 and 7.	Tel & Fax: (+856) 21 453 091 - (+856) 21 453 092 email: info@rrdtc.org House 292, Unit 22, Ban Saphangmor, Saphangmor Road Hohm 5, Saysettha District, P.O. Box 11633, Vientiane http://www.rrdtc.org/
Lao Positive Health Association	LaoPHA aims to provide support, prevention, treatment and care to HIV positive women, orphans and vulnerable	Tel: +856 21 414812 Fax: +856 21 262180 Email: info@laopha.org

Social Considerations		
Organisations	Assigned Roles	Contact Address
(LaoPHA)	children, transgender people, men who have sex with men, female sex workers, migrant workers, drug users and injecting drug users in 9 provinces of Lao.	306 Sisangvon Rd, Xaysettha district, Vientiane Capital Postal address: PO Box T053, Xaysettha district, Vientiane www.laopha.org
Love Natural Resource Association	Love Natural Resource Association aims at improving the quality of life of men, women and ethnic rural minorities through healthcare provision, enhanced food security, education and environmental sustainability.	Address: Learning House for Development, Room #8, Ban Naxay, Saysettha District Vientiane Capital http://www.lovenalao.org/
The Lao Disabled People's Association (LDPA)	LDPA promotes the rights of disabled people and empowers them to fully participate in the social, economic and cultural lives of their communities. It is a disabled people's organization (DPO); an organization that not only supports people with disabilities but is also run and managed by a majority of people who are disabled themselves.	Telephone: (+856) 21 562 963 Fax: (+856) 21 562 964 Email: info@ldpa.org.la Address: Phonesavang-Nongtha Road, Unit No. 55 Ban Phonesavang, Chanthabouly District, Vientiane Capital http://ldpa.org.la
Lao Disabled Women's Development Center	The Center has two main objectives. The first is to create practical opportunities for disabled people through vocational and life skills training. The second objective focuses particularly on disabled women by raising awareness about their plight, raising their profiles, as well as advocating for their rights and equal opportunity. It is a DPO managed by disabled women.	Email: info(at)laodisabledwomen.com Telephone (+856-21) 812 282 / (+856-21) 820 489 Address: Thadeua Road, Hadsayfong District, PO Box 6751, Vientiane http://www.laodisabledwomen.com

Chapter 2

Natural Environment

2 Natural Environment

2.1 Overview

A land-locked country, Lao PDR is environmentally rich with diverse landscapes. Almost 80% of the country is mountainous. One-third of its terrain has slopes steeper than 30%, while two-thirds of the remainder is covered with slopes in the range of more than 20% to 30%. With forests covering over 40% of the land, Lao PDR has an abundance of natural resources. To conserve the rich biodiversity and beautiful landscapes, more than 20% of the country's land is designated as protected areas.

2.2 Regulations and Policies

2.2.1 International Conventions

Based on its commitment as a signatory to the Convention on Biological Diversity (CBD) at the Earth Summit (1992) in Rio, Lao PDR developed a National Biodiversity Strategy and Action Plan (NBSAP) in 2002. This strategy clearly states Lao PDR's goal of maintaining the country's biodiversity as a key to poverty alleviation and of protecting the country's current asset base of the poor in support of the implementation of the government's priority programmes. Further, the Science, Technology and Environment Agency (STEa; currently MONRE) and Ministry of Agriculture and Forestry (MAF) are responsible for directly coordinating with concerned agencies to support the implementation of NBSAP (GoL 2004).

In 2004, Lao PDR became a member of the Convention on International Trade in Endangered Species of Wild Fauna and Flora, more commonly known as CITES. CITES aims to protect certain plants and animals by regulating and monitoring their international trade to prevent the latter from reaching unsustainable levels. The MAF serves as the National Management Authority (NMA) for CITES in Lao PDR. The NMA is responsible for issuing import and export permits (Buongnakeo 2009).

In addition to the above conventions, Lao PDR is also a contracting party to the Convention on Wetlands, commonly known as the 'Ramsar Convention'. The Ramsar Convention is a treaty that embodies the commitments of its member countries to maintain the ecological character of those wetlands in their territories that have been characterized as Wetlands of International

Importance and plan for their ‘wise use’, or sustainable use. Currently, there are two designated Ramsar sites in Lao PDR (Section 2.4.2).

For further details on the status of the ratification and application of international agreements, refer to Table A-2 in the Appendix.

2.2.2 Domestic Laws

The Law on Environmental Protection (EPL), which was first established in 1999, is the principal environmental legislation relevant to Lao PDR at the national level. It specifies the necessary measures and regulations for managing, restoring and protecting the environment with the intention of protecting human health, natural resources and the richness of nature, and enabling sustainable socio-economic development of the nation. This law also mandates that the responsibility of environmental protection lies with the STEA at the Prime Minister’s Office (GoL 1999). WREA, STEA, and sections of the National Land Management Authority (NLMA) were integrated and upgraded to the Ministry of Natural Resources and Environment (MONRE) in 2011. The revised version of EPL was released on 18 December 2012.

The following laws are relevant to the management and protection of natural resources and the environment in Lao PDR.

Table 2.2.1: Laws Relevant to Natural Environment Protection in Lao PDR

No.	Laws
1.	Law on Environmental Protection Law (EPL) (amended in 2012)
2.	Forestry Law (amended in 2007)
3.	Aquatic Animal and Wildlife Law (2007)
4.	Law on Water and Water Resources (2001)
5.	Land Law (amended in 2003)
6.	Law on Agriculture (1999)

Source: MONRE (2012) [modified]

To support the implementation of these environmental and related laws and policies, Lao PDR has developed and implemented a number of decree and regulations.

**Table 2.2.2: Decrees and Regulations Relevant to Natural Environment Protection
in Lao PDR**

No.	Decrees and regulations
1.	Decree on Establishing National Protected Areas (1993)
2.	Decree on the Implementation of the EPL (2003)
3.	Decree on the Establishment and Activities of the National Environment Committee (2009)
4.	Decree on the Environment Protection Fund (2005)
5.	Decree on the Implementation of the Land Law (1999)
6.	Decree on the Implementation of the Water and Water Resources Law (2001)
7.	Decree on the Implementation of the Forestry law (1999)
8.	Decree on the Protection Forest (2010)
9.	Decree on the Control of the Movement of Animal and Animal Products (2012)
10.	Regulation on Management of the National Biodiversity Conservation Areas (NBCAs), Aquatic and Wild Animals (2001)
11.	Decree on Environmental Impact Assessment (2010)
12.	Regulation on the approval procedure for proposed Clean Development Mechanism (2007)

Source: MONRE (2012) [modified]

The importance ascribed by the GoL to the protection of the environment is also evident from the policies developed. One of the key environmental policies is the National Socio-Economic Development Plan (NSED), which clearly states that socio-economic development shall be efficiently and firmly implemented by assuring the ‘proportionality between the economic growth, the socio-cultural development and sustainable environment management’ (MONRE 2012). The five-year NSED is in its seventh term now. The seventh NSED (2011–2015) is aimed at sustainable economic growth, the reduction of poverty and inequality and guiding the country away from ‘Least Developed Country’ status by 2020. This plan targets an annual economic growth of 8% and emphasises the importance of achieving Millennium Development Goals (MDGs), protecting the environment and integrating the country into regional and world economies.

Similarly, the National Environment Strategy 2020 and associated Five-year Action Plans have been developed. The primary goal of this strategy is to ensure appropriate management and sustainable use of natural resources. The specific goals include increasing public awareness and participation in environmental management, and strengthening international and regional

cooperation (MONRE 2012).

Other long term policies implemented include the Forestry Strategy 2020, National Biodiversity Strategy 2020, Action Plan 2010, National Policy on Environment and Social Sustainability of the Hydropower Sector in Lao PDR, Policy on Water and Water Resources, and Water Sector Strategy and Action Plan (MONRE 2012).

2.3 Wildlife Species

Lao PDR is characterised by a rich biological diversity, with many species' populations and habitats probably being less depleted compared to other countries of the Southeast Asian region. However, the fact that Lao PDR's biodiversity remains rich—most notably its wildlife—has less to do with conservation efforts than with the country's low population density and consequent extensive forest cover (GoL 2010).

Most flora resources are scattered all over the country and are found in different forests, land use types and agricultural ecosystems. There are an estimated 8,000–11,000 species of flowering plants in the country. However, compared to neighbouring countries, there is very little botanical documentation in Lao PDR. This is because very few studies have been conducted on plant taxonomy in the country since 1975. This deplorable situation has been compounded by inadequate storage facilities for these flora resources. Furthermore, most existing studies have been conducted by untrained botanists whose work is incomprehensive and poorly documented (GoL 2010).

On the other hand, fauna in Lao PDR is relatively well documented and monitored, thereby making the assessment of its richness more accurate. The population and habitats of many species have been found to be less depleted compared to other countries in the region. Fauna resources in the country include at least 150 to more than 200 reported species of reptiles and amphibians, no less than 700 species of birds, over 90 known species of bats, over 100 species of large mammals, and approximately 500 species of fish (GoL 2010).

A total of 319 species from among the 1,140 species reviewed by Duckworth et al. (1999) are significant for national or global conservation. These species comprise 67%, 53%, 6%, 14%, 22%, 25%, and 2% of the total populations of large mammals, bats, insectivores, murid rodents, birds, reptiles, and amphibians, respectively. Information on local distribution, habitat uses and

population status is most complete for birds and large mammals. Even within these groups, several new species have been discovered within the country in recent years. Bats have also been surveyed extensively since 1995, but coverage remains uneven. Reptiles, insectivores and rodents are still relatively poorly documented on a national scale (GoL 2010).

2.3.1 Endemic Species

While the diversity of flora and fauna in Lao PDR is relatively high, the total number of species endemic to Lao PDR is extremely low, as shown in Table 2.3.1. It must be noted that these numbers are very likely to change as a full inventory of species in Lao PDR has yet to be completed. For details of endemic species in Lao PDR, refer to Table A-3 in the Appendix.

Table 2.3.1: Endemic Species in Lao PDR (by taxonomic group)

Family	Number
Mammals	6
Birds	1
Amphibians	6
Sturgeons	0
Fresh Water Crabs	13
Reef-forming Corals	0
Conifers	0
Cycads	0
Total	26

Source: IUCN (2013)

2.3.2 Endangered Species

The world's most comprehensive inventory of the global conservation status of biological species has been compiled by the International Union for Conservation of Nature and Natural Resources (IUCN). The IUCN Red List of Threatened Species is regularly revised. The latest report published in February 2012 categorises 165 species of animals and 30 species of plants in Lao PDR as critically endangered (CR), endangered (EN) or vulnerable (VU). For details of each species, see Tables A-4 and A-5 in the Appendix.

Table 2.3.2: The Conservation Status of Biological Species in Lao PDR

	EX	EW	CR	EN	VU	Total
Animal	0	0	23	50	91	165
Plant	0	0	7	9	14	30

Notes: EX: Extinct; EW: Extinct in the wild; CR: Critically endangered; EN: Endangered; VU: Vulnerable

Source: IUCN (2013)

Table 2.3.3: Threatened Species in Lao PDR (by taxonomic group)

Mammals	Birds	Reptiles	Amphibians	Fish	Mollusc	Other Inverts	Plants	Total
45	24	16	5	4	16	5	3	195

Source: IUCN (2013)

2.3.3 Internationally Protected Species

There are a number of treaties and conventions related to the conservation and protection of species. This section describes the Convention on the Conservation of Migratory Species of Wild Animals (often abbreviated as CMS, and also known as the Bonn Convention) and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (often abbreviated as CITES).

The CMS was signed in 1979 in Bonn and was enforced in 1983. Its aim is to conserve terrestrial, marine and avian migratory species throughout their natural habitats. It is an intergovernmental treaty concluded under the aegis of the United Nations Environment Programme and concerned with the conservation of wildlife and habitats on a global scale. For more detailed information on CMS-designated species in Lao PDR, see Table A-6 in the Appendix.

As of 21 November 2011, approximately 5,000 species of animals and 29,000 species of plants were protected by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Sixty-six species of animals and 139 species of plants are listed under Lao PDR in Appendices I, II and III of the Convention. For details on the species in Lao PDR designated by CITES, refer to Tables A-7 and A-8 in the Appendix of this volume.

Table 2.3.4: CITES-listed Species in Lao PDR

Appendix	Animal	Plant
I	44	6
I/r	3	-
I/w	3	-
II	118	143
II/r	1	-
II/w	8	-
III	6	-
III/r	2	-
III/w	9	-
Total	194	149

Source: UNEP-WCMC (2013)

2.4 Important Ecosystems and Habitats

2.4.1 Protected Areas

There has been a substantial improvement in Lao PDR's protected area system since the Environment Action Plan was established in 1993. In the same year, 18 National Biodiversity Conservation Areas (NBCAs) were designated as protected areas. Subsequently, five additional new areas were added, raising the total number of NBCAs to 23. These 23 NBCAs cover approximately 36,079 km², which is over 15% of the country's land area (Clearing House Mechanism 2010). It must be noted that NBCAs are the only national-level areas designated for nature conservation (Robichaud et al. 2001). Apart from these areas, there are also 12 proposed NBCAs and a number of provincial and district protection forests.

The NBCAs in Lao PDR have been established under the 1993 Decree on Establishment of National Conservation Forest. The management of these areas is divided among three tiers of government—central, provincial and district and village. The central government is represented by the Department of Forestry (DoF) of the Ministry of Agriculture and Forestry (MAF). The above decree prohibits the following actions in NCBAs:

- 1) Cutting and removal of any timber except for research purposes.
- 2) Hunting, fishing or collecting non-timber forest products without specific authorisation each time from MAF/DoF.
- 3) Mining and construction of reservoirs or roads without the permission of the GoL.

Table 2.4.1: Protected Areas in Lao PDR

No.	Site Name	Year of establishment	Region	Area (km ²)
National Biodiversity Conservation Area (NBCA)				
1	Dong Amphan	1993	Attapeu, Sekong	2,000
2	Dong Houa Sao	1993	Champasak	1,100
3	Dong PhouVieng	1996	Savanakhet	1,970
4	Hin Namnor	1993	Khammuan	862
5	Nakai Nam Theun	1993	Khammouane, Bolikhamxay	3,532
6	Nam Et-Phou Loeuy	1993	Houaphan, Luang Prabang, Xieng Khouang	1,500
7	Nam Ha (East)	1993	Luang Namtha	2,224
8	Nam Kading	1993	Bolikhamxai	1,690
9	Nam Phouy (Poui)	1993	Sayaburi	1,912
10	Nam Xam	1993	Houapahn	700
11	Phou Den Din	1993	Pongsali	2,220
12	Phou Hin Poun	1993	Khammouane	1,500
13	Phou Khao Khouay	1993	Bolikhamxay, Khet Phiset Xaisomboon (Special Zone), Vientiane	2,000
14	Phou Phanang	1993	Vientiane	700
15	Phou Xang He	1993	Savanakhet	1,150
16	Phou Xieng Thong		Champassak, Salavan	1,200
17	Xe Bang Nouan	1993	Salavan, Savanakhet	1,500
18	Xe Pian	1993	Champasak, Attapeu	2,400
19	Xe Sap	1996	Salavan, Xekong	1,335
20	Nam Khan	1996	Bokeo, Luang Namtha	1,360
21	Phou Sabod	2009	Xieng Khouang	1,490
22	Phou He Pii	2011	Oudomxay	873.50
23	Laving Lavane	2011	Savannakhet	860
	Sub-total			36,079
Proposed National Biodiversity Conservation Area (PNBCA)				
1	Bolovens Southwest (Not Reported)		Champasak	620

No.	Site Name	Year of establishment	Region	Area (km ²)
2	Dong Khantung (Not Reported)	1984	Champasak	499
3	Nakai-Nam Theun Extension (Not Reported)		Khammouan	645
4	Nam Chuan (Not Reported)		Khammouane, Bolikhamxay	2,077
5	Nam Ha West (Not Reported)	1998	Luang Namtha	1,663
6	Nam Kan (Not Reported)	1994	Bokeo	775
7	Nam Theun Corridor (Not Reported)	2000	Khammouane, Bolikhamxay	1,543
8	Phou Kathong (Not Reported)		Attapu	880
9	Phou Theung (Not Reported)		Salavan, Xékong	1,130
10	Xe Sap (Not Reported)		Salavan, Xékong	1,130
11	Bolovens Northeast (Not Reported)		Xékong	935
12	Xe Kampho (Not Reported)		Champasak	794
	Sub-total			12,792
	Total			48,868
	Total % of Lao PDR's Territory			33%

Source: Clearing House Mechanism (2010), Keokene and Sengdee (2013)

It should be noted that some of the areas are being protected by international collaborative efforts. For example, Nam Ha NBCA is contiguous with the Shanhyong Nature Reserve in Xishuangbanna Autonomous Prefecture, Yunnan, China. There was an increased recognition of Nam Ha NCBA when it was declared ASEAN Natural Heritage Park in 2004. Similarly, Xe Pian, Dong Huasao and Dong Ampham NCBA's are supported by ADB to implement the Biodiversity Conservation Corridor Initiative (BCCI) Project (Clearing House Mechanism 2010).

Apart from national level protection, Lao PDR has also enforced protection of provincial and district areas. In addition to NBCAs, some 276 areas of locally significant conservation or watershed value have been designated as conservation or protection forests at the provincial or district level. These areas have no national legal framework, and are instead governed under the variable provincial framework (ICEM 2003). There is no relevant information regarding a list of protected areas at the provincial or district level.

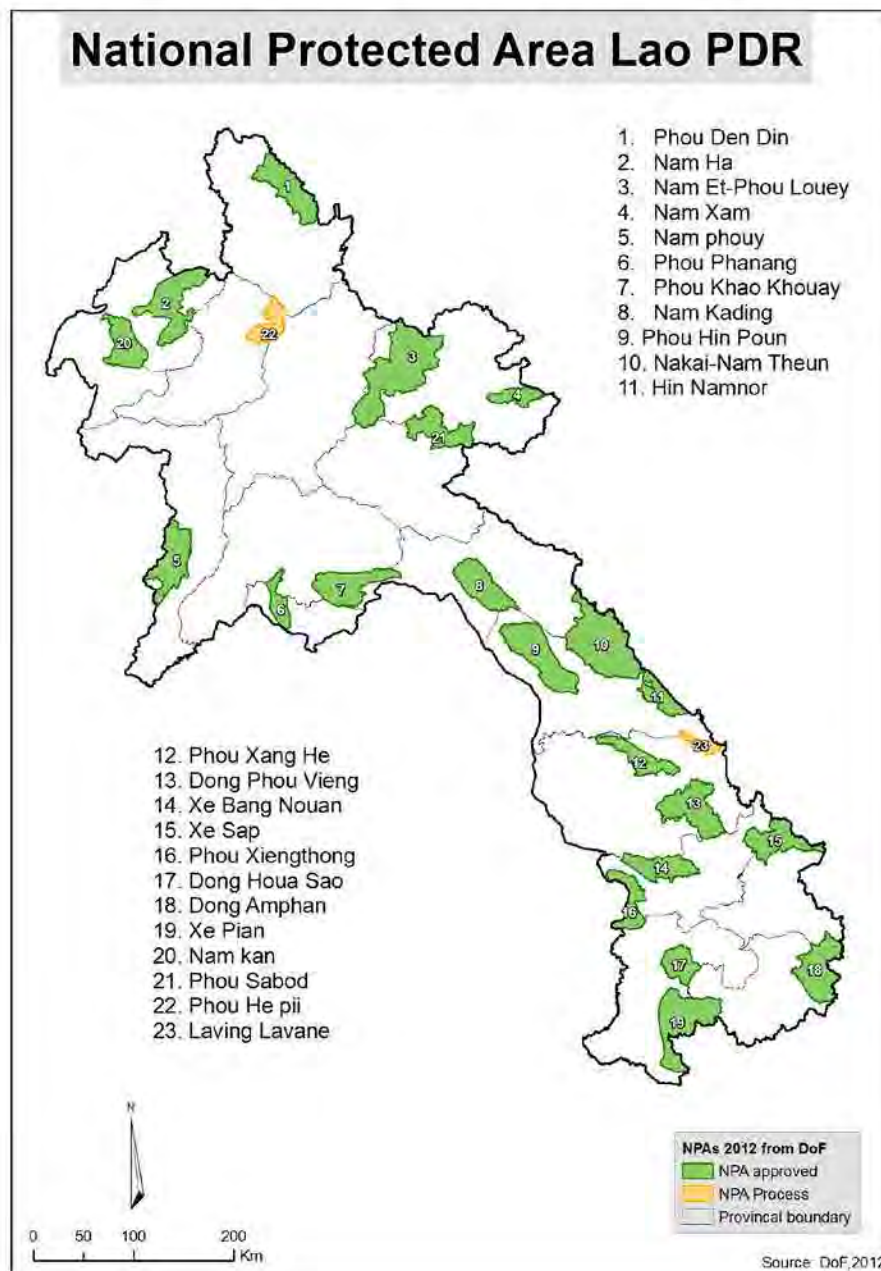


Figure 2.4.1: National Protected Areas in Lao PDR

2.4.2 Ramsar Sites

Popularly known as the ‘Ramsar Convention’, the Convention on Wetlands of International Importance—particularly pertaining to habitats for waterfowl—is an intergovernmental treaty that was adopted on 2 February 1971. There are two Ramsar sites in Lao PDR (Figure 2.4.2).

Table 2.4.2: List of Ramsar Sites in Lao PDR

Site Name	Date of Designation	Subdivision	Area (ha)	Coordinates
Beung Kiat Ngong Wetlands	16 Jun 2010	Savannakhet	2,360	14°45’N 106°03’E
Xe Champhone Wetlands	16 Jun 2010	Savannakhet	12,400	16°23’N 105°13’E

Source: Ramsar Convention (2012)



Figure 2.4.2: Map of Ramsar Sites in Lao PDR

2.4.3 Biodiversity Hotspots

Conservation International (CI) is a non-profit environmental organisation headquartered in Arlington, Virginia. The organisation's mission is to protect nature and its biodiversity for the benefit of humanity. It mainly works for the conservation of biodiversity hotspots, tropical primary forests and valuable coastal ecosystems. A biodiversity hotspot is a biogeographic region with a significant reservoir of biodiversity, which is under threat from human activities. CI designates hotspots according to various criteria including (1) an area that has the world's highest biodiversity, and (2) an ecosystem damaged severely by human activities, including development. Biodiversity hotspots hold particularly high numbers of endemic species, yet their combined area of remaining habitats covers only 2.3% of the Earth's land surface. Each hotspot faces extreme threats and has already lost at least 70% of its original natural vegetation. Over 50% of the world's plant species and 42% of all terrestrial vertebrate species are endemic to 34 biodiversity hotspots (Conservation International 2013).

Lao PDR is a part of the Indo-Burma region, which is one of the 34 hotspots in the world. This region is considered as one of the most threatened biodiversity hotspots in the world due to the rate of resource exploitation and habitat loss in the region (Conservation International 2013).

2.4.4 Important Bird Areas

Important Bird Areas (IBAs) are recognised as globally important habitats, particularly for the conservation of birds. Currently, there are approximately 10,000 IBAs worldwide. The conservation programme was developed and sites are identified by BirdLife International. In Lao PDR, 27 areas are currently designated as IBAs. Table 2.4.3 and Figure 2.4.3 present the names, locations, and areas of IBAs in Lao PDR. Of these, 19 sites support globally threatened species, 16 have restricted-range species, and 19 have biome restricted species. The IBA network in Lao PDR covers approximately 10% of the total land area of the country (BirdLife International 2004).

Hunting is recognized as the most widespread threat to IBAs in Lao PDR. All IBAs in Lao PDR are affected by hunting activities. This is followed by conversion of natural habitats to agriculture, which was identified as a threat in 23 IBAs. Other threats to IBAs include fire, natural resource extraction, infrastructure development, forest grazing and fisheries. It must also be noted that only 15 of the 27 IBAs in Lao PDR are entirely within protected areas, and 4 are partially protected (BirdLife International 2004).

Table 2.4.3: Important Bird Areas in Lao PDR

No.	Site name	Zone	Area (ha)	Coordinates	Status
1	Ban Nakhay	Vientiane	2,480	18°17' N 102°48' E	Protected
2	Nam Neun	Houaphan	85,450	20°18'N 103°31'E	Protected
3	PhouLouey	Houaphan; Luangphabang	60,070	20°18'N 103°17'E	Protected
4	Nam Ha Northern Highlands	LuangNamtha	184,520	21°00'N 101°14'E	Protected
5	Dong Khanthung	Champasak	191,560	14°18'N 105°30'E	Unprotected
6	Mekong Channel upstream of Vientiane	Vientiane; Xaignabouli	18,230	18°14'N 102°05'E	Unprotected
7	Mekong Channel from Phou Xiang Thong to Siphandon	Champasak; Salavan	34,200	15°00'N 105°40'E	Partially protected
8	Upper Nam Ou	Phongsali	126,880	22°03'N 102°17'E	Protected
9	Nam Xam	Houaphan	69,000	20°08'N 104°37'E	Protected
10	Xe Sap	Salavan; Xekong	137,120	16°07'N 107°00'E	Protected
11	Upper XeKhaman	Attapu	34,780	15°05'N 107°17'E	Partially protected
12	Dong Ampham	Attapu	180,220	14°56'N 107°25'E	Protected
13	Attapu Plain	Attapu	71,400	14°48'N 106°58'E	Unprotected
14	Houay Kok-Houay Phalaphang	Champasak; Salavan	36,650	15°31'N 105°38'E	Protected
15	Dakchung Plateau	Xekong	5,140	15°21'N 107°09'E	Unprotected
16	Phou Ahyon	Xekong	148,900	15°48'N 107°09'E	Unprotected
17	Upper Xe Bangfai	Khammouan	31,300	17°07'N	Unprotected

No.	Site name	Zone	Area (ha)	Coordinates	Status
				106°19'E	
18	HinNamno	Khammouan	68,125	17°25'N 105°56'E	Protected
19	Xe Khampho/Xe Pian	Attapu	197,280	14°44'N 106°16'E	Partially protected
20	Xe Kong Plains	Attapu	37,150	14°32'N 106°22'E	Protected
21	Dong Kalo	Champasak	41,460	14°08'N 106°02'E	Protected
22	Siphandon	Champasak	37,320	14°04'N 105°50'E	Unprotected
23	Nam Chat/Nam Pan	Bolikhamxai	81,220	18°34'N 105°01'E	Protected
24	Nakai Plateau	Khammouan	136,550	17°49'N 105°11'E	Partially protected ^R
25	Nakai-Nam Theun	Khammouan	278,000	17°56'N 105°24'E	Protected
26	Central Khammouan Limestone	Khammouan	79,000	17°50'N 104°45'E	Protected
27	Upper Lao Mekong	Bokeo; Oudomxai; Xaignabouli	10,980	20°20'N 100°23'E	Unprotected

Notes: R represents a Ramsar site; WH represents a World heritage site.

Source: BirdLife International (2004) [modified]

Map 1: Provinces, Protected Areas and IBAs in Lao P.D.R.



Figure 2.4.3: IBAs in Lao PDR

At the request of its member countries, the Food and Agriculture Organization (FAO) of the United Nations regularly monitors the world's forests and their management and uses through the Forest Resources Assessment Programme. According to the FAO (2010), the total forest area in Lao PDR in 2010 was estimated at 15,751,000 hectares (ha), which covers 68% of the total

land area. However, the extent of forest areas in Lao PDR has generally been on the decline. Approximately 78,000 ha of forest area were converted to other uses or lost through natural causes every year during the period between 2005 and 2010; the annual deforestation rate in this period was approximately 0.49% (Table 2.5.1).

Table 2.5.1: Trends in the Extent of Forest Areas, 1990–2010

Forest Area (1,000 ha)				Annual Change Rate					
1990	2000	2005	2010	1990–2000		2000–2005		2005–2010	
				1,000 ha/yr	%	1,000 ha/yr	%	1,000 ha/yr	%
17,314	16,532	16,142	15,751	-78	-0.46	-78	-0.48	-78	-0.49

Source: FAO (2010)

With regard to the types of forests, the following classifications (Table 2.5.2) have been made and related definitions and data are provided in FAO (2010).

Table 2.5.2: Classifications of Forests

Primary Forests	The forest areas in National Parks, Wildlife Reserves, and Hunting Reserves are included in this category.
Other naturally regenerated forests	The remainder of the forest areas of the country (excluding plantations) is included in this category.
Planted forests	All plantations for industrial round wood, fuel wood and poles, as well as all plantations raised for watershed development are included in this category.

Source: FAO (2010)

Primary forests are reported to cover an area of 1,490,000 ha, equivalent to 9% of the total forest area in the country. The areas of other naturally regenerated forests are estimated to be 14,037,000 ha, equivalent to 89% of total forest area. On the other hand, planted forests cover only 224,000 ha, equivalent to 1% of total forest area (Table 2.5.3).

Table 2.5.3: Status of Forests in Lao PDR (by type)

Primary forests		Other naturally regenerated forests			Planted forests		
1,000 ha	% of FA	1,000 ha	% of FA	% of which IS	1,000 ha	% of FA	% of which IS
1,490	9	14,037	89	-	224	1	-

Notes: FA represents Forest Area; IS represents Introduced Species

Source: FAO (2010)

The forest ownership patterns in Lao PDR show that 100% of the forests are publicly owned, as shown in Table 2.5.4. In terms of holder management rights of public forests, relevant data are not available.

Table 2.5.4: Ownership Patterns and Holders of Management Rights of Public Forests in Lao PDR

Ownership patterns	Public	100%
	Private	-
	Other	-
Holders of management rights of public forests	Public administration	-
	Individual	-
	Business entities and institutions	-
	Community	-
	Other	-

Source: FAO (2010)

According to FAO (2010), relevant data are unavailable to characterise the area and ratio of forests within protected areas or forests which have management plans in Lao PDR (Table 2.5.5).

Table 2.5.5: Forest Management and Legal Status (as of 2010)

Forests within protected areas		Forests with management plans	
1,000 ha	% of forest areas	1,000 ha	% of forest areas
-	-	-	-

Source: FAO (2010)

Lao PDR has a relatively short history compared to its Southeast Asian counterparts in implementing forest law. Currently, forests in Lao PDR are governed by the Forestry Law (amended in 2007). The Department of Forestry (DoF) of the Ministry of Agricultural and Forestry (MAF) is responsible for managing forests in Lao PDR at the national level. At the provincial level, the Provincial Agriculture and Forestry Offices are the responsible parties.

Table 2.5.6: Categories of Forests

Category	Definition
Protection Forests	Forests and forest land classified for the purpose of protection of watershed areas and prevention of soil erosion. This category also includes areas of forest lands that are significant for national security, areas for protection against natural disasters and the protection of the environment and other areas. (Forestry Law: Article 10)
Conservation Forests	Forests and forest land classified for the purpose of protecting and conserving animal species, plant species, nature and various other things which have historical, cultural, tourism, environmental, educational and other specific research values. (Forestry Law: Article 11)
Production Forests	Forests and forest land classified for the purpose of satisfying the requirements of natural economic and social development, people's livelihoods and for timber and other forest products on a sustainable basis and without significant negative environmental impacts. (Forestry Law: Article 12)
Regeneration Forests	Young fallow forests classified for the purpose of regeneration and maintenance so that there is an increase in maturity towards a stage of natural equilibrium. (Forestry Law: Article 3)
Degraded Forests	Forests which have been heavily damaged such as land without forest on it or barren land classified for tree planting and/or allocated to individuals and organisations for tree planting, permanent agriculture and livestock production, or for other purposes, in accordance with national economic development plans. (Forestry Law: Article 3)

Source: NAFRI (2007)

The traditional forest management system remains the most widely followed system in the country. Under the traditional system, there is no clear forest management planning. This customary management system is practiced where government intervention is limited or not available. Although there is no written forest management plan for village forests, mutually respected non-written rules and regulations exist (NAFRI 2007). Customary forest resource use rights are presented in the table below (Table 2.5.7).

Table 2.5.7: Forest Categories in Lao PDR According to Traditional Forest Management

Forest category	Logging right	NTFP collection	Hunting	Reference law
1. Village Production Forest	Maximum 5 m ³ per household for construction of house. Non-prohibited species.	Only non-prohibited species	Only non-prohibited species, in season	Forest law PM Decree 59 Regulation 535 Regulation 822
2. Village Protection Forest	None	Only non-prohibited species	Only non-prohibited species, in season	Forest law Regulation 535 Regulation 822
3. Village Conservation Forest (spirit forest)	None	Can collect but based on village tradition	None	Forest law Regulation 535 Regulation 822
4. Village degraded Forest	None	Can collect	Only non-prohibited species, in season	Forest law Regulation 535 Regulation 822
5. NBCA, Prohibited Areas	None	None	None	Decree 64 Regulation 524
6. NBCA, Management Areas	Only for household use	Only non-prohibited species	None	Decree 64 Regulation 524
7. Provincial and District Conservation Forest	None	Can collect but refer to local authority	Can hunt but refer to local authority	No regulation at national level

Source: NAFRI (2007)

Chapter 3

Pollution and Environmental Issues

3 Pollution and Environmental Issues

3.1 Overview

The land-locked Lao PDR has abundant natural resources: high levels of forest cover, a large per capita volume of internal renewable water resources, and considerable mineral resources such as gold, lignite, and copper. These natural resources have catalysed the country's economic growth and played a vital role in supporting rural livelihoods. The total value of exports in Lao PDR amounted to 2.5 billion USD approximately in 2011 (Intracen 2013). Mining (58%), hydropower (13%), and timber (12%) are some of Lao PDR's main export products (Intracen 2013, Lao PDR Trade Portal 2013). Recognising the importance of these exports, the Government of Lao PDR has enacted new laws and policies regarding Natural Resources Management (NRM). However, poor implementation has caused significant environmental damage (WB 2013).

Forest cover has declined from 70% to 43% of Lao PDR's surface over the last 50 years (WB 2013; FAO 2010). Forest quality has also deteriorated, with dense forests declining from 29% in 1992 to 8.2% in 2002 and open forests increasing from 16% to 24.5%. The main causes of deforestation are the conversion of forests to plantations and cash crops by commercial companies, hydropower, mining, infrastructure development, illegal logging and shifting cultivation (REDD 2012).

Surface water is the major water resource for urban water supply because most towns are situated alongside rivers. Groundwater is the main source for the rural population (WB and STEA 2005). While it remains within acceptable limits, water quality in Lao PDR is declining. Lao PDR's problems are mainly related to infectious water-borne diseases, especially in rural areas. Malaria, pneumonia, gastritis, influenza and diarrhoea are the major causes of mortality and morbidity in the country (ADB and CAI Asia Center 2006).

Rapid urbanisation, increasing industrial pollution, and highway construction pose additional threats to the urban environment (WB 2013). Poor vehicles and road maintenance are the main causes of outdoor air pollution. Indoor air pollution is mainly caused by the extensive use of wood stoves. The monitoring of air pollutants and the legal framework for managing air pollution are also unsatisfactory. Outdoor air pollution monitoring is performed for only three consecutive days in a year (ADB and CAI Asia Center 2006). As the industrial capacity of the

country develops, it is expected that hazardous chemicals will become an increasingly important issue in the future (WB and STEA 2005).

Lao PDR is the country with the highest Unexploded Ordnance (UXO) contamination per capita in the world, as a result of extensive bombing between 1964 and 1973. Apart from the direct threat UXO poses to human life and people's activities, it also endangers natural resources and the environment through soil, water and air pollution. Buried UXO entails the risk of leakage of explosive and toxic chemical substances into the ground and aquifers or their evaporation into the air. Depleted Uranium (DU) contained in shells and bombs is responsible for radioactive contamination of the surrounding ground. Moreover, dust originating from DU poses an inhalation hazard to minesweepers. Transpiration of Trinitrotoluene (TNT) through the roots and stems of plants increases its concentration in the leaves, making them dangerous to grazing animals. The threat from UXO ground, water and air contamination is a serious problem for all affected areas and countries but is poorly studied (Kuznyetsov 2008). More information on UXO can be found in Chapter 4 (Section 4.1) and Chapter 7 (Section 7.5.2).

3.2 Regulations and Policies

3.2.1 International Agreements

The Government of Lao PDR (GoL) has signed several international treaties, conventions and protocols dealing with pollution control. An overview of the relevant international treaties and conventions signed by the GoL is shown in the table below.

**Table 3.2.1: Major Relevant International Agreements
Signed by the Government of Lao PDR**

No.	International Agreement
1	United Nations Convention on Combat Desertification
2	United Nations Framework Convention on Climate Change
3	Kyoto Protocol on the United Nations Framework Convention on Climate Change
4	Montreal Protocol on Substances that Deplete the Ozone Layer
5	Vienna Convention for the Protection of the Ozone Layer
6	Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade
7	Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal

No.	International Agreement
8	Stockholm Convention on Persistent Organic Pollutants

Source: UN (2013)

For further details regarding the ratification and application status of international agreements, refer to Table A-2 in the Appendix.

3.2.2 Domestic Laws

The institutional structure for environmental management in Lao PDR consists of i) national committees that guide inter-sectoral coordination among agencies, ii) national-level ministries and agencies that play a core role in protecting and conserving the environment, iii) provincial and district entities that implement local-level environmental management and iv) mass organizations that support the government's efforts to promote public participation and awareness. A wide array of legal frameworks has been prepared by the government to protect the environment in Lao PDR from pollution. The 1999 Environmental Protection Law (EPL), which was amended in 2012, is the overarching piece of environmental legislation in the country.

The 1999 EPL mandated that STEA, under the Prime Minister's office, act as the central Environment Management and Monitoring Unit (EMMU) and oversee all forms of management related to the environment. In 2006, STEA was restructured, and WREA was formed. WREA contains one department, the Department of Environment (DOE), and one institute, the Water Resources and Environment Institute (WREI). Recently, in 2011, the WREA was upgraded to the Ministry of Natural Resources and Environment (MONRE) (MONRE 2012).

The central EMMU delegates power to a sectoral EMMU, then to a provincial EMMU, which in its turn delegates power to a district EMMU and finally to a village head. In addition to these units, the National Environmental Committee (NEC) was established via a Prime Ministerial Decree to direct environmental management and address environmental issues in a uniform manner. Provincial authorities establish their own Provincial Environmental Committees (PECs) (MONRE 2012).

Some other key laws that are pollution- and environment-related include

- The Law on Water and Water Resources (1996)
- The Law on Electricity (1997)

- The Law on Mining (1997)
- The Law on Road Transportation (1997)
- The Law on Agriculture (1999)
- The Law on Urban Planning (1999)
- The Law on Roads (1999)
- The Law on Industrial Manufacturing (1999)
- The Law on Hygiene, Disease Prevention and Health Promotion (2001)

Source: MONRE (2012)

The implementation of these laws has been aided by some regulations and agreements

- The Regulation on Industrial Waste Discharge (1994)
- The Regulation on Environment Assessment (2000)
- The Regulation on Environmental Impact Assessment for Electricity Development (2001)
- The Regulation on the Control of the Import, Export and Consumption of Ozone-Depleting Substances (2004)
- The Agreement on the National Environmental Standard (2009)

Source: MONRE (2012)

However, the implementation and enforcement of these environmental regulations is weak. This is due to capacity constraints at the local level, a lack of practical implementation guidelines, overlapping responsibilities and jurisdictions, insufficient or non-existent budgets, inadequate disciplinary options and a lack of awareness among the general public (WB 2013).

3.3 Air Pollution

3.3.1 Current Situation

Poor vehicle road maintenance are the main causes of the air quality problems that Lao PDR is experiencing. Specifically, the problems mainly stem from the large percentage of two-stroke-engine motorcycles (78%) on the road, 57% of which are registered in Vientiane (ADB and CAI-Asia Center 2006).

The compilation of emissions inventories is not performed routinely. The last monitoring was conducted in three sites Vientiane during the period March-April 2004 (ADB and CAI-ASIA 2006). Monitoring is done by the Environment Quality Monitoring / Hazardous Chemical

Center and the WERI, which are contained within the WREA (MONRE 2012).

Indoor air pollution is considered a serious problem because more than 95% of the population uses wood or charcoal for cooking (WB and STEA 2005). However, no studies on indoor air pollution exist.

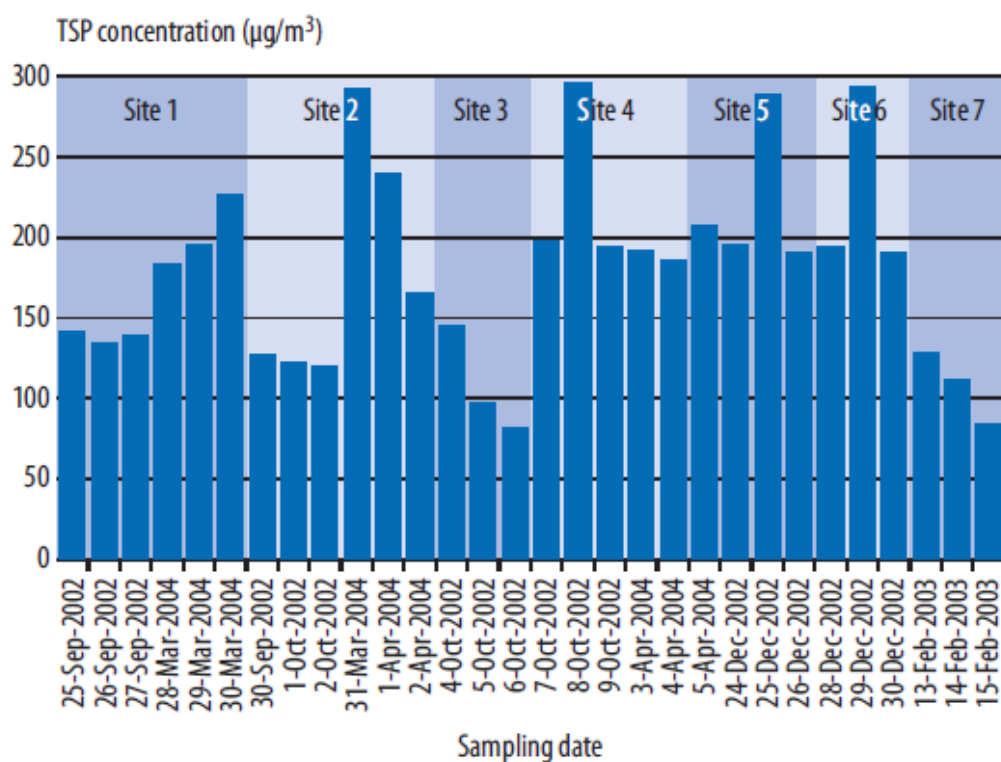
Regular monitoring of air quality has not been undertaken in Lao PDR. It has traditionally been done on an ad-hoc basis. The table below shows information about seven air quality monitoring activities undertaken in different locations of Vientiane.

**Table 3.3.1: Air Quality Monitoring, Location of Sampling Sites
and Corresponding Sampling Dates in Vientiane**

Site	Location	Sampling Dates	Pollutants
1	Ministry of Industry & Handicrafts	25-27 September 2002 / 28-30 March 2004	TSP, PM ₁₀ , NO ₂ , SO ₂
2	Department of Geology & Mines	30 September 02 Oct 2002 / 31 March 31 02 April 2004	TSP, PM ₁₀ , NO ₂ , SO ₂
3	Department of Industry	04-06 October 2002	TSP, PM ₁₀ , NO ₂ , SO ₂
4	Department of Meteorology	07-09 October 2002 / 03-05 April 2004	TSP, PM ₁₀ , NO ₂ , SO ₂
5	Phone Tong Electricity St.	24-26 December 2002	TSP, PM ₁₀ , NO ₂ , SO ₂
6	Sokphalong Electricity St.	28-30 December 2002	TSP, PM ₁₀ , NO ₂ , SO ₂
7	Lao Telecom	13-15 February 2003	TSP, PM ₁₀ , NO ₂ , SO ₂

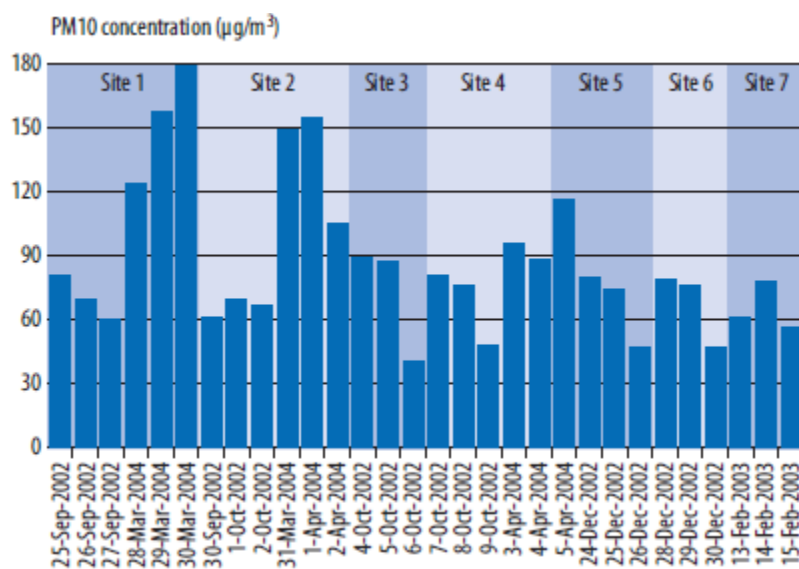
NO₂ = Nitrogen dioxide, PM₁₀ = particulate matter with diameter not more than 10 microns, SO₂ = Sulfur dioxide, TSP = total suspended particulates

Source: ADB and CAI Asia Center (2006)



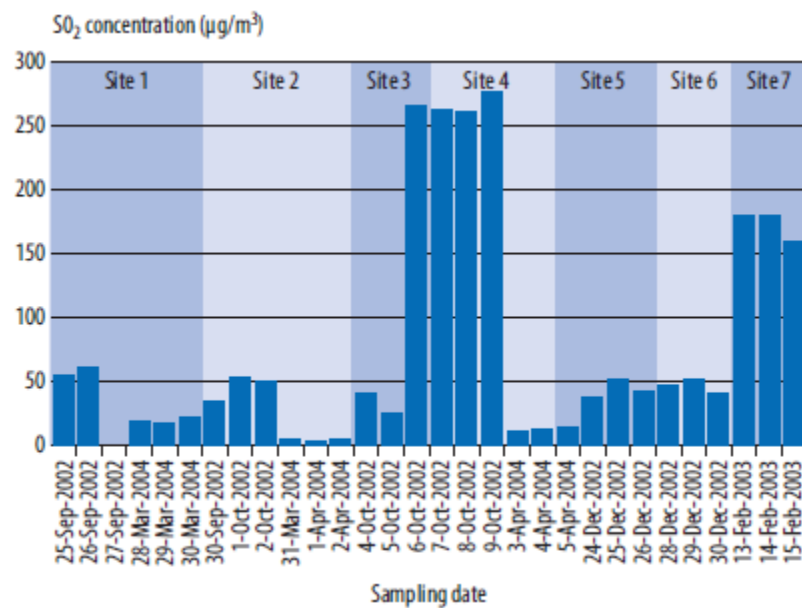
Source: ADB and CAI Asia Center (2006)

Figure 3.3.1 TSP Monitoring in Seven Locations in Vientiane



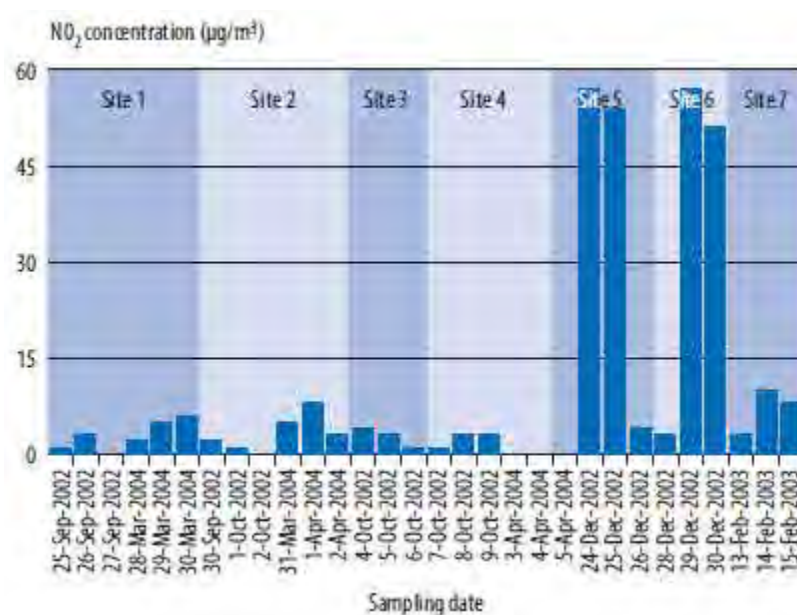
Source: ADB and CAI Asia Center (2006)

Figure 3.3.2: PM10 Monitoring in Seven Locations in Vientiane



Source: ADB and CAI Asia Center (2006)

Figure 3.3.3: SO₂ Monitoring in Seven Locations in Vientiane



Source: ADB and CAI Asia Center (2006)

Figure 3.3.4 NO₂ Monitoring in Seven Locations in Vientiane

Measures of Particulate Matter (PM), nitrogen dioxide (NO₂) and sulphur dioxide (SO₂) are very limited because the monitoring work was done for only 3 days a year. From the data available, PM values for all locations range from 82 µg/m³ to 296 µg/m³ (ADB and CAI-Asia

Center 2006). Only 8 out of 29 SO₂-measurements met the WHO 24-hour standards. NO₂ is currently not a problem.

Although there are no local monitoring efforts, a study by Streets et al. (2003) created an air pollutant emissions inventory in Asia for the year 2000. Because a broad range of countries lacked data for the models they used, some were estimated using data from 1995 or other available data. The chemical species in the inventory included SO₂, NO_x, CO₂, CO, CH₄, Non-Methane Volatile Organic Compounds (NMVOC), submicron Black Carbon aerosol (BC), submicron Organic Carbon aerosol (OC) and NH₃. The sources considered for these are anthropogenic in nature and do not include natural sources, such as volcanic SO₂, etc.

Data on the sources of pollution were extrapolated from the most recent statistical information when unavailable for the year 2000.

**Table 3.3.2: Estimated Numbers of Motor Vehicles
for Lao PDR Compared with Asia in 2000**

		Lao PDR	Asia
Cars	LDGV (Gas)	11,000	73,970,000
	LDDV (Diesel)	0	19,249,000
Buses	HDGV (Gas)	0	1,722,000
	HDDV (Diesel)	1,000	7,017,000
Trucks	LDGT (Gas)	2,000	18,478,000
	LDDT (Diesel)	3,000	11,298,000
	HDGV (Gas)	0	3,024,000
	HDDV (Diesel)	2,000	16,885,000
Tractors		20,000	18,106,000
Motorcycles		356,000	117,577,000

Source: Streets et al. (2003)

**Table 3.3.3: Summary of Estimated National Emissions of Each Substance in Lao PDR
Compared with Asia in 2000 (in gigagrams)**

	SO ₂	NO _x	CO ₂ *	CO	CH ₄	NM VOC	BC	OC	NH ₃
Lao PDR	21	96	44	2547	387	486	18	129	58
Asia	34316	26768	9868	278564	106821	52150	2541	10420	27519

Note: CO₂ is in Teragrams

Source: Streets et al. (2003)

3.3.2 Relevant Laws and Organisations

No specific air pollution control law provides a legal framework for air quality management in Lao PDR. Article 17 of Lao PDR's Constitution (1991) has a provision for environmental protection. It provides that 'all organizations and citizens must protect the environment and the natural resources: land, underground, forests, fauna, water sources, and the atmosphere.'

In addition to the Constitution, the Environmental Protection Law (EPL) (1999), of which a new version was issued in 2012, is the main piece of environmental legislation in Lao PDR at the national level. The EPL mandates that the MONRE at the Prime Minister's office be the main government agency responsible for environmental protection.

The National Ambient Air Quality Standards of Lao PDR are shown in Table 3.3.4.

Table 3.3.4: National Ambient Air Quality Standards of Lao PDR vs. WHO Guidelines

Pollutant	Averaging time	Lao PDR's National Ambient Air Quality Standards (µg/m ³)	WHO Guidelines (µg/m ³)
TSP	24 hours	330 µg/m ³	-
	1 year	100 µg/m ³	-
PM ₁₀	24 hours	120 µg/m ³	50
	1 year	50 µg/m ³	20
PM _{2.5}	24 hours	-	25
	1 year	-	10
SO ₂	10 minutes	-	500
	1 hour	78 µg/m ³	-

	24 hours	30 µg/m ³	20
	1 year	10 µg/m ³	-
NO ₂	1 hour	320 µg/m ³	200
	24 hours	-	-
	1 year	-	40
CO	1 hour	30 mg/m ³	30,000
	8 hours	10.26 mg/m ³	10,000
Lead (Pb)	8 hours	50	-
	1 month	1.5 µg/m ³	
	1 year	-	0.5
Ozone (O ₃)	1 hour	200 µg/m ³	-
	8 hours	-	100

Source: MONRE (2012); WHO (2000); WHO (2006)

In many publications, air quality is only mentioned in passing, and more emphasis is placed on water resources, especially in terms of monitoring. This may be because the air quality monitoring that is performed by EQMHCC is housed within the WREA (MONRE 2012), whose primary responsibility is managing, monitoring, collecting and providing information on the water resources, the environment, meteorology and hydrology of the country (WREA 2013).

In addition to controlling air quality, and in order to cope with climate change, Lao PDR joined the United Nations Framework Convention on Climate Change in 1995 and the Kyoto Protocol in 2003. As a result of the country being a signatory to these treaties, greenhouse gas inventories have been created and studied (Rasabud 2011). There have recently been further efforts in this area, such as drafting decrees to strengthen legislation dealing with the environmental problems that are plaguing Lao PDR.

For further information about air emission standards in Lao PDR, please consult tables A-9 to A-19 in the Appendix.

3.4 Water Pollution

3.4.1 Current Situation

The main use of the water supply in Lao PDR is agriculture, which takes up 82% of total water use; 10% of water is used for industry, and 8% is used for domestic purposes (WEPA 2013). The annual amount of fresh water available is 270 billion m³ (600,000 m³ per person), while the demand is only around 259 m³ per person. Around 264.3 billion m³ of water flows in the natural rivers.

Groundwater is the main source of water in rural areas and small towns. This is especially true in lowland areas, such as Champassack Province, the hinterlands of the Senbangfay, Sebanghieng and the Sedone Valley. Sources of pollution include poor sanitation and the lack of sewerage facilities (WEPA 2013). Although there are no assessment data on the amount of groundwater available, it is believed to be considerable due to the high amount of recharge. Water quality is potable but iron-rich.

The monitoring of tube-well water along the Mekong River, however, found arsenic concentrations ranging from <0.5 µg/L to 278 µg/L (Chanpiwat et al. 2011). The samples were obtained from the provinces of Attapeu, Bolikhamxai, Champasak, Savannakhet, Saravane and Vientiane. Aside from arsenic contamination, traces of boron, barium, manganese, uranium and iron were also discovered. Over half of the samples exceeded WHO guidelines for arsenic (10 µg/L); 46% of these were dominated by As (III). Water samples from Vientiane were all acceptable, except in terms of pH (WHO guidelines for pH: 6.5–8.5). The acidity was below the limit for drinking water.

Water quality in rivers within Lao PDR, as well as the Mekong, is considered to be good based on international standards. The primary pollution sources are sedimentation loads that vary from 41 tonnes/km²/year to 345 tonnes/km²/year (WEPA 2013). Other sources include agricultural and industrial sectors, as well as activities related to mineral exploitation.

The monitoring of water quality is lacking, and anecdotal data suggest that poor sanitation and sewerage facilities cause contamination of surface and groundwater. Also, waste from detergents, dyeing, and food processing industries, as well as from salt mining operations, creates water pollution (ADB 1996).

3.4.2 Relevant Laws and Organisations

Government ministries and agencies that deal with water issues in Lao PDR include but are not limited to:

1) The Prime Minister's Office

- The Water Resources Coordination Committee (WRCC) provides advice on sustainable water and water resources management that will remain in line with the government policy on socio-economic development.
- The Lao National Mekong Committee (LNMC) is in charge of policies, plans, projects, and programs related to water resources development in the Mekong Basin that protect the environmental and ecological balance. The LNMC also ensures community participation and cooperates with other Mekong riparian countries, other countries, and donors.
- The STEA largely handles the environmental quality monitoring of water, soil, air, radiation, noise and other parameters that have set environmental standards. This is performed alongside development activities for compliance.

2) Ministry of Agriculture and Forestry

- The Integrated Watershed Management Unit (IWMU) provides assistance to the Ministry of Agriculture and Forestry regarding watershed management and rural development planning for a sub-watershed area basin.
- The Department of Irrigation (DoI) is in charge of the testing and analysis of water quality based on the standards of the Mekong River Commission. DoI also develops plans for agricultural irrigation, drainage planning and flooding and drought prevention.
- The Department of Livestock and Fisheries (DLF) works with various agencies, as well as district-level offices, to implement government policies, strategies and programs that deal with the management of fisheries and livestock. The evaluation and monitoring of data related to fisheries and livestock is used to create reports to reflect changing situations.

3) Ministry of Industry and Handicraft

- The Industrial Environment Division (IED) tackles industrial environment management, occupational health and safety, industrial waste, mineral resource management and hydropower. It issues regulations for industrial factories regarding wastewater, smoke, odour, radiation, vibration, noise, etc.
- The Social and Environmental Management Division (SEMD) identifies the social and environmental impacts of electricity projects and implements management plans

related to impact monitoring and the application of mitigation measures.

4) Ministry of Communication, Transportation, Post and Construction

- The Waterway Administration Division (WAD) collects data related to water quality sampling at hydrological stations and forwards this data to the Water Quality Laboratory Irrigation Survey Design Center. The results are also sent to the Mekong River Commission Secretariat for further analysis.
- The Water Supply Authority (WASA) establishes regulations on urban water supply and provides technical assistance to water supply operations of the country.
- The Department of Housing and Urban Planning (DHUP) develops policies, regulations and plans regarding water supply, drainage, solid waste and sewerage that are in line with urban development.

5) Ministry of Public Health

- The National Center for Environmental Health and Water Supply (NCEHWS) issues regulations that define safe disposal methods for solid waste and wastewater and ensures the supply of water and sanitation services to non-urban areas.
- The Food Management Division (FMD) ensures the quality of food and drug production in order to protect people's health through the nutritional and drug policies. These policies regulate and manage the importation of drugs and medical instruments. Also, drinking water supplies are monitored based on set standards.

For details on national standards related to drinking water, effluents from industrial facilities, etc., refer to Tables A-20 through A-24 in the Appendix.

In addition to laws, a number of projects related to water resource management have been implemented by a variety of actors.

Environmental Management Support Project

In 2010, a grant aid worth 9.5 million Euros was provided by the Government of the Republic of Finland to the Environmental Management Support Project (2010–2014), which aims to strengthen the Water Resources and Environment Administration (Yaphichit 2010).

Vientiane Declaration

In June of 2013, the governments of Lao PDR, the Kingdom of Cambodia and the Socialist Republic of Vietnam signed a declaration to support the scaling up of the UN-Habitat's Mekong Region Water and Sanitation (MEK-WATSAN) Initiative. Also called the 'Vientiane Declaration', it was established by both UN-Habitat and ADB with financial support from the

Netherlands and aims to provide safe drinking water and basic sanitation (UN-Habitat 2013).

JICA

One of JICA's Technical Cooperation Projects (TCP) in Lao PDR is the Study on the Improvement of the Water Environment in Vientiane Capital. It is a 2009-2011 master plan study on how to improve the water environment, and it includes the formulation of countermeasures against unhygienic environments, as well as conservation measures for the environment of Thad-Luang, an important natural purifier of wastewater in the capital (JICA 2012).

JICA also has a grassroots technical cooperation project called the Community Participatory Water Resource Efficiency Project, which is being performed by the Adventist Development and Relief Agency (ADRA) from November 2009 to March 2012 (JICA 2013).

3.5 Soil Pollution

3.5.1 Current Situation

The soil may be chemically contaminated with a wide range of pollutants, including pesticides, lead and cadmium. Agricultural activities, industry, landfills and emissions from road transport are all major sources of soil pollution. To our knowledge, at the time of writing, no comprehensive assessment of the current and potential magnitude and extent of soil pollution has been undertaken.

3.5.2 Relevant Laws and Organisations

According to the Law on Environmental Protection (1999), the following organizations are responsible for the management of environmental pollution.

1. The Science, Technology and Environment Agency (STEA);
2. Environmental management and monitoring units at the ministerial level;
3. Environmental management and monitoring units at the provincial, municipal or special zone level;
4. Environmental management and monitoring units at the district level;
5. Village administrations.

In addition to those organisations, the MAF is also responsible for the implementation of the Law of Agriculture (1998) and the Decision of the Minister of Agriculture and Forestry on Organic Agriculture Standards (2005). Both are related to the usage of fertilizers, which is one of the main causes of soil pollution. The Decision of the Minister of Agriculture and Forestry on Organic Agriculture Standards (2005) set specific guidelines on the use of heavy metals in organic fertilizers.

Table 3.5.1: Permitted Maximum Levels of Heavy Metals

Heavy metals	In manure and fertilizer (ppm - mg of substance/1 kg of fertilizer)
Arsenic	15
Cadmium	20
Chromium	1000
Copper	400
Lead	250
Mercury	2
Nickel	100
Zinc	1000

Source: GoL (2005)

In addition, Lao PDR has two soil quality standards, which are based on land use: those for habitats and agriculture and those for other purposes. For the details of the standards, refer to Tables A-25 and A-26 in the Appendix.

3.6 Solid Waste

3.6.1 Current Situation

Urban populations in Lao PDR are expanding, and as a result, there are poor waste collection and insufficient disposal facilities. Solid wastes in urban areas degrade the quality of surface and ground water. The improper handling of wastes also results in health risks for people living in the area.

As of 2011, the urban population made up 34.3% of the total population (CIA 2013), with an annual urbanization rate of 4.41%. The capital city of Vientiane, municipalities and secondary towns have landfill sites, whereas small towns have open and uncontrolled dump sites

(AIT/UNEP Regional Resource Center for Asia and Pacific 2010). Waste collection efficiency is 45% in the larger urban areas, and there were five sanitary landfills as of 2003.

In 2005, the total weight of municipal waste generated by Lao PDR was 1,204,400 tons. It was mostly composed of organic material such as food wastes (30%), plastic (30%), glass (25%), paper (15%) and cans and other metals (25%). An alarming one-third of municipal waste is made up of plastics.

Recycling systems for most forms of waste are based on the informal collection and selling of valuable waste to junkshops and dealers. On the other hand, there is no system for dealing with hazardous waste (UNCRD 2013).

Lao PDR is able to conduct capacity building in terms of municipal waste management through training individuals within the public/private sector, local communities, firms and industries (AIT/UNEP Regional Resource Center for Asia and Pacific 2010).

Household Waste

There are no data available on the amount of household waste produced in Lao PDR. As mentioned earlier, food waste is an estimated 30% of total waste and thus makes up a large part of household waste. Lao PDR pushes for the public participation of stakeholders in recycling activities (WB and STEA 2005).

Medical Waste

Medical waste is a mixture of sharp objects such as needles, blood, body parts, chemicals, pharmaceuticals, and medical devices, which may contain harmful components. In most developing countries, no guidelines or regulations on medical waste are available.

After conducting a series of case studies, Phengxay et al. (2005) evaluated the healthcare waste management of Lao PDR, selecting Vientiane Municipality and Bolikhamxay Province as evaluation sites. They defined healthcare waste as a mix of medical waste and general waste.

In interviews with key informants, they found that Lao PDR had problems concerning a lack of regulation and guidelines and low waste segregation rates in healthcare facilities. Workers such as truck drivers and landfill-workers lacked the proper training and knowledge to handle healthcare waste.

**Table 3.6.1: Characteristics of healthcare wastes
in Vientiane Municipality and Bolikhamxay Province**

No	Name of HCF	Type of HCF	HCWM manual	Budget for HCMW			Final disposal	Transport	Incinerator
				Gvt	Own	Intl. Org			
Vientiane Municipality									
1	Mahosot	NH	No	US \$1859/year	Yes	No	SL	US \$312/month	No
2	Sethathirath	PH	Yes	No	Yes	No	SL/incinerator	US \$186/month	Yes
3	Naxaithong	DH	No	No	Yes	No	SL/open burning	US \$3/month	No
4	Saysettha	DH	No	No	Yes	No	SL	US \$3/month	No
5	Maypakngeum	DH	No	No	Yes	No	Open burning	0	Yes (broken)
6	Nonvai	HC	No	No	Yes	No	Open burning	0	No
7	Nankhuoy	HC	No	No	Yes	No	Open burning	0	No
8	Ban Bua	HC	No	No	Yes	No	Open burning	0	No
9	Ban Eelay	HC	No	No	Yes	No	Open burning	0	No
10	Naphai	HC	No	No	Yes	No	Open burning	0	No
11	Nason	HC	No	No	Yes	No	Open burning	0	No
Bolikhamxay Province									
1	Bolikhamxay	PH	No	No	Yes	No	DS	US \$6.5/month	No

No	Name of HCF	Type of HCF	HCWM manual	Budget for HCMW			Final disposal	Transport	Incinerator
				Gvt	Own	Intl. Org			
2	Bolikhhan	DH	No	No	Yes	No	Open burning	0	No
3	Thaphabath	DH	No	No	Yes	No	Open burning	0	No
4	Pakkading	DH	No	No	Yes	No	Open burning	0	No
5	Phamuang	HC	No	No	Yes	No	Open burning	0	No
6	Muangmai	HC	No	No	Yes	No	Open burning	0	No
7	Namkhoun	HC	No	No	Yes	No	Open burning	0	No
8	Phonsy	HC	No	No	Yes	No	Open burning	0	No
9	Pakthouy	HC	No	No	Yes	No	Open burning	0	No
10	Huoyasapha	HC	No	No	Yes	No	Open burning	0	No

Notes: Exchange rate: 1 US\$=10.700 kip. Gvt: Government; Intl. Org: International Organization; HCFs: Healthcare Facilities; HCWM: Healthcare Waste Management; NH: National Hospital; PH: Provincial Hospital; DH: District Hospital; HC: Health Centre; SL: Sanitary Landfill; DS: Dumping Site

Source: Phengxay et al. (2005)

Table 3.6.2: Training in healthcare facilities regarding healthcare waste management was low: 38% (22/58) in Vientiane Municipality and 25% (11/44) in Bolikhamxay Province

HCF level	Segregation done by health staff (kg/bed per day)			Re-segregation done by health staff (kg/bed per day)			Percentage of incorrectly segregated MW
	GW	MW	Total	GW	MW	Total	
National hospital	0.58	0.26	0.84	0.68	0.16	0.84	39%
	69%	31%	100%	81%	19%	100%	
Provincial	0.47	0.35	0.82	0.69	0.13	0.82	62%

HCF level	Segregation done by health staff (kg/bed per day)			Re-segregation done by health staff (kg/bed per day)			Percentage of incorrectly segregated MW
	GW	MW	Total	GW	MW	Total	
hospital	57%	43%	100%	84%	16%	100%	
District hospital	0.12	0.28	0.40	0.28	0.12	0.4	57%
	30%	70%	100%	70%	30%	100%	
Health centre	-	0.16	0.16	0.06	0.10	0.16	37%
	-	100%	100%	38%	63%	100%	

Notes: HCF: healthcare facility; GW: general waste; MW: medical waste, i.e., infectious waste + sharp waste; –: none of the waste was considered general waste during the study period.

Source: Phengxay et al. (2005)

The researcher re-segregated the healthcare waste of different types of hospitals to investigate the percentage of incorrectly segregated medical waste. The least correctly segregated MW was seen at the provincial hospitals (62%), and the better segregated waste was seen at the health centres (37%). It must be noted that the health centre that was studied did not segregate waste and that the low percentage of incorrectly segregated medical waste is due to the higher proportion of medical waste at health centres as compared to hospitals at both study sites.

Instructive posters seem to be more visible in Vientiane, with 81% of respondents during the study reporting to have seen them, as compared to only 48% in Bolikhamxay.

The study also found that only a low percentage of respondents understood the importance of healthcare waste management: 29% in Vientiane Municipality and 16% in Bolikhamxay Province (Phengxay et al. 2005).

Industrial Waste

Regulations specifically targeting industrial wastes are non-existent, as are specialized disposal sites. Industrial wastes are disposed of in landfills and are considered an environmental and public health hazard (UNEP 2013).

Most industrial waste problems are related to water pollution caused by industries that discharge waste into the waters. Solid wastes occur in the form of dust problems caused by cement and detergent industries.

3.6.2 Relevant Laws and Organisations

The National Constitution (1991) states that all Lao citizens must protect the environment and natural resources (land, subterranean areas, forests, fauna, water resources, and atmosphere). The 1999 Environmental Protection Law, which was last amended in 2012, states that '[to] burn, bury, dispose and demolish wastes without treatment based on the technical standards [are prohibited]' (Article 68). Provincial decrees are the legislative basis for solid waste management in every city. They allocate the responsible bodies, define the scope of work and set the fees for private households, government offices and commercial enterprises.

Provincial decrees are an effective management tool for public cooperation (UNCRD 2013). On the national level, the STEA develops overall policies and regulations related to solid waste management.

Ministry of Industry and Handicrafts (MIH)

The MIH is responsible for the regulation of industrial pollution, as well as the management of factory equipment.

Asian Development Bank (ADB)

The ADB provided Technical Assistance (TA) for industrial waste management in 1993 (ADB 1996). This included hiring an international firm as a TA consultant. The consultancy firm provided training to local agency staff and produced a final report that outlined what should be done to manage industrial waste, citing case studies, technology and monitoring manuals, EIAs, sectoral guidelines and methodologies for industrial waste management.

The outcomes of the TA were the preparation and enactment of the Industrial Waste Discharge Regulation on 3 November 1994 and the revision and updating of the Factory Decree on 21 February 1992. There are however no country-specific guidelines on permissible effluents.

For further information about solid waste discharge standards, please consult tables A-27 to A-40 in the Appendix.

United Nations Development Programme (UNDP)

The UNDP provided assistance in solid waste management in urban centres (ADB 1996).

3.7 Noise and Vibration

3.7.1 Current Situation

Noise pollution can have adverse effects on human health and wellbeing. Extremely loud noises that exceed the acceptable human hearing range may result in hearing impairment. It has also been proven that noise pollution can have negative psychological effects on public health. Considering these effects, international organizations, such as the International Finance Corporation, have set ambient noise level guidelines for residential, industrial and commercial areas.

In 2003, ambient air and noise monitoring was conducted in Vientiane Municipality. The result of the noise measurement is not available.

Vibration is also an important health concern. It can be transmitted to the human body through solid structures and can be dangerous to health. In addition to its effects on humans, vibration is also harmful to the natural environment and the human infrastructure. Vibration originates mainly from different modes of transportation (e.g cars, trucks, airplanes etc.), commercial premises, industry (e.g. use of machinery), strong winds and construction work (e.g drilling, quarrying, crushing etc.). If not controlled properly, vibration can induce cracks in constructed structures and cause their subsidence. Heritage sites, due to their older age and less resilient structures can potentially be at a higher risk of suffering from vibration effects. In the UNESCO World Heritage site of Luang Prabang, measures were taken to reduce vehicular traffic and noise pollution to protect the historical structures. As of 2013, Lao PDR did not ratify the 1977 Working Environment (Air Pollution, Noise and Vibration) Convention by the International Labour Organization. Only 45 states have ratified the convention as of 2013. However, Lao PDR does recognize vibration as a source of pollution on human health, animals, plants and the environment. Persons and organizations engaged in activities producing vibrations have to abide by the prescribed limits.

3.7.2 Relevant Laws and Organisations

Article 30 of the Law on Environment Protection (amended in 2012) considers disturbance such as noise, light, odour, vibration and heat, which exceed the National Environmental Quality Standards or National Pollution Control Standards, as sources of environmental pollution. Articles 7 and 36 of the Law of Land Traffic (2000) also mention that operating vehicles shall not emit noise above the standard and that those who violate this regulation will be fined.

Lao PDR has three standards for movable noise sources (Tables 3.7.1, 3.7.2, and 3.7.3) and two standards for ambient noise pollution (Tables A-41 and A-42 in the Appendix).

Table 3.7.1: Motor Boat Noise Standards

Standards	Method of Measurement
100 dB(A) at 5 metres from the boat's exhaust pipe	Diesel engines: accelerate until the engine reaches its highest number of rounds per minute. Benzene engines: accelerate to 3/4 of the maximum rounds.
Conduct the test twice, and use the highest standard measured. If the difference is higher than 2 dB(A), perform the test again.	

Source: PMO and WREA (2009)

Table 3.7.2: Vehicle Noise Standards

Type of Vehicle	Standards	Method of Measurement
Diesel vehicles	When measured at 7.5 metres, not to exceed 85 dB(A)	Accelerate until the engine reaches maximum speed.
	When measured at 0.5 metres, not to exceed 100 dB(A)	
Gasoline vehicle	Car used in ways while it stays still and its engine is running without sound of horn	Park the car with no load and accelerate the engine to 3/4 of maximum rpm.

Source: PMO and WREA (2009)

Table 3.7.3: Motorcycle Noise Standards

Standards	Method of Measurement
When measured at 0.5 metres, not to exceed 95 dB(A) for a stationary car with its engine is running and without the sound of the horn	The engine shall be accelerated to 3/4 of the maximum rounds if the engine has maximum rounds of not more than 5,000 rpm; the engine shall be accelerated to 1/2 of the maximum rounds if the engine has maximum rounds of more than 5000 rpm.

Source: PMO and WREA (2009)

3.8 Climate Change

Climate change refers to any change in climate over time, whether it is due to natural variability or human activity (IPCC 2007). Human interactions with the natural environment have grown tremendously in recent centuries. Environmentally significant greenhouse gases are increasing due to both natural and anthropogenic activities and are contributing to global warming. The Earth's average surface temperature has risen by about 0.74 degrees Celsius in the past 100 years, and it could rise by up to 5 degrees Celsius by 2080 if the emissions of such gases are not decisively reduced (IPCC 2007). It is now universally acknowledged that the climate change we are witnessing will continue for a long time. This obviously has serious implications for human health. While some of these implications have been studied, data remain scarce, and it is difficult to draw clear conclusions regarding future adaptation measures. Human beings are directly exposed to climate change in the form of changing weather patterns (temperature, precipitation, sea-level rise and more frequent extreme events) and, indirectly, in the form of changes in water, air and food quality and changes in ecosystems, agriculture, industry, settlements and the economy. The IPCC (2007) reported that 'Climate change currently contributes to the global burden of disease and premature deaths... At this early stage the effects are small, but are projected to progressively increase in all countries and regions' (IPCC 2007). Clearly, Lao PDR is facing climate-change-induced consequences in many spheres of society and development.

3.8.1 Current Situation

Less developed countries have been found to have insufficient capacity to deal with climate change impacts. In 2008, the National Steering Committee on Climate Change was established, with His Excellency Asang Laoly serving as Chairman. In a message written during the Lao PDR National Adaptation Programme of Action (NAPA) on Climate Change, the Deputy Prime Minister, His Excellency Asang Laoly, emphasized the fact Lao PDR lacks the data, adaptation strategies, funds, human resources and experience to ensure long-term solutions (UNDP/WREA 2009). Lao PDR established NAPA in 2009 to address these problems.

ADB predicts a 2.5–10% decrease in crop yields in Southeast Asia by 2020 and a 5–30% decrease by 2050 due to increasing temperatures and changes in precipitation patterns.

In 1990, it was found that Lao PDR is a carbon dioxide (CO₂) sink, removing as much as 121,641 Gg (121.6 million tons) of CO₂ annually.

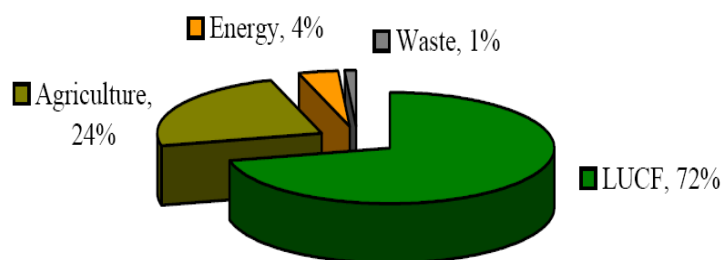
In order to cope with climate change, Lao PDR joined the United Nations Framework Convention on Climate Change in 1995 and the Kyoto Protocol in 2003.

The first complete Greenhouse Gas (GHG) gas inventory was compiled in 2000 as part of the National Communication (INC) to the UNFCCC in 2000. The INC targeted four areas: agriculture, energy, Land Use Change and Forestry (LUCF) and waste (DOE/WREA 2010). The largest emitter was found to be LUCF due to the onsite burning of forests during slash and burn cultivation.

Table 3.8.1: Greenhouse Gas Inventories (1990)

	CO ₂	CH ₄	N ₂ O	CO ₂ -eq
Energy	414.90	22.70	0.12	928.80
Agriculture	0	271.27	0	5,696.67
LUCF	16,628.67	29.50	0.20	17,310.17
Waste	0	11.43	0	240.03
Total	17,043.57	334.90	0.32	24,175.67

Notes: i) Unit: 1,000 tons; ii) CO₂-eq: CO₂ equivalent; iii) Conversion Factor: 1 ton of CH₄ : 21 tons of CO₂-eq; 1 ton of N₂O : 310 tons of CO₂-eq

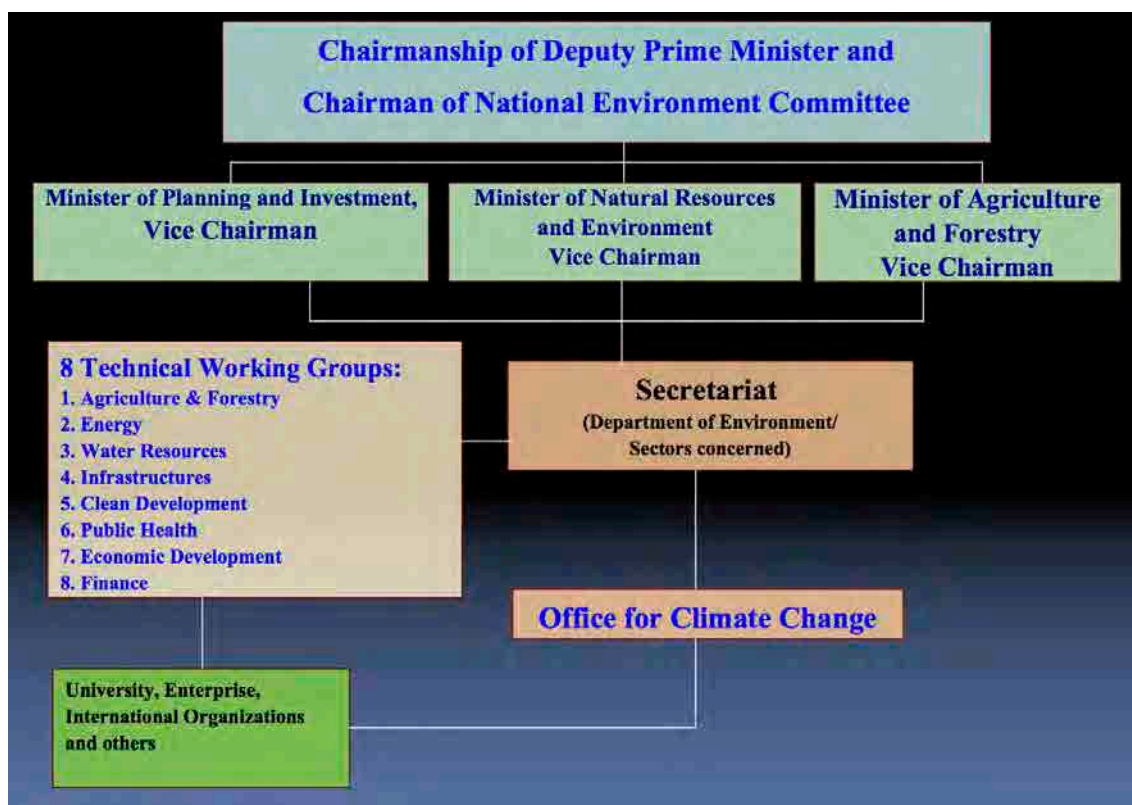


Source: Kuriyama (2013)

Figure 3.8.1: Greenhouse Gas Inventory of Four Sectors (1990 level)

3.8.2 Relevant Laws and Organisations

The Climate Change Office (CCO) operates under the WREA. The CCO is responsible for preparing the National Communications on Climate Change to the UNFCCC.



Source: Rasabud (2011)

Figure 3.8.2: Organisational Chart for Climate Change

Governmental policies related to climate change include the following:

- The Environment Law 1999
- The Water Law 1996
- The Agriculture Law 1998
- The Forest Law 1996
- The Land Use Law 1996
- The Electricity Law 1997
- The Mining Law 1997
- The Road Transportation Law 1997
- The Urban Planning Law 1999.
- The National Policy on an Environmentally and Socially Sustainable Hydropower Sector (2005)
- The Decree on Environment Impact Assessment (2010)
- The Renewable Energy Development Strategy in Lao PDR (2011)

In 2008, the National Steering Committee on Climate Change was established. In the same year, the Climate Change Office was established under the Department of Environment and the Social Impact Assessment Department of the WREA. In 2009, Lao PDR released the NAPA. It identified the four sectors that are the most vulnerable to climate change: agriculture, forestry, health and water resources.

In 2010, the Strategy on Climate Change of Lao PDR (SCC) was released (DOE/WREA 2010). It aimed to secure a future in which Lao PDR is ‘capable of mitigating and adapting to changing climate conditions in a way that promotes sustainable economic development, reduces poverty, protects public health and safety, enhances the quality of Lao PDR’s annual environment, and advances the quality of life for all Lao people.’

JCM/BOCM

In addition to the long-established Clean Development Mechanism (CDM), new mechanisms that aim to complement the CDM have appeared. The most recent ones are the Joint Crediting Mechanism (JCM) and Bilateral Offset Credit Mechanism (BOCM) with the Japanese government, which was signed by the Ambassador Extraordinary and Plenipotentiary of Japan and addressed to Lao PDR and the Minister of Natural Resources and Environment of Lao PDR on August 7, 2013 (Ministry of the Environment of Japan 2013). This bilateral agreement establishes a low-carbon partnership through the promotion of low-carbon technologies, products, systems, services and infrastructure.

Agricultural Sector

In recent years, the severity and frequency of floods and droughts have increased. The agriculture sector’s priority, therefore, is to strengthen the capacity of the National Disaster Management Committees and promote secondary professions to improve the livelihoods of those who will be affected by climate change. The main activities include land use planning and capacity building (UNDP/WREA 2009).

‘Improving the Resilience of the Agriculture Sector in Lao PDR to Climate Change Impacts’ is a 4-year project (2011-2014). It aims to minimise food insecurity and farmers’ vulnerability to the impacts of climate change. The major components of the project are knowledge management, capacity building, community-based agricultural adaptation practices and adaptation learning.

A more long-term strategy, ‘Agricultural Development Strategy for 2020’, aims to introduce and increase the use of modernised market-oriented lowland agricultural production that is adapted to future climate change.

In light of a 2012 publication on the use of indigenous knowledge to adapt to climate change, UN OCHA/IRIN reported that in a village in northern Lao PDR, Kioutaloun, rice farmers that are experiencing shorter but more intense rainy seasons and longer dry seasons have turned to diversifying their crops in order to adapt. Rice production has decreased as farmers try to figure out when is the best time to plant (IRIN 2012).

Because indigenous and rural people rely on their immediate environment for their daily needs, they may feel climate change impacts more strongly.

Forestry Sector (REDD+)

Deforestation and forest degradation have caused a general decline in forest cover from 70% of the total land area in 1940 to 41.5% in 2002 (DOE/WREA 2010). Current government targets include increasing forest cover to 70% by 2020.

Under NAPA, priority projects include the continuation of the slash and burn eradication and the permanent job creation programmes by replacing these areas with permanent land use systems that support local livelihoods (UNDP/WREA 2009). A second project is the strengthening of village forestry volunteer capacity in terms of forest planting, stewardship and management techniques, especially with regard to the use of village forests. This project is geared towards the management of community forests.

One other project related to climate change in the forestry sector is Reducing Emissions from Deforestation and forest Degradation (REDD+). It is undertaken by a REDD+ Task Force and a REDD+ focal person, most of which are within Lao PDR’s Department of Forestry (DoF). Among other goals, its mechanism promotes the conservation of biodiversity and climate change mitigation. Regarding the conservation of the environment, it aims to protect the soil and conserve the watershed and climate. It is an effort to create monetary value for forest biomass and offers incentives to developing countries to reduce emissions from forested lands and to invest in low-carbon, sustainable forestry initiatives.

The key areas that have been identified for REDD+ are awareness raising, consultation and

information sharing. The awareness creation project informs people of the importance of CO₂ emissions in climate change and how forestry and land-use changes contribute to the increase or reduction in CO₂ emissions (FCPF 2010).

As part of its information sharing efforts, REDD+ uses a national Reference Emission Level (REL), which is estimated using historical rates of forest change, the rate of forest degradation, national development plans and economic growth.

The following safeguards when undertaking REDD+ were discussed at the 15th Conference of the Parties (COP15) to the UNFCCC (FCPF 2010):

- 1) Consistency with the objectives of national forest programmes and relevant international conventions and agreements should be maintained.
- 2) With the national legislation and sovereignty in mind, national forest governance structures should be both transparent and effective.
- 3) Indigenous peoples and knowledge should be respected and, as discussed in the General Assembly, the United Nations Declaration on the Rights of Indigenous Peoples should be adopted.
- 4) The full participation of all relevant stakeholders, indigenous peoples and local communities in particular should be solicited.
- 5) Actions that are consistent with and incentivise the conservation of natural forests, their ecosystem services and biological diversity should be undertaken. Further, no actions should be taken to convert natural forests.
- 6) Actions to address the risk of reversals should be taken.
- 7) Actions to reduce the displacement of emissions should be taken.

One of REDD+'s activities is National Greenhouse Gas (GHG) reporting on Land-Use, Land-Use Change and Forestry (LULUCF), which builds capacity for the Climate Change Office in the WREA and DoF. This is a study on emissions and the removal factors for relevant emissions, as well as on the implications of the Lao PDR forest situation for the UNFCCC.

The sources of monetary support for REDD+ include the government, FCPF, the UN-REDD Programme, KfW, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), JICA and the World Bank/Government of Finland (SUFORD).

Water Resources

Six projects are being prioritized by the NAPA (UNDP/WREA 2009):

1. Raising awareness regarding water and water resource management – activities include providing training for water management and the dissemination of water-related information.
2. Mapping of flood-prone areas – the mapping of these areas is either insufficient or non-existent. Completing the mapping will enhance community adaptive capacity.
3. Establishing an early warning system for flood-prone areas and improving and expanding meteorological and hydrological networks and weather monitoring systems – previous disasters caused by flooding have highlighted the need for an early warning system.
4. Strengthening institutional and human resource capacities related to water and water resource management – the existing institutional framework for water and water resource management in Lao PDR is relatively weak, and thus, water management is ineffective.
5. Surveying underground water sources in drought-prone areas – in certain areas, surface waters are inaccessible, and people turn to groundwater reserves. The extraction rate for groundwater, however, should not exceed the carrying capacity. A database of groundwater tables and recharge rates should be made to address this issue.
6. Studying, designing, and building multi-use reservoirs in drought-prone areas – due to fluctuations in water quality and quantity, multipurpose reservoirs are needed to support domestic water needs and prevent crop damage in times of drought.

Health Sector

NAPA projects within the health sector include improving systems for the sustainable use of drinking water and sanitation in flood and drought areas via community participation, as well as the improvement of the knowledge and skills of engineers who design and build water and sanitation systems (UNDP/WREA 2009). In developing countries like Lao PDR, sanitation systems are limited. People do not even have basic access to safe drinking water. In light of the compounding effects of climate change on sanitation and water quality, securing these basic needs is important.

Chapter 4

Social Environment

4. Social Environment

4.1 Overview

According to the 2005 Census, the estimated population of Lao PDR was 5.62 million, a number that has increased to 6,695,166 according to the latest estimates by the CIA in July 2013. The population is estimated to have grown by 1.63% (CIA, 2013). In 2005, about 50% of the population was younger than 20 years, and the national average population density was 28 people/km². Among all provinces, Savannakhet has the largest population, and the capital city of Vientiane has the highest population density (202 people/km²). Lao PDR is a very diverse, multi-ethnic country. The 2005 Census identified 49 different ethnic groups. About 55% of the population is comprised of Lao people, 11% of Khmu indigenous people, 8% of Hmong group while the rest is formed from smaller percentages of the remaining ethnic groups (Figure 4.1.1). However, according to the CIA, there are over 100 minor ethnic groups. With regards to religion, Buddhists are the majority (67%), followed by Christians (1.5%) with the rest being either Muslims, Baha'is, or 'Other' (Figure 4.1.2). Lao is the official and most widely used language in Lao PDR. French, English, and other ethnic languages are also used (CIA 2013; GoL 2005).

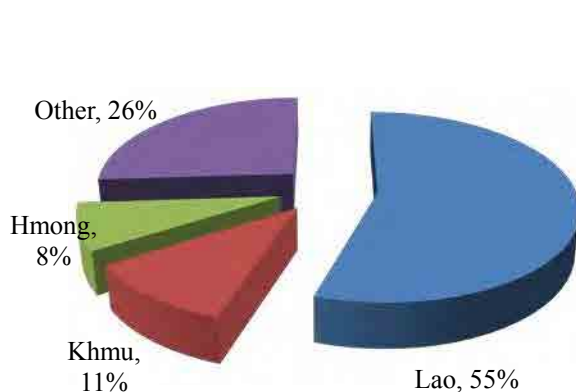


Figure 4.1.1: Ethnic Groups in Lao PDR

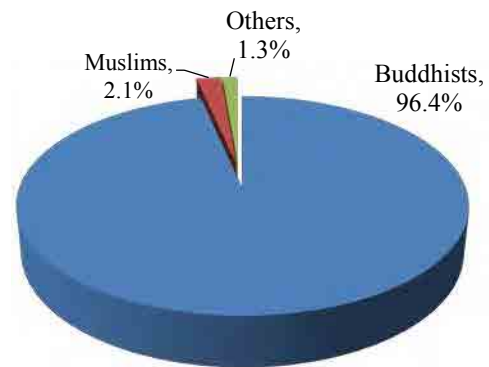


Figure 4.1.2: Religion in Lao PDR

Lao PDR gained its independence in 1945. The country was invaded by the French for a second time in 1946. In 1954, the Geneva Accord was signed and peace was restored in Indochina. However, despite the peace treaty, civil war between the royalists and the communists (Pathet Lao) continued (BBC 2012). From 1964 to 1973, Lao PDR was subjected to heavy bombardment by the American Air Force until the Vientiane ceasefire agreement that divided Lao PDR between the communists and the royalists was signed. It was estimated that more bombs were dropped on Lao PDR during that period than the entire Second World War. A

legacy of the Laotian civil war is ongoing casualties from unexploded ordnances (UXOs) dropped by the U.S. and Laotian Air Forces from 1964 to 1973. More than 2 million tons of bombs, including 260 million cluster munitions were dropped on Lao PDR, particularly on Xiangkhouang Province on the Plain of Jars. Thirty percent of these UXOs failed to explode immediately, posing a long-term deadly threat. Casualties in Lao PDR from UXOs are estimated at 12,000 since 1973. Thirty-three years after the last bomb was dropped and after decades of UXO clearance programs, 59 people were still killed or injured by UXOs in 2006. UXOs continue to kill and injure people and prevent them from using land, even for growing food. UXOs are a key factor driving poverty and stifling economic development in Lao PDR (Legacies of War 2013).

In 1975, the Lao People's Front (formerly known as Pathet Lao) seized power and proclaimed the Lao People's Democratic Republic (Lao PDR), with the Lao People's Revolutionary Party (LPRP) being the only legal party. After serious food shortages and the flight of hundreds of thousands of refugees, the government made some changes to its approach. Although the first election was held in 1989, all candidates still have to be endorsed by the LPRP (BBC 2012).

Lao PDR is listed as a least developed country (LDC). Despite this, however, the country is on a path of sustainable development. From 2001 to 2010, Lao PDR achieved an average economic growth rate of 7.1% per year, and in 2010, the expectation was that this number would increase to 7.6% per year from 2011 to 2015. In 2011, Lao PDR reached a national income per capita level of USD 1,010, which elevated the country from a lower income economy to a lower-middle income economy. It is believed that if this pace continues, the country will be able to graduate from the LDC status by 2020. Hydropower and mining are the main industries contributing to economic growth. In order to increase its integration with the regional and global economy, Lao PDR became a member of Southeast Asian Nations (ASEAN) and the ASEAN Free Trade Area and recently became a full member of the World Trade Organisation (WB 2013).

4.2 Regulations and Policies

The Lao PDR Constitution (2003) affirms that ‘the State protects the freedom and democratic rights of the people which cannot be violated by anyone’ (Article 6). There are other key domestic and international legal instruments relevant to social considerations, including protection of rights. They are listed as follows:

Major Domestic Laws

- Law on Development and Protection of Women (2004)
- Law on the Protection of the Rights and Interests of Children (2007)
- Education Law (2000)
- Decree on the Rights of Persons with Disabilities (2001)
- Decree on a Social Security Scheme for Government Workers (1993)
- Decree on Social Security Scheme for Corporate Employees (2000)
- Law on Hygiene, Disease Prevention, and Health Promotion (2001)
- Amended Labour Law (2006)
- Law on National Heritage (2005)
- Decree on the Preservation of Cultural, Historical, and Natural Heritage (1997)

Major International Agreements

- Convention on the Political Rights of Women (1968-Accession)
- Convention on the Elimination of All Forms of Discrimination against Women (1981)
- Convention on the Rights of the Child (1991-Accession)
- Convention on the Rights of Persons with Disabilities (2009)
- International Covenant on Economic, Social, and Cultural Rights (2007)
- International Convention on the Elimination of All Forms of Racial Discrimination (1974-Accession)
- Convention on the Protection and Promotion of the Diversity of Cultural Expressions (2005)
- Convention for the Safeguarding of the Intangible Cultural Heritage (2003)

Tables A-1 and A-2 in the Appendix show the major governmental laws and regulations, international conventions, protocols, and treaties related to environmental and social considerations.

4.3 Relevant Organisations for Protection of Basic Human Rights

The Lao PDR Government human rights bodies include the Department of Social Welfare of the Ministry of Labour and Social Welfare, which is the relevant ministry for the protection of basic human rights for the socially vulnerable including women, children, and elderly people. A human rights division in the Ministry of Foreign Affairs has responsibility for investigating allegations of human rights violations, although in practice it apparently has no authority to perform investigations or direct other ministries to undertake them (US Dept. of State 2012).

In addition to the organs of state powers, the Lao Front for National Construction, mass organisations such as the Lao Federation of Trade Unions, the Lao People's Revolutionary Youth Union, the Lao Women's Union, the Federation of Military Veterans, and other social and professional organisations operate in the country with a view to uniting and mobilising the Lao people of all social strata in carrying out the tasks of protection and development of the country, to protect the rights and legitimate interests of the respective organisations' members (MOFA 2013). In December 2011 the government established a National Commission on the Coordination of Human Rights to advise ministries on the implementation of Lao and international human rights laws. The commission lacked formal oversight and investigative powers (US Dept. of State 2012).

There are no strong domestic human rights NGOs actively working in Lao PDR. As long as other international bodies are concerned, the government maintains human rights dialogues with several foreign governments and continues to receive training in UN human rights conventions from several international donors. The government also cooperates with the International Committee of the Red Cross in activities implementing international humanitarian law as well as with the Office of the UN High Commissioner for Refugees (UNHCR) and other humanitarian organisations in providing protection and assistance to refugees and other persons of concern (US Dept. of State 2012).

4.4 Protection of Rights for Socially Vulnerable

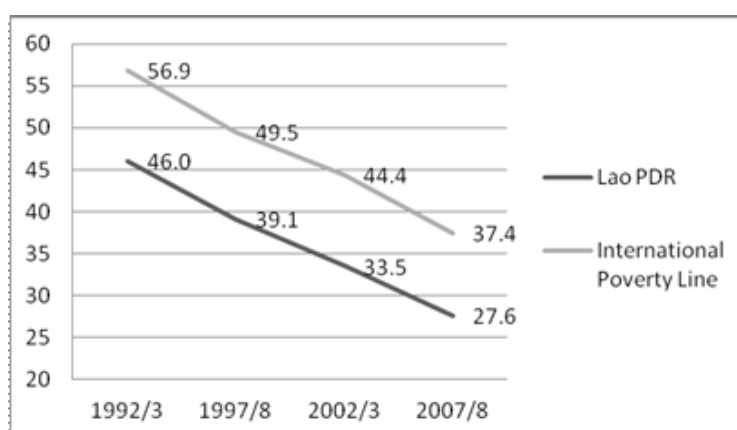
4.4.1 Poverty

Lao PDR faces disadvantages in economic development due to the inability to adopt an outward-oriented development strategy (WB 2006). Despite this, however, Lao PDR has undergone a steady decline in headcount poverty over the past 20 years. In 1992/1993, the poverty rate was 46.0%, while in 2007/2008, this number declined to 27.6%. Likewise, the poverty gap, which indicates the average consumption shortfall of the poor relative to the poverty line, has also shown a steady drop. Last but not least, the poverty severity (squared poverty gap), which takes into account both the distance separating the poor from the poverty line and the inequality among the poor, has shown improvement.

Table 4.4.1: Poverty Headcount, Gap, and Severity in Lao PDR

Year	1992/3	1997/8	2002/3	2007/8
Poverty head count	46.0	39.1	33.5	27.6
Poverty gap	11.2	10.3	8.0	6.5
Poverty severity	3.9	3.9	2.8	2.3

Source: Lao Statistics Bureau (2008)



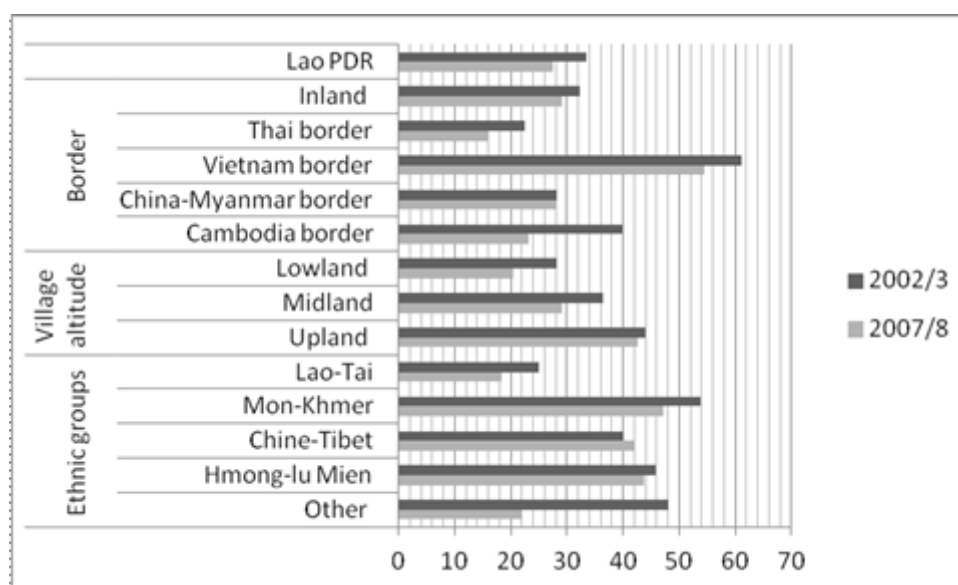
Note: The International Poverty Line is \$1.25.

Source: Lao Statistics Bureau (2008)

Figure 4.4.1: Comparison of Poverty Lines

This steady improvement in poverty alleviation is being attributed to the robust growth of the country's economy (ADB 2013). The drop in poverty has also been accompanied by a swift expansion in household asset ownership. Assets such as motorbikes and mobile phones are helping households in remote areas gain access to information and infrastructure, which is

bringing enormous changes to the lives of rural Lao residents. Despite the improvement in the poverty gap, however, the speed of poverty alleviation has not been entirely equal throughout the country. Areas with the strongest links to markets and infrastructure have seen the fastest declines in poverty, such as urban areas, the Vientiane province, and the districts along the border with Thailand. Conversely, the North, the regions bordering Vietnam, and the uplands areas, which are largely inhabited by minority ethnic groups, continue to face challenges with poverty.



Source: Lao Statistics Bureau (2008)

Figure 4.4.2: Poverty Headcount by Border, Altitude, and Ethnicity, 2002/3 and 2007/8

One of the main socioeconomic problems in Lao PDR is poverty caused by fragile natural resources. During the Indochina conflict from 1964 to 1973, Lao PDR was subjected to heavy bombing, and the 1997 National Survey found that over 3,800 villages (about 1.3 million people) are still affected by UXOs from this conflict. The presence of UXOs prevents access to agricultural land, disturbs traditional land-use patterns, and imposes increased pressures on the natural environment. Fortunately, progress is being made in the removal of UXOs (WB 2006).

Lao PDR's strong performance in poverty alleviation does not accurately reflect the actual situation of most Lao PDR citizens. A small domestic market, skill shortages, and the remoteness and isolation of much of the population continue to be significant problems (IFAD 2012).

The National Growth and Poverty Eradication Strategy and the seventh 5-Year National Socioeconomic Development Plan (NSED) 2011-2015 are the policies currently being implemented for poverty alleviation. Rural development is central to the government's development efforts (Rural Poverty Portal 2013). Specific strategies for developing rural areas have been implemented, such as the establishment of the National Committee for Rural Development and Poverty Eradication (NCRDPE) (also known as the Lao National Committee for Rural Development and Poverty Eradication) and the Poverty Reduction Fund (PRF).

4.4.2 Indigenous Peoples and Ethnic Minority Groups

With a population of around 6.7 million, Lao PDR is the most ethnically diverse country in mainland Southeast Asia. However, the concept of 'indigenous' is problematic in Lao PDR and the government does not use this terminology. It refers to Lao PDR as a multi-ethnic society. The National Assembly's official Agreement N°213 of 24 November 2008 recognised only one nationality - Lao- while at the same time acknowledging 49 ethnic groups, with obvious distinctions in culture and languages. It is these ethnic minority groups that are most often identified and defined as Lao PDR indigenous peoples and are divided into groups according to two ways; either based on the area of occupation or, the more widely accepted linguistic approach. The historically, politically, economically and socially dominant Lao-Tai are the primary residents of urban areas, and also live in high density and agriculturally productive lowland areas around Vientiane and the Mekong corridor. Indigenous peoples and ethnic minority groups are unmistakably the most vulnerable groups in Lao PDR, representing 93% of the country's poor. They face territorial, economic, cultural and political pressures and are experiencing livelihood-related challenges. Their land and resources are increasingly under pressure from government development policies and commercial natural resource exploitation. Further description on the categories of ethnic groups and current issues are given in details in Chapter 7.

4.4.3 Gender

Greater gender equality enhances productivity, helping a country to become more developed. Lao PDR being a developing country, the empowerment of women and girls is vital to translating its economic growth into improved living standards. Following its economic growth and decrease in poverty, Lao PDR has also made improvements in promoting gender equality. The participation of women in the labour market and in decision-making has increased. Despite this progress, however, gender inequality still remains a significant issue across the country's

different geographic areas and ethnic groups.

Problems that women in rural areas of Lao PDR face include a lack of awareness about maternal health and malnutrition. Gender gaps are also seen in education, and even though these gaps are narrowing, girls are more likely to be left behind and challenges still persist in education completion. Low-quality education and consistent dropout rates among girls in rural areas have ranked Lao PDR as one of the lowest performers in the East Asia Pacific region for girls' education (ADB and WB 2012). Women are also subjected to human trafficking to neighbouring countries, often ending up in forced prostitution and domestic labour. In addition, violence against women is widespread. This has been attributed to weak or absent definitions and distinctions of violence in legislation (for example, the Penal Code does not address domestic violence or marital rape), a culture of silence and impunity, poor access to justice for women in rural ethnic communities, and an absence of data and information on the rate of violence and the availability of services for survivors (UN Women 2013).

As mentioned previously, both legal and government frameworks for emphasising women's rights have steadily advanced. Equal rights for men and women have been stipulated in the Constitution and other laws (e.g., the family, land, and property laws; the labour law; the electoral law; and the penal law). The Constitution also mandates women's advancement to the Lao Women's Union (ADB and WB, 2012). In addition, the law on the development and protection of women was established in 2004. The law is concerned with promoting the role of women in Lao PDR and defining the fundamental contents and measures for developing and protecting the rights and interests of women. It also aims to define the responsibility of the Laotian State, society and family towards women. The Government of Lao PDR has established the National Commission for the Advancement of Women (NCAW), which is responsible for driving national policy to promote gender equality and to empower women. NCAW is currently implementing its second National Strategy on the Advancement of Women for 2011 to 2015. This strategy outlines how to translate political commitments in the Convention on the Elimination of All Forms of Discrimination against Women (CEDAW) and other international agreements into practical action, as well as how to integrate gender equality principles into national laws and policies. Apart from NCAW, 'Sub-CAW' units have also been established throughout all ministries and state organisations and at provincial, district, and village levels to enhance the implementation and monitoring of CEDAW.

Additional examples of policies and plans currently in place in Lao PDR to eradicate gender imbalance in the society include the Gender Considerations in National Water and Sanitation

Programs, which aims to improve gender consideration of sanitary facilities; the National Gender Strategy Focuses on Agriculture and Forestry, which aims to enhance women's participation in agriculture and forestry; and the National Government Plans for SME Development, which targets female entrepreneurs.

4.4.4 Children

Besides women, children are the most vulnerable to poverty. As about 50% of the population is under the age of 18, a significant number of children are likely to experience poverty either directly or indirectly. According to the 2005 Census, the national average for infant mortality rate (IMR) was 70 per 1,000 live births, while the under-5 mortality rate was 98 per 1,000 children. This average is among the highest in Southeast Asia. Five provinces had an IMR of higher than 100—Luangnamtha, Khammuane, Saravane, Sekong, and Attapeu. Child nutrition in Lao PDR is also far below the MDG targets, with 40% of children under 5 suffering from stunting, and 40% of 1-year-old children facing moderate to severe malnutrition. These situations are attributable to a lack of medical facilities, human resources, and awareness among the people. Very few children receive vaccinations in Lao PDR; only 27% are fully immunised through a routine system. Poor sanitation and low-quality education for girls are also associated with the poor health of children affected by poverty (MPI and UNICEF 2012).

In terms of education, income and gender disparities still exist. Only about 59% of children from the poorest quintile attend primary schools, and about 75% of those who do not attend school live in the 56 priority districts identified by the Ministry of Education. Despite a steady increase in gender parity in enrolment, disparities widen at higher stages of education. Female students still face enrolment difficulties. The largest gender gaps are found in the North and rural areas. In addition to a lack of human resources, the costs associated with education contribute to educational inequality. Both official and unofficial costs should be factored in, and the loss of income from children's labour in contributing to their families' livelihoods should also be considered (MPI and UNICEF 2012).

The child labour issues do not seem to have gained much attention from policy makers, nor is there sufficient understanding of this matter. About 15% of the total population of children 5 to 17 years of age are considered to be employed. The majority of these working children are girls in rural areas. Apart from performing hazardous work in Lao PDR itself, increased demand for unskilled labour in neighbouring countries has also increased cross-border migration, which consequently increases the vulnerability of children from poor families to exploitation. Low

levels of birth registration make it difficult to track missing children, especially those from ethnic minority groups other than the Lao-Tai (ILO 2012).

Children in Lao PDR are also vulnerable to sexual abuse and exploitation. Although official reports of child abuse are rare, anecdotal evidence suggests that the problem exists. The rise of the tourism industry in the country is correlated with a rise in child sex tourism in Southeast Asia. However, the government has been making efforts to eradicate commercial sex (US Dept. of State 2012).

Relevant legal and policy frameworks have been implemented by the government to reduce the vulnerability of children. The key policies and regulations are the following (MPI and UNICEF 2012):

- Seventh NSEDP and 5-year National Health Sector Development Plan 2011-2015, which has set the overall policy framework for achieving equity in child health;
- National Health Financing Strategy 2011-2015, which aims scale up the primary health services by increasing public investment;
- National Nutrition Strategy and Plan of Action, which addresses malnutrition and food insecurity;
- National Strategy on Rural Water Supply and Environmental Health, which addresses rural water supplies and the sanitation sector and also mandates that all primary schools be equipped with water and sanitation facilities;
- Education Sector Development Framework (ESDF), which aims to achieve MDG and Education for All (EFA) targets by 2015;
- Implementation of Education Law enacted in 2000 and amended in 2007. It aims to abolish school fees and states the right of every Laotian citizen to education without any discrimination based on ethnicity, religion, gender, origin and social status;
- Law on Protection of the Rights and Interests of Children, which defines the principles, rules, and measures to protect the rights of multi-ethnic children (defined as a person below the age of 18) and to define measures against those who commit offenses against them so as to ensure the current and future well-being of children as they become adult members of society;
- National Plan for Action on Commercial Sexual Exploitation of Children (CSEC), which provides a framework of prevention and response for victims of commercial sexual exploitation; and
- UN Convention on the Rights of Child.

4.4.5 Persons with Disabilities

Little is known about the number of people with disabilities in Lao PDR. Currently, there is no centralised statistics system to determine this number. The last National Census in 2005 identified 80,000 people with disabilities, while the World Health Organisation (WHO) estimates that about 10% of the population (approximately 650,000 people) is disabled. This figure is increasing due to ongoing risks of disabilities. The incidence of disability in Lao PDR is highly attributable to low standards of healthcare and the high incidence of land mines and UXOs (LDPA 2013a). Lao PDR has the worst contamination from UXOs in the world and in 41 of the 46 poorest districts in Lao PDR, approximately 80 million UXOs still constitute daily threats to civilians.

As in its other LDC counterparts, poverty and disability perpetuate each other in Lao PDR. This contributes to vulnerability and exclusion and poses significant challenges for people with disabilities. Nearly 75% of people who are disabled are of working age, which makes income generation and job security significant issues. Despite being subjected to equal rights in the Decree on the Rights of Persons with Disabilities, the disabled are still discriminated against in society. Negative stereotypes and social stigma towards disabled people are common, and people with disabilities are typically assigned to a lower social status. Gender inequality and other social stigmas exacerbate the vulnerable status of disabled women and ethnic minorities in Lao PDR (LDPA 2013a).

The Ministry of Health is the primary institution responsible for protecting the rights of persons with disabilities. The Ministry of Labour and Social Welfare and the Lao National Commission for the Disabled are also responsible for protecting disabled people from discrimination. According to the Ministry of Public Works and Transport, construction projects begun after 2009 are required to provide facilities for disabled people and elderly individuals, particularly buildings, roads, and public places. However, it does not mandate modifications to buildings built before the enactment. Following this, regulations established by Ministry of Labour and Social Welfare in 2011 resulted in the construction of additional sidewalk ramps in Vientiane. Although there was some additional progress made for accessibility, a lack of resources and infrastructure and limited staffing have prevented effective implementation (US Dept. of State 2012).

The Decree on the Rights of Persons with Disabilities (2001) serves as the main legislation for protecting the rights of the disabled. The decree defines principles, rules and measures to

formulate and protect the rights of persons with disabilities, protect them from discrimination, and to lay down policies on the rehabilitation, treatment, education and employment promotion of persons with disabilities. Other sectoral laws include the Law on Hygiene, Disease Prevention, and Health Promotion (2001) (which address issues of health care for elderly, handicapped and disabled persons in Articles 30, 31 and 32); the Amended Labour Law (2006) (which states that disabled or handicapped workers are to be given priority according to their abilities and skills with no discrimination in salaries as compared to regular workers in Article 26); the Decree on a Social Security Scheme for Government Workers (1993) (concerned with the authentication and allowances for amputee workers in the government); and the Decree on Social Security Scheme for Corporate Employees (2000) (concerned with persons working in the private, state-owned and joint venture enterprises in the agricultural, industrial and services sectors and in enterprises employing more than 10 persons; it creates allowances for accidents at work and professional diseases). The government has also implemented the Action Plan of the National Strategy for People with Disability (2000) and the Development Policy of Rehabilitation for the Handicapped Sector. Both policy and plan emphasise the integration of people with disabilities into society (UNESCAP 2011). In 2009, the government ratified the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD), which recognises and reaffirms that all persons with disabilities have fundamental rights and freedoms (LDPA 2013b).

4.4.6 Sexual Minorities

There is no specific law that prohibits discrimination based on sexual orientation, and official reports of discrimination have been made. However, it is more likely that societal stigma and concern about repercussions have prevented individuals from reporting incidents of abuse. Despite growing tolerance of LGBT individuals, discrimination in employment and housing still exists. It is understood that LGBT persons should not apply for high-level jobs, given that employers are unwilling to hire them. No efforts have been made by the government regarding the discrimination against sexual minorities (US Dept. of State 2012).

4.5 Protection of Rights of Workers

In 2011, the total labour force of Lao PDR was 3,691,300, which accounts for half of the nation's population. Of these, 43,694 are unemployed. The agriculture and forestry sector has the largest percentage of the total labour force (75.1%), followed by the services and the industry sectors (19.4% and 5.5% of the total labour force, respectively) (Vangkonevilay et al.

2011). While modestly sized compared to neighbouring countries, Lao's garment sector is the country's largest manufacturing employer with over 20,000 workers (WB 2012).

The Labour Law (promulgated in 2006) is the principal law that pertains to labour rights in Lao PDR. Companies are mandated to establish a labour union or to elect a representative if a labour union does not exist. Unions are authorised only if they operate within the legal framework officially sanctioned by the Lao Federation of Trade Union (LTFU, also known as the Federation of Lao Trade Union), which, in turn, is controlled by the LPRP (ITUC 2011). The law also stipulates the prohibition of union membership for foreign workers, the prohibition of cancelling or stopping a work contract by the union members without receiving a permit from the authority concerned, the forbiddance of conducting activities without government's interference, and the forbiddance of establishing alliances and protest meetings (US Dept. of State 2012).

The workers also have no right to bargain collectively. Disputes are resolved through workplace committees of employers, representatives of the local labour union, and federation representatives, with the final authority resting with the Ministry of Labour and Social Welfare. However, there is no information available on the effectiveness of these committees. The U.S. Dept. of State (2012) states that labour disputes and labour strikes are rarely reported. This is largely attributable to the government's failure to provide tools to call a strike. According to labour activists, the federation needs the government's permission to enter factories and provide advance notice of visits to the workplace, thereby making it powerless to protect workers who file complaints (US Dept. of State 2012).

As of November 2011, the minimum monthly wage for private sector workers was 626,000 kip, excluding an additional 8,000 kip meal allowance per day. On the other hand, civil servants and state employees receive a minimum wage of 500,000 kip per month. In addition to their wage, government servants are also entitled to housing subsidies and other government benefits. Nevertheless, it has been reported that some employees, particularly construction workers, earn less than the minimum wage (US Dept. of State 2012).

According to the law, working hours are limited to 48 hours per week with at least one day of rest. Overtime cannot exceed 45 hours per month (AJC 2008). In terms of working environment, the law demands safe working environments and higher compensation for dangerous work. The practice of providing compensation for a worker or worker's family in the case of an injury or death seems to be effectively carried out in formal working environments, but not in most informal businesses (US Dept. of State 2012).

The issues of illegal immigrant workers are also a problem in Lao PDR. Undocumented immigrants come from surrounding countries such as Vietnam, China, and Myanmar. They are vulnerable to exploitation by employers. As of October 2013, it has been estimated that approximately 54,000 foreigners are working in the country, and that one-third of them are undocumented. Illegal immigrants primarily work in construction, plantations, casinos, and service industries (US Dept. of State 2012).

The International Labour Organisation (ILO) has mainly worked with the Ministry of Labour and Social Welfare (MoLSW), LTFU, and the Lao National Chamber of Commerce and Industry (LNCCI) to ensure the well-being of labourers in the country. With significant support from the ILO, MoLSW has established a social security system for private sector employees (SSO), with a national coverage of approximately 10% of eligible employees. MoLSW has also been receiving support in the area of Occupational Health and Safety (OSH) through intra-ASEAN network building (ASEAN-OSHNET) (ILO 2012).

4.6 Cultural Heritage

4.6.1 Relevant Regulations and Government Agencies

The management of the cultural heritage of Lao PDR is divided into four main levels: the Ministry of Information and Culture at the central level, the Division of the Information and Culture at the provincial level, the District Information and Culture Office at the district level, and the village authorities at the fourth level (UNESCO 2012).

There are also other committees and offices that manage the cultural heritage site that are registered as world or regional heritage. These are the National Heritage Committee, the local Heritage Committee, and the World Heritage Office, each with different structures and regulations.

The Ministry of Information and Culture has functions relating to national heritage. It conducts research to help build the policy structure and plans; conducts surveys and data collection and analysis on the different types of national heritage that do exist; disseminates information regarding policies and guidelines; supervises and promotes the status of the region and world heritage and implements policies; recruits officers that are responsible for management; acts as the central organisation that coordinates with other related sectors for management and policy

implementation; establishes a cooperative relationship with other countries and international organisations; submits reports and assessments on its work to the government and Prime Minister; and undertakes other functions mentioned in the law (Sourya, Keosopha, and Siseangrat 2005).

The roles and functions of the Provincial Information and Culture Division focus on the provinces, capital city, and special zones and include the registration, implementation, and planning of the projects of the Ministry; survey and data collection; the promotion of and education about policies; the supervision and enhancement of information in the different offices; the coordination between concerned authorities and management; reporting to the line ministries about the implementation of policies; and the implementation of other rights and functions according to the law. The roles and functions of the District Information and Culture Office are similar to that of the Provincial Information and Culture Division but on a district level. The village authorities are tasked with implementation, surveying, and reporting to the above organisations (Sourya, Keosopha, and Siseangrat 2005).

The main policy governing the cultural heritage of Lao PDR is the 1997 Presidential Decree on the Preservation of Cultural, Historic, and Natural Heritage. It outlines the regulations and measures for the management, conservation, preservation, and use of national heritage. It also includes the promotion of movable and immovable assets with historical, cultural, or natural value to national heritage status. The 2005 Lao PDR National Heritage Law determines the principles, regulations, and measures for the administration, use, protection, conservation, restoration, and rehabilitation of the national and intangible heritage (UNESCO 2012). It also states the rights and duties of the State, social organisations, and individuals regarding the preservation of the national culture, and the historical and natural heritage.

The registration of national, cultural, and historical heritage sites that are owned by individuals or organisations is encouraged by the government. The State conducts surveys and collects items and then evaluates, classifies, and registers them. The regulations of this registration process are as follows:

1. Local-level national heritage sites are to be registered with the information and culture divisions at the provincial or city level
2. National-level heritage sites are to be registered with the Ministry of Information and Culture
3. World-level national heritage sites are to be registered with the relevant international organisations as proposed by Lao PDR.

Lao PDR is also a signatory to conventions relating to the protection of cultural and natural heritage sites. These are the 1972 Convention Concerning the Protection of the World Cultural and Natural Heritage, the 2005 Convention on the Protection and Promotion of the Diversity of Cultural Expressions, and the 2003 Convention for the Safeguarding of the Intangible Cultural Heritage.

Lao PDR serves as the focal point for training heritage guides to serve at world heritage sites. This is in line with the framework of the Greater Mekong Subregion (GMS) Tourism Strategy that is adopted by all member countries (UNESCO 2012). The Lao National Tourism Authority collaborates with UNESCO in the drafting of regulations for the formal recognition of heritage guides, who are provided a certification after training.

Table 4.6.1: Laws and Treaties on Safeguarding Cultural Heritage

Relevant laws and treaties	Year
Domestic laws	
Decree on the Preservation of Cultural, Historic, and Natural Heritage	1997
National Heritage Law	2005
International treaties	
Convention Concerning the Protection of the World Cultural and Natural Heritage	1972
Convention on the Protection and Promotion of the Diversity of Cultural Expressions	2005
Convention for the Safeguarding of the Intangible Cultural Heritage	2003

Funding for the preservation, conservation, revival, and restoration of cultural heritage sites is obtained from the Cultural Heritage Fund, which is composed of funding from the government budget, assistance from other countries and organisations, individual contributions, and income generated by heritage sites.

There are two main types of cultural heritages: tangible objects, which are moveable or immoveable property with unique characters, and intangible items, such as local innovation, knowledge, philosophies, beliefs, etc.

Tangible objects are more concrete, while intangible items are more abstract and include livelihood practices, social behaviour, languages, etc.

4.6.2 Major Cultural Heritage Sites in Lao PDR

Two properties are listed as cultural heritage sites on the United Nations Educational, Scientific and Cultural Organisation (UNESCO) World Heritage List as of July 2013 (see Table 4.6.2 and Figure 4.6.1).

Table 4.6.2: World Heritage Sites in Lao PDR

Site	Property type	Registered year
1. Town of Luang Prabang	Cultural heritage	1995
2. Vat Phou and associated ancient settlements within the Champasak Cultural Landscape	Cultural heritage	2001

Source: UNESCO (2013)

1) Town of Luang Prabang

Luang Prabang is an outstanding example of the fusion of traditional architecture and Lao urban structures built by the European colonial authorities in the 19th and 20th centuries. Its unique, remarkably well-preserved townscape illustrates a key stage in the blending of these two distinct cultural traditions.

2) Vat Phou and Associated Ancient Settlements within the Champasak Cultural Landscape

The Champasak cultural landscape, including the Vat Phou Temple complex, is a remarkably well-preserved planned landscape that is more than 1,000 years old. It was shaped to express the Hindu vision of the relationship between nature and humanity, using an axis from a mountain top to a river bank to lay out a geometric pattern of temples, shrines, and waterworks extending over 10 km. Two planned cities on the banks of the Mekong River are also part of the site, as well as Phou Kao Mountain. The whole area represents a development ranging from the 5th to 15th centuries, mainly associated with the Khmer Empire.



Source: UNESCO (2013)

Figure 4.6.1: World Heritage Sites in Lao PDR

Two other properties have been submitted to the Tentative List of UNESCO World Heritage:

- Sites Mégalithiques de la province de Xieng Khouang (1992)
- That Luang de Vientiane (1992)

(UNESCO 2013)

4.6.3 Issues Related to the Protection of Cultural Heritage

Regulations related to cultural heritage in Lao PDR are severely limited by funding available to the government. Protection and development work in the country relies on help from other countries and international organisations. Lao PDR faces development challenges with the two properties included in the World Heritage List, which are currently not properly managed. This issue is especially pressing as the country is experiencing significant growth in its tourism sector, and this uncontrolled development may cause irreversible damage to the heritage sites.

At the 35th Session of the World Heritage Committee in 2011, Lao PDR was requested to initiate a comprehensive assessment on the state of conservation and the management system of the Vat Phou property. This followed two UNESCO missions that were dispatched to undertake an impact assessment that would act as a guide for drafting an action plan for the site. It was found that a proposed road, the management system of the site, and the presence of insufficient professional staff all threatened the site. This led to the recommendation that urban planning needs to be conducted properly to minimise increased urban sprawl along the new road and to manage the site as a landscape and not just a temple (UNESCO 2012).

In addition, no formal inventory or documentation has been done on the Lao intangible cultural heritage, and no element has been added to the UNESCO Intangible Cultural Heritage (ICH) list. This list preserves the living expressions and traditions of groups and communities in the world that were inherited from ancestors and passed down to descendants. ICH is usually transmitted orally (UNESCO 2012). The government of Lao PDR has requested help from UNESCO in identifying and safeguarding its ICH.

Together with the World Heritage Centre, UNESCO will provide assistance to the national and provincial authorities that are involved. This assistance will help to develop management capabilities. The World Heritage Centre and UNESCO will also work with the Lao PDR government to build local capacity and to implement innovative pilot programmes, including ones that focus on the sustainability of the Lao tourism sector and the country's heritage. Aside from World Heritage Sites, UNESCO has also been vital in introducing a culture-based monitoring framework to encourage schools to integrate both knowledge and culture into their curricula and activities. The conduct of a world heritage periodic reporting process provides opportunities to provide support for workshops as well as for raising awareness (UNESCO 2012).

4.7 Gap Analysis between the Existing Domestic Regulations, the JICA Guidelines for Environmental and Social Considerations, and the World Bank Safeguard Policy

According to Lao PDR's Decree on Environmental Impact Assessment, existing domestic regulations assess projects into three categories: those that need to conduct an initial environmental examination, those that need to conduct an environmental impact assessment, and those that do not require any initial environmental examination or environmental impact assessment. Licensed project developers need to also study impacts to architectural and cultural heritage sites and incorporate the results in the environmental impact assessment report. They also need to consult with local administrations such as the different environment offices, and conduct district-level meetings that include the participation of the representatives of project-affected people. Reports should include revisions from the district level and should be written either in Lao or in English, while the abstract or executive summary, the environmental management and monitoring plan (EMMP), and the social management and monitoring plan (SMMP) should be in both languages. When approved by the Water Resources and Environment Administration, these must be implemented strictly.

The Law on National Heritage decrees that socio-economic development shall proceed side by side with protection and conservation of the national heritage. Individuals or organisations that intend to pursue socio-economic development in an area where it is suspected that there is any national, cultural and historical heritage shall obtain prior approval from the Ministry of Information and Culture, including determination of measures to protect such heritage from damage.

The JICA Guidelines for Environmental and Social Considerations (JICA 2010) strongly emphasise that environmental and social considerations are to be integrated into the decision-making processes of the projects that JICA initiates and participates in. Their requirements obligate them to comply with laws and standards of local governments. In addition, social impact that is taken into consideration includes cultural heritage sites, which are labelled as 'sensitive areas' in their guidelines. Projects undertaken by JICA should be undertaken outside of protected areas, excluding those projects related to the restoration of such areas.

The World Bank Safeguard Policy (OP4.11: Physical Cultural Resources) is also concerned with the development projects that the World Bank finances. The policy recognises that the World Bank should avoid and mitigate impacts on sites with historical, religious, aesthetic, or other

cultural significance. The policy requires a sequence of steps that includes screening, developing terms of reference, collecting baseline data, impact assessment, and formulating mitigating measures and management plans.

All three legal frameworks are broadly consistent with regards to the protection of the cultural heritage of Lao PDR.

Chapter 5

Environmental Assessment

5 Environmental Assessment

5.1 Legal Framework

Since the establishment of Lao PDR in 1975 and the adoption of a new constitution in August 1991, a number of laws and regulations have been created. The 1999 Environmental Protection Law (EPL) established a framework for the management of environmental resources with the objective of conserving and facilitating the sustainable use of natural resources. The Ministry of Natural Resources and Environment (MONRE) is responsible for EPL's implementation. While other ministries issue guidelines for implementing provisions, MONRE issues environmental compliance certificates (ECCs) (Sengdeuane and Inoue 2012). The latest version of the EPL was issued on 18 December 2012.

Article 5 of the EPL states that natural resources, raw materials and energy shall be utilised in economical and rational manners, with utmost benefits and minimal impacts on the environment. The EPL also mentions the conditions and requirement for implementing an initial environment examination (IEE), an environmental impact assessment (EIA), and a strategic environmental assessment (SEA). Both the EIA report and the Environmental and Social Management and Monitoring plan shall be approved by MONRE prior to initiating investment projects and activities (National Assembly 2013)

The first EIA regulation was issued in 2000 and was upgraded to the Decree on Environmental Impact Assessment (the EIA Decree) in 2010. This is the most recent decree that specifies the overall principles of the EIAs. However, this version of the EIA Decree needs revising because the EPL was amended in 2012. As of September 2013, the new version of the EIA Decree is in its finalisation process. After undergoing review by the Ministry of Justice, it will come into force in November 2013. Since this chapter is written based on the 2010 EIA Decree, there may be some discrepancies between the descriptions based on the 2012 EPL and those of the 2010 EIA Decree. Table 5.1.1 summarises the articles stipulated by the EIA Decree.

Table 5.1.1: Summary of the EIA Decree

No.	Title	Summary
1	Objectives	Decree aims to disseminate and implement Article 8 of the 1999 EPL as it pertains to EIA, set the regulations and principles for the functioning of EIA, and ensure that investment projects with adverse effects on the environment and society are designed with the appropriate mitigation measures
2	Scope of application	Decree is applicable to all investment projects
3	Terminological interpretation	Defines the terms used in the decree
4	General principles	Lays down the principles to be followed when assessing environmental impacts
5	Environmental impact assessment process	Procedures on initial environmental examination or environmental impact assessment have to comply with the laws of the relevant agencies and the procedures of investment projects.
6	Screening of investment projects	Lays down the instructions that project developers must comply with during the screening of an investment projects
7	Rights and duties of the ones who are affected by an investment project, and of other stakeholders	Lays down the rights and duties of residents and other stakeholders affected by an investment project (current and potential projects)
8	Involvement process	Lays down the procedures that the MONRE, local administrations, the sectoral bodies in charge of investment and project developers have to follow in order to ensure the participation of affected persons and other stakeholders
9	Duties of the MONRE, local administrations, sectoral bodies in charge of investment, concerned sectors, and project developers on initial environmental examination.	Lays down the duties of the MONRE, local administrations, sectoral bodies in charge of investment, concerned sectors, and project developers on initial environmental examination.

No.	Title	Summary
10	Reviewing of the report on initial environmental examination	Lays down the procedures to examine the reports on initial environmental examination by the responsible parties
11	Determining the scope of the study and terms of references	Declares the obligation of the project developer in determining the scope of the study and TOR for the assessment of environmental impacts and in submitting it to the MONRE, which itself is to review and comment on the scope and TOR
12	Duties of the MONRE, the concerned agencies, local administrations, and project developers in assessment of impacts on environment	Lays down the duties of the MONRE, the concerned agencies, local administrations, and project developers in assessing the impacts on environment
13	Environmental management and monitoring plans	Sets the contents of the environmental management and monitoring plan to be designed by the project developer and to be subsequently incorporated in the EIA report
14	Social management and monitoring plans	Sets the contents of the social management and monitoring plan to be designed by the project developer and to be subsequently incorporated in the EIA report
15	Examination of reports on the environmental impact assessment, environmental management and monitoring plans, and social management and monitoring plans	Lays down the procedures for the examination of the reports on environmental impact assessment, environmental management and monitoring plans and social management and monitoring plans
16	Re-examining of reports of complex investment projects	Lays down the procedures that the MONRE is to follow in soliciting the assistance of specialists in the event an investment project is complicated in a certain field of expertise
17	Issuing of Environmental compliance certificates	Lays down the procedures for issuing environmental compliance certificates
18	Expiry date of environmental compliance	Lays down the rules regulating the period of validity of environmental compliance certificates

No.	Title	Summary
	certificates	
19	Issuance of environmental compliance certificates to investment projects which are under operation	Lays down the procedures that investment projects that had been operating without an environmental certificate prior to the issues of the Decree must follow in order to obtain one in case it is necessary
20	Obligatory financial contribution for initial environmental examination or environmental impact assessment	Sets the obligations that a project developer must financially contribute to when preparing and examining the report on EIA, environmental management and monitoring plan, social management and monitoring plan and when implementing and monitoring the measures to prevent and reduce environmental and social impacts
21	Fees and service charges	Lays down the procedures that the MONRE or the local administration that issue an environmental compliance certificate are to follow when collecting fees and service charges
22	Management and monitoring	Names the actors that carry out the management and monitoring of the implementation of the measures on prevention and mitigation of environmental impacts, the EMMP and SMMP
23	Monitoring carried out by project developers	Lays down the monitoring procedures to be followed by project developers per project category
24	Monitoring carried out by governmental agencies	Lays down the monitoring procedures to be followed by governmental agencies per project category
25	Monitoring carried out by external bodies	Lays down the monitoring steps to be done by external bodies
26	National Steering committee	Sets the duties and authority of a National Steering Committee to be formed in the event a project is complex and has potentially substantial impacts on society and the environment
27	Institutional structure of a National Steering committee	Defines the structure of a National Steering committee
28	Resettlement and Restoration of Living	Defines the duties and authority of the government appointed Provincial or Prefectural Resettlement and

No.	Title	Summary
	Conditions committees	Restoration of Living Condition Committee
29	Personnel composition of a Resettlement and Restoration of Living Condition Committee	Defines the structure of the Resettlement and Restoration of Living Condition committee
30	Change of investment project owner	Lays down the procedures and condition regarding the transfer of an investment project from a project developer to another, especially as pertaining to environmental and social obligations
31	Disclosure of general information	Lays down the procedures to disclose general information
32	Confidential information	Lays down the procedures for the handling of confidential information
33	Types of dispute	Defines the types of environmental and social disputes
34	Parties to disputes	Defines the actors between whom environmental and social disputes may arise
35	Dispute settlement	Lays down the procedures by which dispute settlement is carried out
36	Policy towards person with outstanding compliance	Mentions that a natural person, organization or legal entity with outstanding achievements in managing and implementing an EMMP and SMMP is to be appropriately awarded
37	Disciplinary measures towards violators	Lays down the possible measures towards violators of the Decree
38	Warning and educating measures	Lays down the contents of the warning notice that the MONRE will send to the project developer in case of shortcomings in the implementation of EMMP, SMMP and the measures on prevention and mitigation of impacts on environment and society
39	Fining measures	Lays down the conditions under which a natural person, legal entity or organization is fined
40	Other disciplinary measures	Lays down other alternative disciplinary measures towards violators of the Decree
41	Enforcement	Names the MONRE as the central authority to enforce the Decree

No.	Title	Summary
42	Its effectiveness	Sets the date at which the Decree becomes effective (30 days after signature)

Source: PMO (2012)

An IEE or EIA should be designed after studying multiple options in order to select the best option. Studies must perform the following tasks: cover the impact on antiquities, cultures and customs/traditions; plan solutions for negative impacts on the environment and society; encourage the participation of the people who will be affected by the investment project and other stakeholders in the discussion process at all levels [village, district, province, and national levels (if necessary)]; and draw up a budget for those activities (Sengdeuane and Inoue 2012).

Project developers must ensure public participation and discussion with local administrators at all levels [village, district, province, and national levels (if necessary)] as well as with those who will be affected by investment projects and other people involved in the preparation and examination of IEE or EIA reports (Sengdeuane and Inoue 2012).

Individuals, legal entities or organisations that want to provide EIA services in Lao PDR must be licensed and registered with MONRE, whether they are domestic consulting firms or consultants, or foreign consulting firms or consultants already licensed to provide environmental services in other countries (Sengdeuane and Inoue 2012). Although a certification system does not exist to manage the qualifications of EIA consultants and practitioners, all international and local consultants who want to carry out EIA studies must register with MONRE (Sengdeuane and Inoue 2012).

Project developers are liable for the accuracy of the data and information contained in their IEE or EIA reports. In addition, they must cover every expense incurred in the process of preparing and examining IEE reports, including measures to prevent and minimize impacts on the environment and society, EIA reports, environmental management and monitoring plans (EMMPs) and social management and monitoring plans (SMMPs). Developers are also responsible for expenses incurred in implementing and overseeing measures to prevent and minimize environmental and social impacts and in carrying out environmental and SMMPs (Sengdeuane and Inoue 2012).

New investment projects that are likely to affect other investment projects must have cumulative impact assessments, which take into account relationships with existing investment projects. If

an investment project is likely to create impacts beyond national borders, a transboundary EIA must be conducted (Sengdeuane and Inoue 2012).

MONRE and the Departments of Natural Resources and Environment of provinces (DONREs), which are involved in the examination of or deliberation on IEE or EIA reports, are obliged to monitor the outcomes of measures to prevent and minimize environmental and societal impacts or the outcomes of EMMPs for investment projects. Meanwhile, local administrations are obliged to monitor the implementation of SMMPs (Sengdeuane and Inoue 2012).

5.2 Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA)

5.2.1 Projects Subject to IEE/EIA

The EIA Decree addresses two categories of investment projects requiring environmental and social assessments:

Table 5.2.1: Category 1/2 of investment project

Category 1	Investment projects that are small or create few impacts on the environment and society require IEEs
Category 2	Large investment projects that are complicated or create substantial impacts on the environment and society require EIAs

Source: PMO (2010)

The Environmental Management Support Programme (2012) set the criteria as to whether the development project requires IEE or EIA. Table 5.2.2 lists the criteria.

Table 5.2.2: Criteria as to whether the development project requires IEE or EIA

		Category 1	Category 2
Type of investment projects		IEE	EIA
I. Energy Sector Development Project			
1.1	Hydro power plant project	< 15 MW or reservoir3 capacity < 200,000,000 m or reservoir area < 1,500 ha	≥ 15 MW or reservoir 3 capacity > 200,000,000 m or reservoir area > 1,500 ha
1.2	Nuclear power plant project		All

		Category 1	Category 2
Type of investment projects		IEE	EIA
1.3	Natural gas power plant project	5–50 MW	> 50 MW
1.4	Coal power plant project	≤ 10 MW	> 10 MW
1.5	Gas and oil pipeline project		All
1.6	Oil refinery project		All
1.7	High voltage electrical power line project		
1.8	High voltage > 230 kV	≤ 50 km	> 50 km
1.9	High voltage < 230 kV	All	If the transmission line goes through NPAs or urban areas
1.10	High voltage transformer substation	< 10 ha	> 10 ha
II. Agriculture and Forestry Development Project			
2.1	Forest plantation project	20–300 ha	> 300 ha
2.2	Agricultural products and herbal flora plantation for supplying to industrial work	20–500 ha	> 500 ha
2.3	Irrigation construction project	100–2,000 ha	> 2,000 ha
2.4	Cattles farm (e.g., cow, buffalo, horse and others)	> 500 units	
2.5	Poultry farm	> 1,000 chickens	
2.6	Pig farm	> 200 pigs	
2.7	Fish raising and aquaculture project (fish raising in the pond)	> 10 ha	
2.8	Fish raising and aquaculture project (fish cage raising in the river)	> 300 m ³	
2.9	Crocodile farm	> 100 ton	
III. Industrial Sector Development Project			
3.1	Meat production, processing and storages and production	≤ 20 ton/day	> 20 ton/day

		Category 1	Category 2
Type of investment projects		IEE	EIA
	factory		
3.2	Fish processing, storages and production factory	≤ 20 ton/day	> 20 ton/day
3.3	Fruit/vegetable processing and storages and production factory	All	
3.4	Milk manufacturing plant	≤ 40 ton/day	> 40 ton/day
3.5	Tapioca factory	50–100 ton/day	> 100 ton/day
3.6	Feedstuff factory	All	
3.7	Sugar factory	≤ 50 ton/day	> 50 ton/day
3.8	Foodstuff factory	> 1 ton/day	
3.9	Alcohol, wine, beer production factory	$\leq 500,000$ L/yr	$> 500,000$ L/yr
3.10	None alcoholic production factory (soda, soft drink, mineral waters production)	All	
3.11	Pure drinking water factory	All	
3.12	Tobacco factory	All	
3.13	Fabric, thread, fibre production factory	All	
3.14	Clothes, decoration and painting, animal hairs production factory	All	
3.15	Animal skin processing factory	All	
3.16	Leather production factory (handbag, luggage, saddle, etc.)	$\leq 1,000,000$ Pc/yr	$> 1,000,000$ Pc/yr
3.17	Leather shoes production factory	$\leq 1,000,000$ Pair/yr	$> 1,000,000$ Pair/yr
3.18	Handicraft Factory (using wood, bamboo, straw, etc.)	All	
3.19	Bamboo production factory	$\leq 100,000$ m ² /yr	$> 100,000$ m ² /yr
3.20	Paper and pulp production plant project	≤ 50 ton/day	> 50 ton/day
3.21	Printing service and stationary	All	

		Category 1	Category 2
Type of investment projects		IEE	EIA
	production plant project		
3.22	Petroleum industry		All
3.23	Basic chemical production factory besides chemical fertilizer and production that contained acid	≤ 500 ton/yr	> 500 ton/yr
3.24	Pesticide and chemical fertilizer production factory		All
3.25	Medical supplies, equipment and traditional medicine factory	≤ 500 ton/yr	> 500 ton/yr
3.26	Soap and detergent, cleansing material, brush, perfume and other cosmetic factory	≤ 10 ton/day	> 10 ton/day
3.27	Chemical production factory		All
3.28	Rubber processing factory	100–300 ton/yr	> 300 ton/yr
3.29	Plastic factory project	≤ 500 ton/yr	> 500 ton/yr
3.30	Glass industry and glass production factory	All	
3.31	None metallic ores production factory	All	
3.32	Cement, lime and plaster cement factory	≤ 30 ton/hr	> 30 ton/hr
3.33	Steel and iron smelting factory	≤ 120 ton/day	> 120 ton/day
3.34	Non-Ferrous metal smelting factory	≤ 50 ton/day	> 50 ton/day
3.35	Steel processing factory	≤ 50 ton/day	> 50 ton/day
3.36	Non-Ferrous metal processing factory	All	
3.37	Metal frame, tank, basin/sink production factory	All	
3.38	Dynamo production factory	All	
3.39	Domestic appliances	All	

		Category 1	Category 2
Type of investment projects		IEE	EIA
	production factory		
3.40	Office material equipment, accounting stationeries and computer production plant	All	
3.41	Generator and apparatus production factory	All	
3.42	Battery and dry cell battery production factory	≤ 100 ton/yr	> 100 ton/yr
3.43	Radio, television and communication device and tool production factory	All	
3.44	Medical equipment, metre and eyesight, watch and clock factory	All	
3.45	Vehicle assembly plant (light truck, heavy truck and semitrailer, etc.)	All	
3.46	Spare parts and vehicle parts and engine factory	$\leq 1,000$ ton/yr	$>1,000$ ton/yr
3.47	Bicycle and wheel of disable people	$\leq 10,000$ unit/yr	$> 10,000$ unit/yr
3.48	Furniture factory	$\leq 10,000$ products/yr	$> 10,000$ products/yr
3.49	Storage of solid waste not producing hazardous	All	
3.50	Disposal of solid waste producing hazardous		All
3.51	Solid waste treatments and environment management		All
3.52	Water supply factory	All	
IV. Infrastructure and Service Development Project			
4.1	Lake, river, channel land filling project impacts on public		All
4.2	Dormitories, resettlement	> 50 rooms	

		Category 1	Category 2
Type of investment projects		IEE	EIA
	construction project		
4.3	Golf course construction plant project	9 holes	
4.4	Multi-games sport project		All
4.5	Petrol depot construction project	600–60,000 barrels	
4.6	Industrial zone construction and development project		All
4.7	Special economic zone construction and development project		All
4.8	Inland waterway navigation project	All	
4.9	Waste water treatment plant project (waste water from district, hospital and industrial processing factory)		All
4.10	Road construction through national or provincial protected areas		All
4.11	New railway construction project		≥ 100 km
4.12	New road construction project (national, provincial, district, urban, extra construction)		All
4.13	Road improvement project (national, provincial, district, extra road improvement)	All	
4.14	Road rehabilitation or upgrading project (national, provincial road rehabilitation)	All	
4.15	New runway airport construction project	1,000–2,500 m	$>2,500$ m
4.16	Hospital construction project	≤ 100 beds	> 100 beds

		Category 1	Category 2
Type of investment projects		IEE	EIA
4.17	Hotel or resort construction project near the river	≤ 80 rooms	> 80 rooms
4.18	Hotel or resort construction project	≤ 50 ha	> 50 ha
4.19	Tourism and resort development project in the National or provincial protected area		All
4.20	Solid domestic waste recycle plant project	All	
4.21	Incinerator for domestic solid waste project		All
4.22	Incinerator for industrial solid waste project		All
4.23	Project using part or whole national or provincial protected area, historical or cultural vestiges, or unique landscape, conservation area of local authorities		All
4.24	Telecommunication network construction project	All	
4.25	River communication (improvement of river channel for boat)	≤ 200 ton	> 200 ton
4.26	Port construction project		
4.26.1	Passenger port	≤ 500 ton DWT	> 500 ton DWT
4.26.2	General transportation port	≤ 500 ton DWT	> 500 ton DWT
4.26.3	Transportation port producing hazardous such as chemical, engine oil		All
4.27	Embankment construction		> 1 km

		Category 1	Category 2
Type of investment projects		IEE	EIA
	project		
4.28	Community solid waste management construction	≤ 50 ha	> 50 ha
4.29	Solid waste management construction		All
4.30	Industrial solid waste landfill site project		All
V. Mining and extractive industry			
5.1	The use of groundwater resources for industrial, agricultural, and urban consumption	$\leq 4,500$ m ³ /day	$> 4,500$ m ³ /day
5.2	Project for extraction of rock and sand from a river	1,000–50,000 m ³ /yr	$> 50,000$ m ³ /yr (per point)
5.3	Project for rock extraction and crushing	≤ 50 ton/day	> 50 ton/day
5.4	Project for extraction of surface materials (soil, rock, sand) for construction	$< 100,000$ m ³ /yr	$\geq 100,000$ m ³ /yr
5.5	Project for extraction of solid mineral ore (without using chemicals)		All
5.6	Project for extraction and processing of mineral ore with the use of hazardous chemicals		All
5.7	Project for processing of solid mineral ore	$\leq 50,000$ ton/yr	$> 50,000$ ton/yr
5.8	Project for extraction of groundwater		$> 5,000$ m ³ /day
5.9	Project for use of surface water		$> 10,000$ m ³ /day
5.10	Project for extraction of natural mineral waters (surface and groundwater) for usage and/or consumption		$> 1,000$ m ³ /day

		Category 1	Category 2
Type of investment projects		IEE	EIA
5.11	Project for extraction of natural mineral waters (surface and groundwater) for bathing, medicinal (skin diseases) and other purposes		> 500 m ³ /day
5.12	Project for extraction of mineral ore using chemicals		All
5.13	Project for extraction of oil and natural gas		All

Source: Environmental Management Support Programme (2012)

In relation to investment projects classified in Category 1 and Category 2, including projects provided for in Article 6 (2) of the EIA Decree, the project developer must first obtain an ECC before performing the following acts:

- entering any contracts for the mining or extraction of mineral resources or for construction;
- obtaining any business license; and
- clearing the area, beginning construction or implementing a project (PMO 2010).

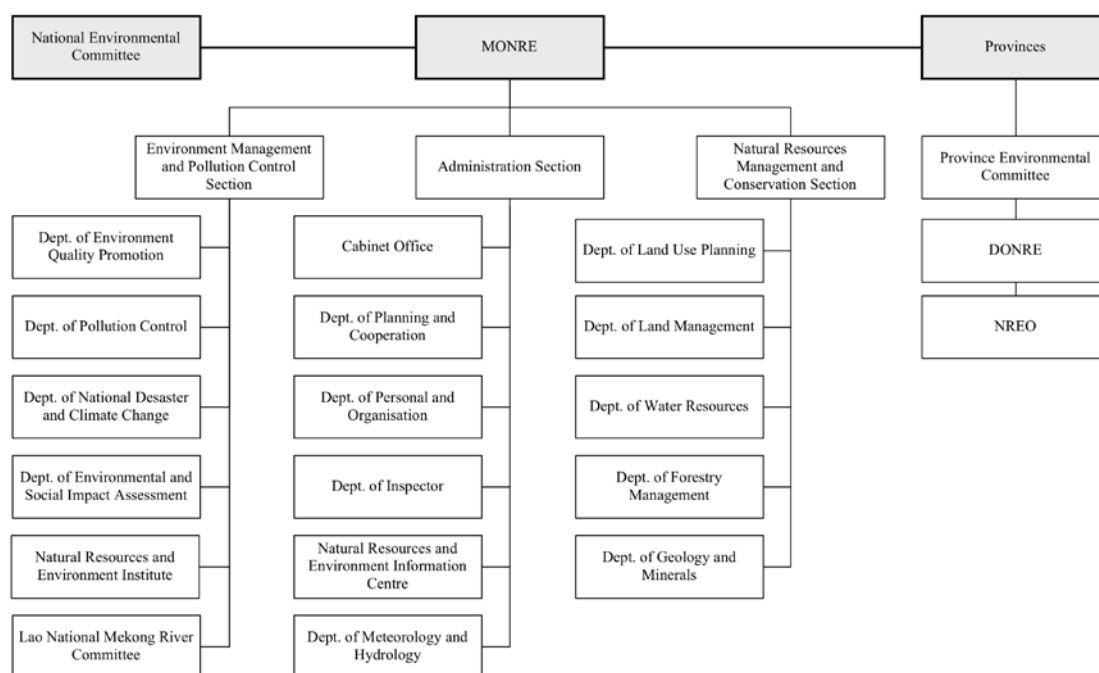
According to the EIA Decree, IEEs involve the initial study, survey, research and analysis of data to estimate initial impacts on the environment and society and to adopt measures to prevent and minimise possible impacts on the environment and society (EMMPs and SMMPs). The impacts include those on health that may arise from investment projects classified in Category 1.

EIAs involve studying, surveying, researching, analysing and estimating possible positive and negative impacts on the environment and society as well as offering appropriate alternatives, EMMPs and SMMPs to prevent and mitigate possible impacts of the construction and operation of investment projects. The impacts include short- and long-term impacts on health created by the investment projects classified in Category 2.

5.2.2 Procedures and Relevant Organisations

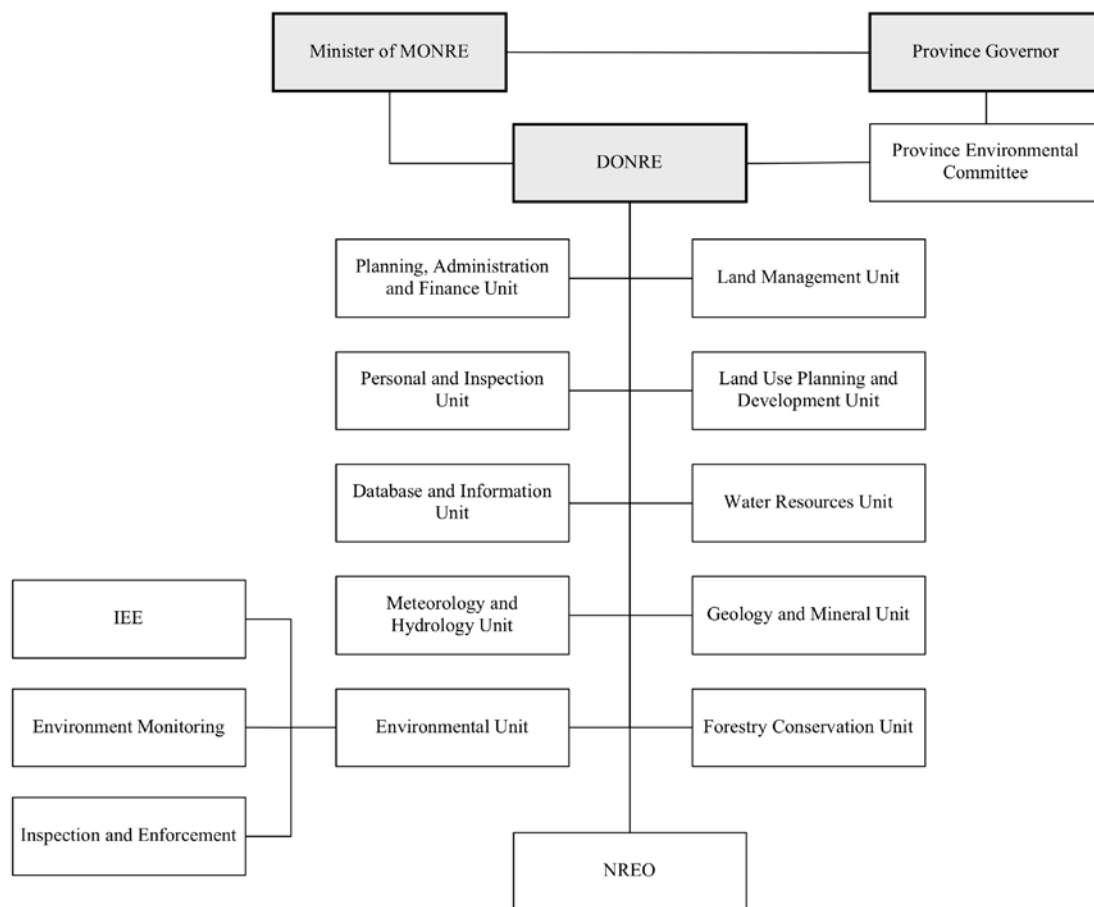
The Ministry of Science and Technology (MOST) was created in 1984. It became the Science, Technology and Environment Organization (STENO) in 1993. In 1999, under the Prime Minister's Office, it was renamed as Science, Technology and Environment Agency (STEА). STEА became the Water Resources and Environment Administration (WREA) in 2008. It was upgraded to the Ministry of Natural Resources and Environment (MONRE) in 2011 by merging WREA with parts of the National Land Management Authority (NLMA) and the Geology Department as well as the Protection and Conservation Divisions of the Department of Forestry. The different departments and their functions and roles are still being clarified (Sengdeuane and Inoue 2012).

MONRE is responsible for the review and implementation of IEEs/EIAs, while DONREs are the representatives of MONRE at the provincial level (Phonvisai 2013).



Notes: NREO: Natural Resources and Environment Offices

Figure 5.2.1: MONRE Organisational Chart



Notes: NREO: Natural Resources and Environment Offices

Source: Phonvisai (2013)

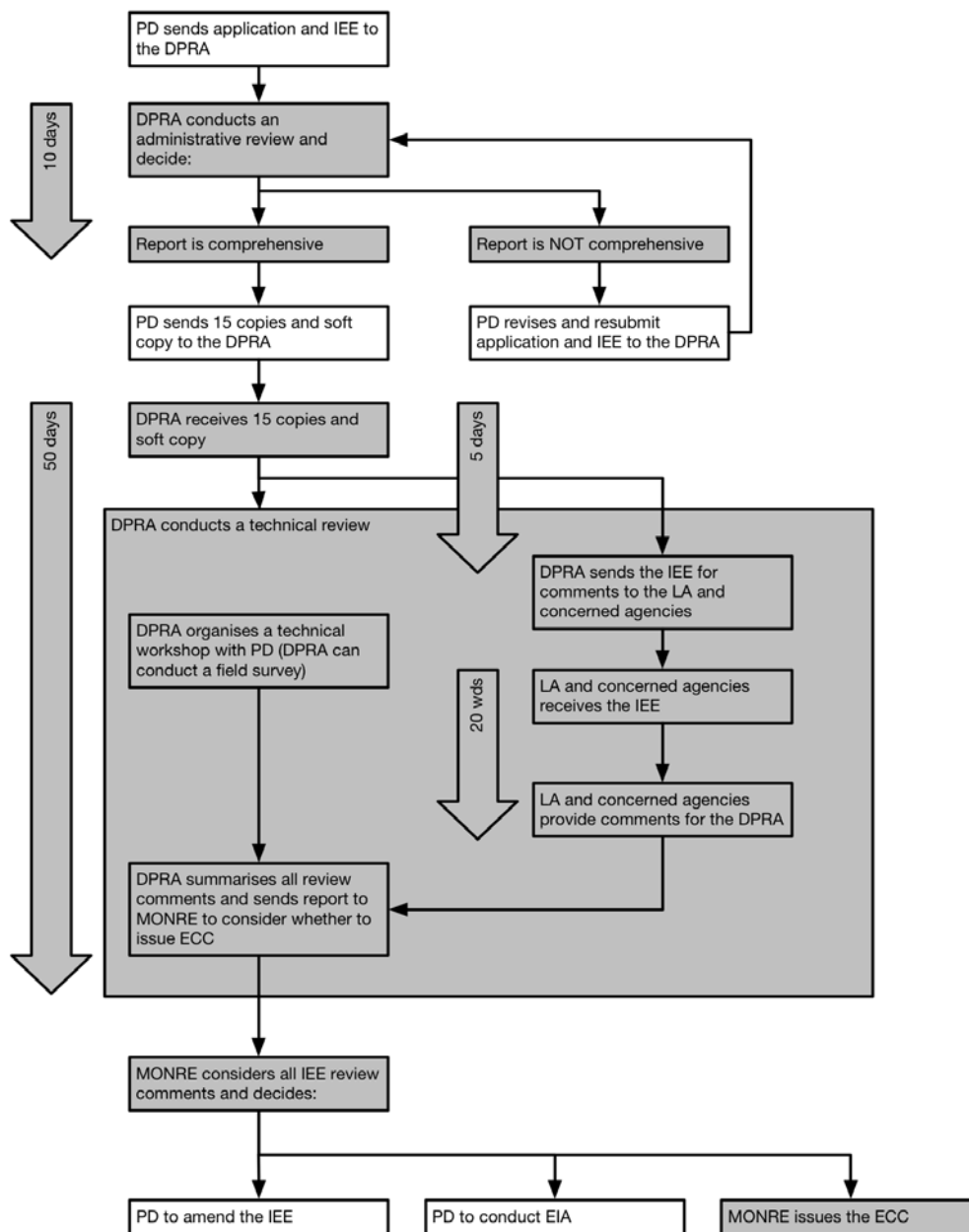
Figure 5.2.2: DONRE Organisational Chart

The Environmental and Social Impact Assessment (ESIA) Department within MONRE is responsible for overseeing the implementation of the EIA process. MONRE is responsible for issuing environmental quality standards in cooperation with the line ministries and for issuing general EIA guidelines specifying procedures and standards to evaluate and mitigate environmental impacts caused by development projects. Development Project Responsible Agencies (DPRAs) are sectorial ministries and other government agencies that are responsible for issuing screening guidelines and executing MONRE's IEE/EIA procedures. MONRE is responsible for reviewing and approving IEE reports, the terms of reference (TORs) for EIAs, the final full EIA reports and the EMMPs, while the DPRAs are responsible for granting approval and issuing construction or operating licenses for projects (Sengdeuane and Inoue 2012).

MONRE issues ECCs for projects that have successfully completed the EIA process and coordinates with DPRAs to carry out compliance monitoring and evaluation. Project proponents are required to submit regular monitoring reports to MONRE based on their EMMPs (Sengdeuane and Inoue 2012).

In addition to regulators, other parties involved in EIAs include developers, other affected parties and facilitators. Developers, including foreign and local companies, may be part of the public sector/state enterprise (e.g. Electricity du Lao PDR (EDL), national and state road authorities) or the private sector (e.g. national and multinational state enterprise companies). In either case, their projects may be subject to EIAs. Many developers have little environmental awareness and few technical or financial resources to perform EIAs. Some projects start implementation before approval and some ignore EIAs. Public developers sometimes provide a poor example for EIA practices (Sengdeuane and Inoue 2012).

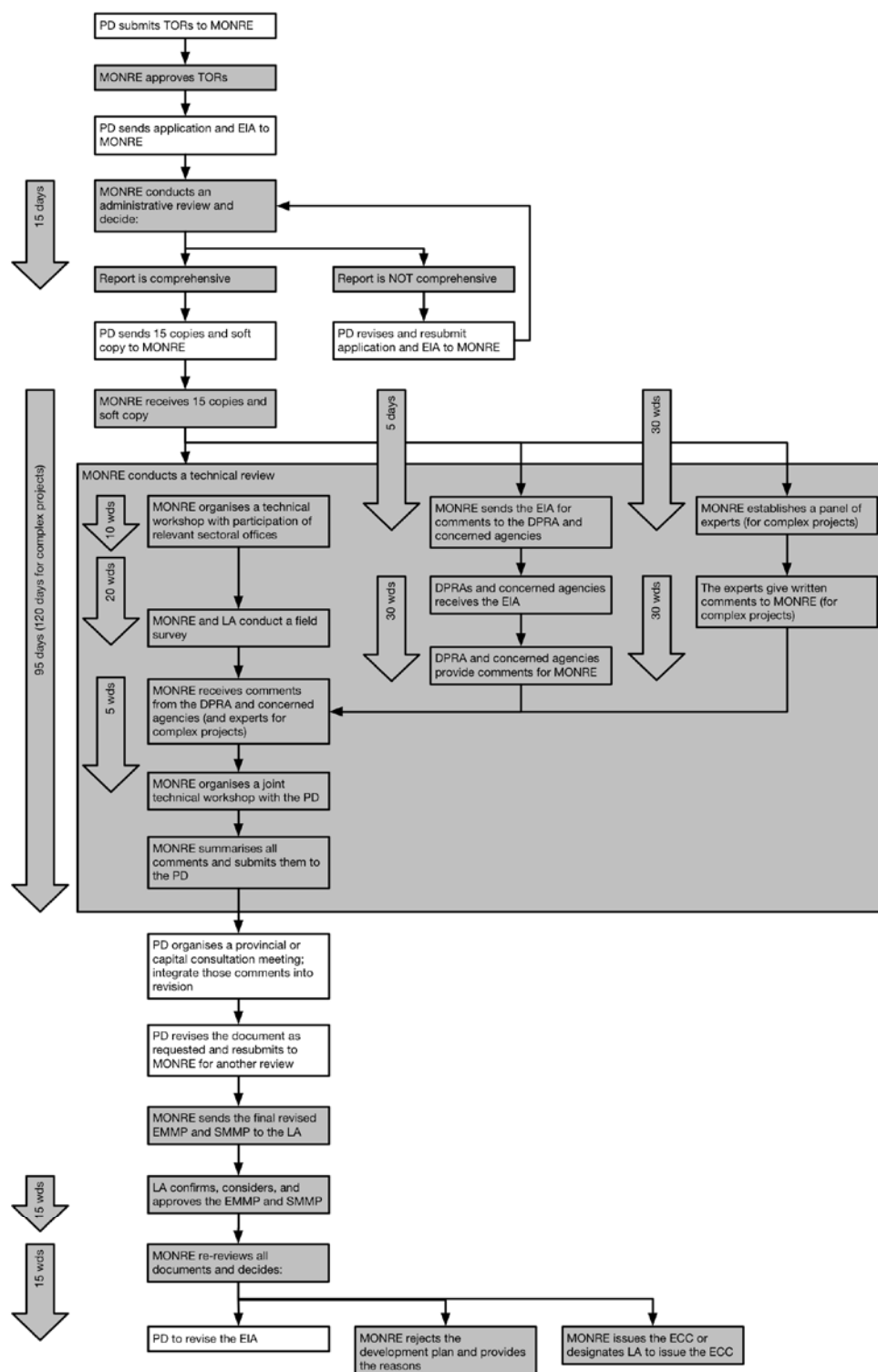
The overall IEE and EIA review processes are illustrated in Figures 5.2.3 and 5.2.4, respectively.



Notes: PD: project developer; ECC: environmental compliance certificate; LA: local administration; wd: working day; DPRA: development project responsible agency.

Source: UNEP and UNDP (2010) [modified]

Figure 5.2.3: IEE Process in Lao PDR



Notes: PD: project developer; ECC: environmental compliance certificate; LA: local administration; wd: working day; DPRA: development project responsible agency.

Source: UNEP and UNDP (2010) [modified]

Figure 5.2.4: EIA Process in Lao PDR

Tables 5.2.3 and 5.2.4 summarize the roles and duties of each relevant actor in the IEE and EIA processes.

Table 5.2.3: Duties of Relevant Actors in the IEE Process

Relevant Actors	Roles and Duties
MONRE	Issue ECCs to approve IEEs proposed by sectorial bodies in charge of investments.
	Participate in field inspections and consultation meetings at the district level. MONRE may nominate the DONRE in the province where the project will be developed to participate on its behalf.
	Coordinate with the concerned sectorial bodies and issue guidelines on practical implementation.
Local administrators (especially DONRE)	Issue ECCs to certify IEE reports, based on the verification of MONRE.
	Cooperate with and facilitate project developers by surveying and collecting information to prepare reports and by organising consultations with people affected by the investment project and other stakeholders.
	Cooperate in the information dissemination process and encourage people affected by an investment project to review the objectives, expected benefits and possible environmental and social impacts of the project.
Sectorial bodies in charge of investment projects	Lead field inspection (if needed); together with people affected by investment projects and other stakeholders, participate in consultation meetings at the village and district level organised by project developers in cooperation with local administrations.
	Examine IEE reports in coordination with local administrations and concerned sectorial bodies, make written comments and report to MONRE.
Sectorial bodies	Provide technical comments on IEE reports; assign that duty to respective offices in provinces or prefectures to perform on their behalf
Project developer	Conduct studies on overall physical, biological and socio-economic aspects and estimate potential impacts that may arise from the project by referring to data gained from concerned sectors, local administrations and other sources, including data collected in field surveys and from consultations with the people affected by the investment project and other stakeholders at village and district levels.
	Follow the Guidelines on Involvement without the use of threat, coercion,

Relevant Actors	Roles and Duties
	force, violence, bribery or deception.
	Coordinate with local administration and sectorial bodies in charge of investment to organise dissemination meetings at the village level to explain the project's development plan, benefits and possible environment and societal impacts of development projects; summarise people's comments in the meetings to incorporate in the IEE report.
	Prepare a report on the IEE including measures to prevent and minimise the environmental and societal impacts.
	Coordinate with local administration and sectorial bodies in charge of investment to organise village-level consultation meetings with people affected by the investment project and other stakeholders to deliberate the first draft of the IEE report; revise the report based on the outcomes of the meetings; disseminate the report to people affected by and involved with the investment project for comment before organising district-level consultation meetings.
	Collaborate with local administration and sectorial bodies in charge of the investment to organise district-level consultation meetings with representatives for people affected by the investment project from each village to deliberate the revised draft of the IEE report; revise the report based on the outcomes of the district consultation meeting. The revised report must be made in Lao if it is a domestic investment or in Lao and in English if it is a foreign investment and then submitted to sectorial bodies in charge of investment for further examination.
	The IEE report must be attached with the minutes of each meeting signed by the consultation firm that prepared the report and the project developer.

Source: PMO (2010)

Table 5.2.4: Duties of Relevant Actors in the EIA Process

Relevant Actors	Roles and Duties
MONRE	Provide technical guidelines on the preparation of EIA reports, EMMPs and SMMPs.
	Collaborate with local administration and concerned agencies to conduct field surveys; together with people affected by the project and other stakeholders, participate in discussions at the village and district levels.
	Be an active coordinator in organising discussion meetings at the provincial

Relevant Actors	Roles and Duties
	or prefectural levels; examine EIA reports, EMMPs and SMMPs; consider and issue ECCs to approve reports and plans.
Concerned agencies	Provide technical comments on EIA reports, EMMPs and SMMPs.
	Participate in discussion meetings at the district level (provincial or prefectural sectorial offices participate) and at the provincial or prefectural level (ministerial sectorial offices participate).
	Participate in field surveys with MONRE.
Local administrations (especially DONRE)	Cooperate with and facilitate project developers in field surveys and in collecting data to prepare reports.
	Organise consultation meetings with those affected by the investment project and other stakeholders.
	Disseminate the objectives and benefits of investment projects, possible environmental and societal impacts that may arise and measures to prevent and minimise those impacts.
	Deliberate on EMMPs and SMMPs before MONRE issues ECCs to approve those plans.
Project developer	Comply with the scope of the study and the terms of references approved by MONRE.
	Collect general information on investment projects, such as physical, biological and socio-economic aspects, from sectors and local administration or by conducting field surveys and consultations with people affected by the project and other stakeholders at the village, district, provincial or prefectural levels.
	Carry out studies to determine the direct and indirect impacts on the residents living around the project site, particularly on health, loss of assets and residences, living conditions and usage of natural resources as well as other impacts on environment and society such as soil, water, climate, forest and biology, including architectural and cultural heritages and antiques/antiquities; incorporate these into an EIA report.
	Collaborate with local administrations to organise village-level dissemination meetings to explain in general the investment project, as well as the benefits, possible environmental and societal impacts, measures to prevent and minimise environmental and societal impacts; summarise the comments and opinions given in the meetings in the report.

Relevant Actors	Roles and Duties
	Prepare an EIA report, an EMMP and an SMMP that includes an assessment of their impact on health and health management measures.
	Collaboration with local administrations to organise meetings in villages with people affected by the investment project and other stakeholders to deliberate the first draft of the EIA report, the EMMP and the SMMP; revise the report and the plans based on the outcomes of the meetings and then disseminate them back to the villagers who are affected and other stakeholders for revision before district meetings.
	Collaborate with local administrations to organise district-level meetings with representatives for those affected by investment projects from each village, the concerned provincial or prefectural offices, mass organisations and other district organisations to deliberate the report revised in compliance with the outcomes of the village meetings. This revised report must be made either in Lao or in English; the abstract, the EMMP and the SMMP shall be made in both Lao and English before submitting them to MONRE to examine.
	The EIA report, the EMMP and the SMMP submitted for examination must be enclosed within the minutes of each meeting and must be signed by the project developer and the consultation firm that prepares the report.

Source: PMO (2010)

UNEP and UNDP prepared '*Guidelines and Checklists to Review Environmental and Social Impact Assessments*' in 2010. UNEP and UNDP (2010) is highly useful for project developers to complete IEE/EIA reports and to conduct IEE/EIA process.

5.2.3 Public Participation

The EIA Decree stipulates public participation through 'involvement'. According to the EIA Decree, involvement is the process of consulting and disseminating information on an investment project in order to collect comments from those who are likely to be affected by or gain benefits from the investment project, as well as from those who are interested in the investment project. This information is used to prepare an IEE or an EIA report, an EMMP and an SMMP. Involvement can be in the form of participation in all meetings of stakeholders and persons likely to be affected by the investment project during the project construction and operation period.

Article 7 of the EIA Decree stipulates that people (residents) who are or will be affected by an investment project and other stakeholders have the following rights and duties:

- 1) Receive information on the investment project development plan, the benefits that they will receive and the possible environmental and societal impacts.
- 2) Provide information and data on the local environment and society in the project area and in nearby locations to be used in an initial environment assessment report consisting of measures to prevent and minimise environmental and societal impacts or in preparing an EIA report, an EMMP and an SMMP.
- 3) Receive information contained in the IEE report, including measures on prevention and minimisation of environmental and societal impacts, the EIA report, the EMMP, and the SMMP, as well as the progress report on the implementation of measures to prevent and minimise the impacts of the investment project.
- 4) Participate in consultation meetings at all levels to deliberate on the IEE or EIA report, the EMMP and the SMMP.
- 5) Participate in discussions on compensation, migration/resettlement and restoration of the living conditions of people affected by the investment project.
- 6) Participate in discussions on implementing environmental and social activities as well as the EMMP and the SMMP.
- 7) Make a written proposal to solve environmental and social problems caused by the investment project to the local administrations at each level; submit proposals directly to MONRE if the problems are not solved.

Article 8 of the EIA Decree stipulates that MONRE, local administrations, sectorial bodies in charge of investments and the project developer have a joint responsibility to ensure the participation of people affected by an investment project and other stakeholders consistent with the IEE or EIA process, as follows:

- 1) When collecting information to prepare an IEE report or an EIA report, the local administration and the project developer must organise dissemination meetings to inform the villagers of the project development plan and the possible environmental and social impacts as well as to collect opinions of people affected by the investment project
- 2) When preparing and examining the IEE report, measures to prevent and minimise the environmental and social impacts should be included. When preparing the EIA report, the EMMP and the SMMP, MONRE, the local administration, the development project responsible agencies and the project developer must organise consultation meetings at village, district and province levels. The consultation meetings will constitute a forum that

provides an opportunity for the project affected people and other stakeholders to share their opinions and give comments on the report and plans, from the first until the final drafts.

- 3) During survey-exploration, construction and operation of the project, the project developer must inform people affected by the investment project and other stakeholders of the project activities which are likely to affect the environment and society, such as clearing the ground surface, destroying rocks, transporting, using and storing dangerous chemical objects and substances, discharging water from the reservoir, etc. At the same time, the project developer must allow project affected people and other stakeholders access to general information about the project.

5.2.4 Participation of Experts, NGOs, and Other Third Parties

In Lao PDR, the participation of experts, NGOs and other third parties is actualised within the same framework of public participation. NGOs may be involved in the consultation process as stakeholders as mentioned in the decree. However, the right to register as a non-profit association was promulgated by the government in 2009. Therefore, the participation of such associations has been limited and ineffective (Sengdeuane and Inoue 2012).

5.2.5 Information Disclosure

The EIA Decree classifies information into two categories: general information and confidential information.

Disclosure of general information shall be performed as follows:

- 1) MONRE has the responsibility to manage information on the environmental and social aspects of an investment project in coordination with the sectorial body concerned and the project developer. MONRE also has a duty to facilitate information access for stakeholders and the people who are or will be directly affected by the investment project.
- 2) The project developer has the responsibility to manage information on the implementation of measures to prevent and mitigate environmental impacts, the EMMP and the SMMP and to facilitate information access for people who are or will be directly affected by the investment project and other stakeholders. In relation to the investment projects in Category 2, project developers shall build information centres within the investment project areas and in related districts.
- 3) The data and information to be disseminated must be both in Lao and English, and consists

of:

- a) An IEE report or an environmental and social impact assessment report, an EMMP and SMMP, excepting confidential information provided in Article 32 of this Decree;
- b) A report on the implementation of measures to prevent and mitigate environmental impacts, an EMMP and SMMP provided by the project developers;
- c) Reports from MONRE or local administrations that issued an ECC in relation to monitoring of the implementation of the EMMP and the SMMP;
- d) Detailed information on fines or other disciplinary measures that MONRE or its provincial/municipal counterparts and the sectorial authority in charge of the investment project have imposed on the project developer; and
- e) The investment project expenditures for environmental and social activities.

Confidential information shall be handled as follows:

- 1) MONRE reserves the right to keep confidential any information related to national stability and not to disclose this information in any IEE report or in any environmental or social impact assessment report, EMMP or SMMP.
- 2) Upon written request from a project developer, MONRE may consider keeping some information confidential and can refuse to put such information in any IEE report, environmental and social impact assessment report, EMMP or SMMP. This information includes:
 - a) Information related to the privacy of an individual;
 - b) Information on property; and
 - c) Information on commercial licenses;
- 3) If a project developer does not wish to disclose any of the information stated in Article 32(2) above, the project developer may submit a request to MONRE with the information in question. Within 25 public working days, MONRE shall conclude whether all or some part of the information in question is confidential or not.
- 4) If the submitted information is considered confidential, that information shall be kept confidential for four years. If the project developer wishes to extend this period, he or she must submit a request 60 public working days prior to the expiry date; otherwise, the information will not be regarded as confidential.

5.3 Environmental Compliance Certificates (ECCs)

MONRE issues environmental compliance certificates (ECCs) to approve EIA reports, EMMPs and SMMPs as stated in Article 10 and Article 15 of the EIA Decree.

Based on verification from MONRE and with consent from the sectorial body in charge of the investment project, a local administration may issue an ECC to approve an IEE. The ECC may contain some conditions that the project developer is obliged to perform. An ECC is valid through the concession period of an investment project.

If an investment project does not begin operations within two years from the date it obtained an ECC, the certificate automatically expires and cannot be used. If the project developer wishes to continue its investment project, it can request reconsideration from MONRE three months prior to the expiry date.

After an investment project obtains an ECC, the project developer must sum up and evaluate the implementation of measures to minimise environmental and societal impacts, the EMMP and the SMMP during the project construction period. These steps must be completed six months prior to the end of the construction phase. During project operations, the project developer must review and improve the same latter measures every 2–5 years (the period for reviewing and improving the EMMP depends on the complexity of the investment project). The EMMP must then be submitted to MONRE for consideration and approval.

5.4 Environmental Management and Monitoring Plan (EMMP)

An environmental management and monitoring plan (EMMP) is a plan formulated in an EIA report that defines a project's main environmental activities, prevention measures, minimisation and mitigation of environmental impacts, organisational structures and responsibilities, schedule and a sufficient budget for the implementation of environmental management and monitoring activities during the construction, operation and termination periods.

An EMMP should be included in an IEE/EIA report. Article 13 of the EIA Decree stipulates the following:

- 1) A project developer must design an EMMP to be incorporated into an EIA report, which contains the following:

Table 5.4.1: Contents of the EMMP of the EIA report

a)	A implementation monitoring plan for the main activities and the people who are responsible for implementing the EMMP: <ul style="list-style-type: none">• A monitoring plan for the project developer;• A monitoring plan for the concerned national agency.
b)	Measures to prevent, minimise and solve problems and to restore environmental conditions stipulated in the EIA report throughout the construction and operation periods.
c)	A plan to avoid and minimise risks, including a plan to prevent and solve any accidents or emergencies that may arise, as well as a sufficient budget to implement the plans.
d)	A plan for planting trees to restore and conserve forest areas that are the original sources of water.
e)	A schedule and a budget for implementation of the EMMP, including a financial mechanism and a budget available for each activity.
f)	In relation to a hydropower project, there must be plans to clean up biological substances from the reservoir area and to manage the flow basin, the reservoir, the river basin and the fishery; other necessary plans should also be in place.
g)	In relation to a mining project, there must be plans to close the mining site and to restore environment in the mining areas, as well as a budget for the implementation of those plans.
h)	Other necessary information

- 2) A project developer must strictly implement the EMMP approved by MONRE. If the developer assigns the task to another company, the terms and conditions of the plan must be incorporated into the contract to ensure that the sub-contractor implements the plan comprehensively.
- 3) During the construction and operation periods, if MONRE finds that problems were not identified and measures to minimise and solve the problems were not sufficiently provided in the EMMP, it will notify the project developer in writing and set the deadline for the project developer to revise the plan and resubmit it to MONRE for re-examination.
- 4) Six months before operation, the project developer must evaluate the implementation of the EMMP in the survey-exploration phase and improve the EMMP to make it suitable for the project operation phase. The EMMP must then be submitted to MONRE for consideration and approval and to the concerned line ministry for an operation license. During the project operation phase, the project developer shall review and improve the EMMP every 2–5 years (the period for reviewing and improving the EMMP depends on the complexity of the investment project and is stipulated in the ECC). The EMMP must

then be submitted to MONRE for consideration and approval.

- 5) In relation to a mining project, before closing the mining site, the project developer must develop a plan for the closure of the mining site and the restoration of the mining area. This plan must be submitted to MONRE for consideration and approval before implementation of the plan.

5.5 Social Management and Monitoring Plan (SMMP)

A social management and monitoring plan (SMMP) is a plan formulated in an EIA report that defines a project's main social activities, prevention measures, the minimisation and mitigation of social impacts, measures for compensation, resettlement and restoration of living conditions of the people who are or will be affected by the investment project, organisational structures and responsibilities, a schedule, and a sufficient budget for the implementation of social monitoring activities during the construction, operation and termination periods.

An SMMP should be included in an IEE/EIA report. Article 14 of the EIA Decree stipulates the following:

- 1) A project developer must design an SMMP to be incorporated into an EIA report including the following:

Table 5.4.2: Contents of the SMMP of the EIA report

a)	Measures to prevent and minimise direct and indirect impacts of an investment project on society, as provided in the EIA report, throughout the project's construction, operation and termination periods.
b)	A plan to prevent and minimise risks, including prevention and solutions for any accidents or emergencies that may arise, as well as a sufficient budget source identified for implementation of the plan.
c)	Measures to compensate for the loss, resettlement and improvement of the living conditions of people affected by the development project.
d)	A draft of a social development plan for the post-closure period of the mining site and the termination of the investment project.
e)	A plan to monitor implementation of the SMMP.
f)	A monitoring plan for the project developer and the concerned national agencies.
g)	The responsibilities of the agency that will implement the SMMP and other related plans.
h)	A schedule and a budget for implementation of the SMMP as well as a financial mechanism

	and budget allocation for each task and activity.
i)	Other necessary information.

- 2) The SMMP must be consistent with the Decree and Regulations on Compensation and Movement and include a resettlement plan for people affected by the investment project, a social development plan and a plan to restore living conditions, with particular attention to the healthcare of those affected.
- 3) The project developer must strictly implement the SMMP approved by MONRE in coordination with the concerned local administration, particularly the Committee of Re-settlement and Restoration of Living Conditions. If the task is assigned to another company, it must incorporate the terms and conditions of the plan into the contract to ensure that the sub-contractor implements the plan comprehensively.
- 4) Six months before operation, the project developer must evaluate the implementation of the SMMP in the survey-exploration phase and improve the SMMP to make it suitable for the project operation phase. The SMMP must then be submitted to MONRE for consideration and approval and to the concerned line ministry for an operation license. During the project operation phase, the project developer shall review and improve the SMMP every 2–5 years (the period for reviewing and improving the SMMP depends on the complexity of the investment project and the pace of restoration and is stipulated in the ECC). The SMMP must then be submitted to MONRE for consideration and approval.
- 5) During the construction and operation periods, if MONRE finds problems that are not identified and the measures to minimise and solve the problems are not sufficiently provided in the EMMP, MONRE shall notify the project developer in writing and set a deadline for the project developer to revise the plan and resubmit it to MONRE for reconsideration and approval.
- 6) In relation to a mining project, the project developer must finalise a social development plan for the post-closing period of the mining site, and such a plan must be approved by MONRE before termination of the project.

5.6 Strategic Environmental Assessment

The strategic environmental assessment (SEA) was first introduced into Lao PDR's environment assessment system when EPL was amended in 2012. Article 19 of EPL defines SEA as a method of anticipating potential impacts on the social or natural environment including climate change issues and impacts from policies, strategies, and programs. According

to the Article, SEA shall determine methods and measures to avoid or mitigate impacts on the social and natural environment in order to accomplish sustainable development goals and shall be undertaken during the development of policies, strategies, and programs, particularly of energy and mining, agriculture and forestry, industry and commerce, public works and transportation, post-telecommunication and communication, information-culture and tourism sectors, except for land use plans of small-scale areas that have been determined in an Integrated Spatial Plan (land use planning aiming to protect, improve and rehabilitate environmental quality, particularly through determination of future residential, agricultural and industrial areas, and locations of large-scale investment projects). The process of SEA shall also include participation of organizations, local concerned authorities and people who are directly or indirectly affected by the concerned sector policies, strategies or programs (National Assembly 2013).

5.7 Monitoring

Managing and monitoring the implementation of prevention and mitigation measures for environmental impacts or an EMMP and a SMMP of an investment project comprise:

- 1) Monitoring carried out by project developers;
- 2) Monitoring carried out by governmental agencies; and
- 3) Monitoring carried by external bodies.

Project developers shall proceed as follows:

- 1) In relation to the investment projects in Category 1, the project developers shall monitor the implementation of prevention and mitigation measures for the environmental and societal impacts on their own and report to MONRE, the sectorial body in charge of investment projects, relevant agencies and local administrations regularly.
- 2) With regard to the investment projects in Category 2, the project developers must establish environmental and social management offices to implement and monitor outputs of the implementation of the EMMP and the SMMP and report to MONRE, the sectorial body in charge of investment projects, relevant agencies and local administrations regularly.

Government agencies shall proceed as follows:

- 1) In relation to the investment projects in Category 1:
 - a) The organisation that examines an IEE report has a duty to monitor outputs of the implementation of prevention and mitigation measures for environmental and

societal impacts by spending the budget allocated in the IEE report and reporting to MONRE and local administrations regularly.

- b) MONRE has a duty to inspect the implementation of prevention and mitigation measures for environmental and societal impacts and to conduct an emergency ad hoc inspection in collaboration with relevant agencies and local administrations; the results of this inspection will be reported to the National Environmental Committee.
- 2) In relation to the investment projects in Category 2:
 - 1) MONRE has a duty to monitor the implementation of EMMPs every six months, or as needed, in collaboration with relevant agencies and local administrations; the results will be reported to the National Environmental Committee regularly.
 - 2) The National Environmental Committee has a duty to inspect the implementation of EMMPs and SMMPs for investment projects.
 - 3) Local administrations have a duty to establish environmental management working units in districts where investment projects are located in collaboration with MONRE in order to monitor the implementation of EMMPs on a regular basis; reports will be made to local administrations and MONRE regularly or urgently in case of an emergency.
 - 4) Local administrations have a duty to establish working units to handle the resettlement and restoration of living conditions. These units include the following:
 - A secretariat of the Resettlement and Restoration of Living Condition Committee; and
 - An inspector to inspect the implementation of SMMP in collaboration with project developers and to report to the local administrations and MONRE regularly or urgently in case of an emergency.
 - 5) MONRE has a duty to give technical advice to, build capacity and provide trainings for the environmental and social management monitoring units within the scope of work-plans and budgets provided for in each phase. The funds primarily come from concession contracts or the EMMPs, the SMMPs and the budget of the state.

The purpose of monitoring by external bodies is to inspect the implementation of environmental and social activities in investment projects. Monitoring by external bodies consists of:

- 1) Oversight by the National Assembly as provided for by the Law on Oversight of the National Assembly;
- 2) Inspection by the State Inspection Authority, as provided for by the Law on State Inspection;

- 3) Auditing by the National Audit Authority, as provided for by the Law on Audit; and
- 4) Monitoring by Expert Teams in case of an emergency.

5.8 Major Issues and Challenges in the Current System

The EIA system has strengths and weaknesses. However, the problems in less-developed countries such as Lao PDR are often more acute because of the human resource constraints, the economic and political pressures facing the country, and the inherent limitations in detailed procedures and legislation. There are marked gaps between policy and implementation and between EIA procedures and EIA practices. Possible ways forward should consider the institutional framework, the roles of particular actors and the EIA procedure itself. In Lao PDR, coordination among EIA proponents, consultants, relevant ministries, local authorities, planners and decision-makers is generally weak. This leads not only to inadequacies in scoping, impact assessment and consideration of the concerned departments' views in EIA reports but also to development projects beginning before obtaining EIA clearance (Sengdeuane and Inoue 2012).

Lack of coordination not only causes delays in decision-making but also hinders effective implementation of environmental regulations. Thus, most deficiencies in EIA systems can be attributed to the poor performance of foundation measures (availability of guidelines, EIA system implementation monitoring, generally weak local expertise and inadequate training and capacity-building initiatives). These measures, by definition, serve to promote good practices and underpin the successful application of systemic approaches. Hence, their absence or poor quality will negatively influence the effectiveness and robustness of EIA implementation and practices in Lao PDR (Sengdeuane and Inoue 2012).

The major difficulty faced by MONRE in effectively carrying out monitoring activities is limited institutional capacity that arises primarily from insufficiencies in the numbers of suitably qualified and experienced personnel and in monitoring equipment and resources. These difficulties have generally been present for environmental authorities in other developing countries. The systems for implementing mitigation measures and for monitoring impacts are also ineffective (Sengdeuane and Inoue 2012).

There is insufficient expertise and awareness among decision-makers and the public concerning the importance of appropriate environmental management. This lack of awareness is due to the poor enforcement of environmental legislation and EIA regulations in particular, as well as the

lack of adequate monitoring programs.

In most developed nations, public involvement is mandatory at various EIA stages, such as screening, scoping, report preparation and decision-making. However, implementation in Lao PDR's public hearings is inadequate and largely limited, particularly the involvement of domestic and international NGOs. Moreover, the points raised in public hearings are rarely incorporated in planning and decision-making. Hence, the effectiveness of public participation in Lao PDR's EIA system is yet to be evaluated and requires development of good guidelines for public involvement (Sengdeuane and Inoue 2012).

The adoption of certain policies regarding the institutional aspects of EIAs would enhance their effectiveness. First, the status of the review agency in each government hierarchy level must be raised. Possible options for doing this include granting an independent ministerial status to the review agency or placing it under a more powerful ministry directly in charge of development and planning. Second, the environmental concerns of responsible agencies should be stimulated. Stricter enforcement mechanisms, environmental education for government officials and upgrading intergovernmental mediation processes might prove useful in changing the behaviour of responsible agencies. Third, EIA procedural rules must define clearly the roles of participants and their interactions (Sengdeuane and Inoue 2012).

5.9 Gap Analysis Between the Present Domestic Regulations, the JICA Guidelines for Environmental and Social Considerations, and the World Bank Safeguard Policy

Although some gaps are identified between the existing domestic regulations and JICA Guidelines, no mutual contradictions have been identified.

Lao PDR's EIA legislation pays remarkably close attention to social impacts compared to other developing countries in East Asia. However, its implementation is reported to be as poor as that of other developing countries.

Project owners should implement environmental assessments in line with government laws and JICA Guidelines. For aspects of environmental impact that government laws do not mention or mention only vaguely, project owners should refer to JICA Guidelines, which are consistent with the World Bank Safeguard Policy.

For further details on the gap analysis and case examples of projects by the World Bank and the Asian Development Bank, refer to Chapter 8.

Chapter 6

Land Acquisition and Involuntary Resettlement

6 Land Acquisition and Involuntary Resettlement

6.1 Legal Framework

Lao PDR's Constitution declares that land is a national heritage. The Land Law (2003) clarifies that groups or individuals can acquire land legally in three ways: allocation by the state, transfer (defined as 'sale, transfer or exchange'), and inheritance (Articles 52, 57, and 58). In Lao PDR, the compensation principles and policy framework for land acquisition and resettlement are governed by the following laws, decrees, and regulations:

- Constitution (2003);
- Land Law (2003);
- Road Law (1999);
- Forestry Law (2007);
- Decree of the Prime Minister on Compensation and Resettlement of People Affected by Development Projects (Decree 192/2005); and
- The new, improved decree 699/PMO-Water Resources and Environmental Agency (WREA, changed to MONRE) dated 12 March 2010 on Compensation and Resettlement of the Development Projects.
- PM Implementation Decree 101/PM, 20 April (2005)
- PM Decree on the Implementation of the Land Law No 88, 03 June (2008)
- Mining Law (1997)
- Law on Investment Promotion (2009)
- PM decree 135 on State Land Lease and Concession (2009)

Constitution (2003)

Article 16 of the Constitution declares that the State protects and promotes all forms of property rights: State, collective, and private domestic and foreign investment in the Lao PDR. Article 17 states that the State protects the property rights (such as the rights of possession, use, usufruct, and disposition) and the inheritance rights of organisations and individuals. It also declares that land is a national heritage, and the State ensures the rights to use, transfer, and inherit it in accordance with the laws.

Land Law (2003)

Adopted by the National Assembly in 2003 (supersedes the Land Law 01/97 dated 12 April 1997), the Land Law is the principal legislation by which the State exercises its constitutional responsibility for tenure, access, use, management, and preservation of land. The articles summarised below are of particular importance to resettlement:

- (a) Article 3 reaffirms that all land in Lao PDR is the property of the national community (as stated in the Constitution, Article 15) for whom the State is the uniform central administrative representative throughout the Country and individuals... are assigned to effectively use the land... (only non-forest land in private title or land held under a long-term lease can be transferred).
- (b) Article 5 protects the legal rights and benefits of those who have effectively received the right to use land including the right to transfer it.
- (c) Article 11 classifies land into eight categories, and subsequent chapters of the Law are concerned with the management of each. The categories are: agricultural land, forest land, water area land, industrial land, communication land, cultural land, defence and security land, and construction land.
- (d) Article 43 refers to the certification of the lawful land use rights of persons or entities. There are two land registration methods (Article 44) by which individuals can register the land which they are using lawfully. First is systematic land registration, which is carried out throughout a designated area where land allocation, zoning, or classification is required. Systematic registration confers a Land Title. Second, persons or entities can apply to certify their right to use certain land.
- (e) Under Article 48, land certificates are issued by district level authorities to certify the temporary right to use agricultural or forest-land. These land certificates can be inherited, but cannot be transferred or used as collateral.
- (f) Article 53 states that persons who have received the right to use the land have the following rights: to protect land for use for a specific objective, to use land for a specific purpose in accordance with the State's allocation plan, to enjoy usufruct or income from the land, to transfer the right of land use, and to inherit the right of land use.
- (g) Article 63 states that the right of land use shall be terminated either through voluntary relinquishment of the land or if the State retrieves the land for public purposes.
- (h) The landholder is entitled to just compensation for land expropriation by the state (Article 70).

(Ministry of Communication, Transport, Post and Construction 2003)

Compensation is treated in Articles 68 to 72 of the Land Law. Article 70 states that persons or entities requiring a right-of-way and who thereby cause damage to crops or buildings must make appropriate compensation. Article 71 was added to the amended law. It states that when the use of land belonging to other persons or organisations becomes necessary for the public interest, the State will compensate any damage suffered by the rightful user of the requisitioned land, as appropriate. Furthermore, the Law requires that each village, province, municipality, or special zone keep 5% of its total land area in reserve to ensure the compensation of requisitioned land.

Evaluation of the damage is provided for by Article 72, which states that the evaluation will be done by a committee composed of representatives of the concerned parties.

The Land Law does not explicitly provide articles addressing unregistered land users. It does however lay down the required procedures that individuals have to follow to register the land they are currently using lawfully and to obtain the relevant certifications. Article 82 states that the right to use a certain piece of land will be conferred on individuals who are keeping and efficiently developing the said piece of land.

Road Law (1999)

The Road Law places the responsibility to manage and use land allocated for transportation activities in the hands of the Ministry of Public Works and Transport (MPWT), in accordance with the articles provided by the Law itself. Road width shall have the area consisting of the carriageway, shoulders, pathways, drainages, slope of road, and Right of Way (Article 17). All construction and other activities are banned within the Right of Way except in extraordinary cases, for which the permission to initiate activities is to be requested from the road management authority (Article 21).

The Law requires that the owner whose land will be acquired for the right-of-way (ROW) receive 'reasonable' compensation for the relocation and replacement structures as well as the loss of trees and crops (Article 19). The Law states that privately owned land or land under permitted land use within the agreed ROW used for road construction will be expropriated, and the owner will receive reasonable compensation. It is common in Lao PDR that structures and parts of housing are constructed within the ROW after it has been delineated. In such circumstances, compensation will be restricted to loss of materials of structures, repair costs, and loss of trees.

Both Land and Road laws ensure compensation for legal owners of properties under acquisition. However, compensation at replacement cost of the acquired properties, restoration of income, and compensation to non-legal (but not illegal) users are not guaranteed under these two laws (Lao National Tourism Administration 2010). On the other hand, the Decree PM 192 together with the Regulations for Implementing Decree 192/PM and the TGCR have provisions that guarantee replacement values, income restoration, and compensation to non-legal residents.

Forestry Law (2007)

The Law sanctions the conversion of forests and forest land to other uses (i.e. for transmission line right of way) when necessary and in the public interest (subject to approval from responsible authorities). It however places responsibility on individuals or organisations given permission to convert forest to another use to pay a conversion fee, perform land reclamation, and plant trees. The law allows the continuation of long practiced activities such as collecting wood for fences and fuel, non-timber forest products (NTFP), hunting and fishing for non-protected species for household consumption, and other customary uses. Regarding the payment of compensation for activities that require cutting down forests, the compensation amount is calculated by assigning an appropriate price to the volume of timber (m³) of a given class of trees that will be cut down (Ministry of Energy and Mines 2010).

Compensation is only paid for timber removed from private forestry plantations, whereas the removal of timber from natural forests located on public lands and NTFP such as bamboo are not compensated for. Replanting trees as compensation for removing trees to create a transmission line right-of-way on degraded land that is remote from the transmission line corridor is not required. Only reservoir cleaning projects requires such forms of compensation. This is due to the need to stabilise slopes at risk of failure from mass wasting processes (ADB 2009).

Decree of the Prime Minister on Compensation and Resettlement of People Affected by Development Projects (Decree 192/2005) and the new improved Decree 699/PMO-WREA (Decree 699/2010) on Compensation and Resettlement of the Development Projects

The Decree and Regulations adopted in 2005 and 2010 under the Water Resource and Environment Administration (WREA (currently MONRE)) define principles, policies, and procedures for land acquisition, compensation and resettlement for all development projects including those funded by the Government of Lao PDR, private investors and/or donors. The technical guidelines include the regulations which cover all stages of project development, from

project identification and pre-feasibility studies through construction and operation of the project.

Decree 192 addresses vital issues not appropriately dealt with in the Land and Road Laws. It states that informal land users are to be provided compensation when appropriate, whereas the Land and Road laws settlers. The Decree also precisely defines the ‘reasonable compensation’ mentioned in the Land and Road Laws as replacement cost. It supplements the Land and Road laws by setting out the necessary processes and mechanisms to acquire and remove structures in addition to land. Furthermore, the Decree calls for ensuring the participation of the community when calculating the appropriate entitlement amount. Last but not least, it recognises of vulnerable and ethnic groups (Lao National Tourism Administration 2010). Together with the Decree Regulation on Implementation (November 2005) and the Technical Guidelines on Compensation and Resettlement of People Affected by Development Projects (TGCR) (November 2011), Decree 192 constitutes the most comprehensive framework on resettlement planning in Lao PDR to this date. The guidelines are broadly consistent with ADB’s and IFC’s safeguard policies and are therefore consistent with international adapted standards.

- (a) Article 2 – Point 2.3 requires a ‘Land Acquisition and Compensation Report/ Resettlement Plans (RPs) to be prepared during the feasibility study stage of the project preparation. The article also refers to the necessity of defining project boundaries.
- (b) Article 6 - Compensation principles state that before compensation, a joint committee will be established to assess loss to APs. APs will be entitled to compensation for structures at replacement cost, and compensation will be payable for losses of income due to the project, and those without documented legal title will still be entitled to compensation for lost structures and other support so as not to be negatively impacted. Article 6 - paragraph 6 states that APs who are living in rural or remote areas, and who do not have a legal Land Use Certificate or any other acceptable proof indicating land use right to the affected land and assets they occupy shall be compensated for their lost rights to use land and for their other assets at replacement cost and shall be provided additional assistance to ensure that they are not worse-off due to the project. In urban areas, APs who do not have a legal Land Use Certificate or any other acceptable proof indicating land use right to the affected land and assets they occupy and who have no land at other places will be compensated for their lost rights to use land and for their other assets at replacement cost and will be provided with additional assistance to ensure they are not worse off due to the project.
- (c) Article 8 - entitlement to economic rehabilitation measures if more than 20% of income-generating assets are lost due to a development project.

- (d) Article 11 - voluntary donation of land by APs is only acceptable if the impact on their income generation is not significant (less than 20% reduction), no physical displacement is caused, and APs are fully aware of their entitlements before relinquishing them.
- (e) Article 11 - project proponents will define mitigations measures and socioeconomic benefits to improve the status of ethnic communities which will be developed in consultation with the communities and in harmony with their cultural preferences.
- (f) Article 15 - requires a separate section on indigenous peoples issues and mitigation measures in the RP. Where impacts on indigenous peoples are more significant an Indigenous peoples Development Plan (or Ethnic Minority Development Plan (EMDP) in Lao PDR) will be prepared.

(MPWT 2009)

- (g) Article 21 – states regarding compensation eligibility that all persons who reside in, utilise land in or otherwise derive livelihood from land within the project impacted area boundaries or those affected by loss of land, will be eligible for compensation and other assistance. Point 2 under the same Article says that APs deriving income from the exploitation of natural resources such as hunting, gathering, fishing, etc. are also eligible for compensation in the form of cash or support for the establishment of new means of livelihood, etc.

Table 6.1.1 shows the summary of major laws and regulations relevant to land acquisition and involuntary resettlement.

Table 6.1.1: Summary of major laws and regulations

Law	Description
Constitution (1991)	The constitution states that land is a national heritage, and that the State ensures the right to use, transfer, and inherit land according to the law.
Land Law (2003)	The land law regulates land use, particularly land use rights and their exercise, land size and use of the land. Land use rights can be acquired by one of three mechanisms of allocation by the state, transfer or inheritance and are revoked either voluntarily relinquishment of rights or if the States retrieves the land for public use (in this landholder is compensated).
Forestry Law (2007)	The law regulates the use and management of forestland and forest resources. Similar to the land law, the right to use forestland, natural forest, and planted forest areas is acquired through allocation by the state, transfer, or inheritance. The law states that in the case that the State needs to use forestland allocated to an individual/organisation, the owner will be

Law	Description
	compensated according to prevailing laws and regulations.
Decree of the Prime Minister on Compensation and Resettlement of People Affected by Development Projects (Decree 192/2005)	The Decree rectifies key areas of the Land and Road Laws which would prevent informal land users from any eligibility. Project Affected Persons (PAPs) are compensated at replacement costs for affected land and non-land assets (incl. non titled PAPs). Severe PAPs are defined as having 20% of income generating assets affected. The decree entitles them to economic rehabilitation ensuring they are not affected negatively by the project.
Decree 699/PMO-Water Resources and Environmental Agency on Compensation and Resettlement of the Development Projects (2010)	The technical guidelines included in in this regulation cover all stages of project development, from project identification and pre-feasibility studies through construction and operation of the project.
PM Implementation Decree 101/PM, 20 April (2005)	Article 25 presents various goals for expropriation or requisition of private land, which are defined as follows: 1. Land for public facilities, 2. National defense, 3. National security, 4. Specific development by the State, 5. Accessing irrigation systems, canals, electricity wire installation, water pipes, etc. Article 24 mentions the ‘withdrawal’ of land use rights and refers to Article 62 of the Land Law, elaborating on the 4 types of ‘loss of land use rights’, while land expropriation is set in the Article 63 entitled ‘termination of land use rights’. Article 24 states ‘ The Government and the Land Management Authority are charged with making the decision on the withdrawal of land use rights and land utilisation rights within the scope of their right and power’ ...and the person subjected to the withdrawal must be informed in writing at least 6 months in advance.
PM Decree on the Implementation of the Land Law No 88, 03 June (2008)	Provides the most detailed definitions of relevant terminologies, such as state land, collective land, land use, land use rights, land utilisation rights, land concession, etc. Article 28 on compensation for the losses of land states that the damage to the concerned person will be compensated on a

Law	Description
	<p>case-by case basis as follows: 1. In case of necessity to use land for public facility, national defense, national security or using the land for specific development purposes by the state 2. Use land for the purpose of building passage way, irrigation canal, electric wire track. The compensation of the losses may be paid in cash or in kind, or by providing land in exchange, based on the mutual consent reached by the two parties in an appropriate manner.</p>
Mining Law (1997)	<p>Article 47 states the following: Mining operators shall perform the following compulsory expenses:</p> <ol style="list-style-type: none"> 1. Resettlement of the population from the mining and ensure their livelihood; 2. Compensation of damage to land, constructions and crops; 3. Rental of land; 4. Environmental protection; and 5. Improvement and rehabilitation of the mining area. <p>Such funds shall be included in the capital of the mining projects.</p> <p>In 2008 a new Law was promulgated, however only released in 2009. The English version is not available as of September 2013.</p>
Law on Investment Promotion (2009)	<p>The law stipulates principles, regulations and measures regarding the promotion and management of domestic and foreign investment in Lao PDR. It aims at a centralised and uniformed management of investments, to increase the overall investment climate of the country and to be in line with national policy and existing rules and regulations. The law thereby sets the overarching framework for investment in land leases or land concessions.</p>
PM decree 135 on State Land Lease and Concession (2009)	<p>This decree divides land concessions into administrative and commercial types, and outlines the requirements to be met for granting land concessions of state land. Before determining the area to be leased or conceded it is necessary to do a land survey, prepare a land map and prepare a land use map. If the area to be leased or conceded extends into the land of the people or individual land, the land use rights of the corresponding parties should be maintained by advising the lessee or concessionaire to conclude contracts with the land owners, or to give such land into a share. The decree adds to the land law's list of obligations of</p>

Law	Description
	the entities leasing and conceding land that if compensation is required, the project's owner must compensate for the loss to the land use right holders.

6.2 Procedures and Relevant Organisations

Resettlement planning and implementation activities are an integral part of a development project, especially for the projects that will result in large-scale involuntary resettlement. The activities run parallel to project planning and implementation activities in the project process cycle. The Ministry of Natural Resources and Environment (MONRE) is the most relevant ministry for land acquisition and involuntary resettlement.

Land Acquisition/Resettlement Process

The mode of land acquisition and if resettlement is required or not is decided and defined during the first two phases of a typical Project Cycle as described in the decree 192 and the updated guidelines. The finalisation of all required reports and plans regarding land acquisition are due within the third phase and the implementation and realisation of the different tasks during phase 4 in parallel or before project operation starts.

The following describes all relevant tasks and main products related to any land acquisition and resettlement using the different steps of the project cycle as orientation.

1. Project Identification (Screening/ISA/TOR for SIA; also screening if EIA or only IEE required)
 - (a) Identifying likely social impacts and issues relevant to the project
 - (b) Review & screening of existing data
 - (c) Determining the level and amount of information required for subsequent phase in the project
 - (d) Establishing the purpose of data collection for resettlement planning, monitoring and evaluation, and preparing terms of References (TORs)

During this first screening phase, it will be decided similarly to the Environmental issues, to which Social Category the project belongs:

Cat. 1: Project categorised as 'S1' will require full RP or a standalone EMDP, as the case may be. In projects with 'S1' category the impacts would be considered significant; whereas

Cat 2: Only a simple RP or a Land Acquisition and Compensation Report would be required for category 'S2' projects. Impacts in 'S2' category of projects would be considered Marginal or Insignificant.

Cat 3: No further studies on resettlement issues necessary for 'S3' category of projects. In which Category the project is classified depends mainly on the number of HH/AP, poverty groups and ethnicity.

2. Pre-Feasibility (Drafting SIA, EMDP, SDP, SA, RPs and EIA or IEE; Refine TOR/Assess options for minimising adverse)
 - (a) Selection of suitable design option
 - (b) Refine the project objectives, scope and resources needed for the implementation
 - (c) Conducting specific technical studies and economic analyses and preparation of preliminary designs.
 - (d) Determine whether the potential resettlement impacts of the proposed project are likely to be significant. Identification of key stakeholders including PAPs and
 - (e) Assessment of various design options for avoiding or minimising adverse impact and selection of suitable design option.
3. Feasibility and detailed Design (Finalisation of SIA including SAP, EMDP, SDP, SA, RPs, typically also the time when EIA(including EMMP) or IEE is finalised)
 - (a) Project boundaries are finalised, although these may be further modified after the feasibility studies are completed,
 - (b) In parallel to the feasibility studies and preparation of technical designs, social assessment study, where necessary, is completed.
 - (c) If resettlement necessary:
 - Detailed census and socioeconomic surveys are completed
 - Inventory of affected assets prepared as an essential element of resettlement preparation.
 - Where necessary, additional information on ethnic minority groups are collected.
 - Consultation with stakeholders is carried out throughout the resettlement preparation stage. Based on detailed surveys and field investigations, necessary documents such as the RPs, Ethnic minority Development Plans, Social Assessment Reports are prepared and finalised.
 - (d) Normally government approval for projects is obtained upon completion of the feasibility studies following which detailed engineering designs & bidding documents are prepared. (both licenses at this stage should be given, investment license and concession license)

4. Implementation

(a) Implementation of the project

(b) However prior to start with construction and project operation, the implementation of resettlement activities have to be done, except in some linear projects where civil works on some sections of the project may begin even when resettlement implementation in other sections is still ongoing:

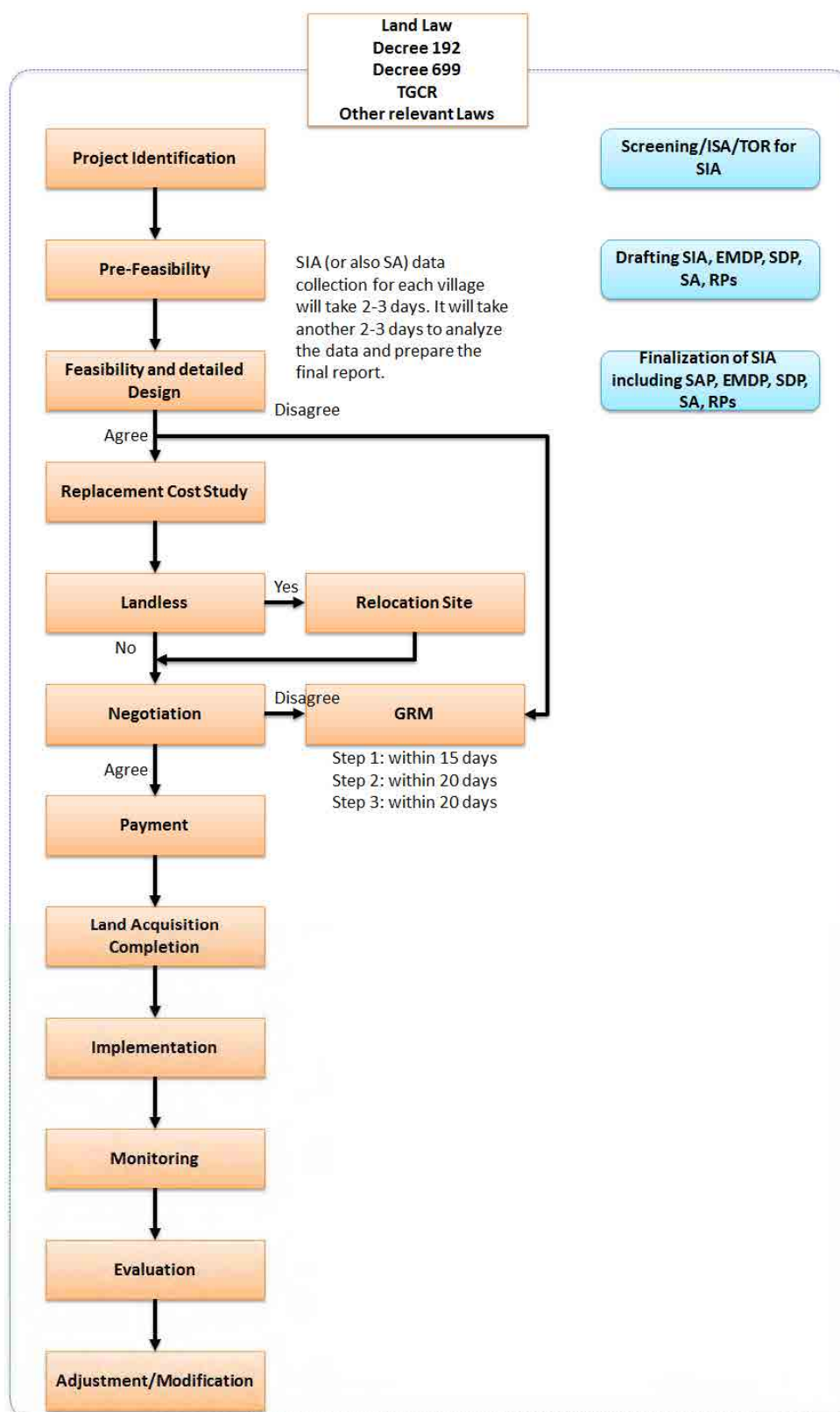
- Land acquisition/transfer,
- Compensation payment
- Relocation activities of displaced affected persons (APs)

5. Monitoring

6. Evaluation

7. Adjustment/Modification

A typical example of the stages of a project process and resettlement activities/outputs in Lao PDR are shown in Figure 6.2.1.



Source: WREA (2005)

Figure 6.2.1: Project Process Cycle and Resettlement Activities

The land acquisition and compensation are completed through the coordination of related organisations, which vary according to projects. Following is an example used in the Lao Transport Sector Project RP, which was prepared in 2009 and funded by the World Bank:

- (1) Based on appropriate consultations with affected villages and local provincial and district governments and the results from an impact survey, a dedicated project team prepared a detailed Project Resettlement Action Plan (RAP).
 - (2) The Environmental and Social Division (under PWTI) (ESD) of the Department of Roads (DOR) at MPWT reviewed the draft RAP and submitted it to MONRE for approval after it had been cleared by ESD in MPWT.
 - (3) The project management office (PMO) publicly informed residents of the areas where the project was to take place of the RAP, the compensation policies, the impact scope, the schedule of implementation, and the grievance procedures only after the RAP had been approved by MONRE and the World Bank.
 - (4) Prior to commencement of construction, the PMO and the resettlement compensation committee signed general agreements in Phongsaly. The agreements gave the green light to carry out land acquisition and resettlement in accordance with the approved RAP.
 - (5) Phongsaly Resettlement Committee, composed of staff from Hoauphanh Public Works and Transport Institute (of MPWT) (PWTI), relevant provincial agencies, and Vieng Xay, Sop Bao, Xieng Khor and Et District officials deliberated with affected villages about land acquisition compensation issues. They also signed compensation agreements and conducted land use procedures;
 - (6) Affected parties received compensation payments by compensation committees, with the participation of local village chiefs and affected households.
 - (7) Completed legal procedures for land acquisition
 - (8) Official land acquisition by the Project.
- (ADB 2009)

Specific resettlement activities and outputs required for the stages of the project process cycle are shown in the TGCR in the table below.

Table 6.2.1: Project Process and Resettlement Outputs

SN	Stages in a Typical Project	Resettlement Activities/Outputs
1	Project Identification	<ul style="list-style-type: none"> • Conduct Initial Social Assessment • Prepare TOR for RP/EMDP/SA as necessary
2	Pre-feasibility	<ul style="list-style-type: none"> • Conduct field surveys (inventories, socioeconomic status) • Prepare RP/EMDP/SA as necessary
3	Feasibility	
4	Project Approval	<ul style="list-style-type: none"> • RP and other documents are approved by the relevant line agencies and MONRE
5	Detailed Technical Design	<ul style="list-style-type: none"> • Adjustment (finalisation) of RP and other documents following detailed design with specific project boundaries, if necessary
6	Implementation	<ul style="list-style-type: none"> • Implementation of arrangements for RP/SA/EMDP • Monitoring and supervision

Source: WREA (2005)

6.3 Grievance Redress Mechanism, Information Disclosure, and Monitoring

6.3.1 Grievance Redress Mechanism (GRM)

Article 13 of Decree 192/PM requires the Project to establish an effective mechanism for grievance resolution. Lao PDR legal requirements for this mechanism are further described in Part VI of the Decree's Implementing Regulations, and in detail in the Technical Guidelines. Decree 192/PM states that the prime responsibility for grievance resolution is the project proponent.

Upon approval of the project by the Government and prior to the start-up of resettlement implementation activities, the project authorities makes a formal request to MONRE to establish Grievance Redress Committees (GRC) in each district covered by the project. GRC addresses any complaints and grievances pertaining to land acquisition, compensation and resettlement that are brought forward by APs.

MONRE, in consultation with appropriate authorities establish GRCs in each of the districts. The GRC shall be comprised of the following:

- 1) A local government representative;
- 2) Village head(s);
- 3) Representatives of the affected households other than the village heads;
- 4) Village elders or local level representatives of mass organisations or Non-benefit organisations; and
- 5) Project owner representatives.

The GRC must be adequately constituted to deal with gender issues that may arise.

(WREA 2005)

It is essential to include representatives of project authorities in GRCs so that essential information on inventories, entitlements, compensation rates etc. can be provided to the committee members for review of particular complaints (WREA 2005).

The grievance redress procedure consists of the following steps:

Step 1: As a first step, all complaints and grievances relating to any aspect of the project or subproject should be properly documented by project officials and addressed through consultations conducted in a transparent manner and aimed at resolving matters through consensus at the project level to pre-empt all disagreements being referred to the district level GRCs or higher levels and ultimately to the court of law. All meetings between the project authorities and complainants should take place in a public place. APs, local Non-benefit organisations and mass organisations, and village heads must be participate in the meetings to ensure transparency.

Project authorities should make every effort to find an amicable settlement to the complaints or grievances brought up by APs at the project level. If the APs are not satisfied with the decision of the project authorities within 15 days from the filing of the complaint or when the problems and issues cannot be addressed to the satisfaction of affected communities and individual APs, the complaints can then be forwarded to the GRC. Representatives of APs, local Non-benefit organisations and mass organisations should ensure that the complaints are forwarded to GRC on behalf of the aggrieved APs.

Step 2: If the APs do not receive any response from the GRC within 20 days of filing the complaint, or if the matter is not resolved to the satisfaction of the APs, the representatives of APs, local Non-benefit organisations or mass organisations will, on behalf of the APs, submit

the complaint to the head office of the project owners and MONRE. Project authorities and representatives of APs will follow-up the case with the Project Head Office and MONRE on behalf of the APs.

Step 3: If the matter still remains unresolved within 20 days of filing the complaint to the project owner and MONRE, and at the request of the APs, the representatives of local Non-benefit organisations and mass organisations will, on behalf of the APs, forward the complaint to the Court of Law and follow up with the relevant authorities. The decision of the Court of Law is final.

Table 6.2.2: Roles and Responsibilities and Work Steps for Grievance Redress

Organisation		Roles and Responsibilities
Step 1 (APs submit grievances to project authorities)	Project Authorities	1) Receive grievances. 2) Consult with APs and settle grievances within 15 working days. 3) If not, forward grievances to GRC 4) Ensure that complaints are sent to GRC on behalf of APs
	Representatives of APs	
	Non-benefit and mass organisations	
	Village heads	
Step 2 (The grievance cannot be settled at the 1st Stage and moves on to the 2nd.)	DRC	1) Receive the unresolved case. 2) Settle grievances within 20 days 3) If not, forward complaint to head office of project owners and MONRE 4) Follow up the case with Project Head Office and MONRE
	Representatives of APs	
	Non-benefit and mass organisations	
Step 3 (The grievance cannot be settled at the 2nd Stage and moves on to the 3rd.)	Project owner	1) Receive the unresolved case 2) Settle grievances within 20 days 3) If not, forward complaint to Court of Law 4) Forward the case to the Court of Law
	MONRE	
	Non-benefit and mass organisations	
Final Step (The grievance cannot be settled in stages 1 to 3 and is transferred to the Court of Law)	Court of Law	1) Receive the unresolved case 2) Make final decision

(WREA 2005)

All administrative and legal costs incurred pursuant to the grievance redress procedures by APs or their representatives at the level of GRC, project head office and MONRE and the Court of Law are to be covered by the project. Claims of all such costs are to be submitted to the project authorities by the APs. A copy of the claims should also be submitted to MONRE for record and information. The Project Authorities will document all complaints received in writing (or written when received verbally) from the APs pursuant to the grievance redress procedures at every stage (WREA 2005).

6.3.2 Information Disclosure and Public Participation

Most complaints and grievances in any project relate to inventory, entitlements, and compensation rates for affected assets. A good degree of transparency and diligent actions by project authorities during resettlement preparation can eliminate or minimise many issues and problems that lead to complaints (WREA 2005).

Table 6.3.1: Sample Public Consultation and Disclosure Plan

Activity	Task	Timing (Date/Period)	No of People	Agen cies	Feedback/ Issues/ Concerns Raised	Remar ks
Stakeholder Identification	Mapping of the project area					
Project Information Dissemination	Distribution of information leaflets to APs					
Consultative Meetings with APs during Scoping Phase	Discuss potential impacts of the project					
Public Notification	Publish list of affected lands/ sites in a local newspaper; Establish eligibility cut-off date					
Socio-Economic Survey	Collect socio-economic info on APs as well as APs' perception on the project					
Consultative Meetings on Resettlement Mitigation Measures	Discuss entitlements, compensation rates, income restoration, site selection, GRMs					
Publicise the RP	Distribute leaflets or booklets in local					

Activity	Task	Timing (Date/ Period)	No of People	Agen cies	Feedback/ Issues/ Concerns Raised	Remar ks
	language					
Full disclosure of the RP to APs	Distribute RP in local language to Aps					
Web Disclosure of the RP	RP posted on donor and/or project owner's website					
Consultative Meetings during Detailed Measurement Survey (DMS)	Face to face meetings with APs	During DMS				
Disclosure after DMS	Disclose updated RP to APs	After DMS				
Web Disclosure of the Updated RP	Updated RP posted on the project owner's and/or EA's website	After project owner's approval of RP				
Consultation and disclosure arrangements during (i) implementation, (ii) monitoring, and evaluation						

Source: WREA (2005)

Example of information disclosure

Nam Theun 2 Hydroelectric Project (World Bank Project No. P076445)

The project which consisted on the installation of a hydropower facility involved involuntary resettlement. The Public Consultation, Participation and Disclosure (PCPD) Process for resettlement planning of this project was conducted in a three phase process as follows:

1. PCPD Phase 1

From 1996 to 2003, more than 250 public consultation and participation briefings and meetings, at local, regional, national, and international levels were conducted. The purpose of these public consultations was to ensure that Project Affected Persons (PAPs) and other stakeholders could participate from the beginning of the project in the design of the resettlement process including the mitigation measures and compensation.

2. PCPD Phase 2

The second phase was conducted from May to August 2004. The purpose of the second phase of the public consultations was to inform stakeholders all relevant information regarding basic project design and planning that was based on the outputs of Phase 1. In addition, it provided PAPs and other stakeholders another opportunity to make proposals and contribute to the further refinement in the project strategy and design.

3. PCPD Phase 3 (Disclosure)

During this phase of the full Social Development Plan, including the Environmental Management Plan, the RAP and Frameworks, revised according to the consultations, were disclosed in both English and Lao language in the website of the project and according to WB's safeguard policies. These safeguard policies require that affected groups, the Government of Lao PDR through relevant agencies, local NGOs, and all other stakeholders be consulted.

In addition to the donor's safeguards, the consultation and information disclosure process followed the recommendations included in the World Commission on Dams (WCD) Report, including:

- Participation of indigenous peoples;
- Consent of affected indigenous peoples should be sought prior to key points in the decision-making process;
- Consent will be guided both by customary laws and customs, and by national laws;
- Affected people will state how they will express their consent to key decisions;
- The integrity of community processes should be guaranteed; and
- Independent dispute resolution mechanism should be agreed with stakeholders.

(World Commission on Dams 2000)

All information and data on the project lands and assets that was going to be affected by the project was disseminated in detail to each village. The information was presented in the form of a large satellite photo/map that was displayed in the village for everyone to see. In villages with no bulletin board or appropriate method of display, the project developer was requested to install one for this purpose. In addition to information regarding the impacts of the project, PAPs were also provided with information regarding their entitlements, compensation schemes, and mitigation measures. In addition to the information provided to stakeholders during consultations and the village notice boards, information centres were created for this project. These information centres were established in Vientiane, Thakhek, and Nakai to promote information exchange from the earliest stages of the project implementation. The first

information centre was established in early 2005 in Vientiane. Safeguards documents in English and summaries in Lao language, a Project small-scale model, and a video were provided at each of these centres (WB 2004).

6.3.3 Monitoring

Activities related to monitoring are detailed in the TGCR as follows.

The objective of monitoring is to provide feedback on implementation, and to identify problems and successes as early as possible to facilitate timely adjustment of implementation arrangements. Monitoring of RAP implementation is of critical importance in all projects involving involuntary resettlement for the following reasons: (1) resettlement is on the critical path on any project and can cause severe delays; (2) it affects people's lives directly, and can cause severe hardship; (3) it is the main mechanism to alert management to delays and problems in implementation (WREA 2005).

In Lao PDR, while most line agencies are aware of supervision procedures for construction activities, very few are competent in supervision and monitoring of resettlement activities. This is due to the fact that many agencies involved in development projects have permanent staff responsible for resettlement and social issues (WREA 2005). To ensure that land acquisition, resettlement and rehabilitation activities are carried out in accordance with the provisions of the RAP, both monitoring and supervision are required throughout the project. Monitoring and supervision are related but distinct activities. Monitoring involves primarily the systematic use of information to determine the extent to which plans are being implemented effectively. Monitoring information also contributes to identification of problems that may require adjustments to the RP itself. Many actors are involved in these processes. In a very simplified model, the actors can be classified as follows.

Table 6.3.2: Actors involved in Monitoring

	Supervision	Monitoring
Internal	Line agency management	Project resettlement unit of line agency (if any)
External	Regulatory Agency	Consultants/ Non-benefit Organisations/ Academic institutions

Source: WREA (2005)

Monitoring indicators should correspond to stages of the process, which may be different than stages of the project cycle. Table 6.3.3 below provides a set of generic resettlement monitoring indicators introduced in the TGCR. No single set of indicators is universally sufficient, however. Project-specific indicators are likely to be needed to reflect the activities and implementation arrangements of the project in question.

Table 6.3.3: Suggested Generic Resettlement Performance Indicators

Sequence	Dimensions of the resettlement process	Indicators	Means of verification
Inputs	Establishment	Qualified staff in place	Quarterly internal monitoring reports
		Equipment available	
		Finance on deposit	
Process	Information to APs	Information disseminated	Internal and external monitoring
	Capacity building	Training of APs	
	Consultation and participation	Meetings held and committees formed	
Outputs	Compensation	Compensation paid for acquired assets	Internal and external monitoring
	Acquisition	Assets acquired	
	Compensation	Community assets replaced and relocation site prepared	
	Relocation of APs	Relocation completed and grants paid	
	Rehabilitation	Jobs/businesses/incomes provided	
Impact	Results	Incomes restored or improved	External monitoring
		Living standards restored or improved	

Source: WREA (2005)

Internal monitoring

During project preparation, and as a part of the RAP, the implementing agency is required to develop a monitoring and reporting framework for resettlement activities. Central to this framework is the census of APs and the inventory of assets that constituted the basis for the agreed RAP. The organisational unit responsible for project reporting on resettlement (project resettlement unit, where it exists) should oversee the progress in resettlement preparation and implementation through regular progress reports submitted through normal channels, and through the monitoring of key indicators of finance, inputs, and activities.

The specific objective of the internal monitoring and supervision is to:

- (i) verify that the baseline information of all APs has been carried out and that the valuation of assets lost or damaged, and the provision of compensation, resettlement and other rehabilitation entitlements has been carried out in accordance with the provisions of the Resettlement Decree and the RAP;
- (ii) oversee that the RP is implemented as designed and approved; and
- (iii) verify that funds for implementation of the RP are provided by the project management in a timely manner and in amounts sufficient for their purposes, and that such funds are used in accordance with the provisions of the RAP.

(WREA 2005)

[Monitoring Indicators]

The main indicators that will be monitored regularly are:

- That the entitlements of APs are in accordance with the approved Decree 192 and that the assessment of compensation is carried out in accordance with the agreed procedures;
- Payment of compensation to the APs in the relevant categories according to the level of compensation described in the RAP;
- Public information and public consultation and grievance procedures are followed as described in the RAP;
- Consultation with, and participation of APs in identifying appropriate rehabilitation assistance measures;
- Relocation, reorganisation, and payment of subsistence and shifting allowances are made in a timely manner;
- Restoration of the public facilities and infrastructure affected by the project;
- Job creation (number of persons who need job provision and the number who have found a job);
- Provision of training and credit availability to those entitled to such assistance; and
- The linkage of resettlement and commencement of civil works.

(WREA 2005)

[Monitoring Report]

This overall monitoring and reporting framework should provide a routine flow of information from the field level to the headquarters of the implementing agency, based on predefined indicators, together with periodic supervision and verification by the resettlement unit, or those in charge of resettlement operations.

External Monitoring

In addition to internal monitoring, external (or independent) monitoring is normally required to provide an independent periodic assessment of resettlement implementation and impacts, to verify internal reporting and monitoring, and to suggest adjustment of delivery mechanisms and procedures as required. To function effectively, the organisation responsible for external monitoring should be independent of the governmental agencies involved in resettlement implementation. Project owners are responsible for contracting a suitable and experienced external monitoring agency and an appropriate budget should be allocated for the consulting agency in the RP. The following activities are the standard functions of the external monitors:

- Verification of internal reports, by field check of delivery of the following:
 - a. payment of compensation including its levels and timing;
 - b. land readjustment;
 - c. preparation and adequacy of resettlement sites and house construction;
 - d. provision of employment, its adequacy, and income levels;
 - e. training;
 - f. rehabilitation of vulnerable groups;
 - g. infrastructure repair, relocation, or replacement;
 - h. enterprise relocation, compensation, and its adequacy; and
 - i. transition allowances.
- Interview a random sample of APs in open-ended discussions to assess their knowledge and concerns regarding the resettlement process, their entitlements and rehabilitation measures.
- Participate as an observer in public consultations for APs at the village or town level. Organising these meetings is the responsibility of the implementing agency.
- Observe the functioning of the resettlement operation at all levels to assess its effectiveness and compliance with the RAP.
- Check the type of grievance issues and the functioning of GRMs by reviewing the processing of appeals at all levels and interviewing aggrieved APs.
- Survey the living standards of the APs (and that of an unaffected control group where feasible) before and after implementation of resettlement to assess whether the living standards of the APs have improved or have been maintained.
- Advise project management regarding possible improvements in the implementation of the RP.

(WREA 2005)

Regular external monitoring should begin along with implementation activities and continue until the end of the project.

The external monitoring agency will submit periodic monitoring reports to project owners, a copy of which should be regularly provided to MONRE and the financing agency.

Post Implementation Evaluation Study

Nine months to one year after the end of resettlement activities, the contracted monitoring agency should conduct an evaluation study of severely affected APs to determine whether or not the objectives of the RAP in terms of income restoration and living standards have been achieved. The methodology for the evaluation study should be based on the follow-up socioeconomic survey to determine the impact of the project on income levels and living standards of the APs who are severely affected by the project. A social and economic assessment of the results of delivered entitlements and a measurement of the income and living standards of the APs before and after resettlement is an integral component of this activity. This survey should be conducted following the same methodology as the one adopted for the inventory preparation. The survey data thus collected should be compared with the baseline survey information that has been collected during the preparation of the RAPs. Should the findings of the study indicate that the objectives of the economic rehabilitation have not been achieved, the consultant should propose appropriate additional assistance that may be necessary to achieve the stated objectives (WREA 2005).

Example of monitoring and reporting

Greater Mekong Sub-region Corridor Towns Development Project (ADB, Project No. 43319)

In compliance with GoL laws, that stipulate that monitoring should be conducted by an institution different from the implementing agency, for this project an external consultant was hired to conduct external monitoring activities, while ADB required also internal monitoring activities. ADB recommends coordinating environmental and social monitoring activities to minimise the disturbance to households and disruption of project activities.

Internal monitoring

The Department of Roads established a semi-annual monitoring system in which the Project Management Unit (PMU) was designed as the internal monitoring body. The PMU would be responsible of submitting the reports twice a year, starting from the moment in which the census is conducted. Additionally, progress reports by the PMU to ADB were required to include an update on resettlement. These progress reports will be submitted to ADB for web posting. The main objective of internal monitoring and supervision is to ensure that:

- Compensation and/or other entitlements are provided according to the final RAP and that

- no PAP is discriminated for reasons of gender, ethnicity, or any other factor;
- Livelihood restoration measures are designed and implemented properly;
 - Additional cash and in-kind assistance to the participating affected households is provided as and when necessary;
 - Public consultation, information disclosure, and grievance redress procedures are followed;
 - Affected public facilities and infrastructure are restored promptly; and
 - Relocation or site clearing and commencement of civil works is not conducted until PAPs have been satisfactorily compensated, assisted, and relocated.

External monitoring

The external monitoring team should include qualified experts in both environmental and social monitoring that can ensure compliance of the project with its environmental and social considerations. The external consultant in charge of the monitoring was assigned to start activities one month before the start of the Detailed Measurement Survey (DMS). The external monitor's main responsibilities were to provide an independent periodic review and assessment of the achievement of resettlement objectives defined in the Resettlement Framework and the RAP, provide information regarding the changes in income, living standards, and livelihoods, evaluate the restoration activities as well as the improvement of the economic and social base of the APs; identify the effectiveness and sustainability of entitlements and the potential need for further mitigation measures.

While the main role of the external monitor is to assess the compliance of the resettlement activities, its role is also to assist during the preparation of the action plans by reviewing existing data and gather additional socio-economic information, on affected households, identify any gap between policies and actual implementation, monitor the resolution of complaints and grievances of affected households, and provide recommendations for improving resettlement updating and implementation including timely resolution of grievances. If any significant involuntary resettlement or indigenous peoples issues is identified through the external monitoring, the PMU will be responsible of updating the RAP with corrective action plan that address such issues.

6.4 Major Issues and Challenges in the Current System

Although the legal framework in Lao PDR is very strong and mostly consistent with the multi-lateral donor's safeguard policies such as the World Bank or ADB, implementation and enforcement are reportedly not sufficient. Major issues and challenges, if any, therefore arise mostly during the implementation stage. The capacity-building support for the government has been conducted by several donors. Even the Nam Theun II Hydropower Project by World Bank and ADB, which was regarded as a rather good example in terms of social considerations, has led to some complaints, including those related to compensation and mitigation measures that were not delivered in a timely manner. Further details on the project are included in Chapter 8.

In addition, large-scale land investments for agricultural and tree plantation development in Lao PDR often have economic, environmental, and sociocultural impacts and negatively affect smallholders' and communities' livelihoods and their rights to land. Despite the strong legal framework, current governing systems do not adequately protect land rights of marginalised groups and exacerbate unsustainable, inequitable land management, creating a lose-lose situation for smallholders.

In July 2013, compensation for lands taken for development projects was debated in Parliament, with lawmakers stating that APs should receive reasonable compensation in order to address the emerging land dispute issue. Members of the National Assembly (NA) debated whether to develop a draft National Land Policy. The parliamentarians welcomed the draft policy. This indicates that compensation for lands taken for commercial projects will be based on market prices, while lands required for public projects will receive reasonable compensation. A draft was eventually prepared, but NA members did not approve it during the NA session.

Some NA members noted that the current Land Law and Prime Ministerial Decree, which state that anyone whose lands are appropriated for development projects must receive reasonable compensation, are still not clear enough. An NA member for several provinces said that land concessions, particularly those for foreign investment projects, had deleterious effects on local people and the disadvantaged because the compensation policy is not clearly defined. Such issues have emerged, especially among local people who have no official land title documents. Some members noted that although the current Land Law and Prime Ministerial Decree stipulate that those concerned must offer reasonable compensation, many APs received unreasonably low compensation, which is driving the emerging issue of land disputes.

Furthermore, besides involuntary resettlement caused by investment projects in the mining, hydropower or agro-forestry sector, or caused by public infrastructure development resettlement is also part of a national response to the question of how to integrate upland isolated populations into a national development plan has, resulting to move certain of the villages from upland areas down to the plains. The displaced people are most often ethnic minorities with a subsistence economy, based on the practices of: slash-and-burn cultivation, collection of Non-Timber Forest Products (NTFPs), hunting and fishing. When moved, these people have to quickly adapt to a new environment, a different climate, new agricultural practices, as well as a new economic system that is more geared towards a market economy. For these ethnic minorities, such changes can lead to a true cultural upheaval.

There is also an initiative to update Decree 192 (Decree of the Prime Minister on Compensation and Resettlement of People Affected by Development Projects). It is expected to be finalised in 2014, after the review of the current EIA decree is completed.

6.5 Gap Analysis between the Present Domestic Regulations, the JICA Guidelines for Environmental and Social Considerations, and the World Bank Safeguard Policy

In Lao PDR, compensation principles and policy framework for land acquisition and resettlement are governed by the laws, decrees, and regulations as shown in Section 6.2. The 2005 changes to the legislation related to compensation and resettlement in development represents a significant improvement in the rights of citizens when their livelihoods, possessions and society are affected by development projects. With support from the ADB-funded project, the legal framework is very close to ADB's safeguard policies as well as those of other international donors, such as JICA and World Bank. Most of the key aspects of the JICA Guidelines or the World Bank OP4.12 related to land acquisition and resettlement are reflected in national laws. However, it has been pointed out that gaps still remain, and that the domestic laws themselves sometimes overlap. Still, no mutual contradictions have been identified.

One example is that both Lao PDR laws and the World Bank policies entitle APs to compensation for land and non-land assets at replacement cost and for livelihood restoration support. Lao PDR legislation defines such livelihood restoration measures as being applicable only to severely affected people, defined as those with more than 20% of their income generating assets affected, whilst the World Bank policy does not pose this restriction. Decree

192/PM (Article 6) also entitles all APs to 'economic rehabilitation assistance to ensure that they are not made worse off due to the project'. The legal framework does therefore provide the potential for parity with the World Bank social safeguards on resettlement. (Electricite Du Laos 2010)

In addition, Lao PDR's EIA legislation pays remarkably close attention to social impacts when compared to legislations of other developing countries in East Asia. However, the implementation of these laws is reported to be unsatisfactory.

Project owners should implement land acquisition and involuntary resettlement in line with government laws and ICA Guidelines. Regarding aspects that government laws do not or only vaguely stipulate, project owners should follow JICA Guidelines, which are mostly consistent with the World Bank Safeguard Policy.

For further details on the gap analysis and case examples of projects by the World Bank and the Asian Development Bank, refer to Chapter 8.

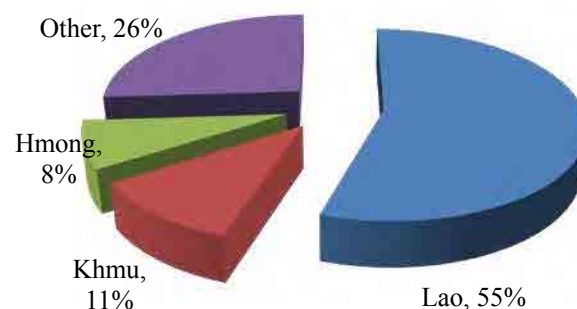
Chapter 7

Indigenous Peoples and Ethnic Minority Groups

Indigenous Peoples and Ethnic Minority Groups

7.1 Social and Economic Situation

With a population of nearly 6.7 million, Lao PDR is the most ethnically diverse country in mainland Southeast Asia. However, the concept of indigenous is problematic in Lao PDR and the government does not use this terminology; it refers to Lao PDR as a multi-ethnic society. The National Assembly's official Agreement N°213 of 24 November 2008 recognised only one nationality - Lao - while at the same time acknowledging 49 ethnic groups with obvious distinctions in culture and languages, and 160 subgroups under them (Appendix A-43) (MAF 2010). The 2005 census identified that the total population was comprised of Lao (55%), Khmu indigenous people (11%) Hmong (8%) and the rest consisted of smaller percentages of the remaining ethnic groups as shown in Figure 7.1.1 (National Center for Biotechnology Information 2005).



Source: National Center for Biotechnology Information (2005)

Figure 7.1.1: Ethnic Groups in Lao PDR

It is these ethnic minority groups that are most often identified and defined as Lao PDR indigenous peoples. The actual number of these groups is considered to be much higher (as high as 240 on the basis of the distinct languages within these ethnic minorities).

Even though the ethnic groups were formerly divided into three categories according to the geographic areas they inhabit, they are nowadays divided into four broader ethno-linguistic groups. Specialists agree on the ethno-linguistic classification of the ethnic groups as a more accurate categorisation that divides those groups according to the four different language families to which they belong:

- Lao-Tai (also referred to as ‘Tai-Kadai’), which includes the ‘ethnic Lao’ group (about 30% of the total population of Lao PDR) and lowland Tai/Thay speaking groups (about 36%);
- Mon-Khmer ethnic groups (about 23.5%);
- Hmong-Mien, including the Miao-Yao (about 7.5%);
- Sino-Tibetan (also referred to as ‘Chine-Tibetan’), which includes Chinese Ho and Tibeto-Burman ethnic groups (about 3%).

(WB 2011)

The Lao-Tai group includes the dominant Lao ethnic group and the lowland Tai speaking groups. Lao-Tai consists of eight ethnic subgroups (Table 7.1.1).

Table 7.1.1: List of Ethnic Groups under Lao-Tai Linguistic Group

	Sub-ethnic		Sub-ethnic		Sub-ethnic
1	Lao	4	Tai	7	Phutai
2	Leu	5	Nhuane	8	Yang
3	Xaek	6	Tai neua		

Source: IFAD-AIPP (2012)

The Austro-Asiatic group (also called Mon-Khmer group), is the second largest linguistic group. It consists of 32 ethnic subgroups (Table 7.1.2).

Table 7.1.2: List of Ethnic Groups under Mon-Khmer Linguistic Group

	Sub-ethnic		Sub-ethnic		Sub-ethnic
1	Khmou	12	Phong	23	Bid
2	Pray	13	Thene	24	Lamed
3	Xingmoon	14	Eudou	25	Samtao
4	Katang	15	Makong	26	Taoey
5	Yru	16	Triang	27	Katu
6	Yae	17	Brao	28	Kriang
7	Hahak	18	Oey	29	Suay
8	Jeng	19	Kadang	30	Pako
9	Nhaheun	20	Lavy	31	Nguane
10	Kmer	21	Toum	32	Tri
11	Moy	22	Kree		

Source: IFAD-AIPP (2012)

The Hmong-Mien group includes two ethnic subgroups (Table 7.1.3).

Table 7.1.3: List of Ethnic Groups under Hmong-Mien Linguistic Group

	Sub-ethnic		Sub-ethnic
1	Hmong	2	Lumien

Source: IFAD-AIPP (2012)

The Sino-Tibetan group encompasses the Chinese and Tibeto-Burman ethnic groups and contains seven ethnic subgroups (Table 7.1.4).

Table 7.1.4: List of Ethnic Groups under Chinese-Tibetan Linguistic Group

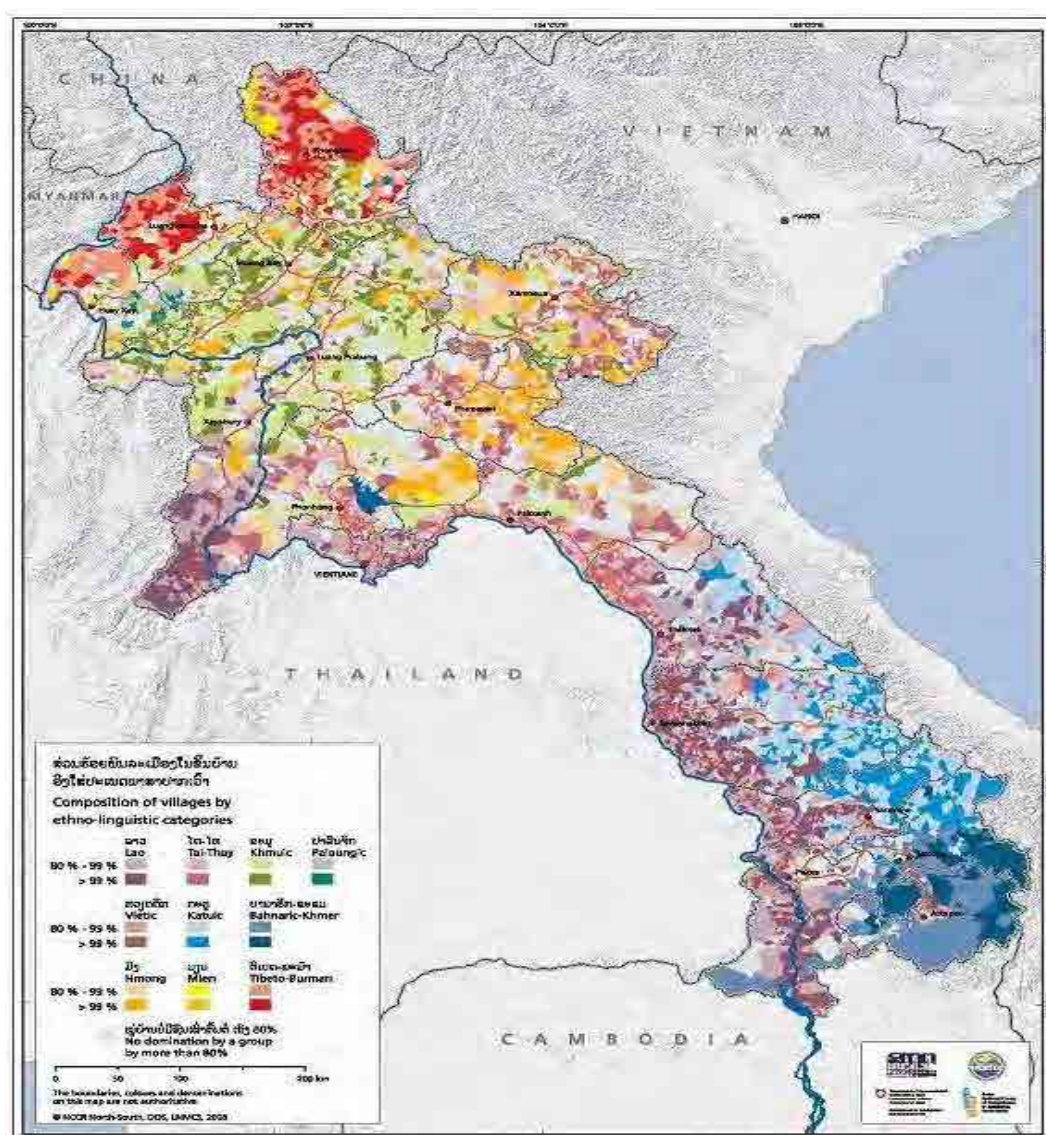
	Sub-ethnic		Sub-ethnic		Sub-ethnic
1	Akha or Ko	4	Phounoy	7	Lolo
2	Sila	5	Lahou		
3	Hor	6	Hayi		

Source: IFAD-AIPP (2012)

Ethnic groups show differing attitudes towards social services, gender issues, and other cultural practices that shape their overall world conception. Across ethno-linguistic groups, there are pronounced disparities in living standards, with some groups getting along much worse than others. The groups are geographically dispersed and many inhabit ethnically homogeneous villages. The historically, politically, economically and socially dominant Lao-Tai are the primary residents of urban areas, and also live in lowland areas around Vientiane and the Mekong corridor, which are of higher density and are agriculturally productive. Most of the other ethnic groups live in the remote, mountainous and forested areas of Lao PDR and practise more traditional ways of life with distinct sociocultural differences; they experience marginalisation. The Mon-Khmer people, whose presence nowadays in Lao PDR predates all the other groups, typically live in midland rural areas of the North and the South. The Hmong-Lu Mien people are found in the uplands and high mountains in the north and the Chine-Tibetan are located in the northern highland areas.

These four groups of Lao-Tai, Mon-Khmer, Hmong-Mien, and Sino-Tibetan are sometimes considered to be the ‘indigenous peoples’ of Lao PDR, even though officially all ethnic groups have equal status, and the concept of ‘indigenous peoples’ is not recognised. Indigenous peoples are unmistakably the most vulnerable groups in Lao PDR, representing 93% of the country’s poor. They face territorial, economic, cultural and political pressures and are experiencing

livelihood-related challenges. Their land and resources are increasingly under pressure from government development policies and commercial natural resource exploitation.



Source: Swiss National Centre of Competence in Research (NCCR) North-South, Department of Statistics of the Ministry of Planning and Investment, Lao National Mekong Committee Secretariat (2008)

Figure 7.1.2 Geographical Distribution Map of Indigenous Peoples and Ethnic Minority Groups in Lao PDR

While a number of ethnic groups had already been categorised a long time ago, in the 1970s, the Government formally started to classify its ethnic minorities into three wide groups by geographical classification; Lao Loum (Lowland Lao), Lao Theung (Upland Lao), and Lao Soung (Highland Lao). This methodology is now considered not as appropriate as a

language-based classification.

The Lao Loum, the majority of the Lao population, includes 12 ethnic groups as shown in Table 7.1.5. In general, they live in big groups located in lowland valley areas convenient for communication, transportation, trading, planting rice, and other agricultural production activities. According to the Department of Statistics (DOS) under the Ministry of Planning and Investment (MPI), in terms of economic development, Lao Loum is better-off than other groups in Lao PDR. Theravada Buddhism is the main religion, practised by almost 90% of the Lao Loum (IFAD-AIPP 2012).

Table 7.1.5: Lao Loum Group – Ethnic groups classification based on occupied area

	Ethnic groups		Ethnic groups
1	Lao	7	Tai deng
2	Lue	8	Tai khao
3	Lu	9	Tai meuy
4	Phouan	10	Tai neua
5	Saek	11	Tai Nyee
6	Tai dam	12	Yang

Source: IFAD-AIPP (2012)

The Lao Theung group comprises the Austro-Asiatic linguistic family. This group generally occupies the southern area of the country, and the mountainous and remote areas where they have traditionally hunted for animals and collected wild products, as they still currently do in some areas. Sub-groups of Lao Theung or Lao Soung exhibit varying degrees of assimilation and adaptation to Tai-Lao culture. These sub-groups consists of 36 small ethnic groups of which some practise Buddhism, but most remain animists (Table 7.1.6) (IFAD-AIPP 2012).

Table 7.1.6: Lao Theung Group – Ethnic groups classification based on occupied area

	Ethnic groups		Ethnic groups
1	Aluck	19	Phai
2	Bid	20	Samed
3	Cheng	21	Phong
4	Dakkung	22	Phounoy
5	Doy	23	Puak
6	Kado	24	Samtao
7	Kaseng	25	Sapuan

	Ethnic groups		Ethnic groups
8	Katang	26	Sok
9	Katoo	27	Soo
10	Khmou	28	Suay
11	Lawae	29	Taliang
12	Lawain	30	TaOy
13	Lawee	31	Thin
14	Lawuck	32	Tongleuang
15	Makong	33	Trew
16	Nyahern	34	Trui
17	Oy	35	Yae
18	Pakoh	36	Yru

Source: IFAD-AIPP (2012)

The Lao Soung group consists of Hmong-Mien peoples of the Austro-Thai and the Sino-Tibetan language families. Lao Soung people are generally located in the top or upper slopes of mountains in the north of Lao PDR at an average altitude of 1,700 metres. Their main source of living is shifting agriculture. As mentioned earlier however, different sub-groups of Lao Theung or Lao Soung exhibit varying degrees of assimilation and adaptation to Tai-Lao culture and they consequently differ in the extent of their dependence on shifting agriculture. The Lao Soung consists of 20 groups as shown in Table 7.1.7 (IFAD-AIPP 2012).

Table 7.1.7: Lao Soung Group – Ethnic groups classification based on occupied area

	Ethnic groups		Ethnic groups
1	Hayi	11	Korphousang
2	Hmong Dam (Black Hmong)	12	Korphouyord
3	Hmong Khao (White Hmong)	13	Korpoulee
4	Hmong Lai (Striped Hmong)	14	Korsida
5	Kongsard	15	Kui
6	Korcheechad	16	Laentaen
7	Kormoochee	17	Lahou
8	Kormouter	18	Mouser Dam (Black Mouser)
9	Korpana	19	Mouser Khao (White Mouser)
10	Korpheh	20	Yao

Source: IFAD-AIPP (2012)

As far as religious minorities are concerned, animism is still commonly practised among many of the highland ethnic groups, while a small Christian minority in Vientiane and some Muslims in the border region near Myanmar are also present. There are also small Chinese and Vietnamese minorities, estimated at only a few tens of thousands.

7.2 Legal Framework and Relevant Organisations

Article 8 of the Lao Constitution (2003) guarantees that the state will not discriminate against people based on ethnicity. It also provides ethnic groups the right to maintain their traditions and improve their culture. The government of Lao PDR, however, does not recognise the existence of indigenous peoples and refers to all ethnic groups as ‘xon phao’, ‘banda phao’, and ‘paxaxon banda phao’, which roughly means ‘tribal’ (UNDP 2011). No specific legislation currently covers the issues of ethnic minorities (IFAD-AIPP 2012).

In Lao PDR, the first policy for ethnic minorities that encompassed indigenous peoples started was the policy for the Hmong people. The Hmong people are considered one of the poorest and largest ethnic groups, as well as the one with the most controversial role in Lao PDR’s history (ADB 2010). The government adopted the Hmong Policy in 1981 to increase political opportunities for them, especially in the governing process. This was a move to improve their living conditions and increase the national security of the whole country. This policy developed into the Resolution of the Central Administration Committee of the Party Regarding Ethnic Minority in a New Phase (Resolution 1992), which also covers other ethnic minorities (MoH n.d.). It pushes for improved access to services for ethnic groups and for all discrimination to be eradicated.

During the seventh Lao Party Congress, the government set a policy to gradually develop Lao PDR under the rule of state law. It initiated the Legal Sector Master Plan (LSMP) for 2020 and formally adopted it in 2009. It aims to turn Lao PDR into a state that is legally responsible toward its citizens and that ensures that citizens fundamentally perform their legal obligations toward the state in return (UNDP 2011).

Customary Law

The indigenous groups of Lao PDR, however, rely not on state law but on their own informal laws that are collectively referred to as customary law. The first activity program under LSMP

was the survey of the customary law and the subsequent summary report. Members of this program consisted of a representative from the Lao Front for National Construction (LFNC), the National Assembly, the socio-science research institute, the Ministry of Information and Culture, Lao Women Union, the National Committee for Advancement of Women, the Supreme People's Court, the Office of the Supreme People's Prosecutor, the Faculty of Law and Administration, and three Law colleges (UNDP 2011).

In a large number of villages, a semi-formal mechanism called the Village Mediation Unit (VMU) is promoted by the government to mediate civil and minor criminal disputes. It bases the outcomes on the state law but also takes into account local traditions and practices that are deemed acceptable.

Elections

Article 3 of the Law on Election recognises the right of ethnic people who have reached 18 years of age to vote for their representatives in the National Assembly during elections. It also acknowledges their right to nominate representatives when they are 21 and have the capacity to do so. Although there is no ethnic-based discrimination in representation in the Lao People's Revolutionary Party (LPRP), representation for other indigenous groups is lower than that of Lao Loum.

International Standards

Lao PDR is required to implement many international standards since it is party to six core human rights conventions and two optional protocols. The Customary Law is in conflict with some of them. These include the Right to a Fair Trial or Right to Life under the Universal Declaration of Human Rights (UDHR) and International Covenant on Civil and Political Rights (ICCPR), women's rights under the Convention on the Elimination of All Forms of Discrimination against Women (CEDAW) and children's rights under the Convention on the Rights of the Child (CRC) (UNDP 2011). Ethnic groups abide by their group's way of managing conflict.

Land Concessions

Indigenous people's lands and other low lands are being taken from them through land concessions by the government for industries such as mining, eucalyptus, and rubber plantations. There is a current moratorium until 2015 on such land concessions. However, several similar moratoria over the past ten years have been ignored (IWGIA 2013).

National Legislation & Policies

While the amended Constitution (2003) remains the prime document stressing the State's multi-ethnic character and the right of all ethnic groups to protect their culture and traditions, it also mentions that the State will implement every measure to 'develop and upgrade the socio-economic levels of all ethnic groups' (Article 8). The legal and policy instruments primarily affect ethnic minorities. The instruments include:

1. Resolution of the Central Party Organisation Concerning Ethnic Minority Affairs in the New Era (1992). This policy is the cornerstone of current ethnic minority policy in Lao PDR and has motivated many of the subsequent Decrees relating to village organisation and administration. The resolution presents a mostly negative evaluation of the 1981 Ethnic Affairs Policy. It criticises an apparent negligence of ethnic problems by some organisations and governmental agencies. It states that illiteracy rates were increasing for some ethnic children, that the livelihoods of ethnic groups had not improved sufficiently, and that some permanent resettlement plans were not satisfactorily implemented. The resolution calls for the gradual implementation of political and economic development initiatives to improve the lives of ethnic minorities, preserve their culture, ensure their equal rights to education, and train teachers to be assigned to remote ethnic areas. Special emphases are placed on addressing the issue of Hmong and Khmu scripts, as well as putting a stop to the practice of shifting cultivation and permanently resettling its practitioners.
2. Resolution of the Political Bureau Concerning the Affairs of Various Minorities, Especially the Hmong Minority (1981). This document was created in response to a concern over the growing insurgency movement led by this ethnic group. Apart from law and order issues, the document focuses on the need to improve Hmong livelihoods, including agricultural practices. In 1981 the aim was not to eradicate shifting cultivation but to stabilise it.
3. Decree 102/PM (1995) on the Organisation & Administration of Villages. Decree that allows for village merging based on the criterion that any area that comprises less than 20 households will be merged to a neighbouring village.
4. Law on Local Administration, No. 60/PO (2003). The law describes the principles for the organisation of local administrations with the objective of improving the functioning, transparency and efficiency of local administration bodies in Lao PDR in implementing the plans, policies and laws of the State and constitution as well as to ensure the rights of Laotian citizens.

5. The 8th Party Congress and Directive Order No. 9 of the Politburo, 8th June 2004, Instruction Order on the Establishment of Village and Village Cluster for Merging Administration (kumban patthana).

These last three policies affect ethnic minorities more than others because not only do they specify how many people constitute the minimum-sanctioned dwelling cluster of a village, but they also reinforce other efforts to provide socio-economic and infrastructure facilities to remote populations.

Directive Order No.9 is the latest in a series of decrees and directives aiming to address poverty reduction, including the establishment of a rural development committee (RDC, now abolished) via Decree 010/PMO of 2000 on decentralisation, which was felt to have been implemented inconsistently. The RDC previously organised focal sites (khedchutsoom) which still persist in some provinces such as Savannakhet or Luang Prabang among others. In order to accelerate the reform of local governance and public administration, the decree of Party 09 of 2004 superseded the decree 010/PMO of 2000. Decree 09 additionally requires, apart the formulation of kumbaan phatthana, for each district in each province to identify priority zones, which are sometimes called focal sites 'khedchutsoom'. Directive Order No.9 is now the principal policy document cited by provinces and districts to authorise concessions with the aim of turning land into funding opportunities to speed up national development, as well as to resettle villages previously resettled under Decree 102 and Law 6026. A cited objective is for 'ethnic people in the village cluster to live together with love and solidarity under the Party's guidance'.

7.3 Procedures and Relevant Organisations

The implementation of the Party's policies concerning ethnic minorities is delegated to the Lao Front for National Construction (LFNC) (Neo Lao Sang Xat), which was established in 1979 and is based on the former Lao Patriotic Front (Neo Lao Hak Xat) and the Lao Freedom Front (Neo Lao Issara) (IFAD-AIPP 2012). It is represented at the provincial and district levels and is part of the village administration. It sometimes has higher status than other mass organisations and brings together different organisations and individuals from different social classes to promote solidarity and equality among the population. This is done with the aim of building greater national unity. LFNC is responsible for the following:

- (i) promoting and preserving their cultural traditions;

- (ii) improving and expanding healthcare, knowledge of reproductive health, traditional medicine and detoxification of opium addicted persons;
- (iii) ensuring that educational opportunities are made available to ethnic groups;
- (iv) promoting the human development of ethnic group officials; and
- (v) enhancing the administrative mechanism for ethnic groups including their promotion in rural development activities by ensuring that other agencies are aware of the requirements for the participation of ethnic groups (ADB 2011) .

The Ethnic Minorities Committee under the National Assembly is charged with drafting and evaluating proposed legislation concerning ethnic minorities, and lobbying for its implementation along with other socio-economic development plans. It also studies different information on ethnic issues and makes recommendations. Ethnic minority research is the responsibility of the Institute for Cultural Research under the Ministry of Information and Culture. The lead institution for ethnic affairs is the LFNC.

Responsibility for eradicating shifting cultivation belongs to the National Program for Shifting Cultivation Stabilisation under the Ministry of Agriculture and Forestry (MAF), but the party committees of province and district levels are responsible for implementing Directive Order No.9.

7.4 Affirmative Actions

Currently, there are no significant affirmative actions provided in Lao PDR because the Government refers to Lao PDR as a multi-ethnic society and does not emphasise any particular ethnic groups. There are, however, a few initiatives that would benefit indigenous peoples and ethnic minority groups.

Legislative Actions

The results of the Customary Law project survey provided individual reports on the 49 ethnic groups and the background for making a strategy to ensure that customary practices and informal systems for dispute settlement are integrated with the state legal system and international principles (IWGIA 2013). It also provided validation and recognition of customary law, which opened the discursive space to indigenous leaders.

7.5 Major Issues and Challenges in the Current System

7.5.1 Legislative Issues

There is no specific legislation in Lao PDR addressing indigenous people issues (IWGIA 2013). In fact, the written use of the word is not allowed. Instead, the words ‘xon phao’, ‘banda phao’, and ‘paxaxon banda phao’ are translated as ‘tribal’ (UNDP 2011). Although the government voted in favour of the UN Declaration on the Rights of Indigenous Peoples (UNDRIP), steps towards the implementation of the declaration were not taken (IWGIA 2013). The Ethnic Minority Policy is constrained by budget, which is especially hard since many ethnic minority communities are in remote areas. Also, steps to achieve its principles are not specifically outlined.

State laws are uniform, consistent, and predictable but cannot be implemented in the same way throughout Lao PDR (UNDP 2011). This is due to a normative gap between state and customary laws. In some communities, customary law is more compelling than state law.

7.5.2 Physical Wellbeing

Unexploded ordnances (UXO) are explosive weapons, such as bombs and landmines, that did not explode when they were deployed and pose a risk to people who live in areas where they remain. Approximately 12,000 UXO accidents occurred between 1973 and 2006. In a 2006 study, UNICEF found out that although there is a high level of risk awareness, people are still in contact with UXOs while going about their everyday lives.

[illegible]

Figure 7.5.1 Map of UXO Impact and Bombing Data 1965-1975

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7.5.3 Social Issues

The dominant Ethnic Lao generally receive more development benefits than indigenous peoples. Moreover, customary laws of indigenous groups are becoming more obsolete as reliance on state institutions for conflict resolution increases (IWGIA 2013). Ethnic groups have a generally lower level of economic and social development. Acts of violence against these minorities have also been reported (UNPO 2012).

Religion is another controversial issue. Although religious freedom is improving in Lao PDR, there are still instances wherein individuals have been forced to renounce their faiths. Religions such as Christianity are questioned because they are seen as susceptible to foreign or ‘divisive’ influence (UNPO 2012).

Overall, ethnic communities are slowly losing their cultural traditions as urbanisation progresses. They are slowly abandoning traditional clothing and behaviours and there are increased levels of alcohol and drug abuse and a higher level of anti-social behaviour among ethnic community members.

7.5.4 Land Concession Issues

Land concessions are granted without surveys or supervised land allocations, and the government grants these concessions in line with policies such as the eradication of slash-and-burn cultivation and its plan to end opium production (U.S. Department of State n.d.). Indigenous groups affected by these land concessions are unable to repurchase their lands for as long as 70 years (IWGIA 2013). Though moratoriums have been placed on the granting of land concessions, they have been largely ignored and still continue to be a problem.

In some areas where rubber plantations are established, local Khmu have been forbidden to raise cows and buffalos and are forced to buy them for ceremonies. They end up borrowing money and sinking deeper into debt. Loss of land to these concessions also affects their food security, as they are unable to obtain forest food.

7.6 Gap Analysis between the Existing Domestic Regulations, the JICA Guidelines for Environmental and Social Considerations, and the World Bank Safeguard Policy

There is no specific legislation that covers the issues relevant to indigenous peoples and ethnic minority groups in Lao PDR, despite the presence of many ethnic groups with differing characteristics. Regarding the aspects related to involuntary resettlement, there are many references on indigenous peoples and ethnic minorities in Decree 192 and Technical Guidelines on Compensation and Resettlement of People Affected by Development Projects (2005), which were prepared based on multi-national donors' policies such as World Bank or ADB. Contradictions between the donors' policies and government laws have been rarely identified; one example is that the legal instruments do not clearly stipulate the requirements of free, prior and informed consultation (FPIC).

On the other hand, it should be pointed out that despite the strong legal framework in relation to involuntary resettlement mentioned above, its actual implementation in development projects has often been not sufficient and selective (IFAD-AIPP 2012).

Project owners should implement considerations on indigenous peoples and ethnic minorities in land acquisition and involuntary resettlement in line with government laws and JICA Guidelines. For aspects that government laws do not stipulate or only vaguely stipulate, project owners should follow JICA Guidelines, which are mostly consistent with the World Bank Safeguard Policy.

Chapter 8 in this report provides further detailed gap analysis information between the governmental laws of Lao PDR and other donors' guidelines, including case studies.

Chapter 8

Environmental and Social Considerations in

Other Donors' Projects

8 Environmental and Social Considerations in Other Donors' Projects

This chapter was prepared to provide an overview of other donor agencies' projects in Lao PDR. The overview includes a review of the approach that some major donor agencies take when implementing projects in Lao PDR and how they address potential gaps with local regulations.

Donor agencies' safeguard policies regarding Environmental Assessment, Land Acquisition and Involuntary Resettlement, and Indigenous Peoples were reviewed. Past projects were also studied to identify potential implementation barriers and how they were addressed. In addition, the monitoring and information disclosure process was analysed to provide a benchmark for these activities.

8.1 World Bank

The World Bank (WB) has been working in Lao PDR since 1977 to help reduce poverty and support the Government's development goals. The WB's assistance mainly focuses on budget support under the Poverty Reduction Support Operations, economic and analytical work, capacity development, investment projects in infrastructure, rural, health, education, and natural resources management, and environment sectors. In order to avoid or mitigate any negative impact of development projects, the WB developed environmental and social safeguard policies. The safeguard policies provide guidelines for the Bank and borrower staffs in the identification, preparation, and implementation of programmes and projects.

8.1.1 Environmental Assessment

The WB conducts environmental screening of each proposed project in order to determine the appropriate extent and type of environmental assessment (EA). The WB classifies the proposed project into one of four categories, depending on the type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts, as follows:

- Category A: A proposed project is classified as Category A if it is likely to have significant adverse environmental impacts that are sensitive, diverse, or unprecedented. These impacts may affect an area broader than the sites or facilities subject to physical works. EA for a Category A project examines the project's potential negative and positive environmental impacts, compares them with those of feasible alternatives (including the 'without project' situation), and recommends any measures needed to prevent, minimise, mitigate, or

compensate for adverse impacts and improve environmental performance. For a Category A project, the borrower is responsible for preparing a report, normally an EIA (or a suitably comprehensive regional or sectoral EA), that includes, as necessary, elements of the other instruments referred to in paragraph 7 of Operational Policy (OP) 4.01.

- Category B: A Category B project has potential adverse environmental impacts on human populations or environmentally important areas—including wetlands, forests, grasslands, and other natural habitats—which are less adverse than those of Category A projects. These impacts are site-specific; few if any of them are irreversible; and in most cases, mitigatory measures can be designed more readily than for Category A projects. The scope of the EA for a Category B project may vary from project to project, but it is narrower than that of a Category A assessment. Like Category A, a Category B environmental assessment examines the project's potential negative and positive environmental impacts and recommends any measures needed to prevent, minimise, mitigate, or compensate for adverse impacts and improve environmental performance. The findings and results of an EA for a Category B project are described in the project documentation (Project Appraisal Document and Project Information Document).
- Category C: A Category C project is likely to have minimal or no adverse environmental impacts and therefore does not require further EA action beyond screening.
- Category FI: Category FI projects are those in which the WB provides funds to participating national banks, credit institutions, and other financial intermediaries (FIs) for lending at the FIs' risk to final borrowers. In the case of such projects, the FI screens each subproject proposed for financing and classifies it into one of the three categories A, B, or C (WB 2013a).

For all Category A and B projects, the borrower provides relevant material in a timely manner prior to consultation and in a form and language that are understandable and accessible to the groups being consulted (OP 4.01, 14) (WB 2013a).

Regarding Environmental Assessment, The WB considers that the Government of Lao PDR (GOL) system is equivalent to the Objectives and Operational Principles of OP 4.01. However a few gaps remain to be addressed in order to make a determination of full equivalence. Identified gaps are as follows:

- Lao PDR system does not state clearly if an assessment of project alternatives is required to determine their relative feasibility under local conditions, including comparative capital and recurrent costs, and institutional, training, and monitoring requirements. National laws only refer to the option to include 'one or more' alternatives deemed 'feasible' and

compare the advantages and disadvantages of such alternatives.

- According to Lao PDR's national laws, the initial environmental examination (IEE) and the EIA should not be performed by the project proponents and should be outsourced to external consultants.
- There is no reference to the need for the EA to provide for institutional capacity development and training to address environmental aspects of the project.
- The Lao PDR system does not address requirements for sub-projects as such (WB 2009a).

Table 8.1.1: Recent Projects in Lao PDR

Project Name (ID)	Date of Approval	Description
Laos Transport Sector Project (P102398) Environmental Category B	25 Mar 2010	The project will upgrade two national roads, provide periodic maintenance of the provincial road network, and road safety improvements. Additionally, technical assistance to the Ministry of Public Works and Transport (MPWT) and the Provincial Departments of Public Works and Transport (DPWT) on strategic management, local road management, country systems for environmental safeguards, fiduciary management, and internal controls were included.
Nam Theun 2 Hydroelectric Project (P076445) Environmental Category A	31 Mar 2005	The Nam Theun 2 Hydroelectric (NT2) Project seeks to generate revenues through an environmentally and socially sustainable development of NT2's hydropower potential. The project was classified as Environmental Category A. An Environment Management Plan was prepared to meet local regulations and implement the agency's safeguards.
Rural Electrification Phase II (P110978) Environmental Category B	12 Jan 2010	The objectives of the project are to increase access to electricity of rural households and improve the financial performance of Electricite du Laos (EdL). The project was classified as Environmental Category B since only minor negative impacts such as dust, noise, and increased pH during construction of hydropower plants and grids, and erosion and sedimentation were expected.

Source: WB (2013b)

Case example: Laos Transport Sector Project (P102398)

The objectives of the project, which was approved in 2010, are to improve road services by rehabilitating roads damaged by Typhoon Ketsana, and to establish a contingency fund for quick disaster response in the road sector. The project was classified as Environmental Category B because the proposed road was not planned to run through any protected area. Only minor vegetation loss from road widening, realignment of right of way, and extraction from quarries and borrow pits was expected during the planning phase. In compliance with local regulations, an IEE that included an Environmental Management Plan (EMP) was prepared for this project. The EMP stipulated specific mitigation measures for the design, construction and operation phases of the roads. Mitigation measures included in the EMP are:

- Carry out awareness-raising campaigns on wildlife value for the workers.
- Locate storage area for diesel located at least 500 metres away from watercourses.
- Collect and recycle all lubricants and take precautions to prevent accidental spills.
- Do not harvest wood resources in villages' water protected areas.
- Where local materials must be used, make agreement with local communities about the areas or volume that can be harvested without significant impacts.

To ensure compliance with both local regulations and the WB's Operation Safeguards, the project proposal included a legal framework equivalence analysis between the laws and regulations of Lao PDR and WB's Operation Safeguards. In this analysis, the project implementation team concluded that while there was broad equivalence between Lao PDR's legal framework and WB's objectives and operational principles, a number of measures to bridge some gaps were required to ensure that national laws and regulations fully met the WB policies. Regarding Environmental Policies, for this project, it was recommended to perform an assessment of alternatives. The purpose of the study of alternatives is to compare relative feasibility under local conditions for each sub-project, including comparative capital and recurrent costs, and institutional, training, and monitoring requirements. (WB 2009a)

Case example: Nam Theun 2 Hydroelectric Project (P076445)

The Narn Theun 2 Project's (NT2) main objective is to tap the hydroelectric energy potential in the provinces of Khammouane, Bolikharnxay and Savannakhet in Central Lao PDR, through a dam on the Narn Theun River, a tributary of the Mekong River.

The project has been developed in several stages since 1991, when the GOL identified several locations for hydropower development along the Mekong River. In that year, with the support of the WB and the United Nations Development Programme, a Feasibility Study for the Nam Theun 2 Hydroelectric Project that included the investigation of alternative options and

economic evaluations was conducted. Since 1994, the Nam Theun 2 Electricity Consortium has been responsible, with support from the Asian Development Bank (ADB), Agence Française de Développement (AFD), WB, and the government, for development of the project design. On 1 January 2004, the responsibilities of Nam Theun 2 Electricity Consortium to develop the Project were transferred to Nam Theun 2 Power Company Limited (NTPC), which is wholly owned by four companies: Electricité de France International (35%), Electricité du Laos (EDL, 25%), Electricity Generating Public Company Limited (25%), and Italian-Thai Development Public Company Limited (15%). The final project consisted of a dam in the Nam Theun, a tributary of the Mekong, generating 1,070 megawatts (MW) of electricity for supply to the Electricity Generating Authority of Thailand (EGAT) and EDL.

Due to the scale of the project and in order to minimise its negative impacts, the GOL as well as donor agencies requested that several alternatives for this project be analysed. A total of nineteen candidate independent power projects were included in the study of alternatives and compared against technical, economic, financial, environmental, and social criteria. According to the Summary Environmental and Social Impact Assessment report published by the WB, incorporating additional design features, such as multiple-level intakes and regulating ponds, could achieve a significant reduction in the environmental impacts of several of the proposed independent power projects. The scale of social impacts was also found to relate directly to the scale of resettlement. The study of alternatives was conducted following the WB Safeguard requirements since in GOL the law currently does not provide any reference to the ‘no project’ alternative.

The study showed that all alternative projects required a reduced run-of-the-river status to achieve a significant mitigation level in social impacts. Based on this analysis the Nam Theun Project was ranked as Environmental Category A. Additionally, in order to mitigate the impact of the project on biodiversity, a 31.5 million wildlife management and protection program to compensate for the losses caused by the project was created by the project proponents (WB 2004a).

Case example: Rural Electrification Phase II (P110978)

Increasing the access to electricity of rural households in villages of targeted provinces and improving the financial performance of Electricité du Laos (EdL) were considered the main objectives of the Rural Electrification Phase II Project. The main components of the project were:

1. Grid extension in the seven southern provinces, namely: Bolikhamxay, Khammouane,

Savannakhet, Salavan, Xekong, Champasak, and Attapeu; and

2. Off-grid electrification at seventeen provinces through solar home systems, and pico-hydro options.

The grid-extension subprojects was planned to follow the existing roads which connect local communities located in the flat and mountainous areas. The latter fact triggered WB's Environmental Assessment (OP/BP 4.01). While no major negative impact was estimated, experience from past projects (Rural Electrification Phase I) indicated that providing the transmission line would involve small scale civil works and negative impacts (dust, noise, wastes, and site clearance) on the local environment during construction. These impacts were temporary, localised, and could be mitigated by good engineering practices (WB 2009b). After completion, the expected impact of the project was also estimated to be mainly positive. However, potential negative environmental impacts that could affect the local environment due to the disposal of lead acid or nickel-cadmium batteries used were considered. Accordingly, the project was classified as Environmental 'Category B', meaning that an IEE and an Environmental Management Plan with mitigation measures were required. (WB 2009c).

The proposed mitigation for each of the technologies considered in the project were:

Household Biogas Digester: use good housekeeping measures to avoid improper waste management during operation.

Village Hydro: the following mitigation measures were considered:

- a) install fish bypasses to avoid damage to fish stocks;
- b) take precautionary measures to avoid fish being sucked in the turbines;
- c) ensure proper landscaping to avoid erosion.

Village Biomass: ensure the proper selection of the site to avoid disturbance to protected/sensitive areas or significant modification of river/stream that may affect fish migration or other natural habitats.

Mini Grids: no mitigation measure was considered because the negative impacts were expected to be minimal (WB 2009c).

8.1.2 Land Acquisition and Involuntary Resettlement

The WB's Operational Policy (OP) 4.12: Involuntary Resettlement prescribes the conditions in which involuntary resettlement should be conducted. It establishes that involuntary resettlement should be avoided where feasible, or minimised after exploring all viable alternative project designs. In cases where it is not feasible to avoid resettlement, resettlement activities should be conceived and executed as sustainable development programs, providing sufficient resources to enable the persons displaced by the project to share in project benefits. To guarantee that all potential impacts of the resettlement are addressed and mitigation measures are defined, the WB OP 4.12 requires a RAP.

The RAP must include all the necessary measures to ensure that the displaced persons are:

- informed about their options and rights pertaining to resettlement;
- consulted and provided with technically and economically feasible resettlement alternatives; and
- provided prompt and effective compensation at full replacement cost for losses of assets attributable directly to the project (WB 2013a).

The WB also emphasises the importance of conducting regular monitoring by an external monitoring agent to confirm:

- the results of internal monitoring;
- that the compensation process has been accomplished adhering to procedures communicated to project-affected families and indigenous peoples during consultation;
- whether the resettlement entitlements were suitable to the objectives, whether the objectives were suited to the project-affected families, and if the livelihood and standard of living were restored or enhanced;
- that the affected enterprises received enough assistance to re-establish themselves; and
- if vulnerable groups were provided with effective and sustainable income earning opportunities to help restore pre-project income levels (WB 2013a).

Resettlement planning includes early screening, scoping of key issues, choosing a resettlement instrument, and obtaining the information required to prepare the resettlement component or subcomponent. The scope and level of detail of the resettlement instruments vary with the magnitude and complexity of resettlement. In preparing the resettlement component, the borrower draws on appropriate social, technical, and legal expertise and on relevant community-based organisations and non-governmental organisations (NGOs).

No significant gaps between the WB Safeguard Policies and Lao PDR national laws were identified during this study.

Table 8.1.2: WB Projects with Resettlement Plan in Lao PDR

Project name (ID)	Approval Date	Description
Rural Electrification Phase II (P110978)	12 Jan 2010	The objectives of the project are to increase access to electricity of rural households and improve the financial performance of Electricite du Laos (EdL). Regarding the RAP, investment activities that required safeguard attention were limited to the expansion of grid-extension service to about 582 villages in the central and southern target provinces.
Lao Transport Sector Project (P102398)	25 Mar 2010	The project's objective is to upgrade two national roads, provide periodic maintenance of the provincial road network, and road safety improvements. According to a detailed impact survey, the proposed project will affect 20 villages in 4 districts of Hoauphanh Province. These are Vieng Xay, Sopbao, Xieng khor, and Et Districts. A total of 26 households in 20 villages will be affected by land acquisition, house demolition, and attachments removal. This includes permanent land acquisition of 1.45ha of land areas with 1.36ha of farmland and 0.1ha of housing land, and demolition of 1,009 square metres (sq.m.) of houses with 612 square metres of houses and 497 square metres of shops.
Nam Theun 2 Hydroelectric Project (P076445)	31 Mar 2005	The Nam Theun 2 Hydroelectric (NT2) Project required the acquisition and either temporary or permanent use of land for construction and operation. Impacts including disturbance, and temporary or permanent loss of land and assets were considered in the RAP. The total number of impacted households in the project area is 2,738. A total of 394 households are affected by Nam Theun 2 construction work by than 10 % of their annual income.

Source: WB (2013b)

Case example: Rural Electrification Phase II (P110978)

The Rural Electrification Phase II project was not expected to require significant land acquisition. However, experience from previous projects indicated that acquisition of small parts of parcels for placement of power poles might be necessary. To help project developers address any potential land acquisition, a RAP was prepared for this project. The RAP stipulates that any compensation due to land acquisition should be handled by EdL and the process should be supervised by the WB. According to the preliminary analysis, negative impacts would be limited to the expansion of grid-extension. The following types of compensation and rehabilitation measures were taken into consideration:

1. Loss of agricultural land: replacement land of equal productive capacity and satisfactory to the displaced person is the preferred mitigation measure and loss of standing crops will be replaced at market price.
2. Loss of residential land and structures: compensation will be either in-kind or in cash at replacement cost. If land loss is partial but the remaining land is not sufficient to restore or rebuild a house, the affected person may request that the whole land or structure be bought at replacement cost.
3. Loss of business: compensation should include provision of an alternative business site of equal size and accessibility to customers, cash compensation for lost business structures, and transitional support for loss of income.

In addition to compensation for land loss, infrastructure and access to services should be replaced or restored at no cost to the affected communities. The Social Safeguard Framework for this project was used as the baseline for the preparation of the RAP. It indicates that if there is any inconsistency between local laws and regulations, and the WB policy framework, the domestic law or regulation shall be waived to the extent necessary to comply with local regulations. The Social Safeguard Framework included a screening procedure to provide guidance to project developers and ensure that adequate mitigation measures are implemented. The WB requested that the screening process be completed for each project. The questions included in the screening checklist are:

1. Does the subproject involve land acquisition, relocation, indirect loss of access and assets, and/or has adverse impacts on ethnic minority groups?
2. Is the scale of the civil works larger than those identified in the project description or involves new construction?
3. Is forest clearance required or is the project located in a protected area?
4. Is the subproject located in an insensitive area (less than 50m of villages, residential, or other

environmental sensitive area)?

5. If the answers to the above questions 1-4 are yes, does the subproject have mitigation plans in place which are consistent with the EMP?

The screening process can be useful in providing guidance on how to proceed during the construction and maintenance stages including the periodic monitoring of the contractor's activities by the project developer and the conducting of public consultations. WB also requires a semi -annual report of these activities to be submitted by the Project Management Unit. (WB 2009c)

Case study: Lao Transport Sector Project (P102398)

The project, which is expected to be completed by 2017, will focus mainly on upgrading existing roads rather than construction of new roads. As a result, no major adverse environmental and social impacts are expected. However, given the scale and location of the project, an initial environment and social impact assessment was carried out to comply with government regulations and WB's Safeguard Policies. According to a preliminary survey, the upgrading works of the roads would require some farmland and housing land acquisition which would cause relocation of approximately 49 households (WB 2009d).

To address the negative impact to those limited households that would be affected by the project, a RAP with detailed information of compensation for land loss was created. The compensation rates were decided following national laws and regulations and included consultation with AP. For this project, the compensation rates for house demolition were set at \$40 per square metre for concrete houses, \$35 per square metre for concrete wooden houses, and \$30 per square metre for wooden structures. Regarding land compensation, the rate decided was \$3 per square metre for paddy land, fish pond and housing land. The RAP also established that replacement housing plots and moving allowance should also be provided. (WB 2009e)

Case study: Nam Theun 2 Hydroelectric Project (P076445)

The construction of the dam in the Nam Theun River will create a 450 square kilometre reservoir on the Nakai Plateau that will require the relocation of more than 1,000 households. The WB assured funding and a RAP was prepared to define the scope and requirements of the resettlement activities.

The RAP indicates the following guiding assumptions and principles:

- Funding is assured with all partners agreeing that the RAP is to be fully financed by the

Nam Theun 2 Project;

- Resettlement planning is to be integrated with the general Nam Theun 2 Project design from the earliest stages of project preparation;
- The GOL will develop and adopt the appropriate policies to ensure proper and just resettlement, including the development of an applicable Resettlement Policy for the Nam Theun 2 Project;
- Resettled people living standards and income earning capacity will improve to at least the national poverty level, and APs will be provided with adequate support during the transition period; resettlement is to be avoided or minimised wherever feasible;
- Identified gender concerns and specific women's needs and perspectives are to be considered in all components, strategies, and planned activities; women and men will have equal opportunity to participate in decision-making, training, and the Nam Theun 2 Project benefits;
- People to be resettled or directly affected will play an active role in the design, planning, implementation, and monitoring of the RAP;
- Traditional organisational structures, religious beliefs and resource use will be taken into account during resettlement planning and implementation; and
- The planning, implementation and compensation processes will be open and transparent and will follow prescriptive Safeguard guidelines. (WB 2004b)

WB indicates in its latest monitoring report that all resettled families are living in their new homes, with all the needed infrastructure such as access roads, water supply and sanitation, electricity, schools and clinics. According to the latest socioeconomic monitoring survey, around 80% of the resettled households reported being satisfied with the resettlement process and their new living conditions and environment. The same survey report by WB states that villagers are taking advantage of improved education, health, and transportation facilities. Regarding livelihood activities, the people affected by resettlement indicated steady progress since physical resettlement began in 2006. In 2009, fisheries and agriculture contributed two thirds of the activities (WB 2013c).

8.1.3 Indigenous Peoples

The Safeguard Policy OP 4.10, Indigenous Peoples, is the WB's safeguard policy that provides for indigenous peoples. It requires that borrowers and the Bank staff identify indigenous peoples that might be affected by a project, ensure that consultation with them is conducted and promote their participation in a culturally appropriate way. The policy also requires the avoidance of

adverse impacts generated by the project, or where not feasible, the minimisation or mitigation of those impacts. OP 4.10 stipulates the following steps:

- Screening by the Bank to identify whether indigenous peoples are present, or have a collective attachment to the project area;
- Social assessment by the borrower. The assessment should include baseline information on the demographic, social, cultural, and political characteristics of the affected indigenous peoples' communities;
- Free, prior, and informed consultation with the affected indigenous peoples' communities at each stage of the project, and particularly during project preparation, to fully identify their views and ascertain their broad community support for the project;
- Preparation of an Indigenous Peoples Plan (IPP) or an Indigenous Peoples Planning Framework (IPPF); and
- Disclosure of the draft IPP or draft IPPF.

The WB assumes responsibility for disclosing information to the public in accordance with the WB Policy on Disclosure of Information, while the borrower should make information available to the affected indigenous peoples' communities in a culturally appropriate form, manner, and language.

GOL uses the term ethnic minorities instead of indigenous peoples. According to the most recent classification by the Lao Front for National Construction (LFNC), the country is divided into four linguistic groups with 49 ethnic categories. Approximately 40% of the population is from a different ethnic group than the Lao ethnic group. The other groups include the Lao-Tai, Mon-Khmer, Hmong-lomien, and Sino-Tibetan groups. The Bank has determined that OP 4.10 will apply to at least three linguistic groups except the Lao-Tai, who still maintain cultural and socioeconomic practices different than those practiced by the Lao national majority. In this study no significant gaps between the WB Safeguard Policies and GOL national laws were identified. However, special considerations for ethnic minorities such as free, prior, and informed consultation (FPIC) for development projects are not included in national laws. In these cases, national laws address the AP in general.

Table 8.1.3: WB Projects with Indigenous Peoples Plan in Lao PDR

Project Name (ID)	Approval Date	Description
Nam Theun 2 Hydroelectric Project (P076445)	31 Mar 2005	The Nam Theun 2 Hydroelectric (NT2) Project required the acquisition and either temporary or permanent use of land for construction and operation. Because of the ethnic diversity of the region, an Ethnic Minority Development Framework was prepared to ensure that full consultation, in a language spoken by the ethnic minority groups is undertaken. Participation of ethnic minority groups is fully taken into account during preparation and implementation of subprojects. The current practices, beliefs and cultural preferences of ethnic minority groups are to be respected
Rural Electrification Phase II (P110978)	12 Jan 2010	The objectives of the project (REP II) are to increase access to electricity of rural households and improve the financial performance of Electricite du Laos (EdL). A pre-screening was conducted to identify all grid-extension subproject areas which have ethnic group communities and are candidates for REP II. The communities identified were visited (at the time of first consultation with communities) by the project sponsor, relevant local authorities, and consultants in order to conduct consultations.
Sustainable Forestry For Rural Development Project (P064886)	24 Jun 2003	The objective of the Sustainable Forestry for Rural Development (SUFORD) Project for Lao People's Democratic Republic is to assist the borrower achieve the sustainable management of production forests and alleviate rural poverty.

Source: WB (2013b)

Case study: Nam Theun 2 Hydroelectric Project (P076445)

In general, Highland Peoples resort to traditional leadership and institutional arrangements to resolve conflicts arising from within the village. PRIP views these arrangements as the most appropriate venue for initial airing of project-related conflicts. If mediation fails, disputes

relating to sub-projects will be addressed by the Commune Council prior to sub-project approval. Disputes arising in the course of implementation of the IPDP will be addressed by the village chief/elders for submission to the project authorities and other relevant authorities.

The RAP indicates that of all APs affected by resettlement due to the Nam Theun 2 Project, about 10% of groups located along the Xe Bangfai and approximately 45% of those residing on Project Lands and other downstream areas were ethnic minority groups. Hence, the project required the preparation of an Ethnic Minorities Development Plan according to the principle that any group with a distinct social and cultural identity from the dominant society may be classified as vulnerable or disadvantaged in the context of the development processes. For this project, it was deemed necessary to identify specific needs and aspirations through prior consultation in order to create conditions for participatory planning, implementation and monitoring, minimising potentially adverse effects, and encouraging developments that will lead to economic and social improvements.

It should also be pointed out that all relevant material and recommendations in the Indigenous Peoples Development Plan were incorporated fully into the RAP and mitigation plans as required by WB Safeguard Policies.

Regarding the ethnic minorities in the Downstream, similar culturally sensitive methods of consultation and planning approach were used for the communities that are directly and indirectly affected by project impacts and that require compensation and mitigation. (WB 2004c)

Case study: Rural Electrification Phase II (P110978)

The Rural Electrification Phase II project, which is expected to be completed by June 2014, expects to increase access to electricity of rural households in villages of project provinces, and further improve the financial performance of Electricite du Laos (EdL). Since the project will cover the whole country, it is expected that people from all ethnic minorities will benefit from the improved access to electricity. However, since some ethnic minorities have a distinct social and cultural identity from the dominant society, they might be disadvantaged in the development process. To ensure that these groups' needs and concerns are incorporated to the project, an ethnic minority framework was prepared.

By gathering both qualitative and quantitative data, the basic social economic profile of beneficiary population or project AP will be developed. This information should be used to

ensure that all ethnic minority needs and opinions are taken into account through the project preparation and implementation process. The assessment should include a participatory mapping of community access to road and other key services. If the social assessment indicates that there are potential social issues that affect ethnic group populations, the developer should ensure that ethnic group populations participate in decision-making related to the subproject. (WB 2009c)

Case study: Sustainable Forestry for Rural Development Project (P064886)

The Sustainable Forestry for Rural Development Project, which ran from 2003 to 2012, had the objective of assisting Lao PDR alleviate rural poverty by implementing forest policy reform actions and policies to achieve sustainable management of production forests. Ethnic minority groups in Lao PDR usually live in remote and upland forests. Changing the forest management policies would therefore have an impact on these communities.

Through the initial surveys it was identified that in the areas covered by the project, an estimated 40% of the villages had ethnic minority groups. These ethnic minority groups face disadvantages in terms of poverty, less access to development, and generally have a lower literacy in the Lao language. Considering these conditions, an Ethnic Group Development Plan based on WB's Safeguard Policies was required for this project. To prepare the Ethnic Group Development Plan and ensure that the needs of ethnic minority groups were included, a participatory approach was introduced. The project was designed to promote full participation of all beneficiaries, including ethnic minority groups, in order to identify potential issues. The outputs of these participatory planning processes were then incorporated into the specific development projects of each village. Ethnic participation was promoted through the following activities:

- Creating audio-visual materials in local languages was proposed as an effective way of enhancing understanding of the project among ethnic minority villagers;
- Providing support, where needed, for functional literacy and numeracy training for villagers; and
- Relying on government and collaborator staff members who are fluent in ethnic group languages in villages where relatively few residents are fluent in Lao or recruiting other staff with the appropriate language capabilities. (WB 2002a)

By the end of the project, WB rated the implementation of the project as satisfactory because of the significant improvements in the policy and legal framework of the natural resource sector. However, regarding ethnic minority group participation, the project was rated as moderately

unsatisfactory because the participation level was less than expected and the anticipated revenue flowing from timber harvests by the end of the project in 2013 was not evident (WB 2013d).

8.1.4 Monitoring

The WB has developed a monitoring and evaluation system for use during project implementation as well as after completion of the project. The WB task team will initially conduct a mid-term monitoring review. During the course of the review, the team's environmental and social considerations specialist will periodically (at least twice a year) visit the field to monitor.

The team verifies compliance with the conditions agreed upon between the WB and the borrower, and the monitoring results obtained by the borrowers. The WB also stipulates that during project implementation, the borrower must report on:

- compliance with measures agreed upon with the Bank on the basis of the findings and results of the EA, including implementation of any EMP, as set out in the project documents;
- the status of mitigatory measures; and
- the findings of monitoring programs.

The WB bases supervision of the project's environmental aspects on the findings and recommendations of the EA, including measures set out in the legal agreements, any EMP and other project documents.

According to an EIA study conducted by the WB, EMPs must include the activities to be monitored (parameters and indicators) during three separate project phases: pre-construction, construction, and operation. Monitoring provides reliable information and a scientific basis for environmental management by investigating environmental quality prior to the project's commencement and by keeping records of the project's impact on environmental quality during construction and operation (WB 2013a). During project implementation, WB complies with local regulations and places special importance on external monitoring. For example, for the Nam Theun 2 Hydroelectric Project (WB 2004a), the monitoring included external monitoring during construction and operation periods, following the ISO 14001 quality management plan for monitoring construction activities. For social aspects, WB developed a set of indicators for affected households including income levels and sources of income that could be used for both internal and external monitoring.

8.1.5 Information Disclosure

The WB's safeguard policies state that, for meaningful consultations between the borrower, project-affected groups and local NGOs in all Category A and B projects, the borrower should provide relevant material in a timely manner prior to the consultation and in a form and language understandable and accessible to the groups being consulted.

For a Category A project, the borrower must provide a summary of the proposed project's objectives, description, and potential impacts ahead of the initial consultation. In addition, for a Category A project, the borrower must make the draft EA report available in a public place accessible to project-affected groups and local NGOs. Any separate Category B report for a project proposed for IDA financing must be made available to project-affected groups and local NGOs (WB 2013a).

Gaps between the WB Safeguard Policies and GOL national laws regarding information disclosure were not identified during this study. GOL national law provides information on how disclosure of the general information that is consistent with donor agencies' safeguards is to be done. For additional details, please refer to Chapter 6.

8.2 Asian Development Bank

Asian Development Bank (ADB) is one of the major donors in Lao PDR. Between 2000 and 2009, ADB provided a total of \$643 million in assistance to Lao PDR comprising 23 loans, 25 grants, and 81 technical assistance (TA) grants. Additionally, the Asian Development Fund (ADF) was used to finance 36 projects amounting to \$512 million used for development projects in different sectors. During the same period, ADB ranked the overall assistance to Lao PDR as successful based on the positive impact of the projects and their relevance with ADB's Assistance Policy (ADB 2011a).

8.2.1 Environmental Assessment

The Asian Development Bank (ADB) Environmental Guidelines were updated in 2009 in order to:

- incorporate the increasing expectations of environmental assessment that reflect the growing environmental concerns around the globe;
- have a more transparent procedure for determining the environmental category;

- formalise approaches for the ADB's lending activities to financial intermediaries;
- refine approaches to sector lending where the subprojects and specific locations may not be known in advance; and
- strengthen requirements for environmental management plans.

In accordance with the project's assessed potential environmental impacts, a project is categorised into one of four groups:

- Category A: A Category A project is likely to have significant adverse environmental impacts and requires an EIA.
- Category B: A Category B project includes potentially adverse environmental impacts that are less than those of Category A. An initial environmental examination (IEE) is required to determine whether or not significant environmental impacts warranting an EIA are likely. If an EIA is not needed, the IEE is regarded as the final environmental assessment report (ADB 2009a).
- Category C: A Category C project does not require an EIA or an IEE, although environmental implications are still reviewed.
- Category FI: Projects are classified as Category FI if they involve a credit line through a financial intermediary or an equity investment in a financial intermediary.

Table 8.2.1: ADB Projects with Environmental Assessment in Lao PDR

Project Name (ID)	Approved Date	Description
Greater Mekong Subregion Corridor Towns (43319) Environmental Category B	6 Nov 2012	The project will transform the corridor towns of Kaysone Phomvihane, Phine, and Dansavanh into economic hubs by improving urban environmental infrastructure and strengthening the institutional capacity of provincial and local authorities. The productivity and sustainability of economic enterprises in these towns will be significantly improved, as the flood control measures will increase climate resilience. The environment will be improved through clean wastewater, disposal of solid waste, and enhanced mobility on improved urban roads.
Northern Rural Infrastructure Development Sector Project	26 Nov 2010	The project involved the rehabilitation and upgrade of rural access roads and irrigation. Subprojects were limited to existing alignments and will most likely involve limited cut and fill, minor widening, and little realignment. For irrigation

Project Name (ID)	Approved Date	Description
(42203) Environmental Category B		rehabilitation and development, feasibility studies were conducted to ensure that water off-take during the dry season allows sufficient flows to maintain the riparian ecosystem and ensure adequate resources for downstream users. The introduction of land zoning in the catchment areas of reservoirs will minimise inappropriate land use and reduce the risk of siltation while assuring dry season flows. Environment category A subprojects will be ineligible for financing under the proposed project.
Nam Ngum 3 Hydropower Project (40906) Environmental Category A	3 Nov 2011	The project will be located along the Nam Ngum River (NNR) in Vientiane and Xieng Khouang provinces and will form a cascade with other hydropower projects in the area. None of the habitats to be inundated or located within the Nam Ngum are listed as protected. Due to difficulties in deciding the export tariff, the project was cancelled on November, 2013.

Source: (ADB 2013a)

Case Study: Greater Mekong Sub-region Corridor Towns (43319)

The Greater Mekong Subregion Corridor Towns project was classified as Environment Category B because the subprojects were not expected to cause irreversible adverse environmental impacts. Initial environmental examinations were conducted for all the project cities. The examinations identified potential impacts and raised mitigation measures that should be implemented through EMPs. Inputs from public consultations were included as part of the output of the initial examinations. The EMP included details of mitigation measures that should be undertaken by the project developer during pre-construction, construction, and operation phases. The expected impacts from the project indicated in the EMP were:

1. Pre-construction Phase:

- Land clearing.

2. Construction Phase

- Civil works environmental impacts such as dust, air pollution, noise, solid & liquid waste, erosion, sedimentation, local flooding, and land & surface water pollution.
- Potential unforeseen impact on valued ecological habitat, and cultural property and values.

3. Operation Phase:

- Increased vehicle traffic and its associated impacts such as noise and pollution

(ADB 2012a).

Case Study: Northern Rural Infrastructure Development Sector Project (42203)

Through the Northern Rural Infrastructure Development Sector Project, existing irrigation were rehabilitated, and where new ones were developed when appropriate, additionally, rural access roads from district centres and kumban (village cluster) centres to villages were upgraded and rehabilitated. Along with ADB Safeguard Policies, the Environmental Protection Law (EPL) (1999) and its associated Decree on the Implementation of the EPL (2002) and the EIA Decree (2010) were used to determine the procedures for conducting environmental assessments, together with the requirements for the environmental monitoring of projects. The EIA Decree assigns primary responsibility for undertaking environmental assessment of projects to the project developer.

To limit the negative environmental impact of the project, a pre-screening process to ensure that subprojects considered for financing will not have significant negative environmental impacts and that an appropriate mitigation strategy of minor impacts is implemented through EMPs should be prepared as part of each initial environmental examination. Under this scheme, projects classified as Category A for environmental impacts were not eligible for financing (ADB 2010a).

Case Study: Nam Ngum 3 Hydropower Project (40906)

The Nam Ngum 3 Hydropower Project was classified as Category A for Environment due to the scale of the impacts of the project. According to local laws and regulations and in compliance with ADB's Safeguards, an EIA and EMP were required. In addition to the EIA, an independent advisory panel, financed by ADB, was constituted to assist the government in evaluating the impacts on biodiversity, assessing the adequacy of recommended measures, and implementing effective biodiversity offset programs to achieve a zero net loss of biodiversity (ADB 2011b).

In addition, an Independent Monitoring Agency (IMA) comprised of well-qualified experts in environmental and social monitoring was set for the project. The IMA was going to be responsible of the external monitoring and the results of their findings were planned for disclosure at the project's website every six-months.

Despite the project documentation being prepared, due to prolonged tariff negotiations, the Government decided not to renew the Pilot Demonstration Activity with Nam Ngum 3 Power Company. As a result, the company informed they were no longer in a position to develop the

Project, and therefore the loan was cancelled in 2013 (ADB 2013b).

8.2.2 Land Acquisition and Involuntary Resettlement

According to the ADB, Category A and B projects may involve land acquisition potentially resulting in adverse social impacts, including the displacement of individuals and communities. The project proponent must avoid involuntary resettlement wherever possible and minimise involuntary resettlement by exploring design alternatives. The borrower/client must conduct social impact assessments and set a cut-off date to identify any AP or affected structures. Based on the results of these assessments, a RAP is to be formulated and should include:

- the scope of land acquisition and resettlement;
- objectives, policy framework, and entitlements that describe key national and local land, compensation and resettlement policies, laws, and guidelines that apply to the project;
- consultation and grievance redress participation;
- compensation, relocation, and income restoration in which are described the arrangements for valuing and disbursing compensation and the arrangements for housing relocation, including transfer and establishment, as well as income restoration measures to be implemented;
- institutional framework;
- resettlement budget and financing;
- implementation schedule; and
- monitoring and evaluation (ADB 2009a).

The monitoring and evaluation of projects according to the ADB's policies should include:

- budget and timeframe: whether the resources are being allocated on time and if land has been acquired and occupied in time for project implementation;
- delivery of entitlements: whether all APs received entitlements according to the numbers and categories of loss set out in the entitlement matrix; if all APs received payment on time, including compensation to business and wage earners affected by the project; and if relocation sites have been developed as per agreed standards;
- consultation, grievances, and special issues; and
- livelihood development.

It can therefore be said that the ADB's methods of compensation are essentially similar to those of the WB's. In both organisations' policies, the independent or external monitoring agents employed by project proponents are tasked with the same assignments and submission of

compliance monitoring reports. An independent land appraiser or a specialist in property appraisal is employed to confirm the means of compensation and property valuation or land pricing.

Table 8.2.2: ADB Projects with Resettlement Plan in Lao PDR

Project Name (ID)	Approval Date	Description
Nam Ngum 3 Hydropower Project (40906)	3 Nov 2011	The project was planned to be located along the Nam Ngum River (NNR) in Vientiane and Xieng Khouang provinces and to form a cascade with other hydropower projects in the area. Due to the potential impacts, this project was classified as Category A for resettlement. Measures to address the social impacts of the project were included in the resettlement and ethnic minority development plan (EMDP). The project was classified as Category A for both environment and resettlement. Due to conflicts in deciding the tariff and the complexity of the project, the Ministry of Finance announced the cancellation of the project in September 2013.
Second Northern Greater Mekong Sub region Transport Network Improvement Project (41444)	25 Nov 2010	The objective of the project was to facilitate regional cooperation and increased economic growth by improving the national roads. The project was classified as category B. The RAP concluded that road widening may increase the number of households but the impacts will not be significant. Detailed design was completed in 2012. About 147 households were expected to lose a small portion of land.
Northern Rural Infrastructure Development Sector Project (42203)	26 Nov 2010	The project was categorised as B for involuntary resettlement as little resettlement is anticipated and subprojects will rehabilitate existing infrastructure and require insignificant land acquisition. To ensure these conditions, the agency required all subprojects to be pre-screened before grant effectiveness. For this project it was also decided that only category B and C subprojects will be eligible for financing. Finally, any minor compensation that may be needed will be provided in accordance with RAPs prepared for each subproject based on the guidelines outlined in the resettlement framework agreed with the government.

Source: (ADB 2013a)

Case Study: Nam Ngum 3 Hydropower Project (40906)

In the original project proposal, construction activities were scheduled to start in 2011 and the reservoir was scheduled to be filled during the rainy season of 2016. Electricity, which would be mainly exported to Thailand, would be generated from early 2017 onwards and during a concession period of 27 years. While the project was finally cancelled in 2013 after the Nan Ngum 3 Power Company failed to negotiate the tariff rates due to the size of the project, it presents an appropriate example of the activities that need to be undertaken for projects that involve land acquisition and involuntary resettlement.

Based on the location and scale of the project it was estimated that 29 villages were going to be directly and indirectly impacted and approximately 782 households were going to be physically and/or economically affected. For entitlement, the policy that was followed for the project was in-kind compensation. Cash transfer was only considered as a last resort option as recommended by ADB through its Safeguard Policies. The entitlement matrix included the outcome of numerous public consultation and participation briefings, presentations, and meetings that took place at Central, Provincial, and District levels.

Regarding the regulatory framework, the project development plan was prepared based on local regulations as well as ADB's Safeguard Policies. While both Lao PDR's laws and ADB's Safeguards entitle APs for compensation, they are not completely equivalent. For example, regarding the definition of 'major impact,' ADB sets the threshold at more than 200 persons being physically displaced from housing or losing 10% or more of their productive assets. On the other hand, Lao PDR defines 'major impact' as loss of more than 20% of productive assets. To bridge the gap, the project chose to follow ADB's definition of 10% of assets lost as it was more stringent than that of Lao PDR. Further, local regulations do not consider any prior livelihood preparations for resettlement. This contrasts with ADB's recommended policies.

For this project, the development plan considered at least 2 years prior to physical relocation to ensure that there is no loss of primary source of household income when preparing the new agricultural area (ABD 2011c).

Case Study: Second Northern Greater Mekong Sub region Transport Network Improvement Project (41444)

The Project, which was approved on November 2010, is still running as of October 2013, aims at enhancing transport connection between Lao PDR and Vietnam to promote economic growth and poverty reduction through increasing inter-country trade and cooperation. Once completed in June 2016, the project is expected to address maintenance and vehicle overloading problems that undermine road sector sustainability in the two countries. The main component of the project will be the upgrading of three road sections or site improvement for parts of NR6 from Ko Kinh to Vien Xay.

(kokomade)

The project's resettlement impacts have been classified as category B for Vietnam and Lao PDR under ADB's Safeguard Policy Statement. There are about 8,913 households (35,652 people) in Vietnam and about 147 households in Lao PDR that will lose a small portion of land. Only 6 households will require relocation in Lao PDR and no relocation will be necessary in Vietnam. Due to the transnational nature of the project, the RAPs were endorsed and disclosed by both the MOT in Vietnam and MPWT in Lao PDR.

In Lao PDR, the RAP was prepared according to the compensation principles and policy framework for land acquisition and involuntary resettlement in compliance with ADB Safeguards and the Constitution (1991), the Land Law (2003), Road Law (1999), the Decree of the Prime Minister on Compensation and Resettlement of People Affected by Development Project (No.192/PM, 2005), and the Regulations for Implementing Decree of the Prime Minister on Compensation and Resettlement of People Affected by Development Project (No.2432/STEA, 2005) (ADB 2010). While there is equivalence between GOL laws and Safeguards, some gaps were identified:

1. Decree 192/PM (Article 8) defines severely affected households as those losing 20% or more of their income generating assets while ADB uses a threshold of 10%. To bridge the gap, the project used the GOL threshold.
2. GOL and ADB policies entitle non-tilted displaced people to compensation for affected assets at replacement cost and other assistance so that they are not made worse off due to the project. However GOL goes beyond ADB's policy and provides displaced people who do not have proof of land-use rights and who have no other land in other places compensation for loss of land-use rights at replacement cost.

On the other hand, as part of the RAP, a socio-economic survey to determine the preferences of APs was conducted. The results indicated that APs preferred replacement land instead of money compensation in case of land or agricultural production loss. (ADB 2010b)

Case Study: Northern Rural Infrastructure Development Sector Project (42203)

The Northern Rural Infrastructure Development Sector Project, approved in 2009, will try to address infrastructure deficiencies in the region by providing support to the Government in its objective to improve agricultural productivity and market access. Villages in their current locations will be the focus of the project and resettlement was not deemed necessary during the design phase of the project. The provinces of Bokeo, Luang Namtha, Oudomxay, and Phongsaly that will be covered by this project have significant numbers of poor households and food insecurity.

While some subprojects might require road widening and minor re-alignment, as well as widening of irrigation canals that may result in minor land losses or disruptions, the losses are expected to be temporary with no major negative impacts expected. To guarantee that the project does not cause major negative impacts, only subprojects that are classified as category B or C for resettlement were considered for approval. In compliance with ADB's Safeguard Policies, a Resettlement Framework was prepared for this project.

The Resettlement Framework identified some differences between local regulations and ADB's safeguards. It is stated in the Resettlement Framework that while both Lao PDR laws and ADB policies entitle AP to compensation for affected assets at replacement cost, Lao PDR goes beyond ADB's policy and provides APs in rural or remote areas who have no proof of land-use rights and who have no other land in other places compensation for loss of land-use rights at replacement cost in addition to compensation for their other assets. A total of 147 households with 833 persons were estimated to be affected by the project (ADB 2010d).

8.2.3 Indigenous Peoples

In its Safeguard Policy Statement, the ADB defines IPs as a distinct and vulnerable social and cultural group possessing the following characteristics to varying degrees:

- self-identification as members of a distinct indigenous cultural group and recognition of this identity by others;
- collective attachment to geographically distinct habitats or ancestral territories in the project area and to the natural resources in these habitats and territories;

- customary cultural, economic, social, or political institutions that are separate from those of the dominant society and culture; and
- a distinct language, often different from the official language of the country or region.

The ADB Safeguard Policy covers ethnic minorities, indigenous peoples, and other disadvantaged groups. The policy ensures that these people should not be deprived from the benefits of a development project, as in the past they have had limited access to benefits although they were located in resource-wealthy areas. Because of their unique culture and social characteristics, they should have an equal opportunity to participate in and gain from the project activities.

The policy outlines the requirements that borrowers or clients are required to meet in safeguarding the rights of indigenous peoples in projects supported by ADB, including:

- undertaking the social impact assessment and planning process;
- preparing social impact assessment reports and planning documents;
- disclosing information and undertaking consultation, including ascertaining consent of affected Indigenous Peoples community to selected project activities;
- establishing a grievance mechanism; and
- monitoring and reporting.

In line with the policy, it is necessary to undertake a social impact assessment as part of the project design to assess potential project impacts, both positive and adverse, on indigenous peoples. If the social impact assessment identifies indigenous peoples specifically as a significantly and adversely affected population, an IPP acceptable to the ADB must be prepared. The IPP should include a framework for continued consultation with the affected indigenous peoples' communities during project implementation that specifies measures to ensure that indigenous peoples receive culturally appropriate benefits, identifies measures to avoid, minimise, mitigate, or compensate for any adverse project impacts, and includes culturally appropriate grievance procedures, monitoring, and evaluation arrangements as well as a budget and time-bound actions for implementing the planned measures.

Table 8.2.3: ADB Projects with Indigenous Peoples Plan in Lao PDR

Project Name (ID)	Approval Date	Description
Northern Rural Infrastructure Development Sector Project (42203)	26 Nov 2010	The project consists of rehabilitating existing irrigation facilities and, where appropriate, developing new ones, as well as rehabilitating and upgrading rural access roads from district centres and village cluster centres to villages. The project is categorised as B for indigenous peoples because most people in the region are ethnic minorities who generally have higher poverty rates than the nationally dominant Lao–Thai group. The pre-screening of subprojects and consultation processes will exclude subprojects that would disadvantage any groups. IPPs for each approved subproject will detail requirements for inclusion, benefit measuring, and monitoring.
Nam Ngum 3 Hydropower Project (40906)	3 Nov 2011	The project will be located along the Nam Ngum River (NNR) in Vientiane and Xieng Khouang provinces and form a cascade with other hydropower projects in the area. Due to its potential impacts, this project was classified as category A for resettlement. Among the particularities of this project is the broad community support it has received by the Khmu ethnic community living in Ban Xiengdet, which will be directly affected by the Project. Support was documented during meeting agreements and ‘household level consent to relocate’ forms were authenticated by village leaders. Effective measures to avoid, minimise, mitigate and compensate for the adverse impacts, and to ensure compliance with ADB’s social protection requirements are incorporated in the various social plans in the RAP.

Source: ADB (2013a)

Case Study: Northern Rural Infrastructure Development Sector Project (42203)

The rehabilitation of existing irrigation facilities and the development of new ones envisioned in this project include areas in which indigenous peoples live. According to ADB Safeguards, an IPP was prepared for this project to determine the impact of the project on indigenous peoples as well as mitigation measures to limit the negative impact.

In the Constitution of Lao PDR (1991), reference is made to the multi-ethnicity of the

population. In 1992, the Minority Policy was recast to include all ethnic minorities in the country. It was entitled 'Resolution of the Party Central Organisation Concerning Ethnic Minority Affairs in the New Era.' The term Indigenous Peoples is not used in Lao PDR. The overall policy concerning ethnic minorities focuses on achievement of equality between all ethnic minority groups and national solidarity while recognising the cultural heritage and ethnic identity of each group.

Given the high levels of illiteracy amongst rural adults, some ethnic minorities have difficulties in accessing written materials and agreements concerning development and other programs. To address these constraints, the IPP required project developers to take special measures to ensure that ethnic minorities are fully consulted in project decisions and to enable participation in capacity building, various working groups and other project activities (ADB 2010d).

Case Study: Nam Ngum 3 Hydropower Project (40906)

The project, which was cancelled in 2013, was going to be located in an area where ethnic minorities live and considered from the initial stages the need to safeguard their interests. Almost all APs were expected to belong to the Khmu, Hmong and Yao ethnic minorities. Based on these conditions, both local regulations and ADB's Safeguards for ethnic minority groups were reviewed. Both ADB's Safeguard Policy and Decree 192 of Lao PDR require that mitigation measures and socioeconomic benefits are in place to ensure that the status of ethnic communities is improved and that their cultural preferences are considered. Accordingly, an Ethnic Minority Development Plan in compliance with local regulations and ADB's Safeguard Policies was prepared. The plan included mitigation measures aimed at addressing issues related to land acquisition and involuntary resettlement, as well as other social issues such as gender inequality focusing on the special needs of affected ethnic minorities.

While compensation and mitigation measures were available to all eligible APs equally, special considerations were included to address the specific needs of affected ethnic minorities, particularly of women. These measures include:

- Support for non-formal education for these groups with an emphasis on female literacy;
- Inclusion of members of ethnic minority groups in the resettlement and grievance process committees;
- Provision compensation to both husband and wife;
- Joint ownership of land titles by husband and wife;
- No requirement for Khmu people from Ban Xiengdet to relocate outside the existing village boundary;

- Inclusion of verbal translations in ethnic minority languages during all meetings;
- Design of a code of conduct for project and Contractor's staff.

Due to the cancellation of the project, involuntary resettlement was not necessary and no further action to safeguard the interests of ethnic minority groups was undertaken (ABD 2011c).

8.2.4 Monitoring

Upon its reorganisation in 2002, the ADB established arrangements for compliance by monitoring projects with its safeguard policies. With the support of the Environment and Social Safeguard Division, the ADB's Chief Compliance Officer is responsible for advising management and operations departments on safeguard compliance and related operational procedures and guidelines. Compliance with safeguard policies is monitored throughout the project cycle. If a project poses risks of noncompliance, actions to ensure compliance are recommended at the Management Review Meeting, and project compliance is reviewed again at a Staff Review Committee meeting. Operations departments take steps to ensure that outstanding safeguard requirements are met before board approval. As stated in the ADB Safeguard Policy Statement (SPS), the ADB assumes responsibility for conducting due diligence and for reviewing, monitoring and supervising projects throughout the ADB's project cycle in conformity with the principles and requirements embodied in the SPS (ADB 2009a). Likewise, the ADB requires borrowers/clients to follow SPS Section 57, which requires them to:

- establish and maintain procedures to monitor the progress of implementation of safeguard plans;
- verify compliance with safeguard measures and progress towards intended outcomes;
- document and disclose monitoring results and identify necessary corrective and preventive actions in the periodic monitoring reports;
- follow up on these actions to ensure progress towards the desired outcomes;
- retain qualified and experienced external experts or qualified NGOs to verify monitoring information for projects with significant impacts and risks;
- use independent advisory panels to monitor project implementation for highly complex and sensitive projects; and
- submit periodic monitoring reports on safeguard measures as agreed with the ADB.

GOL laws stipulate that monitoring should be conducted by an institution different from the

implementing agency or the borrower while ADB recommends that monitoring is conducted by the same donor agency. To bridge this gap, ADB projects adhere to GOL laws and hire an external consultant to conduct the monitoring activities.

For project implementation, ADB projects comply with local regulations and divide monitoring in two components as shown in the Northern Rural Infrastructure Development Sector (ADB 2010d):

- a) Internal monitoring conducted by the Provincial and District Agricultural and Forestry Offices (PAFO and DAFO) that provided quarterly reports to ADB and the Project Steering Committee.
- b) External monitoring conducted by an external organisation, such as international NGOs and/or national institutions. In addition to monitoring the resettlement process, the external organisation is also in charge of conducting a post-resettlement impact evaluation to assess whether the impacts of the project have been mitigated adequately and if pre-project livelihood of APs has been restored.

8.2.5 Information Disclosure

According to the ADB's 2009 SPS, the borrower/client must submit to the ADB the following documents for disclosure on the ADB's website (ADB 2009a):

- a draft full EIA draft (including the draft EMP) at least 120 days prior to the ADB Board consideration, and/or environmental assessment and review frameworks before project appraisal, where applicable;
- the final EIA/IEE;
- a new or updated EIA/IEE and corrective action plan prepared during project implementation, if any; and
- environmental monitoring reports.

No significant differences between ADB Safeguards and GOL national laws were identified. GOL law's provisions are equivalent to those of ADB regarding Information Disclosure. Experience from previous projects shows that involvement of APs from the initial stages of the project is conducted as recommended by ADB. In the case of the Northern Rural Infrastructure Development Project (ADB 2010d) for example, all important papers were displayed in Lao language and placed at important public places in each village. Copies were made available for independent review and study.

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TABLE A-1**Major Acts and Rules Related to Environmental and Social Considerations in Lao PDR**

No.	Name	Year
General		
1	The National Constitution http://www.ilo.org/wcmsp5/groups/public/@ed_protect/@protrav/@ilo_aids/documents/legaldocument/wcms_117348.pdf	2003
2	Environment Protection Law (EPL) of 1999 http://faolex.fao.org/docs/texts/lao18236.doc	2012
3	Environment Impacts Assessment http://www.laolandissues.org/wp-content/uploads/2011/12/EIA-Decree-112-PM-2010-Inofficial-transl.-Eng.pdf	2000
4	Regulation on Environment Assessment in the Lao PDR http://siteresources.worldbank.org/INTEAPREGTOPENVIRONMENT/Resources/Lao_PD_R_EIA_Decree_2000.doc	2000
5	Decree on the Implementation of the EPL	2003
6	Decree on Establishing National Protected Areas	1993
7	Decree on the preservation of Cultural, Historical, and Natural Heritage	1997
8	Decree on the Establishment and Activities of the National Environment Committee	2009
9	Decree on the Environment Protection Fund	2005
10	Decree on Social and Environment Impact Assessment	2010
11	Decision of the Minister on Good Agriculture Practices for Environmental Management Standard http://www.laotradeportal.gov.la/index.php?r=site/display&id=100	2011
12	Decision of the Minister of Agriculture and Forestry on Organic Agriculture Standards http://www.laotradeportal.gov.la/index.php?r=site/display&id=130	2005
Pollution and Conservation		
1	Decree on the Control of Import, Export and Use of Ozone Depleting Substances http://www.laotradeportal.gov.la/index.php?r=site/display&id=315	2004
2	Regulation on Industrial Waste Discharge http://faolex.fao.org/docs/pdf/lao17659.pdf	1994
3	Regulation on Control of Import, Export and Consumption of Ozone Depleting Substances http://www.laotradeportal.gov.la/index.php?r=site/display&id=316	2004
4	Regulation on the approval procedure for proposed Clean Development Mechanism (CDM)	2007
Health		
1	Law on Hygiene, Decease prevention and Health Promotion http://www.vientianetimes.org.la/Laws%20in%20English/46.%20Law%20on%20Hygiene,%20Disease%20Prevention%20and%20Health%20Promotion%20(2001)%20Eng.pdf	2001
2	Law on Drugs and Medical Products http://www.vientianetimes.org.la/Laws%20in%20English/43.%20Law%20on%20Drugs%20and%20Medical%20Products%20(2000)%20Eng.pdf	2000
3	Law on Health Care http://www.na.gov.la/docs/eng/laws/econ/Health%20Care%20(2005)%20Eng.pdf	2005

No.	Name	Year
4	Law on Drugs http://www.apicc.info/_custom/apicc/_common/board/download.jsp?attach_no=20130201164858981218	2007
5	Regulation Governing Drug Registration http://www.laotradeportal.gov.la/index.php?r=site/display&id=41	2003
6	Provision on the Quality Control of Cosmetic Products http://www.laotradeportal.gov.la/index.php?r=site/display&id=217	2003
7	Provision on the Establishment of Medical Products Import-Export Companies http://www.laotradeportal.gov.la/index.php?r=site/display&id=44	2003
8	Ministerial Regulation On The Basic Principles In The Application Of Sanitary And Technical Measures For The Food Safety Management http://www.laotradeportal.gov.la/index.php?r=site/display&id=118	2009
9	Decision on the Organization and Operation of Sanitary and Phytosanitary Enquiry Point http://www.laotradeportal.gov.la/index.php?r=site/display&id=126	2011
10	Decision of the Minister on Good Agriculture Practices for Worker Health, Safety and Welfare Standard http://www.laotradeportal.gov.la/index.php?r=site/display&id=109	2011
11	Decision of the Ministry of Public Health on the List of Narcotic Drugs, Nerve Affecting Substances and Basic Chemical Substance	2005
12	Law on narcotic	2007
Food and Consumer Protection		
1	Law on Food http://www.vientianetimes.org.la/Laws%20in%20English/51.%20Law%20on%20Food%20(2004)%20Eng.pdf	2004
2	LAW ON LIVESTOCK PRODUCTION AND VETERINARY MATTERS http://www.laotradeportal.gov.la/index.php?r=site/display&id=58	2008
3	Law on Consumer Protection	2011
4	Technical Regulation on Livestock Management and Animal Production http://www.laotradeportal.gov.la/index.php?r=site/display&id=141	2003
5	Provision on Food Registration	1994
6	Decision on the Procedures for Rice Import and Export in the Lao PDR http://www.laotradeportal.gov.la/index.php?r=site/display&id=291	2012
Occupational Rights and Safety		
1	Law on Industrial Manufacturing	1999
2	Promulgation of the Amended Labour Law http://www.ilo.org/dyn/travail/docs/1413/Labour%20Law%20-%20Amended%20-%202006.pdf	2007
3	Decree on Minimum Wage	
4	Decree on Lao Labour force in foreign countries, and other related legal instruments.	
5	Provisions On Technical Standards and accessories of vehicles that are authorized for import for registering and assembling for using in Lao PDR http://www.laotradeportal.gov.la/kcfinder/upload/files/Provision%20No.4312%20-%20Eng.pdf	2002

No.	Name	Year
6	Decree on Social Security Regime for Employees in Enterprises http://www.ilo.org/dyn/travail/docs/1426/Social%20Security%20Regime%20for%20Employees%20in%20Enterprises%201999.pdf	1999
7	Family Law http://www.vientianetimes.org.la/Constitution/Constitution_familyLaw.htm	1990
8	Law on National Defence Obligations http://www.vientianetimes.org.la/Laws%20in%20English/27.%20Law%20on%20National%20D	1995
Public Safety and Dangerous Substances		
1	Notification on Procedure and reference in approving an import-export of explosive subject and raw material in producing industrial explosive substance http://www.laotradeportal.gov.la/index.php?r=site/display&id=249	2011
2	Notification on Importation of Guns and Bullets for Sports http://www.laotradeportal.gov.la/index.php?r=site/display&id=304	2012
Displacement, Relief and Rehabilitation		
1	Decree on Compensation and Resettlement of People Affected by Development Projects http://www.monre.gov.la/home/images/stories/pdf/M-IWRM-CRPF%20Lao_Final%20version_15Oct2010.pdf	2006
Land Use, Administration and Management		
1	Land law http://www.vientianetimes.org.la/Laws%20in%20English/33.%20Law%20on%20Land_Deceree%20(2003)%20Eng.pdf	2003
2	Decree on the Implementation of the Land Law http://www.forestcarbonasia.org/wp-content/uploads/2011/10/6.-Decree-On-the-Implementation-of-the-Land-Law.doc	1999
Agriculture and Agro-Chemicals		
1	Law on Agriculture http://www.na.gov.la/docs/eng/laws/econ/Agriculture%20(1998)%20Eng.pdf	1999
2	Regulation on Control of Pesticides http://www.laotradeportal.gov.la/index.php?r=site/display&id=96	2010
3	Ministerial order on Issuing the Phytosanitary Certificate	2013
4	Ministerial decision on management and consumming the plantation	2012
5	Ministerial Ordinance on Tightly Monitoring and Preventing Cassava Mealy bug's Outbreak http://www.laotradeportal.gov.la/index.php?r=site/display&id=367	2011
6	Ministerial Decision on the basic principle for the Application of sanitary and Phytosanitary Measures in Plant and Animal Product Administration http://www.laotradeportal.gov.la/index.php?r=site/display&id=129	2012
7	Decree on Prevention and Control of Animal Epidemic Diseases http://www.laotradeportal.gov.la/index.php?r=site/display&id=253	2012
8	Decree On Implementing the Law on Plant Protection http://www.laotradeportal.gov.la/index.php?r=site/display&id=254	2012
9	Decision of the Minister on Good Agriculture Practices for Food Safety Standard	2011

No.	Name	Year
Water Resources		
1	Law on Water and Water Resources http://faolex.fao.org/docs/pdf/lao7478.pdf	1996
2	Decree on the Implementation of the Water and Water Resources Law	2001
Fishery		
1	Fisheries Law	2009
Forestry		
1	The Forestry Law of 1996 http://faolex.fao.org/docs/pdf/lao89474.pdf	2007
2	Decree on the Implementation of the Forestry law	1999
3	Decree on the Protection Forest http://www.forestcarbonasia.org/wp-content/uploads/2011/10/5.-Decree-On-The-Protection-Forest-No-333PM.pdf	2010
Wildlife and Domestic Animal		
1	Wildlife and Aquatic Resources Law http://www.laotradeportal.gov.la/index.php?r=site/display&id=81	2008
2	Regulation on Management of the National Biodiversity Conservation Areas (NBCAs), Aquatic and Wild Animals	2001
3	Decree on the Control of the Movement of Animal and Animal Products http://www.laotradeportal.gov.la/index.php?r=site/display&id=276	2012
Energy and Mineral Resources		
1	Law on Electricity http://www.vientianetimes.org.la/Laws%20in%20English/34.%20Law%20on%20Electricity_Decree%20(1997)%20Eng.pdf	1997
2	Law on Mining http://www.vientianetimes.org.la/Laws%20in%20English/36.%20Law%20on%20Mining%20(1997)%20Eng.pdf	1997
3	Regulation on Environmental Impact Assessment for Electricity Development in Lao PDR	2001
4	Notification on The Management of Importation of Exempted Fuel for the Developing Projects http://www.laotradeportal.gov.la/index.php?r=site/display&id=204	2009
Rural and Urban Planning and Protection		
1	Law on Urban Planning http://www.vientianetimes.org.la/Laws%20in%20English/41.%20Law%20on%20Urban%20Plans%20(1999)%20Eng.pdf	1999
Transportation and Safety		
1	Law on Road Transportation http://www.laotradeportal.gov.la/index.php?r=site/display&id=35	1997
2	Law on Public Roads http://www.vientianetimes.org.la/Laws%20in%20English/42.%20Law%20on%20Public%20Roads%20(1999)%20Eng.pdf	1999
3	Law on Land Traffic http://www.vientianetimes.org.la/Laws%20in%20English/44.%20Law%20on%20Land%20	2000

No.	Name	Year
	Traffic%20(2000)%20Eng.pdf	
Cultural and Natural Heritage		
1	Law on national heritage http://www.vientianetimes.org.la/Laws%20in%20English/60.%20Law%20on%20National%20Heritage%20(2005)%20Eng.pdf	2005
2	Law on Heritage and Basis of Inheritance http://www.vientianetimes.org.la/Laws%20in%20English/7.%20Law%20on%20Heritage%20and%20Basis%20of%20Inheritance%20(1990)%20Eng.pdf	1990
Vulnerable Group		
1	Law on Development and Protection of Women http://www.ilo.org/dyn/travail/docs/1425/Law%20on%20the%20Development%20and%20Protection%20of%20Women%202004.pdf	2004
2	Law on the Protection of the Rights and Interests of Children http://www.vientianetimes.org.la/Laws%20in%20English/65.%20Law%20on%20the%20Protection%20of%20the%20Rights%20of%20Children%20(2006)%20Eng.pdf	2007
Miscellaneous and Others		
1	The Law on Local Administration http://www.vientianetimes.org.la/Laws%20in%20English/49.%20Law%20on%20Local%20Administration%20(2003)%20Eng.pdf	2003

TABLE A-2**Status of Lao PDR with Regard to Major International Conventions, Protocols and Treaties Related to Environmental and Social Considerations**

International agreement	Signature	Ratification	Accession	Succession	Acceptance	Provisional Application
Constitution of the United Nations Industrial Development Organization http://www.unido.org/fileadmin/user_media/UNIDO_Header_Site/About/UNIDO_Constitution.pdf	5 Mar 1980	3 Jun 1980				
Constitution of the Asia-Pacific Telecommunity http://treaties.un.org/doc/Publication/MTDSG/Volume%20II/Chapter%20XXV/XXV-2.en.pdf		20 Oct 1989				
Convention and Statute on Freedom of Transit http://www.wipo.int/wipolex/en/other_treaties/text.jsp?file_id=201915				24 Nov 1956		
Agreement establishing the International Fund for Agricultural Development http://www.ifad.org/pub/basic/agree/e/!01agree.pdf			13 Dec 1977			
Convention on the Prevention and Punishment of Crimes against Internationally Protected Persons, including Diplomatic Agents http://www.un.org/en/sc/ctc/docs/conventions/Conv4.pdf			22 Aug 2002			
International Convention on the Suppression and Punishment of the Crime of Apartheid http://legal.un.org/avl/pdf/ha/cspca/cspca_e.pdf			5 Sep 1981			
Convention on Transit Trade of Land-locked States http://treaties.un.org/doc/Publication/MTDSG/Volume%20II/Chapter%20X/X-3.en.pdf	8 Jul 1965	20 Sep 1966				
Vienna Convention on Diplomatic Relations http://legal.un.org/avl/pdf/ha/vcdr/vcdr_e.pdf			3 Dec 1962			

International agreement	Signature	Ratification	Accession	Succession	Acceptance	Provisional Application
United Nations Convention against Corruption http://www.unodc.org/documents/treaties/UNCAC/Publications/Convention/08-50026_E.pdf	10 Dec 2003	25 Sep 2005				
Convention on the Political Rights of Women http://treaties.un.org/doc/Treaties/1954/07/19540707%2000-40%20AM/Ch_XVI_1p.pdf			28 Jan 1968			
Constitution of the World Health Organization http://www.who.int/governance/eb/who_constitution_en.pdf					17 May 1950	
Convention for the Suppression of the Traffic in Persons and of the Exploitation of the Prostitution of Others http://polis.osce.org/library/f/3655/2833/UN-USA-RPT-3655-EN-2833			14 Apr 1978			
International Covenant on Economic, Social and Cultural Rights http://www.ohchr.org/EN/ProfessionalInterest/Pages/CESCR.aspx	7 Dec 2000	13 Feb 2007				
Agreement establishing the Asian Development Bank http://www.adb.org/sites/default/files/pub/1965/charter.pdf	4 Dec 1965	30 Sep 1966				
Convention on Biological Diversity http://www.cbd.int/doc/legal/cbd-en.pdf			20 sep 1996			
Convention on the Prevention and Punishment of the Crime of Genocide http://legal.un.org/avl/pdf/ha/cppcg/cppcg_e.pdf			8 Dec 1950			
Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction	13 Jan 1993	25 Feb 1997				

International agreement	Signature	Ratification	Accession	Succession	Acceptance	Provisional Application
http://treaties.un.org/doc/Publication/MTDSG/Volume%20II/Chapter%20XXVI/XXVI-3.en.pdf						
Agreement establishing the Asia-Pacific Institute for Broadcasting Development http://www.paclii.org/pits/en/treaty_database/1977/5.rtf			11 Sep 1986			
Kyoto Protocol to the United Nations Framework Convention on Climate Change http://unfccc.int/resource/docs/convkp/kpeng.pdf			6 Feb 2003			
Convention on the Rights of the Child http://www.ohchr.org/en/professionalinterest/pages/crc.aspx			8 May 1991			
Montreal Protocol on Substances that Deplete the Ozone Layer http://ozone.unep.org/pdfs/Montreal-Protocol2000.pdf			21 Aug 1998			
Vienna Convention for the Protection of the Ozone Layer http://ozone.unep.org/pdfs/viennaconvention2002.pdf			21 Aug 1998			
Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment http://www.ohchr.org/EN/ProfessionalInterest/Pages/CAT.aspx	21 Sep 2010	26 Sep 2012				
Agreement establishing the Common Fund for Commodities https://www.icac.org/projects/commonfund/admin/agreement.pdf			17 Dec 2002			
United Nations Framework Convention on Climate Change http://unfccc.int/files/essential_background/background_publications_htmlpdf/application/pdf/conveng.pdf			4 Jan 1995			

International agreement	Signature	Ratification	Accession	Succession	Acceptance	Provisional Application
United Nations Convention on the Law of the Sea http://www.un.org/depts/los/convention_agreements/texts/unclos/unclos_e.pdf	10 Dec 1982	2 Mar 1989				
Convention on the Safety of United Nations and Associated Personnel http://treaties.un.org/doc/Publication/MTDSG/Volume%20II/Chapter%20XVIII/XVIII-8.en.pdf			22Aug 2002			
International Convention for the Suppression of the Financing of Terrorism http://www.unodc.org/documents/treaties/Special/1999%20International%20Convention%20for%20the%20Suppression%20of%20the%20Financing%20of%20Terrorism.pdf			29 Sep 2008			
Vienna Convention on Consular Relations http://www.state.gov/documents/organization/17843.pdf			9 Aug 1973			
Convention on the Privileges and Immunities of the Specialized Agencies http://legal.un.org/avl/pdf/ha/cpiun-cpisa/cpiun-cpisa_e.pdf			9 Aug 1960			
Convention on the Privileges and Immunities of the United Nations http://www.un.org/en/ethics/pdf/convention.pdf			24 Nov 1956			
Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade http://ec.europa.eu/world/agreements/downloadFile.do?fullText=yes&treatyTransId=1442			21 Sep 2010			
Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal			21 Sep 2010			

International agreement	Signature	Ratification	Accession	Succession	Acceptance	Provisional Application
http://www.basel.int/Portals/4/Basel%20Convention/docs/text/BaselConventionText-e.pdf						
International Convention on the Elimination of All Forms of Racial Discrimination http://eudo-citizenship.eu/InternationalDB/docs/International%20Convention%20on%20the%20Elimination%20of%20all%20Forms%20of%20Racial%20Discrimination%20Art%201%20and%205%20FULL%20TEXT.pdf			22 Feb 1974			
United Nations Convention against Illicit Traffic in Narcotic Drugs and Psychotropic Substances http://www.unodc.org/pdf/convention_1988_en.pdf			1 Oct 2004			
Convention on psychotropic substances http://www.unodc.org/pdf/convention_1971_en.pdf			22 sep 1997			
International Covenant on Civil and Political Rights http://treaties.un.org/doc/Publication/UNTS/Volume%2099/volume-999-I-14668-English.pdf	7 Dec 2003	24 Sep 2009				
Convention on the Elimination of All Forms of Discrimination against Women http://www.ohchr.org/Documents/ProfessionalInterest/cedaw.pdf	17 Jul 1980	14 Aug 1981				
Stockholm Convention on Persistent Organic Pollutants http://www.pops.int/documents/convtext/convtext_en.pdf	5 Mar 2002	28 Oct 2004				
United Nations Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa http://treaties.un.org/doc/Publication/MTDSG/Volume%20II/Chapter%20XXVII/XXVII-10.en.pdf	30 Aug 1995	20 Sep 1997				
WHO Framework Convention on Tobacco Control	29 Jun 2003	6 Sep 2006				

International agreement	Signature	Ratification	Accession	Succession	Acceptance	Provisional Application
http://whqlibdoc.who.int/publications/2003/9241591013.pdf						
Intergovernmental Agreement on the Asian Highway Network http://treaties.un.org/doc/source/RecentTexts/XI_B_34_E.pdf	26 Apr 2004	30 Aug 2008				
International Convention Against the Taking of Hostages http://www.un.org/en/sc/ctc/docs/conventions/Conv5.pdf			22 Aug 2002			
Intergovernmental Agreement on the Trans-Asian Railway Network http://www.unescap.org/ttdw/common/TIS/TAR/text/tar_agreement_e.pdf	10 Nov 2006	29 Mar 2011				
Convention on the Rights of Persons with Disabilities http://www.un.org/disabilities/convention/conventionfull.shtml	12 Jan 2008	25 Sep 2009				
Convention on the International Trade in Endangered Species of Wild Fauna and Flora http://www.cites.org/eng/disc/E-Text.pdf			1 Mar 2004			
Single Convention on Narcotic Drugs, 1961, as amended by the Protocol amending the Single Convention on Narcotic Drugs, 1961 http://www.unodc.org/pdf/convention_1961_en.pdf	16 Mar 2009					
Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity http://www.cbd.int/abs/doc/protocol/nagoya-protocol-en.pdf			26 Sep 2012			
Cartagena Protocol on Biosafety to the Convention on			3 Aug 2004			

International agreement	Signature	Ratification	Accession	Succession	Acceptance	Provisional Application
Biological Diversity http://www.cbd.int/doc/legal/cartagena-protocol-en.pdf						
Convention on Biological Diversity http://www.cbd.int/doc/legal/cbd-en.pdf			20 Feb 1996			
Protocol Bringing under International Control Drugs Outside the Scope of the Convention of 13 July 1931 for Limiting the Manufacture and Regulating the Distribution of Narcotic Drugs, as amended by the Protocol signed at Lake Success, New York, on 11 December 1946 http://treaties.un.org/doc/Treaties/1949/12/19491201%2011-57%20PM/Ch_VI_13p.pdf				7 Oct 1950		
Convention on the non-applicability of statutory limitations to war crimes and crimes against humanity http://www1.umn.edu/humanrts/instree/x4cnaslw.htm			28 Dec 1984			
Treaty banning nuclear weapon tests in the atmosphere, in outer space and under water http://www.un.org/disarmament/WMD/Nuclear/pdf/Partial_Ban_Treaty.pdf	8 Aug 1963	12 Feb 1965				

Note: * Definitive signature

Source: UN (2013)

TABLE A-3
Endemic Species in Lao PDR

No.	Kingdom	Phylum	Class	Order	Family	Species	IUCN Category
Comprehensively-Assessed Group							
1	ANIMALIA	CHORDATA	MAMMALIA	PRIMATES	CERCOPITHECIDAE	<i>Trachypithecus laotum</i>	VU
2	ANIMALIA	CHORDATA	MAMMALIA	EULIPOTYPHLA	ERINACEIDAE	<i>Hylomys megalotis</i>	DD
3	ANIMALIA	CHORDATA	MAMMALIA	RODENTIA	DIATOMYIDAE	<i>Laonastes aenigmamus</i>	EN
4	ANIMALIA	CHORDATA	MAMMALIA	CHIROPTERA	HIPPOSIDERIDAE	<i>Hipposideros rotalis</i>	LC
5	ANIMALIA	CHORDATA	MAMMALIA	RODENTIA	MURIDAE	<i>Saxatilomys paulinae</i>	DD
6	ANIMALIA	CHORDATA	MAMMALIA	CHIROPTERA	HIPPOSIDERIDAE	<i>Hipposideros khaokhouayensis</i>	VU
7	ANIMALIA	CHORDATA	AVES	PASSERIFORMES	PYCNONOTIDAE	<i>Pycnonotus hualon</i>	LC
8	ANIMALIA	CHORDATA	AMPHIBIA	CAUDATA	SALAMANDRIDAE	<i>Laotriton laoensis</i>	DD
9	ANIMALIA	CHORDATA	AMPHIBIA	GYMNOPHIONA	ICHTHYOPHIIDAE	<i>Ichthyophis laosensis</i>	DD
10	ANIMALIA	CHORDATA	AMPHIBIA	ANURA	MEGOPHRYIDAE	<i>Leptobrachium buchardi</i>	DD
11	ANIMALIA	CHORDATA	AMPHIBIA	ANURA	RANIDAE	<i>Odorrana bolavensis</i>	DD
12	ANIMALIA	CHORDATA	AMPHIBIA	ANURA	RHACOPHORIDAE	<i>Philautus petilus</i>	DD
13	ANIMALIA	CHORDATA	AMPHIBIA	ANURA	RANIDAE	<i>Amolops vitreus</i>	DD
14	ANIMALIA	ARTHROPODA	CRUSTACEA	DECAPODA	POTAMIDAE	<i>Erebusa calobates</i>	LC
15	ANIMALIA	ARTHROPODA	CRUSTACEA	DECAPODA	POTAMIDAE	<i>Pupamon prabang</i>	DD
16	ANIMALIA	ARTHROPODA	CRUSTACEA	DECAPODA	POTAMIDAE	<i>Megacephalomon kittikooni</i>	DD
17	ANIMALIA	ARTHROPODA	CRUSTACEA	DECAPODA	POTAMIDAE	<i>Indochinamon villosum</i>	EN
18	ANIMALIA	ARTHROPODA	CRUSTACEA	DECAPODA	POTAMIDAE	<i>Indochinamon guttum</i>	VU
19	ANIMALIA	ARTHROPODA	CRUSTACEA	DECAPODA	POTAMIDAE	<i>Pupamon lao</i>	DD
20	ANIMALIA	ARTHROPODA	CRUSTACEA	DECAPODA	POTAMIDAE	<i>Pudaengon khammouan</i>	DD
21	ANIMALIA	ARTHROPODA	CRUSTACEA	DECAPODA	POTAMIDAE	<i>Hainanpotamon directum</i>	DD
22	ANIMALIA	ARTHROPODA	CRUSTACEA	DECAPODA	POTAMIDAE	<i>Pudaengon hinpoon</i>	DD
23	ANIMALIA	ARTHROPODA	CRUSTACEA	DECAPODA	POTAMIDAE	<i>Pudaengon arnamicaei</i>	DD
24	ANIMALIA	ARTHROPODA	CRUSTACEA	DECAPODA	POTAMIDAE	<i>Pupamon pealianoides</i>	DD
25	ANIMALIA	ARTHROPODA	CRUSTACEA	DECAPODA	POTAMIDAE	<i>Iomon luangprabangense</i>	VU

No.	Kingdom	Phylum	Class	Order	Family	Species	IUCN Category
26	ANIMALIA	ARTHROPODA	CRUSTACEA	DECAPODA	POTAMIDAE	<i>Indochinamon ou</i>	DD
Not-Comprehensively-Assessed Group							
1	ANIMALIA	ARTHROPODA	INSECTA	ODONATA	AMPHIPTERYGIDAE	<i>Devadatta glaucinota</i>	DD
2	ANIMALIA	ARTHROPODA	INSECTA	ODONATA	AMPHIPTERYGIDAE	<i>Devadatta multinervosa</i>	DD
3	ANIMALIA	ARTHROPODA	INSECTA	ODONATA	CHLOROCYPHIDAE	<i>Indocypha silbergliedi</i>	DD
4	ANIMALIA	ARTHROPODA	INSECTA	ODONATA	LIBELLULIDAE	<i>Amphithemis kerri</i>	DD
5	ANIMALIA	ARTHROPODA	INSECTA	ODONATA	LIBELLULIDAE	<i>Zygonyx immaculata</i>	DD
6	ANIMALIA	ARTHROPODA	INSECTA	ODONATA	MACROMIIDAE	<i>Macromia vangviengensis</i>	DD
7	ANIMALIA	ARTHROPODA	INSECTA	ODONATA	PLATYSTICTIDAE	<i>Protosticta trilobata</i>	DD
8	ANIMALIA	ARTHROPODA	INSECTA	ODONATA	PLATYSTICTIDAE	<i>Protosticta robusta</i>	DD
9	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	BALITORIDAE	<i>Schistura novemradiata</i>	DD
10	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	BALITORIDAE	<i>Schistura sertata</i>	DD
11	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	BALITORIDAE	<i>Schistura latidens</i>	DD
12	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	BALITORIDAE	<i>Schistura nudidorsum</i>	EN
13	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	BALITORIDAE	<i>Nemacheilus arenicolus</i>	LC
14	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	BALITORIDAE	<i>Schistura imitator</i>	LC
15	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	BALITORIDAE	<i>Schistura obeini</i>	LC
16	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	BALITORIDAE	<i>Schistura rikiki</i>	DD
17	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	BALITORIDAE	<i>Schistura bolavenensis</i>	EN
18	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	BALITORIDAE	<i>Schistura irregularis</i>	DD
19	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	BALITORIDAE	<i>Schistura pertica</i>	DD
20	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	BALITORIDAE	<i>Schistura crabro</i>	DD
21	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	BALITORIDAE	<i>Schistura punctifasciata</i>	DD
22	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	BALITORIDAE	<i>Schistura xhatensis</i>	DD
23	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	BALITORIDAE	<i>Schistura sombooni</i>	LC
24	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	BALITORIDAE	<i>Schistura russa</i>	DD
25	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	BALITORIDAE	<i>Schistura kaysoni</i>	VU
26	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	BALITORIDAE	<i>Schistura personata</i>	NT
27	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	BALITORIDAE	<i>Schistura cataracta</i>	LC

No.	Kingdom	Phylum	Class	Order	Family	Species	IUCN Category
28	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	BALITORIDAE	<i>Schistura tubularis</i>	VU
29	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	BALITORIDAE	<i>Hemimyzon khonensis</i>	DD
30	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	BALITORIDAE	<i>Schistura ephelis</i>	DD
31	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	BALITORIDAE	<i>Schistura defectiva</i>	DD
32	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	BALITORIDAE	<i>Schistura quaesita</i>	DD
33	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	BALITORIDAE	<i>Schistura procera</i>	LC
34	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	BALITORIDAE	<i>Hemimyzon confluens</i>	VU
35	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	BALITORIDAE	<i>Schistura clatrata</i>	LC
36	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	BALITORIDAE	<i>Schistura quasimodo</i>	EN
37	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	BALITORIDAE	<i>Schistura fusinotata</i>	LC
38	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	BALITORIDAE	<i>Schistura leukensis</i>	CR
39	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	BALITORIDAE	<i>Schistura globiceps</i>	DD
40	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	BALITORIDAE	<i>Sewellia diardi</i>	DD
41	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	BALITORIDAE	<i>Schistura atra</i>	VU
42	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	BALITORIDAE	<i>Schistura coruscans</i>	DD
43	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	BALITORIDAE	<i>Vanmanenia serrilineata</i>	DD
44	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	BALITORIDAE	<i>Schistura suber</i>	DD
45	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	BALITORIDAE	<i>Sewellia elongata</i>	NT
46	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	BALITORIDAE	<i>Schistura nomi</i>	LC
47	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	BALITORIDAE	<i>Schistura tizardi</i>	DD
48	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	BALITORIDAE	<i>Schistura tenuta</i>	CR
49	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	BALITORIDAE	<i>Schistura sigillata</i>	DD
50	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	COBITIDAE	<i>Serpenticobitis octozona</i>	DD
51	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	CYPRINIDAE	<i>Acheilognathus deignani</i>	DD
52	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	CYPRINIDAE	<i>Poropuntius lobocheiloides</i>	EN
53	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	CYPRINIDAE	<i>Scaphognathops theunensis</i>	CR
54	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	CYPRINIDAE	<i>Acrossocheilus xamensis</i>	DD
55	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	CYPRINIDAE	<i>Poropuntius solitus</i>	EN
56	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	CYPRINIDAE	<i>Garra cyrano</i>	DD

No.	Kingdom	Phylum	Class	Order	Family	Species	IUCN Category
57	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	CYPRINIDAE	<i>Rhodeus laoensis</i>	VU
58	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	CYPRINIDAE	<i>Devario acrostomus</i>	DD
59	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	CYPRINIDAE	<i>Garra theunensis</i>	LC
60	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	CYPRINIDAE	<i>Poropuntius bolovenensis</i>	EN
61	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	CYPRINIDAE	<i>Osteochilus striatus</i>	DD
62	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	CYPRINIDAE	<i>Poropuntius consternans</i>	EN
63	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	CYPRINIDAE	<i>Troglocyclocheilus khammouanensis</i>	VU
64	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	CYPRINIDAE	<i>Devario gibber</i>	LC
65	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	CYPRINIDAE	<i>Laocypris hispida</i>	DD
66	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	CYPRINIDAE	<i>Poropuntius angustus</i>	DD
67	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	CYPRINIDAE	<i>Bangana musaei</i>	VU
68	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	CYPRINIDAE	<i>Tor ater</i>	VU
69	ANIMALIA	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	CYPRINIDAE	<i>Devario fangfangae</i>	LC
70	ANIMALIA	CHORDATA	ACTINOPTERYGII	PERCIFORMES	GOBIIDAE	<i>Rhinogobius albimaculatus</i>	VU
71	ANIMALIA	CHORDATA	ACTINOPTERYGII	PERCIFORMES	GOBIIDAE	<i>Rhinogobius lineatus</i>	EN
72	ANIMALIA	CHORDATA	ACTINOPTERYGII	PERCIFORMES	ODONTOBUTIDAE	<i>Terateleotris aspro</i>	EN
73	ANIMALIA	CHORDATA	ACTINOPTERYGII	SILURIFORMES	AKYSIDAE	<i>Pseudobagarius inermis</i>	DD
74	ANIMALIA	CHORDATA	ACTINOPTERYGII	SILURIFORMES	SILURIDAE	<i>Pterocryptis inusitata</i>	EN
75	ANIMALIA	CHORDATA	ACTINOPTERYGII	SILURIFORMES	SISORIDAE	<i>Oreoglanis lepturus</i>	CR
76	ANIMALIA	CHORDATA	ACTINOPTERYGII	SILURIFORMES	SISORIDAE	<i>Oreoglanis hypsiurus</i>	LC
77	ANIMALIA	CHORDATA	ACTINOPTERYGII	SILURIFORMES	SISORIDAE	<i>Pseudecheneis sympelvica</i>	DD
78	ANIMALIA	CHORDATA	ACTINOPTERYGII	SILURIFORMES	SISORIDAE	<i>Oreoglanis delacouri</i>	DD
79	ANIMALIA	CHORDATA	ACTINOPTERYGII	SILURIFORMES	SISORIDAE	<i>Oreoglanis macronemus</i>	DD
80	ANIMALIA	CHORDATA	ACTINOPTERYGII	SILURIFORMES	SISORIDAE	<i>Oreoglanis frenata</i>	DD
81	ANIMALIA	MOLLUSCA	GASTROPODA	LITTORINIMORPHA	HYDROBIIDAE	<i>Paraprososthenia lynnei</i>	VU
82	ANIMALIA	MOLLUSCA	GASTROPODA	LITTORINIMORPHA	POMATIOPSIDAE	<i>Pachydrobia dubiosa</i>	DD
83	ANIMALIA	MOLLUSCA	GASTROPODA	LITTORINIMORPHA	POMATIOPSIDAE	<i>Lacunopsis ventricosa</i>	DD
84	ANIMALIA	MOLLUSCA	GASTROPODA	LITTORINIMORPHA	POMATIOPSIDAE	<i>Pachydrobia levayi</i>	VU
85	ANIMALIA	MOLLUSCA	GASTROPODA	LITTORINIMORPHA	POMATIOPSIDAE	<i>Jullienia nodulosa</i>	DD

No.	Kingdom	Phylum	Class	Order	Family	Species	IUCN Category
86	ANIMALIA	MOLLUSCA	GASTROPODA	LITTORINIMORPHA	POMATIOPSIDAE	<i>Jullienia costata</i>	VU
87	ANIMALIA	MOLLUSCA	GASTROPODA	LITTORINIMORPHA	POMATIOPSIDAE	<i>Hubendickia velimirovichi</i>	DD
88	ANIMALIA	MOLLUSCA	GASTROPODA	LITTORINIMORPHA	POMATIOPSIDAE	<i>Jullienia albaobscura</i>	VU
89	ANIMALIA	MOLLUSCA	GASTROPODA	LITTORINIMORPHA	POMATIOPSIDAE	<i>Tricula conica</i>	VU
90	ANIMALIA	MOLLUSCA	GASTROPODA	LITTORINIMORPHA	POMATIOPSIDAE	<i>Hubendickia pellucida</i>	VU
91	ANIMALIA	MOLLUSCA	GASTROPODA	LITTORINIMORPHA	POMATIOPSIDAE	<i>Lacunopsis deiecta</i>	VU
92	ANIMALIA	MOLLUSCA	GASTROPODA	LITTORINIMORPHA	POMATIOPSIDAE	<i>Lacunopsis sphaerica</i>	DD
93	ANIMALIA	MOLLUSCA	GASTROPODA	LITTORINIMORPHA	POMATIOPSIDAE	<i>Jullienia minima</i>	VU
94	ANIMALIA	MOLLUSCA	GASTROPODA	LITTORINIMORPHA	STENOTHYRIDAE	<i>Stenothyra huaimoi</i>	EN
95	ANIMALIA	MOLLUSCA	GASTROPODA	LITTORINIMORPHA	STENOTHYRIDAE	<i>Stenothyra decollata</i>	VU
96	ANIMALIA	MOLLUSCA	GASTROPODA	LITTORINIMORPHA	STENOTHYRIDAE	<i>Stenothyra khongi</i>	NT
97	ANIMALIA	MOLLUSCA	GASTROPODA	LITTORINIMORPHA	STENOTHYRIDAE	<i>Stenothyra laotiensis</i>	VU
98	ANIMALIA	MOLLUSCA	GASTROPODA	SORBEOCONCHA	PACHYCHILIDAE	<i>Brotia mariae</i>	NT
99	ANIMALIA	MOLLUSCA	GASTROPODA	SORBEOCONCHA	PACHYCHILIDAE	<i>Brotia laodelectata</i>	VU
100	PLANTAE	TRACHEOPHYTA	LILIOPSIDA	ORCHIDALES	ORCHIDACEAE	<i>Bulbophyllum coveniorum</i>	DD
101	PLANTAE	TRACHEOPHYTA	LILIOPSIDA	ZINGERBERALES	ZINGIBERACEAE	<i>Amomum calcaratum</i>	VU
102	PLANTAE	TRACHEOPHYTA	LILIOPSIDA	ZINGERBERALES	ZINGIBERACEAE	<i>Amomum calcicolum</i>	NT
103	PLANTAE	TRACHEOPHYTA	LILIOPSIDA	ZINGERBERALES	ZINGIBERACEAE	<i>Amomum chryseum</i>	LC
104	PLANTAE	TRACHEOPHYTA	LILIOPSIDA	ZINGERBERALES	ZINGIBERACEAE	<i>Amomum glabrifolium</i>	LC
105	PLANTAE	TRACHEOPHYTA	LILIOPSIDA	ZINGERBERALES	ZINGIBERACEAE	<i>Amomum prionocarpum</i>	LC
106	PLANTAE	TRACHEOPHYTA	LILIOPSIDA	ZINGERBERALES	ZINGIBERACEAE	<i>Amomum stephanocoleum</i>	EN
107	PLANTAE	TRACHEOPHYTA	MAGNOLIOPSIDA	GERANIALES	BALSAMINACEAE	<i>Impatiens angustisepala</i>	CR
108	PLANTAE	TRACHEOPHYTA	MAGNOLIOPSIDA	PODOSTEMALES	PODOSTEMACEAE	<i>Hydrodiscus koyamae</i>	LC
109	PLANTAE	TRACHEOPHYTA	MAGNOLIOPSIDA	SCROPHULARIALES	GESNERIACEAE	<i>Paraboea mahaxayana</i>	DD
110	PLANTAE	TRACHEOPHYTA	MAGNOLIOPSIDA	SCROPHULARIALES	GESNERIACEAE	<i>Paraboea thorelii</i>	DD

Notes: EX: Extinct; EW: Extinct in the wild; CR: Critically Endangered; EN: Endangered; VU: Vulnerable; NT: Near Threatened; LC: Least Concern; DD: Data deficient; NE: Not evaluated; PE: Probably extinct (informal).

Source: IUCN (2013)

TABLE A-4
IUCN Red List of Lao PDR (Animal)

No.	Scientific Name	English Name
Critically Endangered (CR)		
1	<i>Aptosyax grypus</i>	Mekong Giant Salmon Carp
2	<i>Bos sauveli</i>	Kouprey
3	<i>Catlocarpio siamensis</i>	Giant Carp
4	<i>Crocodylus siamensis</i>	Siamese Crocodile
5	<i>Cuora galbinifrons</i>	Indochinese Box Turtle
6	<i>Cuora trifasciata</i>	Chinese Three-striped Box Turtle
7	<i>Datnioides pulcher</i>	Siamese Tiger Perch
8	<i>Dicerorhinus sumatrensis</i>	Sumatran Rhinoceros
9	<i>Gyps bengalensis</i>	White-rumped Vulture
10	<i>Gyps tenuirostris</i>	Slender-billed Vulture
11	<i>Nomascus concolor</i>	Black Crested Gibbon
12	<i>Nomascus leucogenys</i>	Northern White-cheeked Gibbon
13	<i>Oreoglanis lepturus</i>	
14	<i>Pangasianodon gigas</i>	Mekong Giant Catfish
15	<i>Pangasius sanitwongsei</i>	Giant Pangasius
16	<i>Pristis pristis</i>	Large-tooth Sawfish
17	<i>Pseudibis davisoni</i>	White-shouldered Ibis
18	<i>Pseudoryx nghetinhensis</i>	
19	<i>Rhinoceros sondaicus</i>	Javan Rhinoceros
20	<i>Sarcogyps calvus</i>	Red-headed Vulture
21	<i>Scaphognathops theunensis</i>	
22	<i>Schistura leukensis</i>	
23	<i>Schistura tenura</i>	
24	<i>Thaumatibis gigantea</i>	Giant Ibis
Endangered (EN)		
1	<i>Bos javanicus</i>	Banteng
2	<i>Bubalus arnee</i>	Asian Buffalo
3	<i>Cairina scutulata</i>	White-winged Duck
4	<i>Cuon alpinus</i>	Dhole
5	<i>Cuora mouhotii</i>	Jagged-shelled Turtle
6	<i>Dasyatis laosensis</i>	Mekong Freshwater Stingray
7	<i>Elephas maximus</i>	Asian Elephant
8	<i>Heliopais personatus</i>	Masked Finfoot
9	<i>Himantura polylepis</i>	
10	<i>Hylobates lar</i>	Lar Gibbon
11	<i>Hylobates pileatus</i>	Pileated Gibbon
12	<i>Indochinamon villosus</i>	
13	<i>Indotestudo elongata</i>	Elongated Tortoise
14	<i>Laonastes aenigmamus</i>	Laotian Rock Rat
15	<i>Laubuca caeruleostigmata</i>	Flying Minnow
16	<i>Leptoptilos dubius</i>	Greater Adjutant

No.	Scientific Name	English Name
17	<i>Luciocyprinus striolatus</i>	
18	<i>Manis javanica</i>	Sunda Pangolin
19	<i>Manis pentadactyla</i>	Chinese Pangolin
20	<i>Muntiacus vuquangensis</i>	Large-antlered Muntjac
21	<i>Nomascus gabriellae</i>	Red-cheeked Gibbon
22	<i>Nomascus siki</i>	Southern White-cheeked Gibbon
23	<i>Pangasianodon hypophthalmus</i>	Striped Catfish
24	<i>Panthera tigris</i>	Tiger
25	<i>Pavo muticus</i>	Green Peafowl
26	<i>Pelochelys cantorii</i>	Cantor's Giant Softshell
27	<i>Platysternon megacephalum</i>	Big-headed Turtle
28	<i>Poropuntius bolovenensis</i>	
29	<i>Poropuntius consternans</i>	
30	<i>Poropuntius lobocheiloides</i>	
31	<i>Poropuntius solitus</i>	
32	<i>Prionailurus viverrinus</i>	Fishing Cat
33	<i>Probarbus jullieni</i>	Jullien's Golden Carp
34	<i>Probarbus labeamajor</i>	Thicklipped Barb
35	<i>Protothrops sieversorum</i>	Three Horned-scaled Pitviper
36	<i>Pterocryptis inusitata</i>	
37	<i>Pygathrix nemaeus</i>	Red-shanked Douc Langur
38	<i>Rhinogobius lineatus</i>	
39	<i>Rucervus eldii</i>	Eld's Deer
40	<i>Sacalia quadriocellata</i>	Four-eyed Turtle
41	<i>Schistura bairdi</i>	
42	<i>Schistura bolavenensis</i>	
43	<i>Schistura nudidorsum</i>	
44	<i>Schistura quasimodo</i>	
45	<i>Stenothyra huaimoi</i>	
46	<i>Sterna acuticauda</i>	Black-bellied Tern
47	<i>Terateleotris aspro</i>	
48	<i>Trachypithecus germaini</i>	Indochinese Lutung
49	<i>Trachypithecus hatinhensis</i>	Hatinh Langur
50	<i>Trachypithecus phayrei</i>	Phayre's Leaf-monkey
Vulnerable (VU)		
1	<i>Aceros nipalensis</i>	Rufous-necked Hornbill
2	<i>Acrocephalus tangorum</i>	Manchurian Reed-warbler
3	<i>Actinodura sodangorum</i>	Black-crowned Barwing
4	<i>Amyda cartilaginea</i>	Asiatic Softshell Turtle
5	<i>Aonyx cinerea</i>	Asian Small-clawed Otter
6	<i>Aquila clanga</i>	Greater Spotted Eagle
7	<i>Aquila heliaca</i>	Eastern Imperial Eagle
8	<i>Arctictis binturong</i>	Binturong
9	<i>Bangana behri</i>	
10	<i>Bangana musaei</i>	

No.	Scientific Name	English Name
11	<i>Bos gaurus</i>	Gaur
12	<i>Brotia laodelectata</i>	
13	<i>Chrotogale owstoni</i>	Owston's Civet
14	<i>Cirrhinus microlepis</i>	Small Scaled Mud Carp
15	<i>Columba punicea</i>	Pale-capped Pigeon
16	<i>Datnioides undecimradiatus</i>	
17	<i>Devario apopyris</i>	
18	<i>Emberiza aureola</i>	Yellow-breasted Bunting
19	<i>Epalzeorhynchus munense</i>	Red Fin Shark
20	<i>Gallinago nemoricola</i>	Wood Snipe
21	<i>Grus antigone</i>	Sarus Crane
22	<i>Hapalomys delacouri</i>	Lesser Marmoset Rat
23	<i>Helarctos malayanus</i>	Sun Bear
24	<i>Hemimyzon confluens</i>	
25	<i>Heosemys grandis</i>	Giant Asian Pond Turtle
26	<i>Hipposideros khaokhouayensis</i>	Phou Khao Khouay Leaf-nosed Bat
27	<i>Hipposideros scutinares</i>	Shield-nosed Leaf-nosed Bat
28	<i>Hubendickia pellucida</i>	
29	<i>Hylarana attigua</i>	
30	<i>Hypsibarbus lagleri</i>	
31	<i>Indochinamon guttum</i>	
32	<i>Iomon luangprabangense</i>	
33	<i>Jullienia albaobscura</i>	
34	<i>Jullienia costata</i>	
35	<i>Jullienia flava</i>	
36	<i>Jullienia minima</i>	
37	<i>Kurixalus baliogaster</i>	
38	<i>Labeo pierrei</i>	
39	<i>Lacunopsis delecta</i>	
40	<i>Lacunopsis globosa</i>	
41	<i>Lacunopsis minutarpiettei</i>	
42	<i>Leptobrachium banae</i>	
43	<i>Leptoptilos javanicus</i>	Lesser Adjutant
44	<i>Lutrogale perspicillata</i>	Smooth-coated Otter
45	<i>Macaca arctoides</i>	Stump-tailed Macaque
46	<i>Macaca leonina</i>	Northern Pig-tailed Macaque
47	<i>Macromia katae</i>	
48	<i>Malayemys subtrijuga</i>	
49	<i>Manouria impressa</i>	Impressed Tortoise
50	<i>Mulleripicus pulverulentus</i>	Great Slaty Woodpecker
51	<i>Mystacoleucus lepturus</i>	
52	<i>Mystus bocourti</i>	
53	<i>Naja siamensis</i>	Black And White Spitting Cobra
54	<i>Neofelis nebulosa</i>	Clouded Leopard
55	<i>Nycticebus bengalensis</i>	Bengal Slow Loris

No.	Scientific Name	English Name
56	<i>Nycticebus pygmaeus</i>	Pygmy Slow Loris
57	<i>Ophiophagus hannah</i>	King Cobra
58	<i>Orcaella brevirostris</i>	Irrawaddy Dolphin
59	<i>Osphronemus exodon</i>	Elephant Ear Gourami
60	<i>Oxygaster pointoni</i>	
61	<i>Pachydrobia bertini</i>	
62	<i>Pachydrobia levayi</i>	
63	<i>Pangasius krempfi</i>	
64	<i>Paraprososthenia lynnei</i>	
65	<i>Pardofelis marmorata</i>	Marbled Cat
66	<i>Philosina alba</i>	
67	<i>Pseudohemiculter dispar</i>	
68	<i>Python bivittatus</i>	Burmese Python
69	<i>Rhacophorus exechopygus</i>	
70	<i>Rhacophorus kio</i>	
71	<i>Rhinogobius albimaculatus</i>	
72	<i>Rhodeus laoensis</i>	
73	<i>Rusa unicolor</i>	Sambar
74	<i>Rynchops albicollis</i>	Indian Skimmer
75	<i>Scaphognathops bandanensis</i>	
76	<i>Schistura atra</i>	
77	<i>Schistura kaysoni</i>	Laotian Cave Loach
78	<i>Schistura tubularis</i>	
79	<i>Serpenticobitis cingulata</i>	
80	<i>Sitta formosa</i>	Beautiful Nuthatch
81	<i>Stenothyra decollata</i>	
82	<i>Stenothyra laotensis</i>	
83	<i>Tenuulosa thibaudeaui</i>	Mekong herring
84	<i>Tor ater</i>	
85	<i>Trachypithecus laotum</i>	Laotian Langur
86	<i>Tricula conica</i>	
87	<i>Troglocyclocheilus khammouanensis</i>	
88	<i>Turdus feae</i>	Grey-sided Thrush
89	<i>Ursus thibetanus</i>	Asiatic Black Bear
90	<i>Viverra zibetha</i>	Large-spotted Civet
91	<i>Yasuhikotakia nigrolineata</i>	Black-Lined Loach
92	<i>Yasuhikotakia splendida</i>	

Source: IUCN (2013a)

TABLE A-5
IUCN Red List of Lao PDR (Plant)

No.	Scientific Name	English Name
Critically Endangered (CR)		
1	<i>Aquilaria crassna</i>	Agar Wood
2	<i>Diospyros mun</i>	Ebony
3	<i>Dipterocarpus turbinatus</i>	
4	<i>Glyptostrobus pensilis</i>	Chinese Swamp Cypress
5	<i>Hopea thorelii</i>	
6	<i>Impatiens angustisepala</i>	
7	<i>Shorea thorelii</i>	
Endangered (EN)		
1	<i>Afzelia xylocarpa</i>	
2	<i>Amomum celsum</i>	
3	<i>Amomum stephanocoleum</i>	
4	<i>Cunninghamia konishii</i>	
5	<i>Dalbergia bariensis</i>	Burmese Rosewood
6	<i>Dipterocarpus costatus</i>	
7	<i>Hopea pierrei</i>	
8	<i>Hopea recopei</i>	
9	<i>Shorea henryana</i>	White Meranti
10	<i>Shorea roxburghii</i>	White Meranti
Vulnerable (VU)		
1	<i>Amentotaxus yunnanensis</i>	Yunnan Catkin Yew
2	<i>Amomum calcaratum</i>	
3	<i>Amomum odontocarpum</i>	
4	<i>Amomum petaloideum</i>	
5	<i>Cephalotaxus mannii</i>	Mann's Yew Plum
6	<i>Curcuma rhabdota</i>	Candy Cane
7	<i>Cycas micholitzii</i>	
8	<i>Cycas pectinata</i>	
9	<i>Dalbergia cochinchinensis</i>	Rose Wood
10	<i>Fokienia hodginsii</i>	Fujian Cypress
11	<i>Hopea odorata</i>	
12	<i>Hydnocarpus annamensis</i>	
13	<i>Keteleeria evelyniana</i>	
14	<i>Knema tonkinensis</i>	
15	<i>Platanus kerrii</i>	

Source: IUCN (2013a)

TABLE A-6
CMS-Listed Animals in Lao PDR

No.	Phylum	Class	Order	Family	Scientific Name
Appendix I					
1	CHORDATA	MAMMALIA	ARTIODACTYLA	BOVIDAE	<i>Bos sauveli</i> (Urbain, 1937)
2	CHORDATA	PISCES	SILURIFORMES	PANGASIIDAE	<i>Pangasianodon gigas</i> (Chevey, 1931)
Appendix I/II					
1	CHORDATA	MAMMALIA	CETACEA	DELPHINIDAE	<i>Orcaella brevirostris</i> (Owen in Gray, 1866)
2	CHORDATA	AVES	ANSERIFORMES	ANATIDAE	<i>Aythya baeri</i> (Radde, 1863)
3	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Aquila clanga</i> (Pallas, 1811)
4	CHORDATA	AVES	FALCONIFORMES	FALCONIDAE	<i>Falco naumanni</i> (Fleischer, 1818)
5	CHORDATA	AVES	PASSERIFORMES	EMBERIZIDAE	<i>Emberiza aureola</i> (pallas, 1773)
Appendix II					
1	CHORDATA	AVES	CICONIIFORMES	CICONIIDAE	<i>Ciconia nigra</i> (Linnaeus, 1758)
2	CHORDATA	AVES	FALCONIFORMES	PANDIONIDAE	<i>Pandion haliaetus</i> (Linnaeus, 1758)
3	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Aviceda jerdoni</i> (Blyth, 1842)
4	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Aviceda leuphotes</i> (Dumont, 1820)
5	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Pernis ptilorhyncus</i> (Temminck, 1821)
6	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Milvus migrans</i> (Boddaert, 1783)
7	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Circaetus gallicus</i> (Gmelin, 1788)
8	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Circus spilonotus</i> (Kaup, 1847)
9	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Circus cyaneus</i> (Linnaeus, 1766)
10	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Circus melanoleucos</i> (Pennant, 1769)
11	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Accipiter badius</i> (Gmelin, 1788)
12	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Accipiter soloensis</i> (Horsfield, 1821)
13	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Accipiter gularis</i> (Temminck & Schlegel, 1844)
14	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Accipiter virgatus</i> (Temminck, 1822)
15	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Accipiter nisus</i> (Linnaeus, 1758)
16	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Accipiter gentilis</i> (Linnaeus, 1758)
17	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Butastur indicus</i> (Gmelin, 1788)

No.	Phylum	Class	Order	Family	Scientific Name
18	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Buteo buteo</i> (Linnaeus, 1758)
19	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Hieraaetus pennatus</i> (Gmelin, 1788)
20	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Spizaetus nipalensis</i> (Hodgson, 1836)
21	CHORDATA	AVES	FALCONIFORMES	FALCONIDAE	<i>Falco tinnunculus</i> (Linnaeus, 1758)
22	CHORDATA	AVES	FALCONIFORMES	FALCONIDAE	<i>Falco amurensis</i> (Radde, 1863)
23	CHORDATA	AVES	FALCONIFORMES	FALCONIDAE	<i>Falco columbarius</i> (Linnaeus, 1758)
24	CHORDATA	AVES	FALCONIFORMES	FALCONIDAE	<i>Falco subbuteo</i> (Linnaeus, 1758)
25	CHORDATA	AVES	FALCONIFORMES	FALCONIDAE	<i>Falco severus</i> (Horsfield, 1821)
26	CHORDATA	AVES	FALCONIFORMES	FALCONIDAE	<i>Falco peregrinus</i> (Tunstall, 1771)
27	CHORDATA	AVES	STRIGIFORMES	STRIGIDAE	<i>Ninox scutulata</i> (Raffles, 1822)
28	CHORDATA	AVES	STRIGIFORMES	STRIGIDAE	<i>Asio otus</i> (Linnaeus, 1758)
29	CHORDATA	AVES	STRIGIFORMES	STRIGIDAE	<i>Asio flammeus</i> (Pontoppidan, 1763)
30	CHORDATA	AVES	CHARADRIIFORMES	BURHINIDAE	<i>Burhinus oedicephalus</i> (Linnaeus, 1758)
31	CHORDATA	AVES	CHARADRIIFORMES	LARIDAE	<i>Sterna albifrons</i> (Pallas, 1764)

Source: UNEP (2013)

TABLE A-7
CITES-Listed Animals in Lao PDR

No.	Phylum	Class	Order	Family	Scientific Name
Appendix I					
1	CHORDATA	MAMMALIA	PRIMATES	LORISIDAE	<i>Nycticebus bengalensis</i> (Lacépède, 1800)
2	CHORDATA	MAMMALIA	PRIMATES	LORISIDAE	<i>Nycticebus pygmaeus</i> (Bonhote, 1907)
3	CHORDATA	MAMMALIA	PRIMATES	CERCOPITHECIDAE	<i>Pygathrix nemaeus</i> (Linnaeus, 1771)
4	CHORDATA	MAMMALIA	PRIMATES	HYLOBATIDAE	<i>Hylobates lar</i> (Linnaeus, 1771)
5	CHORDATA	MAMMALIA	PRIMATES	HYLOBATIDAE	<i>Hylobates pileatus</i> (Gray, 1861)
6	CHORDATA	MAMMALIA	PRIMATES	HYLOBATIDAE	<i>Nomascus annamensis</i> (Van Ngoc Thinh, Mootnick, Vu Ngoc Thanh, Nadler & Roos, 2010)
7	CHORDATA	MAMMALIA	PRIMATES	HYLOBATIDAE	<i>Nomascus concolor</i> (Harlan, 1826)
8	CHORDATA	MAMMALIA	PRIMATES	HYLOBATIDAE	<i>Nomascus gabriellae</i> (Thomas, 1909)
9	CHORDATA	MAMMALIA	PRIMATES	HYLOBATIDAE	<i>Nomascus leucogenys</i> (Ogilby, 1840)
10	CHORDATA	MAMMALIA	PRIMATES	HYLOBATIDAE	<i>Nomascus siki</i> (Delacour, 1951)
11	CHORDATA	MAMMALIA	CETACEA	DELPHINIDAE	<i>Orcaella brevirostris</i> (Owen in Gray, 1866)
12	CHORDATA	MAMMALIA	CARNIVORA	AILURIDAE	<i>Ailurus fulgens</i> (F. G. Cuvier, 1825)
13	CHORDATA	MAMMALIA	CARNIVORA	URSIDAE	<i>Helarctos malayanus</i> (Raffles, 1821)
14	CHORDATA	MAMMALIA	CARNIVORA	URSIDAE	<i>Ursus thibetanus</i> (G. Cuvier, 1823)
15	CHORDATA	MAMMALIA	CARNIVORA	VIVERRIDAE	<i>Prionodon pardicolor</i> (Hodgson, 1842)
16	CHORDATA	MAMMALIA	CARNIVORA	FELIDAE	<i>Catopuma temminckii</i> (Vigors & Horsfield, 1827)
17	CHORDATA	MAMMALIA	CARNIVORA	FELIDAE	<i>Neofelis nebulosa</i> (Griffith, 1821)
18	CHORDATA	MAMMALIA	CARNIVORA	FELIDAE	<i>Panthera pardus</i> (Linnaeus, 1758)
19	CHORDATA	MAMMALIA	CARNIVORA	FELIDAE	<i>Panthera tigris</i> (Linnaeus, 1758)
20	CHORDATA	MAMMALIA	CARNIVORA	FELIDAE	<i>Pardofelis marmorata</i> (Martin, 1837)
21	CHORDATA	MAMMALIA	CARNIVORA	FELIDAE	<i>Prionailurus bengalensis</i> (Kerr, 1792)
22	CHORDATA	MAMMALIA	CARNIVORA	FELIDAE	<i>Prionailurus bengalensis</i> (Kerr, 1792) <i>ssp. Bengalensis</i> (Kerr, 1792)
23	CHORDATA	MAMMALIA	PERISSODACTYLA	TAPIRIDAE	<i>Tapirus indicus</i> (Desmarest, 1819)
24	CHORDATA	MAMMALIA	PERISSODACTYLA	RHINOCEROTIDAE	<i>Dicerorhinus sumatrensis</i> (G. Fischer, 1814)

No.	Phylum	Class	Order	Family	Scientific Name
25	CHORDATA	MAMMALIA	PERISSODACTYLA	RHINOCEROTIDAE	<i>Rhinoceros sondaicus</i> (Desmarest, 1822)
26	CHORDATA	MAMMALIA	ARTIODACTYLA	CERVIDAE	<i>Axis porcinus</i> (Zimmermann, 1780)
27	CHORDATA	MAMMALIA	ARTIODACTYLA	CERVIDAE	<i>Axis porcinus</i> (Zimmermann, 1780) <i>ssp. Annamiticus</i> (Heude, 1888)
28	CHORDATA	MAMMALIA	ARTIODACTYLA	CERVIDAE	<i>Muntiacus vuquanghensis</i> (Tuoc, Dung, Dawson, Arctander & MacKinnon, 1994)
29	CHORDATA	MAMMALIA	ARTIODACTYLA	CERVIDAE	<i>Rucervus eldii</i> (McClelland, 1842)
30	CHORDATA	MAMMALIA	ARTIODACTYLA	BOVIDAE	<i>Bos gaurus</i> (C. H. Smith, 1827)
31	CHORDATA	MAMMALIA	ARTIODACTYLA	BOVIDAE	<i>Bos sauveli</i> (Urbain, 1937)
32	CHORDATA	MAMMALIA	ARTIODACTYLA	BOVIDAE	<i>Capricornis milneedwardsii</i> (David, 1869)
33	CHORDATA	MAMMALIA	ARTIODACTYLA	BOVIDAE	<i>Naemorhedus griseus</i> (Milne Edwards, 1871)
34	CHORDATA	MAMMALIA	ARTIODACTYLA	BOVIDAE	<i>Pseudoryx nghetinhensis</i> (Dung, Giao, Chinh, Touc, Arctander & MacKinnon, 1993)
35	CHORDATA	AVES	ANSERIFORMES	ANATIDAE	<i>Asarcornis scutulata</i> (S. Müller, 1842)
36	CHORDATA	AVES	GALLIFORMES	PHASIANIDAE	<i>Rheinardia ocellata</i> (Elliot, 1871)
37	CHORDATA	AVES	CORACIIFORMES	BUCEROTIDAE	<i>Aceros nipalensis</i> (Hodgson, 1829)
38	CHORDATA	AVES	CORACIIFORMES	BUCEROTIDAE	<i>Buceros bicornis</i> (Linnaeus, 1758)
39	CHORDATA	AVES	PICIFORMES	PICIDAE	<i>Dryocopus javensis</i> (Horsfield, 1821)
40	CHORDATA	REPTILIA	TESTUDINES	PLATYSTERNIDAE	<i>Platysternon megacephalum</i> (Gray, 1831)
41	CHORDATA	REPTILIA	SAURIA	VARANIDAE	<i>Varanus nebulosus</i> (Gray, 1831)
42	CHORDATA	REPTILIA	SERPENTES	PYTHONIDAE	<i>Python molurus</i> (Linnaeus, 1758)
43	CHORDATA	ACTINOPTERYGII	CYPRINIFORMES	CYPRINIDAE	<i>Probarbus jullieni</i> (Sauvage, 1880)
44	CHORDATA	ACTINOPTERYGII	SILURIFORMES	PANGASIIDAE	<i>Pangasianodon gigas</i> (Chevey, 1931)
Appendix I/r					
1	CHORDATA	MAMMALIA	CETACEA	DELPHINIDAE	<i>Orcaella brevirostris</i> (Owen in Gray, 1866)
2	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Aquila heliaca</i> (Savigny, 1809)
3	CHORDATA	AVES	FALCONIFORMES	FALCONIDAE	<i>Falco peregrinus</i> (Tunstall, 1771)
Appendix I/w					
1	CHORDATA	MAMMALIA	CARNIVORA	MUSTELIDAE	<i>Lutra lutra</i> (Linnaeus, 1758)
2	CHORDATA	MAMMALIA	PROBOSCIDEA	ELEPHANTIDAE	<i>Elephas maximus</i> (Linnaeus, 1758)

No.	Phylum	Class	Order	Family	Scientific Name
3	CHORDATA	REPTILIA	CROCODYLIA	CROCODYLIDAE	<i>Crocodylus siamensis</i> (Schneider, 1801)
Appendix II					
1	CHORDATA	MAMMALIA	SCANDENTIA	TUPAIIDAE	<i>Dendrogale murina</i> (Schlegel & Müller, 1843)
2	CHORDATA	MAMMALIA	SCANDENTIA	TUPAIIDAE	<i>Tupaia belangeri</i> (Wagner, 1841)
3	CHORDATA	MAMMALIA	CHIROPTERA	PTEROPODIDAE	<i>Pteropus vampyrus</i> (Linnaeus, 1758)
4	CHORDATA	MAMMALIA	PRIMATES	CERCOPITHECIDAE	<i>Macaca arctoides</i> (I. Geoffroy, 1831)
5	CHORDATA	MAMMALIA	PRIMATES	CERCOPITHECIDAE	<i>Macaca assamensis</i> (McClelland, 1840)
6	CHORDATA	MAMMALIA	PRIMATES	CERCOPITHECIDAE	<i>Macaca leonina</i> (Blyth, 1863)
7	CHORDATA	MAMMALIA	PRIMATES	CERCOPITHECIDAE	<i>Macaca mulatta</i> (Zimmermann, 1780)
8	CHORDATA	MAMMALIA	PRIMATES	CERCOPITHECIDAE	<i>Trachypithecus ebenus</i> (Brandon-Jones, 1995)
9	CHORDATA	MAMMALIA	PRIMATES	CERCOPITHECIDAE	<i>Trachypithecus francoisi</i> (Pousargues, 1898)
10	CHORDATA	MAMMALIA	PRIMATES	CERCOPITHECIDAE	<i>Trachypithecus germaini</i> (Milne-Edwards, 1876)
11	CHORDATA	MAMMALIA	PRIMATES	CERCOPITHECIDAE	<i>Trachypithecus laotum</i> (Thomas, 1911)
12	CHORDATA	MAMMALIA	PRIMATES	CERCOPITHECIDAE	<i>Trachypithecus obscurus</i> (Reid, 1837)
13	CHORDATA	MAMMALIA	PRIMATES	CERCOPITHECIDAE	<i>Trachypithecus phayrei</i> (Blyth, 1847)
14	CHORDATA	MAMMALIA	PHOLIDOTA	MANIDAE	<i>Manis javanica</i> (Desmarest, 1822)
15	CHORDATA	MAMMALIA	PRIMATES	CERCOPITHECIDAE	<i>Manis pentadactyla</i> (Linnaeus, 1758)
16	CHORDATA	MAMMALIA	RODENTIA	SCIURIDAE	<i>Ratufa bicolor</i> (Sparman, 1778)
17	CHORDATA	MAMMALIA	CARNIVORA	CANIDAE	<i>Cuon alpinus</i> (Pallas, 1811)
18	CHORDATA	MAMMALIA	CARNIVORA	MUSTELIDAE	<i>Aonyx cinerea</i> (Illiger, 1815)
19	CHORDATA	MAMMALIA	CARNIVORA	MUSTELIDAE	<i>Lutra sumatrana</i> (Gray, 1865)
20	CHORDATA	MAMMALIA	CARNIVORA	MUSTELIDAE	<i>Lutrogale perspicillata</i> (I. Geoffroy Saint-Hilaire, 1826)
21	CHORDATA	MAMMALIA	CARNIVORA	FELIDAE	<i>Felis chaus</i> (Schreber, 1777)
22	CHORDATA	MAMMALIA	CARNIVORA	FELIDAE	<i>Prionailurus bengalensis</i> (Kerr, 1792) <i>ssp. bengalensis</i> (Kerr, 1792)
23	CHORDATA	MAMMALIA	CARNIVORA	FELIDAE	<i>Prionailurus viverrinus</i> (Bennett, 1833)
24	CHORDATA	AVES	CICONIIFORMES	CICONIIDAE	<i>Ciconia nigra</i> (Linnaeus, 1758)
25	CHORDATA	AVES	ANSERIFORMES	ANATIDAE	<i>Sarkidiornis melanotos</i> (Pennant, 1769)
26	CHORDATA	AVES	FALCONIFORMES	PANDIONIDAE	<i>Pandion haliaetus</i> (Linnaeus, 1758)

No.	Phylum	Class	Order	Family	Scientific Name
27	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Accipiter badius</i> (Gmelin, 1788)
28	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Accipiter gularis</i> (Temminck & Schlegel, 1844)
29	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Accipiter nisus</i> (Linnaeus, 1758)
30	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Accipiter soloensis</i> (Horsfield, 1821)
31	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Accipiter trivirgatus</i> (Temminck, 1824)
32	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Accipiter virgatus</i> (Temminck, 1822)
33	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Aegypius monachus</i> (Linnaeus, 1766)
34	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Aquila clanga</i> (Pallas, 1811)
35	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Aviceda jerdoni</i> (Blyth, 1842)
36	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Aviceda leuphotes</i> (Dumont, 1820)
37	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Butastur indicus</i> (Gmelin, 1788)
38	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Butastur liventer</i> (Temminck, 1827)
39	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Buteo buteo</i> (Linnaeus, 1758)
40	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Circaetus gallicus</i> (Gmelin, 1788)
41	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Circus cyaneus</i> (Linnaeus, 1766)
42	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Circus melanoleucos</i> (Pennant, 1769)
43	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Circus spilonotus</i> (Kaup, 1847)
44	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Elanus caeruleus</i> (Desfontaines, 1789)
45	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Gyps bengalensis</i> (Gmelin, 1788)
46	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Gyps tenuirostris</i> (G. R. Gray, 1844)
47	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Haliaeetus leucogaster</i> (Gmelin, 1788)
48	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Haliastur indus</i> (Boddaert, 1783)
49	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Hieraaetus fasciatus</i> (Vieillot, 1822)
50	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Hieraaetus kienerii</i> (Geoffroy Saint-Hilaire, 1835)
51	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Hieraaetus pennatus</i> (Gmelin, 1788)
52	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Ichthyophaga humilis</i> (Müller & Schlegel, 1841)
53	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Ichthyophaga ichthyæetus</i> (Horsfield, 1821)
54	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Ictinaetus malayensis</i> (Temminck, 1822)
55	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Milvus migrans</i> (Boddaert, 1783)
56	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Pernis ptilorhynchus</i> (Temminck, 1821)

No.	Phylum	Class	Order	Family	Scientific Name
57	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Sarcogyps calvus</i> (Scopoli, 1786)
58	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Spilornis cheela</i> (Latham, 1790)
59	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Spizaetus cirrhatu</i> s (Gmelin, 1788)
60	CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Spizaetus nipalensis</i> (Hodgson, 1836)
61	CHORDATA	AVES	FALCONIFORMES	FALCONIDAE	<i>Falco amurensis</i> (Radde, 1863)
62	CHORDATA	AVES	FALCONIFORMES	FALCONIDAE	<i>Falco columbarius</i> (Linnaeus, 1758)
63	CHORDATA	AVES	FALCONIFORMES	FALCONIDAE	<i>Falco naumanni</i> (Fleischer, 1818)
64	CHORDATA	AVES	FALCONIFORMES	FALCONIDAE	<i>Falco severus</i> (Horsfield, 1821)
65	CHORDATA	AVES	FALCONIFORMES	FALCONIDAE	<i>Falco subbuteo</i> (Linnaeus, 1758)
66	CHORDATA	AVES	FALCONIFORMES	FALCONIDAE	<i>Falco tinnunculus</i> (Linnaeus, 1758)
67	CHORDATA	AVES	FALCONIFORMES	FALCONIDAE	<i>Microhierax caerulescens</i> (Linnaeus, 1758)
68	CHORDATA	AVES	FALCONIFORMES	FALCONIDAE	<i>Microhierax melanoleucos</i> (Blyth, 1843)
69	CHORDATA	AVES	FALCONIFORMES	FALCONIDAE	<i>Polihierax insignis</i> (Walden, 1872)
70	CHORDATA	AVES	GALLIFORMES	PHASIANIDAE	<i>Pavo muticus</i> (Linnaeus, 1766)
71	CHORDATA	AVES	GALLIFORMES	PHASIANIDAE	<i>Polyplectron bicalcaratum</i> (Linnaeus, 1758)
72	CHORDATA	AVES	GRUIFORMES	GRUIDAE	<i>Grus antigone</i> (Linnaeus, 1758)
73	CHORDATA	AVES	STRIGIFORMES	TYTONIDAE	<i>Phodilus badius</i> (Horsfield, 1821)
74	CHORDATA	AVES	STRIGIFORMES	TYTONIDAE	<i>Tyto alba</i> (Scopoli, 1769)
75	CHORDATA	AVES	STRIGIFORMES	STRIGIDAE	<i>Asio flammeus</i> (Pontoppidan, 1763)
76	CHORDATA	AVES	STRIGIFORMES	STRIGIDAE	<i>Asio otus</i> (Linnaeus, 1758)
77	CHORDATA	AVES	STRIGIFORMES	STRIGIDAE	<i>Athene brama</i> (Temminck, 1821)
78	CHORDATA	AVES	STRIGIFORMES	STRIGIDAE	<i>Bubo nipalensis</i> (Hodgson, 1836)
79	CHORDATA	AVES	STRIGIFORMES	STRIGIDAE	<i>Glaucidium brodiei</i> (Burton, 1836)
80	CHORDATA	AVES	STRIGIFORMES	STRIGIDAE	<i>Glaucidium cuculoides</i> (Vigors, 1831)
81	CHORDATA	AVES	STRIGIFORMES	STRIGIDAE	<i>Ketupa flavipes</i> (Hodgson, 1836)
82	CHORDATA	AVES	STRIGIFORMES	STRIGIDAE	<i>Ketupa ketupu</i> (Horsfield, 1821)
83	CHORDATA	AVES	STRIGIFORMES	STRIGIDAE	<i>Ketupa zeylonensis</i> (Gmelin, 1788)
84	CHORDATA	AVES	STRIGIFORMES	STRIGIDAE	<i>Ninox scutulata</i> (Raffles, 1822)
85	CHORDATA	AVES	STRIGIFORMES	STRIGIDAE	<i>Otus bakkamoena</i> (Pennant, 1769)
86	CHORDATA	AVES	STRIGIFORMES	STRIGIDAE	<i>Otus spilocephalus</i> (Blyth, 1846)

No.	Phylum	Class	Order	Family	Scientific Name
87	CHORDATA	AVES	STRIGIFORMES	STRIGIDAE	<i>Otus sunia</i> (Hodgson, 1836)
88	CHORDATA	AVES	STRIGIFORMES	STRIGIDAE	<i>Strix leptogrammica</i> (Temminck, 1831)
89	CHORDATA	AVES	STRIGIFORMES	STRIGIDAE	<i>Strix seloputo</i> (Horsfield, 1871)
90	CHORDATA	AVES	CORACIIFORMES	BUCEROTIDAE	<i>Anorrhinus tickelli</i> (Blyth, 1855)
91	CHORDATA	AVES	CORACIIFORMES	BUCEROTIDAE	<i>Anthracoceros albirostris</i> (Shaw & Nodder, 1807)
92	CHORDATA	AVES	CORACIIFORMES	BUCEROTIDAE	<i>Rhyticeros undulatus</i> (Shaw, 1811)
93	CHORDATA	AVES	PASSERIFORMES	MUSCICAPIDAE	<i>Garrulax canorus</i> (Linnaeus, 1758)
94	CHORDATA	AVES	PASSERIFORMES	MUSCICAPIDAE	<i>Leiothrix argentauris</i> (Hodgson, 1837)
95	CHORDATA	AVES	PASSERIFORMES	STURNIDAE	<i>Gracula religiosa</i> (Linnaeus, 1758)
96	CHORDATA	REPTILIA	TESTUDINES	GEOEMYDIDAE	<i>Cuora amboinensis</i> (Daudin, 1801)
97	CHORDATA	REPTILIA	TESTUDINES	GEOEMYDIDAE	<i>Cuora galbinifrons</i> (Bourret, 1939)
98	CHORDATA	REPTILIA	TESTUDINES	GEOEMYDIDAE	<i>Cuora mouhotii</i> (Gray, 1862)
99	CHORDATA	REPTILIA	TESTUDINES	GEOEMYDIDAE	<i>Cuora trifasciata</i> (Bell, 1825)
100	CHORDATA	REPTILIA	TESTUDINES	GEOEMYDIDAE	<i>Cyclemys oldhamii</i> (Gray, 1863)
101	CHORDATA	REPTILIA	TESTUDINES	GEOEMYDIDAE	<i>Cyclemys shanensis</i> (Annandale, 1918)
102	CHORDATA	REPTILIA	TESTUDINES	GEOEMYDIDAE	<i>Heosemys annandalii</i> (Boulenger, 1903)
103	CHORDATA	REPTILIA	TESTUDINES	GEOEMYDIDAE	<i>Heosemys grandis</i> (Gray, 1860)
104	CHORDATA	REPTILIA	TESTUDINES	GEOEMYDIDAE	<i>Malayemys subtrijuga</i> (Schlegel & S. Müller, 1844)
105	CHORDATA	REPTILIA	TESTUDINES	GEOEMYDIDAE	<i>Sacalia quadriocellata</i> (Siebenrock, 1903)
106	CHORDATA	REPTILIA	TESTUDINES	GEOEMYDIDAE	<i>Siebenrockiella crassicolis</i> (Gray, 1831)
107	CHORDATA	REPTILIA	TESTUDINES	TESTUDINIDAE	<i>Indotestudo elongata</i> (Blyth, 1853)
108	CHORDATA	REPTILIA	TESTUDINES	TESTUDINIDAE	<i>Manouria impressa</i> (Günther, 1882)
109	CHORDATA	REPTILIA	TESTUDINES	TRIONYCHIDAE	<i>Amyda cartilaginea</i> (Boddaert, 1770)
110	CHORDATA	REPTILIA	TESTUDINES	TRIONYCHIDAE	<i>Pelochelys cantorii</i> (Gray, 1864)
111	CHORDATA	REPTILIA	SERPENTES	PYTHONIDAE	<i>Python molurus</i> (Linnaeus, 1758)
112	CHORDATA	REPTILIA	SERPENTES	COLUBRIDAE	<i>Ptyas mucosus</i> (Linnaeus, 1758)
113	CHORDATA	REPTILIA	SERPENTES	ELAPIDAE	<i>Naja atra</i> (Cantor, 1842)
114	CHORDATA	REPTILIA	SERPENTES	ELAPIDAE	<i>Naja kaouthia</i> (Lesson, 1831)

No.	Phylum	Class	Order	Family	Scientific Name
115	CHORDATA	REPTILIA	SERPENTES	ELAPIDAE	<i>Naja siamensis</i> (Laurenti, 1768)
116	CHORDATA	REPTILIA	SERPENTES	ELAPIDAE	<i>Ophiophagus hannah</i> (Cantor, 1836)
117	ARTHROPODA	INSECTA	LEPIDOPTERA	PAPILIONIDAE	<i>Troides aeacus</i> (C. & R. Felder, 1860)
118	ARTHROPODA	INSECTA	LEPIDOPTERA	PAPILIONIDAE	<i>Troides helena</i> (Linnaeus, 1758)
Appendix II/r					
1	CHORDATA	MAMMALIA	PRIMATES	CERCOPITHECIDAE	<i>Macaca fascicularis</i> (Raffles, 1821)
Appendix II/w					
1	CHORDATA	AVES	PSITTACIFORMES	PSITTACIDAE	<i>Loriculus vernalis</i> (Sparrman, 1787)
2	CHORDATA	AVES	PSITTACIFORMES	PSITTACIDAE	<i>Psittacula alexandri</i> (Linnaeus, 1758)
3	CHORDATA	AVES	PSITTACIFORMES	PSITTACIDAE	<i>Psittacula eupatria</i> (Linnaeus, 1766)
4	CHORDATA	AVES	PSITTACIFORMES	PSITTACIDAE	<i>Psittacula finschii</i> (Hume, 1874)
5	CHORDATA	AVES	PSITTACIFORMES	PSITTACIDAE	<i>Psittacula roseata</i> (Biswas, 1951)
6	CHORDATA	REPTILIA	SAURIA	VARANIDAE	<i>Varanus salvator</i> (Laurenti, 1768)
7	CHORDATA	REPTILIA	SERPENTES	PYTHONIDAE	<i>Python bivittatus</i> (Kuhl, 1820)
8	CHORDATA	REPTILIA	SERPENTES	PYTHONIDAE	<i>Python reticulatus</i> (Schneider, 1801)
Appendix III					
1	CHORDATA	MAMMALIA	CARNIVORA	CANIDAE	<i>Vulpes vulpes</i> (Linnaeus, 1758)
2	CHORDATA		CARNIVORA	HERPESTIDAE	<i>Herpestes javanicus</i> (É.GeoffroySaint-Hilaire, 1818)
3	CHORDATA	REPTILIA	TESTUDINES	GEOEMYDIDAE	<i>Mauremys sinensis</i> (Gray, 1834)
4	CHORDATA	REPTILIA	SERPENTES	COLUBRIDAE	<i>Atretium schistosum</i> (Daudin, 1803)
5	CHORDATA	REPTILIA	SERPENTES	COLUBRIDAE	<i>Cerberus rynchops</i> (Schneider, 1799)
6	CHORDATA	REPTILIA	SERPENTES	COLUBRIDAE	<i>Xenochrophis piscator</i> (Schneider, 1799)
Appendix III/r					
1	CHORDATA	MAMMALIA	CARNIVORA	MUSTELIDAE	<i>Mustela kathiah</i> (Hodgson, 1835)
2	CHORDATA	MAMMALIA	CARNIVORA	MUSTELIDAE	<i>Mustela sibirica</i> (Pallas, 1773)
Appendix III/w					
1	CHORDATA	MAMMALIA	CARNIVORA	CANIDAE	<i>Canis aureus</i> (Linnaeus, 1758)
2	CHORDATA	MAMMALIA	CARNIVORA	MUSTELIDAE	<i>Martes flavigula</i> (Boddaert, 1785)
3	CHORDATA	MAMMALIA	CARNIVORA	VIVERRIDAE	<i>Arctictis binturong</i> (Raffles, 1821)

No.	Phylum	Class	Order	Family	Scientific Name
4	CHORDATA	MAMMALIA	CARNIVORA	VIVERRIDAE	<i>Paguma larvata</i> (C. E. H. Smith, 1827)
5	CHORDATA	MAMMALIA	CARNIVORA	VIVERRIDAE	<i>Paradoxurus hermaphroditus</i> (Pallas, 1777)
6	CHORDATA	MAMMALIA	CARNIVORA	VIVERRIDAE	<i>Viverra zibetha</i> (Linnaeus, 1758)
7	CHORDATA	MAMMALIA	CARNIVORA	VIVERRIDAE	<i>Viverricula indica</i> (É. Geoffroy Saint-Hilaire, 1803)
8	CHORDATA	MAMMALIA	CARNIVORA	HERPESTIDAE	<i>Herpestes javanicus</i> (É. Geoffroy Saint-Hilaire, 1818) <i>ssp. auropunctatus</i> (Hodgson, 1836)
9	CHORDATA	MAMMALIA	CARNIVORA	VIVERRIDAE	<i>Herpestes urva</i> (Hodgson, 1836)

Source: UNEP-WCMC (2013)

TABLE A-8
CITES-Listed Plants in Lao PDR

No.	Order	Family	Scientific Name
Appendix I			
1	ORCHIDALES	ORCHIDACEAE	<i>Paphiopedilum appletonianum</i> (Gower) (Rolfe)
2	ORCHIDALES	ORCHIDACEAE	<i>Paphiopedilum bellatulum</i> (Reichb. f.) (Stein)
3	ORCHIDALES	ORCHIDACEAE	<i>Paphiopedilum callosum</i> (Reichb.f.) (Stein)
4	ORCHIDALES	ORCHIDACEAE	<i>Paphiopedilum concolor</i> (Lindl.) (Pfitzer)
5	ORCHIDALES	ORCHIDACEAE	<i>Paphiopedilum gratrixianum</i> (Masters) (Guillaumin)
6	ORCHIDALES	ORCHIDACEAE	<i>Paphiopedilum villosum</i> (Lindl.) (Stein) var. <i>annamense</i> (Rolfe)
Plants (Appendix II)			
1	ORCHIDALES	ORCHIDACEAE	<i>Aerides multiflora</i> (Roxb.)
2	ORCHIDALES	ORCHIDACEAE	<i>Aerides odorata</i> (Lour.)
3	MYRTALES	THYMELAEACEAE	<i>Aquilaria crassna</i> (Pierre ex Lecomte)
4	ORCHIDALES	ORCHIDACEAE	<i>Ascocentrum ampullaceum</i> (Lindl.) (Schltr.)
5	ORCHIDALES	ORCHIDACEAE	<i>Ascocentrum curvifolium</i> (Lindl.) (Schltr.)
6	ORCHIDALES	ORCHIDACEAE	<i>Ascocentrum garayi</i> (Christenso)
7	ORCHIDALES	ORCHIDACEAE	<i>Ascocentrum miniatum</i> (Lindley) (Schltr.)
8	ORCHIDALES	ORCHIDACEAE	<i>Ascocentrum pusillum</i> (Aver.)
9	ORCHIDALES	ORCHIDACEAE	<i>Bulbophyllum affine</i> (Lindley)
10	ORCHIDALES	ORCHIDACEAE	<i>Bulbophyllum haniffii</i> (Carr)
11	ORCHIDALES	ORCHIDACEAE	<i>Bulbophyllum laxiflorum</i> (Blume) (Lindley)
12	ORCHIDALES	ORCHIDACEAE	<i>Bulbophyllum odoratissimum</i> (Lindl.)
13	ORCHIDALES	ORCHIDACEAE	<i>Bulbophyllum putidum</i> (Teijsm. & Binn) (J.J.Smith)
14	ORCHIDALES	ORCHIDACEAE	<i>Bulbophyllum rufinum</i> (Reichb. F.)
15	ORCHIDALES	ORCHIDACEAE	<i>Bulbophyllum secundum</i> (Hook.f.)
16	ORCHIDALES	ORCHIDACEAE	<i>Bulbophyllum siamense</i> (Reichb.F.)
17	ORCHIDALES	ORCHIDACEAE	<i>Bulbophyllum taeniophyllum</i> (Par. & Reichb.f.)
18	ORCHIDALES	ORCHIDACEAE	<i>Bulbophyllum tortuosum</i> (Blume) (Lindley)
19	ORCHIDALES	ORCHIDACEAE	<i>Calanthe angusta</i> (Lindl.)
20	ORCHIDALES	ORCHIDACEAE	<i>Calanthe cardioglossa</i> (Schltr.)
21	ORCHIDALES	ORCHIDACEAE	<i>Calanthe lyroglossa</i> (Reichb.f.)
22	ORCHIDALES	ORCHIDACEAE	<i>Calanthe poilanei</i> (Gagnep)
23	ORCHIDALES	ORCHIDACEAE	<i>Calanthe succedanea</i> (Gagnep)
24	ORCHIDALES	ORCHIDACEAE	<i>Calanthe triplicata</i> (Willeme.) (Ames)
25	ORCHIDALES	ORCHIDACEAE	<i>Coelogyne cumingii</i> (Lindley)
26	ORCHIDALES	ORCHIDACEAE	<i>Coelogyne fimbriata</i> (Lindl.)
27	ORCHIDALES	ORCHIDACEAE	<i>Coelogyne flaccida</i> (Lindley)
28	ORCHIDALES	ORCHIDACEAE	<i>Coelogyne nitida</i> (Wallich ex Don) (Lindley)
29	ORCHIDALES	ORCHIDACEAE	<i>Coelogyne pallens</i> (Ridley)
30	ORCHIDALES	ORCHIDACEAE	<i>Coelogyne trinervis</i> (Lindley)
31	ORCHIDALES	CYCADACEAE	<i>Cycas pectinata</i> (Buch.-Ham.)
32	ORCHIDALES	CYCADACEAE	<i>Cycas siamensis</i> (Miq.)
33	ORCHIDALES	ORCHIDACEAE	<i>Cymbidium aloifolium</i> (L.) (Sw.)
34	ORCHIDALES	ORCHIDACEAE	<i>Cymbidium bicolor</i> (Lindl.)

No.	Order	Family	Scientific Name
35	ORCHIDALES	ORCHIDACEAE	<i>Cymbidium bicolor</i> (Lindl.) ssp. <i>obtusum</i> (Du Puy & P.J.Cribb)
36	ORCHIDALES	ORCHIDACEAE	<i>Cymbidium dayanum</i> (Rchb.f.)
37	ORCHIDALES	ORCHIDACEAE	<i>Cymbidium ensifolium</i> (L.) (Sw.)
38	ORCHIDALES	ORCHIDACEAE	<i>Cymbidium finlaysonianum</i> (Lindl.)
39	ORCHIDALES	ORCHIDACEAE	<i>Cymbidium lancifolium</i> (Hook.)
40	ORCHIDALES	ORCHIDACEAE	<i>Cymbidium macrorhizon</i> (Lindl.)
41	FABALES	LEGUMINOSAE	<i>Dalbergia cochinchinensis</i> (Pierre)
42	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium acinaciforme</i> (Roxb.)
43	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium aduncum</i> (Wall.ex Lindl.)
44	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium aggregatum</i> (Roxb.)
45	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium aloifolium</i> (Blume) (Rchb.f.)
46	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium anosmum</i> (Lindl.)
47	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium aphyllum</i> (Roxb.) (C. Fischer)
48	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium bellatulum</i> (Rolfe)
49	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium brymerianum</i> (Rchb.f)
50	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium capillipes</i> (Rchb.f.)
51	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium cariniferum</i> (Rchb.f.)
52	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium chrysanthum</i> (Wall.)
53	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium chryseum</i> (Rolfe)
54	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium chrysotoxum</i> (Lindley)
55	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium crepidatum</i> (Lindley & Paxton)
56	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium cretaceum</i> (Lindley)
57	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium crystallinum</i> (Rchb.f.)
58	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium cumulatum</i> (Lindley)
59	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium delacourii</i> (Guill.)
60	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium deltatum</i> (Seidenf.)
61	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium densiflorum</i> (Wallich ex Lindley)
62	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium dixanthum</i> (Rchb.f)
63	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium draconis</i> (Rchb.f.)
64	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium farmeri</i> (Paxton)
65	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium faulhaberianum</i> (Schltr.)
66	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium fimbriatum</i> (Hook.)
67	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium findlayanum</i> (Parish & Rchb.f.)
68	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium friedericksianum</i> (Rchb.f.)
69	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium gratiosissimum</i> (Rchb.f.)
70	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium hercoglossum</i> (Rchb.f.)
71	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium heterocarpum</i> (Lindley)
72	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium indivisum</i> (Blume) (Miq.) var. <i>iindivisum</i>
73	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium inflatum</i> (Rolfe)
74	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium infundibulum</i> (Lindley)
75	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium jenkinsii</i> (Wallich) ex (Lindley)
76	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium lamellatum</i> (Blume) (Lindley)
77	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium leonis</i> (Lindl.) (Rchb.f.)
78	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium lindleyi</i> (Steud.)
79	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium lituiflorum</i> (Lindley)
80	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium loddigesii</i> (Rolfe)

No.	Order	Family	Scientific Name
81	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium mannii</i> (Ridley)
82	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium moschatum</i> (Buch.-Ham.) (Sw.)
83	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium multilineatum</i> (Kerr)
84	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium nathanielis</i> (Rchb.f.)
85	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium nobile</i> (Lindley)
86	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium nobile</i> (Lindl.) var. <i>nobile</i>
87	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium pachyglossum</i> (Par. & Rchb.f.)
88	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium palpebrae</i> (Lindley)
89	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium parciflorum</i> (Rchb.f.) ex (Lindley)
90	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium parishii</i> (Rchb.f.)
91	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium pendulum</i> (Roxb.)
92	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium porphyrophyllum</i> (Guill.)
93	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium primulinum</i> (Lindley)
94	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium pulchellum</i> (Roxb. ex Lindley)
95	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium scabrilingue</i> (Lindley)
96	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium secundum</i> (Blume) (Lindley ex Wall.)
97	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium senile</i> (Parish.) ex (Rchb.f.)
98	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium signatum</i> (Rchb.f.)
99	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium sulcatum</i> (Lindley)
100	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium thyrsiflorum</i> (Rchb.f.)
101	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium tortile</i> (Lindley)
102	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium trigonopus</i> (Rchb.f.)
103	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium unicum</i> (Seidenf.)
104	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium venustum</i> (Teijsm. & Binn)
105	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium virgineum</i> (Rchb.f.)
106	ORCHIDALES	ORCHIDACEAE	<i>Dendrobium wattii</i> (Hook.f.) (Reichb.f.)
107	LILIALES	DIOSCOREACEAE	<i>Dioscorea deltoidea</i> (Wallich ex Kunth)
108	EBENALES	EBENACEAE	<i>Diospyros curranii</i> (Merr.)
109	EBENALES	EBENACEAE	<i>Diospyros ferrea</i> (Willd.) (Bakh.)
110	EBENALES	EBENACEAE	<i>Diospyros montana</i> (Roxb.)
111	EBENALES	EBENACEAE	<i>Diospyros vera</i> (A.Chev.)
112	ORCHIDALES	ORCHIDACEAE	<i>Eria dasyphylla</i> (Par. & Reichb.f.)
113	ORCHIDALES	ORCHIDACEAE	<i>Galeola javanica</i> (Blume) (Benth. & Hook.)
114	ORCHIDALES	ORCHIDACEAE	<i>Gastrochilus dasypogon</i> (Lindl.) (Kuntze)
115	ORCHIDALES	ORCHIDACEAE	<i>Habenaria rhodocheila</i> (Hance)
116	ORCHIDALES	ORCHIDACEAE	<i>Liparis distans</i> (C.B. Clarke)
117	ORCHIDALES	ORCHIDACEAE	<i>Luisia filiformis</i> (Hook.f.)
118	NEPENTHALES	NEPENTHACEAE	<i>Nepenthes anamensis</i> (Macfarl)
119	NEPENTHALES	NEPENTHACEAE	<i>Nepenthes mirabilis</i> (Lour) (Druce)
120	ORCHIDALES	ORCHIDACEAE	<i>Papilionanthe teres</i> (Lindley) (Garay)
121	ORCHIDALES	ORCHIDACEAE	<i>Phalaenopsis amabilis</i> (L.) (Blume)
122	ORCHIDALES	ORCHIDACEAE	<i>Phalaenopsis cornucervi</i> (Breda) (Blume & Reichb.f.)
123	ORCHIDALES	ORCHIDACEAE	<i>Phalaenopsis gibbosa</i> (Sweet)
124	ORCHIDALES	ORCHIDACEAE	<i>Phalaenopsis mannii</i> (Rchb.f.)
125	ORCHIDALES	ORCHIDACEAE	<i>Pleione bulbocodioides</i> (Franch.) (Rolfe)
126	ORCHIDALES	ORCHIDACEAE	<i>Pleione hookeriana</i> (Lindl.) (B.S.Williams)

No.	Order	Family	Scientific Name
127	ORCHIDALES	ORCHIDACEAE	<i>Pleione praecox</i> (J.E.Sm.) (D.Don)
128	GENTIANALES	APOCYNACEAE	<i>Rauvolfia serpentina</i> (Benth.) ex (Kurz)
129	ORCHIDALES	ORCHIDACEAE	<i>Renanthera coccinea</i> (Lour.)
130	ORCHIDALES	ORCHIDACEAE	<i>Rhynchostylis coelestis</i> (Reichb.f.)
131	ORCHIDALES	ORCHIDACEAE	<i>Rhynchostylis gigantea</i> (Lindl.) (Ridl.)
132	ORCHIDALES	ORCHIDACEAE	<i>Rhynchostylis retusa</i> (Blume)
133	ORCHIDALES	ORCHIDACEAE	<i>Schoenorchis gemmata</i> (Lindl.) (J.J.Sm.)
134	ORCHIDALES	ORCHIDACEAE	<i>Tropidia curculigoides</i> (Blume)
135	ORCHIDALES	ORCHIDACEAE	<i>Vanda concolor</i> (Blume)
136	ORCHIDALES	ORCHIDACEAE	<i>Vanda denisoniana</i> (Benson & Reichb.f.)
137	ORCHIDALES	ORCHIDACEAE	<i>Vanda lilacina</i> (Teijsm. & Binn.)
138	ORCHIDALES	ORCHIDACEAE	<i>Vanda liouvillei</i> (Finet)
139	ORCHIDALES	ORCHIDACEAE	<i>Vanda pumila</i> (Hook.f.)
140	ORCHIDALES	ORCHIDACEAE	<i>Vanda tricolor</i> (Lindley)
141	ORCHIDALES	ORCHIDACEAE	<i>Vanda tricolor</i> (Lindl.) <i>ssp. suavis</i> (Lindl.) (Veitch)
142	ORCHIDALES	ORCHIDACEAE	<i>Vandopsis gigantea</i> (Lindl.) (Pfitzer)
143	ORCHIDALES	ORCHIDACEAE	<i>Vandopsis lissochiloides</i> (Gaudich.) (Pfitz.)

Source: UNEP-WCMC (2013)

TABLE A-9
Air Emission Standards from Factories

No.	Types of Buildings	Type of Factories	Emission Limits
1.	Ammonia and ammonium compounds	Trade, Industrial or processing plant	76 mg/Nm ³
2.	Antimony and its compounds	Trade, Industrial or processing plant	5 mg/Nm ³
3.	Arsenic and its compounds	Trade, Industrial or processing plant	1 mg/Nm ³
4.	Benzene	Trade, Industrial or processing plant	5 mg/Nm ³
5.	Cadmium and its compounds	Trade, Industrial or processing plant	3 mg/Nm ³
6.	Carbon monoxide	Trade, Industrial or processing plant or fuel burning process	625 mg/Nm ³
7.	Chlorine	Trade, Industrial or processing plant	32 mg/Nm ³
8.	Copper and its compounds	Trade, Industrial or processing plant	5 mg/Nm ³
9.	Dioxins and furans	Fuel burning, incineration process or wood industry	1.0 mg/TEZ/Nm ³
10.	Ethylene Oxide	Trade, Industrial or processing plant	5 mg/Nm ³
11.	Fluorine, hydrofluoric acid or inorganic fluorine compounds	Trade, Industrial or processing plant	50 mg/Nm ³
12.	Formaldehyde	Trade, Industrial or processing plant	20 mg/Nm ³
13.	Hydrogen Chloride	Trade, Industrial or processing plant	200 mg/Nm ³
14.	Hydrogen Sulphide	Trade, Industrial or processing plant	7.6 mg/Nm ³
15.	Lead and its compounds	Trade, Industrial or processing plant	5 mg/Nm ³
16.	Mercury and its compounds	Trade, Industrial or processing plant	3 mg/Nm ³
17.	Oxides of nitrogen	Trade, Industrial or processing plant	700 mg/Nm ³
18.	Particulate substances	Trade, Industrial or processing plant	I) 100 mg/Nm ³ II) 100 mg/Nm ³ 200 mg/Nm ³
19.	Smoke	Fuel burning, incineration or wood industry	Rangeland No.1 or equivalent opacity
20.	Styrene monomer	Trade, Industrial or processing plant	100 mg/Nm ³
21.	Sulphur dioxide	Trade, Industrial or processing plant	500 mg/Nm ³
22.	Sulphur dioxide and other acid greases	Fuel burning, incineration or wood industry	500 mg/Nm ³
23.	Sulphur dioxide or Sulphuric acid mist	Trade, Industrial, process, fuel burning plant or wood industry	100 mg/Nm ³
24.	Vinyl chloride monomer	Trade, Industrial or processing plant	20 mg/Nm ³

Source: PMO and WREA (2009)

TABLE A-10**Air Emission Standard from Cement Factories**

Type of cement factories	Permitted Air Emission Standard Value		
	Dust (mg/Nm ³)	Sulphur dioxide (ppm)	Dioxide of Nitrogen calculated in the form or Nitrogen dioxide (ppm)
Existing Cement Factories emitted air pollution in each specific area:			
(a) General cement burning plant	Not more than 300	Not more than 50	Not more than 600
(b) White cement burning plant	Not more than 300	Not more than 600	Not more than 600
(c) Cooling plant, cement crushing and coal crushing plant	Not more than 200	—	—
New Cement Factories emitted air pollution in each specific area:			
(a) General cement burning plant	Not more than 120	Not more than 50	Not more than 500
(b) White cement burning plant	Not more than 120	Not more than 500	Not more than 500
(c) Cooling plant, cement crushing and coal crushing plant	Not more than 120	—	—

Source: PMO and WREA (2009)

TABLE A-11**Air Emission Standard from Power Plant**

No.	Type of Substances	Point source	Permitted Emission Value
1.	Sulphur dioxide	Coal or Gas power plant: 1. with the capacity of not more than 300 MW 2. with the capacity from 300 MW to 500 MW 3. with the capacity above 500 MW	640 ppm
2.	Sulphur dioxide	Natural gas power plant	450 ppm
3.	Oxide of Nitrogen	Power Plant generating electricity from: 1. Coal 2. Gas 3. Natural Gas	350 ppm 180 ppm 120 ppm
4.	Particulate Substances	Power Plant generating electricity from: 1. Coal 2. Gas 3. Natural Gas	120 ml/Nm ³ 120 ml/Nm ³ 60 ml/Nm ³

Source: PMO and WREA (2009)

TABLE A-12**Air Emission Standard from Iron production plant**

Type of cement factories	Permitted Air Emission Standard Value		
	Dioxide of Nitrogen calculated in the form of Nitrogen dioxide (ppm)	Sulphur dioxide (ppm)	Dust (mg/Nm ³)
New Sources	800	180	120
Existing Sources	800	200	240

Source: PMO and WREA (2009)

TABLE A-13**Average Atmospheric Chemical Concentration in the Workplace**

No.	Parameters	Chemical Concentration	
		ppm	mg/m ³
1.	Aldrin	-	0.25
2.	Azinphos-methyl	-	0.2
3.	Chlordane	-	0.5
4.	DDT	-	1
5.	DDVP	-	1
6.	Dichlorvos	-	1
7.	Dieldrin	-	0.25
8.	Dimethyl 1.2-dibromo 2.2dichloroethyl phosphate (Dibrom)	-	3
9.	Endrin	-	0.1
10.	Guthion	-	0.2
11.	Lead asenate	-	0.15
12.	Lindane	-	0.5
13.	Melathion	-	15
14.	Methoxychlor	-	15
15.	Nicotine	-	0.5
16.	Systox	-	0.1
17.	Thalium (soluble compounds)	-	0.1
18.	Thiram	-	5
19.	Toxaphene	-	0.5
20.	Parathion	-	0.11
21.	Phosdrin	-	0.1
22.	Pyrethum	-	5
23.	Warfarin	-	0.1
24.	Carbaryl (sevin (R))	-	5
25.	2.4-D	-	10
26.	Paraquat	-	0.5
27.	2.4.5-T	-	10
28.	Acetic Acid	10	25
29.	Ammonia	50	35
30.	Arsenic and its compounds	-	0.5

31.	Arsine	0.05	0.2
32.	Biphenyl	0.2	1
33.	Bisphenol	0.5	2.8
34.	Carbon dioxide	5000	9000
35.	Carbon monoxide	50	55
36.	Chlorine	1	3
37.	Chlorine dioxide	0.1	0.3
38.	Chromium and its compounds	-	1
39.	Copper fume	-	0.1
40.	Dust or mist of copper	-	1
41.	Cotton dust (raw)	-	1
42.	Cyanide	-	5
43.	Ethyl alcohol	1000	1900
44.	Fluoride	-	2.5
45.	Fluorine	0.1	0.2
46.	Hydrogen cyanide	10	11
47.	Iron oxide fume	-	10
48.	Methyl alcohol	200	260
49.	Nikel carbonyl	0.001	0.007
50.	Nickel, metal and soluble compounds	-	1
51.	Nitric acid	2	5
52.	Nitric oxide	25	30
53.	Nitrogen dioxide	5	9
54.	Nitroglycerin	0.2	2
55.	Sodium hydroxide	-	2
56.	Sulphur dioxide	5	13
57.	Sulphuric acid	-	1
58.	Tetraethyl Lead	-	0.075
59.	Tetra methyl Lead	-	0.07
60.	Tin and Inorganic compounds of tin	-	2
61.	Tin and Organic compounds of tin	-	0.1
62.	Phenol	5	19
63.	Phosgene (Carbonyl chloride)	0.1	0.4
64.	Phosphine	0.3	0.4
65.	Posphoric acid	-	1
66.	Phosphorus (yellow)	-	0.1
67.	Phosphorus pentachloride	-	1
68.	Phosphorus pentasulfide	-	1
69.	Phosphorus	0.5	3
70.	Xylene	100	435
71.	Zinc chloride fume	-	1
72.	Zinc oxide fume	-	5

Source: PMO and WREA (2009)

TABLE A-14**Maximum Atmospheric Chemical Substances Concentration in the Workplace**

No.	Parameters	Chemical Concentration	
		ppm	mg/m ³
1.	Ally glycidyl ether	10	45
2.	Boron trifluoride	1	3
3.	Butylamine	5	15
4.	Tert-Butyl chromate	-	0.1
5.	Chlorine trifluoride	0.1	0.4
6.	Chloroacetaldehyde	1	3
7.	Chloroform (trichloromethane)	50	240
8.	o-Dichlorobenzene	50	300
9.	Dichloroethyl ether	15	90
10.	1,1-Dichloro-1-nitroethane	10	60
11.	Diglycidyl ether	0.5	2.8
12.	Ethyl mercaptan	10	25
13.	Ethylene mercaptan glycol dinitrate and/or Nitroglycerin	0.2	1
14.	Hydrogen chloride	5	7
15.	Iodine	0.1	1
16.	Manganese	-	5
17.	Methyl bromide	20	80
18.	Methyl mercaptan	10	20
19.	α -Methyl styrene	100	480
20.	Methylene bisphenyl isocyanate	0.02	0.2
21.	Monomethyl hydrazine	0.2	0.35
22.	Terphenyls	1	9
23.	Toluene-2,4-Diisocyanate	0.02	0.14
24.	Vinyl chloride	1	

Source: PMO and WREA (2009)

TABLE A-15**Maximum Atmospheric Chemical Materials Concentration in the Workplace**

No.	Materials	Average Concentration during normal Work Period	Concentration for a Specified Time		Permitted Concentration Value
			Concentration	Permitted Exposure Period	
1.	Benzene	10 ppm	50 ppm	10 mins	25 ppm
2.	Beryllium and its compounds	2 mg/m ³	25 mg/m ³	30 mins	5 mg/m ³
3.	Cadmium fume	0.1 mg/m ³	-		0.3 mg/m ³
4.	Cadmium dust	0.2 mg/m ³	-		0.6 mg/m ³
5.	Carbondisulfide	20 ppm	100 ppm	30 mins	30 ppm
6.	Carbontetrachloride	10 ppm	200 ppm	5 mins in any 4 hours	25 ppm
7.	Ethylene dibromide	20 ppm	50 ppm	5 mins	30 ppm
8.	Ethylene dichloride	50 ppm	200 ppm	5 mins in any 3 hours	200 ppm
9.	Formaldehyde	3 ppm	10 ppm	30 mins	5ppm
10.	Fluoride as dust	2.5 mg/m ³	-	-	-
11.	Lead and its inorganic compounds	0.2 mg/m ³	-	-	-
12.	Methyl chloride	100 ppm	300 ppm	5 mins in any 3 hours	200 ppm
13.	Methyl chloride	500 ppm	2000 ppm	5 mins in any 2 hours	1000 ppm
14.	Organo mercury	0.01 mg/m ³	-		0.04 mg/m ³
15.	Styrene	100 ppm	600 ppm	5 mins in any 3 hours	200 ppm
16.	Trichloro ethylene	100 ppm	300 ppm	5 mins in any 2 hours	200 ppm
17.	Tetrachloro ethylene	100 ppm	300 ppm	5 mins in any 3 hours	200 ppm
18.	Toluene	200 ppm	500 ppm	10 mins	300 ppm
19.	Hydrogen Sulfide	-	50 ppm	10 mins	20 ppm
20.	Mercury	-	-	-	0.05 mg/m ³
21.	Chromic acid and chromate salt	-	-	-	0.1 mg/m ³

Source: PMO and WREA (2009)

TABLE A-16**Emission Standard for New Vehicles**

Type of Vehicle	Standard Values			
	Particulate Matters (PM) (mg/km)	Nitrogen Oxide (NOx) (mg/km)	Hydrocarbon (HC) (mg/km)	Carbon Monoxide (mg/km)
Gasoline Engine Vehicle	–	150	200	2,300
Diesel Engine Vehicle	50	500	–	640

Source: PMO and WREA (2009)

TABLE A-17**Emission Standard for Used Motor Vehicles (Motorcycle)**

Pollutants	Standards	Equipment	Methods of Measurement
Carbon monoxide (CO)	4.5%	Non-dispersive Infrared Detection	Measure while parking the motorcycle at idle and no load
Hydrocarbon (HC)	10,000 ppm		
White Smoke	30%	Smoke Metre, Full Flow Opacity System	Measure while parking the motorcycle at idle and no load by quick acceleration the engine to 75% of maximum power rpm

Source: PMO and WREA (2009)

TABLE A-18**Emission Standard for Used Motor Vehicles (Gasoline Vehicle)**

Type	Pollutants	Standard	Equipment	Method of Measurement
	Carbon Monoxide CO (%)	Hydrocarbon HC (ppm)		
Gasoline Vehicle	4.5	600	Non-Dispersive Infrared Detection	Measure while parking the car at idle and no load

Source: PMO and WREA (2009)

TABLE A-19
Emission Standard for Used Motor Vehicles (Diesel Vehicle)

Type	Standards	Equipment	Methods of Measurement
Diesel Vehicle	50%	Filter System	Measure while parking the car at load by quick acceleration the engine to maximum rpm
	45%	System Opacity	
	40%	Filter System	Measure while the car running steady on the roller at 60% of maximum power rpm
	35%	System Opacity	

Source: PMO and WREA (2009)

TABLE A-20
Drinking Water Quality Standards

A) Bacteriological Parameters

Parameters	Unit	Concentration
Faecal-Coliform	MPN/100ml	0
Total Coliform	MPN/100ml	< 2.2
Enterovirus	MPN/100ml	0

B) Physical- Chemical Parameters

No.	Parameters	Symbol	Unit	Concentration	
				Min.	Max.
1.	Aluminum	Al	mg/l	0.1	0.2
2.	Ammonia	NH ₃	mg/l	0.5	1.5
3.	Chloride	Cl ⁻	mg/l	200	250
4.	Copper	Cu	mg/l	1.0	2.0
5.	Iron	Fe	mg/l	0.3	< 1
6.	Manganese	Mn	mg/l	0.1	0.5
7.	Sodium	Na	mg/l	200	250
8.	Sulphate	SO ₄ ²⁻	mg/l	200	250
9.	Hydrogen Sulphide	H ₂ S	mg/l	0.05	0.1
10.	Conductivity	Ec	μs/cm		< 1,000
11.	Total dissolved solids	TDS	mg/l	500	600
12.	Sodium Chloride	NaCl	mg/l	100	300–350
13.	pH			6.5	8.5
14.	Temperature		°C	25	35
15.	Hardness		mg/l	50	300
16.	Turbidity		NTU	5	< 10
17.	Taste and Odour				Acceptable
18.	Colour		TCU		5
19.	Residual Chloride (if Chlorine disinfection is used)	Cl ₂	mg/l		< 0.2

C) Health Significant Chemical Parameters

No.	Parameters	Symbol	Unit	Maximum Concentration
1.	Antimony	Sb	mg/l	0.005
2.	Arsenic	As	mg/l	0.01–0.05
3.	Barium	Ba	mg/l	0.7
4.	Boron	B	mg/l	0.5
5.	Cadmium	Cd	mg/l	0.003
6.	Chromium	Cr	mg/l	0.05
7.	Cyanide	CN ⁻	mg/l	0.07
8.	Fluoride	F ⁻	mg/l	1.5
9.	Lead	Pb	mg/l	0.01
10.	Mercury	Hg	mg/l	0.001
11.	Nitrate	NO ₃ ⁻	mg/l	50
12.	Nitrite	NO ₂ ⁻	mg/l	3
13.	Selenium	Se	mg/l	0.01

D) Priorities of Parameters

No.	Parameters	Symbol	Unit	Maximum Concentration
1.	Iron	Fe	mg/l	<1
2.	Manganese	Mn	mg/l	<0.5
3.	Arsenic	As	mg/l	<0.05
4.	Fluoride	F ⁻	mg/l	<1.5
5.	Nitrate	NO ₃ ⁻	mg/l	50
6.	Nitrite	NO ₂ ⁻	mg/l	3
7.	Nitrite Nitrogen	NO ₂ N	mg/l	1
8.	pH			6.5-8.5
9.	Coliforms		MPN/100ml	0
10.	Conductivity	Ec	μs/cm	1000
11.	Residual Chloride (if Chlorine disinfection is used)	Cl ₂	mg/l	0.2
12.	Total Hardness		mg/l	<300
13.	Turbidity		NTU	<10
14.	Taste and Odour			Acceptable

Source: PMO and WREA (2009)

TABLE A-21**Drinking Water Quality in the Covered Container**

No.	Parameters	Symbol	Unit	Permitted Concentration
1.	Arsenic	As	mg/l	0.01-0.05
2.	Barium	Ba	mg/l	0.7
3.	Boron	B	mg/l	0.5
4.	Cadmium	Cd	mg/l	0.003
5.	Chromium	Cr	mg/l	0.05
6.	Copper	Cu	mg/l	2
7.	Fluoride	F ⁻	mg/l	1.5
8.	Lead	Pb	mg/l	0.01-0.05
9.	Manganese	Mn	mg/l	0.5
10.	Mercury	Hg	mg/l	0.001
11.	Nitrate	NO ₃ ⁻	mg/l	50
12.	Iron	Fe	mg/l	0.3
13.	pH			6.5-8.5
14.	Hardness		mg/l	100-300

Source: PMO and WREA (2009)

TABLE A-22
Groundwater Quality Standards

No.	Substances	Symbol	Unit	Standard Value	Method of Measurement
I. Volatile Organic Compound					
1.	Benzene	C ₆ H ₆	mg/l	0.005	Purge and Trap Gas Chromatography or Purge and Trap Gas Chromatography/ Mass Spectrometry
2.	Carbon Tetrachloride	CCl ₄	mg/l	0.005	
3.	1,2-Dichloroethane	CH ₂ Cl.CH ₂ Cl	mg/l	0.005	
4.	1,1- Dichloroethylene	CCl ₂ =CH ₂	mg/l	0.007	
5.	Cis-1,2-Dichloroethylene		mg/l	0.7	
6.	Trans-1,2-Dichloroethylene		mg/l	0.1	
7.	Dichloroethylene	CH ₂ Cl ₂	mg/l	0.005	
8.	Ethly benzene	C ₆ H ₅ .C ₂ H ₅	mg/l	0.7	
9.	Styrene	C ₆ H ₅ CH=CH ₂	mg/l	0.1	
10.	Tetrachloroethylene	Cl ₂ C=CCl ₂	mg/l	0.005	
11.	Toluene	C ₆ H ₅ .CH ₃	mg/l	1	
12.	Trichloroethylene	Cl ₂ C=CHCl	mg/l	0.005	
13.	1,1,1 Trichloroethane	Cl ₂ C=CH ₃	mg/l	0.2	
14.	1,1,2 Trichloroethane	Cl ₂ CH-CH ₂ Cl	mg/l	0.005	
15.	Total Xylenes	o, m, p- (CH ₃ .C ₆ H ₄ . CH ₃)	mg/l	10	
II. Heavy Metals					
1.	Cadmium	Cd	mg/l	0.003	Direct Aspiration/Absorption Spectrometry or Inductively Coupled Plasma/Plasma Emission Spectroscopy
2.	Hexavalent Chromium	Cr ⁺⁶	mg/l	0.05	
3.	Copper	Cu	mg/l	1	
4.	Lead	Pb	mg/l	0.01	
5.	Manganese	Mn	mg/l	0.5	
6.	Nickel	Ni	mg/l	0.02	
7.	Zinc	Zn	mg/l	5	
8.	Arsenic	As	mg/l	0.01	Hydride Generation/Atomic Absorption Spectrometry or Inductively Coupled Plasma/Plasma Emission Spectroscopy
9.	Selenium	Se	mg/l	0.01	
10.	Mercury	Hg	mg/l	0.001	Cold-Vapour Atomic Absorption Spectrometry/Plasma Emission Spectroscopy
III. Pesticides					
1.	Chlordane	C ₁₀ H ₅ Cl ₈	mg/l	0.0002	Liquid-Liquid Extraction Gas Chromatography/Mass Spectrometry or Liquid-Liquid Extraction Gas Chromatography (Method I)
2.	Dieldrin	C ₁₂ H ₈ Cl ₆ O	mg/l	0.00003	
3.	Heptachlor	C ₁₀ H ₅ Cl ₇	mg/l	0.0004	
4.	Heptachlor Epoxide		mg/l	0.0002	
5.	DDT	DDT	mg/l	0.002	
6.	2,4-D	2, 4 D	mg/l	0.03	

7.	Atrazine	$C_8H_{14}ClN_5$	mg/l	0.003	Gas Chromatography
8.	Lindane	C_6Cl_6	mg/l	0.0002	Liquid-Liquid Extraction Gas Chromatography (Method I)
9.	Pentachlorophenol	$Cl_5C_6H_5OH$	mg/l	0.001	Liquid-Liquid Extraction Chromatography or Liquid-Liquid Extraction Gas Chromatography/Mass Spectrometry
IV. Others					
1.	Benzo(a)pyrene		mg/l	0.0002	Liquid-Liquid Extraction Chromatography or Liquid-Liquid Extraction Gas Chromatography/Mass Spectrometry
2.	Cyanide		mg/l	0.2	Pyridine Barbituric Acid or Colorimetric or Ion Chromatography
3.	PCBs		mg/l	0.0005	Liquid-Liquid Extraction Gas Chromatography (Method II)
4.	Vinyl Chloride		mg/l	0.002	Purge and Trap Gas Chromatography or Purge and Trap Gas Chromatography/Mass Spectrometry

Source: PMO and WREA (2009)

TABLE A-23
Groundwater Standards for Drinking Purposes

Characteristics	Parameters	Symbol	Unit	Permitted standard	
				Suitable	Maximum
Physical	1. Colour		Platinum-Cobalt (Pt-Co)	5	15
	2. Turbidity		JTU	5	20
	3. pH			7.0–8.5	6.5–9.2
Chemical	4. Iron	Fe	mg/l	≤ 0.5	1
	5. Manganese	Mn	mg/l	≤ 0.3	0.5
	6. Copper	Cu	mg/l	≤ 1.0	1.5
	7. Zinc	Zn	mg/l	≤ 5	15
	8. Sulphate		mg/l	≤ 200	250
	9. Chloride	Cl	mg/l	≤ 250	600
	10. Fluoride	F ⁻	mg/l	≤ 0.7	1
	11. Nitrate	NO ₃	mg/l	≤ 15	45
	12. Total Hardness as CaCO ₃	Total CaCO ₃	mg/l	≤ 300	500
	13. Non-carbonate hardness as CaCO ₃	Non CaCO ₃	mg/l	≤ 200	250
Toxic chemical substances	14. Total solids	TS	mg/l	≤ 600	1,200
	15. Arsenic	As	mg/l	None	0.05
	16. Cyanide	CN ⁻	mg/l	None	0.1
	17. Lead	Pb	mg/l	None	0.05
	18. Mercury	Hg	mg/l	None	0.001
	19. Cadmium	Cd	mg/l	None	0.01
	20. Selenium	Se	mg/l	None	0.01
Bacteria	21. Coliform bacteria	Coliform	MPN/100ml	< 2.2	< 2.2
	22. E. coli	E. coli	-	None	None
	23. Standard late count		Colonies/ml	≤ 500	

Source: PMO and WREA (2009)

TABLE A-24
Surface Water Quality Standards

No.	Substances	Symbol	Unit	Standard Value	Method of Measurement
1.	Colour, Odour and Test		-	N	-
2.	Temperature		C	N'	Thermometre
3.	pH		-	5-9	Electronic pH Metre
4.	Dissolved Oxygen	DO	mg/l	6	Azide Modification
5.	COD	COD	mg/l	5	Potassium permanganate
6.	BOD5	BOD ₅	mg/l	1.5	Azide Modification at 20 degree C, 5 days
7.	Total Coliform Bacteria	Coliform Bacteria	MPN/100ml	5000	Multiple Tube Fermentation
8.	Faecal Coliform Bacteria	Faecal Coliform	MPN/100ml	1000	
9.	Nitrate-Nitrogen	NO ₃ -N	mg/l	<5.0	Cadmium Reduction
10.	Ammonia-Nitrogen	NH ₃ -N	mg/l	0.2	Distillation Nesslerization
11.	Phenols	C ₆ H ₅ -OH	mg/l	0.005	Distillation, 4-Amin antipyrène
12.	Copper	Cu	mg/l	0.1	Atomic Absorption Direct Aspiration
13.	Nickel	Ni	mg/l	0.1	
14.	Manganese	Mn	mg/l	1.0	
15.	Zinc	Zn	mg/l	1.0	
16.	Cadmium	Cd	mg/l	0.005	
17.	Chromium, Hexavalent	Cr ⁶⁺	mg/l	0.05	
18.	Lead	Pb	mg/l	0.05	
19.	Mercury	Hg	mg/l	0.002	Atomic Absorption Cold Vapour
20.	Arsenic	As	mg/l	0.01	Atomic Absorption Direct Aspiration
21.	Cyanide	CN ⁻	mg/l	0.005	Pyridine-Barbituric
22.	Alpha-Radio activity	α	Becquerel/l	0.1	Gas Chromatography
23.	Beta-Radio activity	β	Becquerel/l	1.0	
24.	Total Organochlorine		mg/l	0.05	
25.	DDT	C ₁₄ H ₉ Cl ₅	mg/l	1.0	
26.	Alpha-BHC	α BHC	mg/l	0.02	
27.	Dieldrin	C ₁₂ H ₈ Cl ₆ O	mg/l	0.1	
28.	Aldrin		mg/l	0.1	
29.	Endrin		mg/l	None	

Source: PMO and WREA (2009)

TABLE A-25
Soil Quality Standards for Habitat and Agriculture

No.	Substances	Symbol	Unit	Standard Value	Method of Measurement
I. Volatile Organic Compound					
1.	Benzene	C ₆ H ₆	mg/kg	0.5	Gas Chromatography or Gas Chromatography/ Mass Spectrometry (GC/MS) or other methods approved by WREA
2.	Carbon Tetrachloride	CCl ₄	mg/kg	89	
3.	1,2-Dichloroethane	CH ₂ Cl.CH ₂ Cl	mg/kg	230	
4.	1,1- Dichloroethylene	CCl ₂ =CH ₂	mg/kg	1700	
5.	Cis-1,2-Dichloroethylene		mg/kg	57	
6.	Trans-1,2-Dichloroethylene		mg/kg	520	
7.	Dichloroethylene	CH ₂ Cl ₂	mg/kg	28	
8.	Ethly benzene	C ₆ H ₅ .C ₂ H ₅	mg/kg	630	
9.	Styrene	C ₆ H ₅ . CH=CH ₂	mg/kg	8.4	
10.	Tetrachloroethylene	Cl ₂ C=CCl ₂	mg/kg	210	
11.	Toluene	C ₆ H ₅ -CH ₃	mg/kg	6.5	
12.	Trichloroethylene	Cl ₂ C=CHCl	mg/kg	2.5	
13.	1,1,1 Trichloroethane	Cl ₂ C=CH ₃	mg/kg	3.5	
14.	1,1,2 Trichloroethane	Cl ₂ CH. CH ₂ Cl	mg/kg	43	
15.	Total Xylenes	o, m, p (CH ₃ -C ₆ H ₄ -CH ₃)	mg/kg	63	
II. Heavy Metals					
1.	Arsenic	As	mg/kg	3.9	Inductively Coupled Plasma-Atomic Emission Spectrometry or Inductively Coupled Plasma-Mass Spectrometry or Atomic Absorption, Gaseous Hydride or Atomic Absorption, Borohydride Reduction or other Methods Approved by WREA
2.	Cadmium and its compounds	Cd	mg/kg	37	
3.	Hexavalent Chromium	Cr ⁶⁺	mg/kg	300	
4.	Lead	Pb	mg/kg	400	Inductively Coupled Plasma-Atomic
5.	Manganese and its compounds ds	Mn	mg/kg	1800	

No.	Substances	Symbol	Unit	Standard Value	Method of Measurement
					Emission Spectrometry or Inductively Coupled Plasma-Mass Spectrometry or Atomic Absorption, Direct Aspiration or Atomic Absorption, Furnace Techniques or other Methods Approved by WREA
6.	Mercury and its compounds	Hg	mg/kg	23	Cold-Vapour Technique or other Methods Approved by WREA
7.	Nickel, soluble salts	Ni	mg/kg	1,600	Inductively Coupled Plasma-Atomic Emission Spectrometry or Inductively Coupled Plasma-Mass Spectrometry or Atomic Absorption, Direct Aspiration or Atomic Absorption, Furnace Techniques or other Methods Approved by WREA
8.	Selenium	Se	mg/kg	390	
III. Pesticides					
1.	Atrazine	C ₈ H ₁₄ ClN ₅	mg/kg	22	Gas Chromatography or other Methods Approved by WREA
2.	Chlordane		mg/kg	16	Gas Chromatography/ Mass Spectrometry (GC/MS) or other Methods Approved by WREA
3.	2,4-D		mg/kg	690	Gas Chromatography or High Performance Liquid

No.	Substances	Symbol	Unit	Standard Value	Method of Measurement
					Chromatography/ Thermal Extraction/ Gas Chromatography/ Mass Spectrometry (TE/GC/MS) or other Methods Approved by WREA
4.	DDT	DDT	mg/kg	17	Gas
5.	Dieldrin	C ₁₂ H ₈ Cl ₆ O	mg/kg	0.3	Chromatography or
6.	Heptachlor	Cl ₇	mg/kg	1.1	Gas
7.	Heptachlor Epoxide		mg/kg	0.5	Chromatography/
8.	Lindane		mg/kg	4.4	Mass Spectrometry (GC/MS) or other Methods Approved by WREA
IV. Others					
1.	Benzo(a)pyrene		mg/kg	0.6	Gas Chromatography/ Mass Spectrometry (GC/MS) or Thermal Extraction Gas Chromatography/ Mass Spectrometry (TE/GC/MS) Chromatography/ Fourier Transform Infrared (GC/FT-IR) Spectrometry or other Methods Approved by WREA
2.	Cyanide and its compounds	CN	mg/kg	11	Total and Amenable Cyanide: Distillation, or Total Amenable Cyanide (Automated Colorimetric, with off-line Distillation), or Cyanide Extraction Procedure for Solids and Oils or other Methods Approved

No.	Substances	Symbol	Unit	Standard Value	Method of Measurement
					by WREA
3.	PCBs		mg/kg	2.2	Gas Chromatography or other Methods Approved by WREA
4.	Vinyl Chloride		mg/kg	1.5	Gas Chromatography or Gas Chromatography/ Mass Spectrometry (GC/MS) or other Methods Approved by WREA

Source: PMO and WREA (2009)

TABLE A-26
Soil Quality Standards for Other Purposes

No.	Substances	Symbol	Unit	Standard Value	Method of Measurement
I. Volatile Organic Compound					
1.	1.1- Dichloroethylene		mg/kg	0. 5	Gas Chromatography or Gas Chromatography/ Mass Spectrometry (GC/MS) or other methods approved by WREA
2.	Dichloroethylene		mg/kg	89	
3.	Ethly benzene		mg/kg	230	
4.	Styrene		mg/kg	1,700	
5.	Tetrachloroethylene		mg/kg	57	
6.	Toluene		mg/kg	520	
7.	Trichloroethylene		mg/kg	28	
8.	1.1.1 Trichloroethane		mg/kg	630	
9.	1.1.2 Trichloroethane		mg/kg	8.4	
10.	Total Xylenes		mg/kg	210	
11.	Benzene		mg/kg	6.5	
12.	Carbon Tetrachloride		mg/kg	2.5	
13.	1.2-Dichloroethane		mg/kg	3.5	
14.	Cis-1,2- Dichloroethylene		mg/kg	43	
15.	Trans-1,2- Dichloroethylene		mg/kg	63	
II. Heavy Metals					
1.	Arsenic	As	mg/kg	27	Inductively Coupled Plasma-Atomic Emission Spectrometry or Inductively Coupled Plasma-Mass Spectrometry or Atomic Absorption Furnace Technique or Atomic
2.	Cadmium and its compounds	Cd	mg/kg	810	
3.	Hexavalent Chromium	Cr ⁶⁺	mg/kg	640	Co precipitation or Colorimetric or Chelation/Extraction or other Methods Approved by WREA
4.	Lead	Pb	mg/kg	750	Inductively Coupled Plasma-Atomic Emission Spectrometry or Inductively Coupled Plasma-Mass Spectrometry or Atomic Absorption, Direct Aspiration or Atomic Absorption, Furnace Techniques or other Methods Approved by WREA
5.	Manganese and its compounds ds	Mn	mg/kg	32,000	
6.	Mercury and its compounds	Hg	mg/kg	610	Cold-Vapour Technique or

No.	Substances	Symbol	Unit	Standard Value	Method of Measurement
					other Methods Approved by WREA
7.	Nickel, soluble salts	Ni	mg/kg	41,000	Inductively Coupled Plasma-Atomic Emission Spectrometry or Inductively Coupled Plasma-Mass Spectrometry or Atomic Absorption, Direct Aspiration or Atomic Absorption, Furnace Techniques or other Methods Approved by WREA
8.	Selenium	Se	mg/kg	10,000	Inductivity Coupled Plasma-Atomic Emission Spectrometry or Atomic Absorption, Furnace Technique or Atomic Absorption, Gaseous Hydride or Atomic Absorption, Borohydride Reduction or other Methods Approved by WREA
III. Pesticides					
1.	Atrazine	C ₈ H ₁₄ ClN ₅	mg/kg	110	Gas Chromatography or other Methods Approved by WREA
2.	Chlordane	C ₁₀ H ₅ Cl ₈	mg/kg	110	Gas Chromatography/Mass Spectrometry (GC/MS) or other Methods Approved by WREA
3.	2,4-D		mg/kg	12,000	Gas Chromatography or High Performance Liquid Chromatography/Thermal Extraction/ Gas Chromatography/Mass Spectrometry (TE/GC/MS) or other Methods Approved by WREA
4.	DDT	DDT	mg/kg	120	Gas Chromatography or Gas Chromatography/Mass Spectrometry (GC/MS) or other
5.	Dieldrin	C ₁₂ H ₈ Cl ₆ O	mg/kg	1.5	
6.	Heptachlor	Cl ₇	mg/kg	5.5	
7.	Heptachlor Epoxide		mg/kg	2.7	
8.	Lindane		mg/kg	29	

No.	Substances	Symbol	Unit	Standard Value	Method of Measurement
					Methods Approved by WREA
9.	Pentachlorophenol	Cl ₅ C ₆ H ₅ OH	mg/kg	110	Gas Chromatography or Gas Chromatography/Mass Spectrometry (GC/MS) or Gas Chromatography/Fourier Transform Infrared (GC/FT-IR) Spectrometry or other Methods Approved by WREA
IV. Others					
1.	Benzo(a)pyrene		mg/kg	2.9	Gas Chromatography/Mass Spectrometry (GC/MS) or Thermal Extraction Gas Chromatography/Mass Spectrometry (TE/GC/MS) Chromatography/Fourier Transform Infrared (GC/FT-IR) Spectrometry or other Methods Approved by WREA
2.	Cyanide and its compounds	CN ⁻	mg/kg	11	Total and Amenable Cyanide: Distillation, or Total Amenable Cyanide (Automated Colorimetric, with off-line Distillation), or Cyanide Extraction Procedure for Solids and Oils or other Methods Approved by WREA
3.	PCBs (C ₁₂ H ₇ Cl ₃)		mg/kg	10	Gas Chromatography or other Methods Approved by WREA
4.	Vinyl Chloride		mg/kg	8.3	Purge and Trap Gas Chromatography or Purge and Trap Gas Chromatography Mass Spectrometry

Source: PMO and WREA (2009)

TABLE A-27
Standards for General Industries

No.	Parameters	Symbols	Unit	Maximum Concentration
1.	BOD ₅		mg/l	40
2.	Ammonia Nitrogen	NH ₃ -N	mg/l	4
3.	Total Suspended Substances	TSS	mg/l	40
4.	pH		mg/l	6–9.5
5.	Total Dissolved Substances	TDS	mg/l	3,500
6.	Phenols	C ₆ H ₅ OH	mg/l	0.3
7.	Phosphorous	P	mg/l	1.0
8.	Silver	Ag	mg/l	0.1
9.	Zinc	Zn	mg/l	1.0
10.	Sulphide	S	mg/l	1.0
11.	Free Chlorine	Cl ₂	mg/l	1.0
12.	Chloride	Cl ⁻	mg/l	500
13.	Iron	Fe	mg/l	2.0
14.	Fluoride	F	mg/l	15
15.	Cyanide	CN ⁻	mg/l	0.1
16.	Copper	Cu	mg/l	0.5
17.	Lead	Pb	mg/l	0.2
18.	Oil and Grease		mg/l	5
19.	Nickel	Ni	mg/l	0.2
20.	Mercury	Hg	mg/l	0.005
21.	Manganese	Mn	mg/l	1.0
22.	Arsenic	As	mg/l	0.25
23.	Barium	Ba	mg/l	1.0
24.	Cadmium	Cd	mg/l	0.03
25.	Chromium	Cr	mg/l	0.1
26.	Total Chromium	Total Cr	mg/l	0.5

Source: PMO and WREA (2009)

TABLE A-28
Sugar Cane Factories

No.	Parameters	Unit	Maximum Concentration
1.	BOD ₅	mg/l	60
2.	Total Suspended Substances	mg/l	100
3.	pH		6–9.5

Source: PMO and WREA (2009)

TABLE A-29**Textiles and Garments Factories with Dyeing of Yarns**

No.	Parameters	Symbols	Unit	Maximum Concentration
1.	BOD ₅		mg/l	40
2.	Phenols	C ₆ H ₅ OH	mg/l	1
3.	Total Suspended Substances	TSS	mg/l	40
4.	pH			6–9.5

Source: PMO and WREA (2009)

TABLE A-30**Pulp Products**

No.	Parameters	Symbols	Unit	Maximum Concentration
1.	BOD ₅		mg/l	90
2.	Ammonia-Nitrogen	NH ₃ -N	mg/l	7
3.	Phenols	C ₆ H ₅ OH	mg/l	1
4.	Total Suspended Substances	TSS	mg/l	60
5.	pH			6–9.5

Source: PMO and WREA (2009)

TABLE A-31**Paper Products**

No.	Parameters	Symbols	Unit	Maximum Concentration
1.	BOD ₅		mg/l	30
2.	Total Suspended Substances	TSS	mg/l	30
3.	pH			6–9.5

Source: PMO and WREA (2009)

TABLE A-32**Slaughtering Factories**

No.	Parameters	Symbols	Unit	Maximum Concentration
1.	BOD ₅		mg/l	40
2.	Ammonia-Nitrogen	NH ₃ -N	mg/l	4
3.	Total Suspended Substances	TSS	mg/l	40
4.	pH			6–9.5

Source: PMO and WREA (2009)

TABLE A-33
Factories that Contain Organic Substances

No.	Types of Factories	Parameters		
		Max BOD ₅	Max pH	Max TSS
1.	Canned fish	40	6–9.5	50
2.	Beer	30	6–9.5	30
3.	Starch	70	6–9.5	80
4.	Tannery	40	6–9.5	40
5.	Yarn Dyeing	40	6–9.5	40
6.	Pharmacy	40	6–9.5	40

Source: PMO and WREA (2009)

TABLE A-34
Factories that Contain Inorganic Substances: Metal Plating

No.	Parameters	Symbols	Unit	Maximum Concentration
1.	pH			6–9.5
2.	Zinc	Zn	mg/l	5.0
3.	Cyanide	CN ⁻	mg/l	0.2
4.	Total Suspended Substances	TSS	mg/l	3.0
5.	Chrome	Cr	mg/l	0.3
6.	Total Chrome	Total Cr	mg/l	2.0
7.	Nickel	Ni	mg/l	0.2
8.	Copper	Cu	mg/l	1.0
9.	Total Heavy Metals		mg/l	6.0
10.	Oil and Grease		mg/l	30

Source: PMO and WREA (2009)

TABLE A-35
Batteries

No.	Parameters	Symbols	Unit	Maximum Concentration
1.	Lead	Pb	mg/l	0.2
2.	Copper	Cu	mg/l	0.5
3.	Zinc	Zn	mg/l	1
4.	Antimony	Sb	mg/l	1
5.	Cadmium	Cd	mg/l	0.03
6.	Chromium	Cr	mg/l	0.5
7.	Nickel	Ni	mg/l	1
8.	Mercury	Hg	mg/l	0.005
9.	pH		mg/l	6–9.5

Source: PMO and WREA (2009)

TABLE A-36**Effluent Standard for Pig Farm**

No.	Parameters	Symbol	Unit	Maximum Permitted Value		
				Standard A	Standard B	Method for Examination
1.	pH			5.5–9	5.5–9	pH Metre
2.	Biochemical Oxygen Demand	BOD	mg/l	60	100	Aside Modification or Membrane Electrode
3.	Chemical Oxygen Demand	COD	mg/l	300	400	Potassium Dichromate Digestion, Open Reflux or Closed Reflux
4.	Suspended Solids	SS	mg/l	150	200	Glass Fibre Filter Disc, Dry Evaporation 103–105 degree Celsius
5.	Total Kjeldahl Nitrogen	TKN	mg/l	120	200	Kjeldahl; Colorimetric or Ammonia Selective Electrode

Notes:

Standard A: 1. Large Farm is more than 400 Livestock Unit (LU)

2. Medium Farm is 60–400 LU.

Standard B: 1. Small Farm is 6–60 LU.

2. 1 LU equals 500 kg.

3. Weight of breeding pig = 170 kg/head

4. Weight of fattened pig = 60 kg/head

5. Weight of nursling pig = 12 kg/head

Source: PMO and WREA (2009)

TABLE A-37**Gas Station Effluent Standard**

No.	Parameters	Symbol	Unit	Range or Maximum Permitted Values	Method of Examination
1.	pH			5.5–9.0	pH Metre
2.	Chemical Oxygen Demand	COD	mg/l	200	Potassium Dichromate Digestion
3.	Suspended Solid	SS	mg/l	60	Glass Fibre Filter Disc
4.	Oil and Grease		mg/l	15	Extract with solvent

Source: PMO and WREA (2009)

TABLE A-38
The Standard of Wastewater Discharge

No.	Parameters	Symbol	Standards				
			A	B	C	D	E
1.	Biochemical Oxygen demand	BOD	Not more than (mg/l)				
			30	40	50	60	200
2.	Suspended Solids	SS	Not more than (mg/l)				
			30	40	50	50	60
3.	Settleable Solids		Not more than (mg/l)				
			0.5	0.5	0.5	0.5	-
4.	Total Dissolved Solids	TDS	Not more than (mg/l)				
			3000	250	2000	1500	-
5.	Chemical Oxygen Demand	COD	Not more than (mg/l)				
			120	130	150	350	400
6.	Sulphide	S ²⁻	Not more than (mg/l)				
			1.0	1.0	3.0	4.0	-
7.	Total Kjeldahl Nitrogen	TKN	Not more than (mg/l)				
			35	35	40	40	-
8.	Fat Oil and Grease		Not more than (mg/l)				
			20	20	20	20	100
9.	Temperature	t	Not more than (degree Celsius)				
			40	40	40	40	40
10.	pH		Not more than				
			6-9.5	6-9.5	6-9.5	6-9.5	6-9.5

Source: PMO and WREA (2009)

TABLE A-39**Classification of Buildings according to the Standard of Wastewater Discharge**

No.	Types of Buildings	Size of Buildings	Standard
1.	Buildings	Less than 100 rooms From 101 to 500 rooms Above 501 rooms	D C B
2.	Hotels	Less than 60 rooms From 61 to 200 rooms Above 201 rooms	D C B
3.	Dormitories	From 1 to 50 rooms From 51 to 250 rooms Above 251 rooms	D C B
4.	Medical Centers, Hospitals, Clinic	No bed From 1 to 30 beds. Above 31 beds.	C B A
Classification of buildings for using			
5.	Residential, temple	From 5,000 to 10,000 sq.m Above 10,001 sq.m	E D
6.	Entertainment zone, health center Swimming pool, Fitness Center	From 1,000 to 5,000 sq.m Above 5,001 sq.m	D B
7.	School, Educational institutions, College, Universities	From 5,000 to 25,000 sq.m Above 25,001 sq.m	B A
8.	Service Areas, Swimming pools or massage centers	From 10 to 30 beds Above 31 beds	B A
9.	Office, enterprises, foreign and private buildings, Hall	From 5000 to 10,000 sq.m. From 10,001 to 55,000 sq.m. Above 55,001 sq.m.	C B A
10.	Commercial centers and Supermarkets	From 5,000 to 25,000 sq.m. Above 25,001 sq.m.	B A
11.	Markets	From 500 to 1,000 sq.m. From 1001 to 1500 sq.m. From 1501 to 2500 sq.m. Above 2501 sq.m.	D C B A
12.	Restaurants	Less than 100 sq.m. From 101 to 250 sq.m. From 251 to 500 sq.m. From 501 to 2500 sq.m. Above 2501 sq.m.	E D C B A
13.	Auto service center(Motorbike, car)	From 500 to 1,000 sq.m. From 1,001 to 1,500 sq.m. From 1,501 to 2500 sq.m. Above 2,501 sq.m.	D C B A
14.	Terminal Stations, Airport.	From 5,000 to 10,000 sq.m. From 10,001 to 55,000 sq.m. Above 55,001 sq.m.	C B A
15.	Slather house in City	From 500 to 1,000 sq.m. From 1,001 to 1,500 sq.m.	D C

No.	Types of Buildings	Size of Buildings	Standard
		From 1,501 to 2,500 sq.m.	B
		Above 2,501 sq.m.	A

Source: PMO and WREA (2009)

TABLE A-40

Determination of Standard for Wastewater Treatment from Public Areas

No.	Parameters	Symbol	Standard Values	Method of Examination
1.	pH		6-9.5	pH Metre
2.	Biochemical Oxygen Demand	BOD	Not more than 30	Manometric method at 20 Celsius for 5 consecutive days
3.	Suspended Solid	SS	Not more than 30	Evaporation at about 150 Celsius during 1 hour
4.	Settleable Solids		0.5	Gravimetric
5.	Total Dissolved Solids	TDS	1500	Glass fibre filter disc
6.	Chemical Oxygen Demand	COD	Not more than 120	Potassium Digestion
7.	Sulphide	S ²⁻	1	Titration Method
8.	Total Kjeldahl Nitrogen	TKN	Not more than 100	Kjeldahl Method
9.	Fat Oil and Grease		Not more than 5	Extraction by solvent and separation of the weight of fat and grease
10.	Temperature	t	Nor more than 40 degree Celsius	Thermometre

Source: PMO and WREA (2009)

TABLE A-41

Noise Standard

Standards	Method of Measurement
Maximum Sound Level (Lmax) should not exceed 115 dB(A)	Equivalent Sound Level (Leq) from Fluctuating Noise
Leq 24 hour not exceeding 70 dB(A)	Equivalent Sound Level (Leq) from Steady Noise

Source: PMO and WREA (2009)

TABLE A-42
Noise Standards for Places

Type of Area	Standard Value in dB(A)		
	6:00–18:00	18:00–22:00	22:00–6:00
Quiet areas: hospitals, libraries, sanitary places, kindergarten and schools	50	45	40
Residential areas: hotels and houses	60	55	45
Commercial and service areas	70	70	50
Small industrial factories intermingling in residential areas	75	70	50

Source: PMO and WREA (2009)

TABLE A-43
Ethnic Groups according to the LFNC Classification

I: The Lao-Tai Language Family (8 Groups) ^{*1}			
No.	General Name	Subgroup	Other local names
1	Lao		Lao
		Phouan	Phouan
		Kaleung	Kaleung
		Bo	Bo
		Yooy	Yooy
		Nyo	Nyo
			Thay Pheung
			Isane ^{*2}
			Thay Xam
			Thay Yeuang
			Thay Lane
			Thay Cha
			Thay Mat
			Thay O
			Thay Lang
2	Phou Thay		Phou Thay
			Thay Ang Kham
			Thay Kata'
			Thay Kapong
			Thay Sam Kau
			Thay Vang
3	Tai	Tai Dam	Tai Dam (Black Tai)
		Tai Deng	Tai Deng (Red Tai)
		Tai Khao	Tai Khao (White Tai)
		Tai Moey	Tai Mène
			Tai Theng
			Tai Et
			Tai Xom
4	Lue		Lue ^{*3}

		Kheun	Kheun ^{*4}
5	Nyouan		Nyouan
		Kalom	Kalom
		Ngiau	Ngiau ^{*5}
6	Yang (Nhang)		Yang ^{*6}
7	Sek		Sek
			Koy
8	Tay Neua		Tay Neua ^{*7}
II: The Mon-Khmer Language Family (32 Groups) ^{*8}			
No.	General Name	Subgroup	Other local names
9	Kh mou		Kh mou, Kam mu
		Kh mou Ou	Kh mou Ou
		Kh mou Lue	Kh mou Lue
		Kh mou Nyouan	Kh mou Nyouan
		Kh mou Kh rong	Kh mou Kh rong
		Kh mou Rok	Kh mou Rok
		Kh mou Kh wène	Kh mou Kh wène ^{*9}
		Kh mou Mè	Kh mou Mè
		Kh mou Kasak	Kh mou Kasak
		Kh mou Cheuang	Kh mou Cheuang
			Mok Pray
			Mok Prang
			Mok Tang Chak
			Mok Kok
			Mok Tou
10	Pray	Thin	Thin, Lawa, Lao May ^{*10}
11	Ksing Moul		Phouak, Lao May
12	Phong		Phong, Kaniang
		Phong Piat	
		Phong Lane	
		Phong Fène	Phong Fène
		Phong Chapouang	Phong Chapouang
13	Thène		Thène, Thay Thène
14	Oe Du		Oe Du, Thay Hat
15	Bit		Bit
16	Lamet		Lamet
17	Sam Tao		Sam Tao
		Doi	Doi
18	Katang		Brou Katang
		Pha Keo	Pha Keo
19	Makong		Brou Makong
		Trouy	Trouy
		Phoua	Phoua
		Maroy	Maroy
		Trong	Trong
20	Tri		Brou Tri
21	Jrou		Laven, Sou'

		Jrou Kong	Jrou Kong
		Jrou Dak	Jrou Dak
22	Triang		Triang
23	Ta Oy		Ta Oy
		Tong	Tong
		Yinr	In
24	Yè'		Yè'
25	Brao		Lavè, Louy Vé
		Kavèt	Kavèt
		Halang	Halang
26	Katu		Katu ^{*11}
		Triu	Triu
		Dak Kang	Dak Kang (Panh Deng)
27	Halak		Alak
28	Oy	Sapouan	Sapouan
		Sok	Sok
		Inthi	Inthi
			Mèkrong
			Mèreuyao
29	Kriang		Ngè'
		Chatong	Chatong
		Ko'	Ko'
30	Cheng		Cheng
31	Sadang		Sedang ^{*12}
		Kayong	Kayong
		Sadang Douan	Sadang Douan
32	Souay		Souay
33	Nya Heun		Tang Kè', Heunh
34	Lavi		Lavi
35	Pacoh		Pacoh ^{*13}
		Kado	Kado
		Kanay	Kanay
36	Khmer		Khom, Khmer ^{*14}
37	Toum		Toum
		Liha	Liha
		Thay Cham	Thay Cham
			Thay Poun
		Thay Pong	Thay Pong
			Moy
38	Ngouan		Ngouan
39	Meuang		Moy
40	Kri ^{*15}		Salang, Arem
			Tong Leuang
		Maleng	Maleng
		Mlabri ^{*16}	Labri, Tong Leuang
III: The Chine-Tibet Language Family (7 Groups) ^{*17}			
No.	General Name	Subgroup	Other local names

41	Akha		Ko, Iko
		Akha Chi Cho	Chi Cho
		Akha Pouly	Pouly
		Akha Pana	Pana
		Akha Fé	Ko Fé
		Akha Nou Kouy	Nou Kouy
		Akha Louma	Louma
		Akha Oe Pa	Oe Pa
		Akha Chi Pya	Chi Pya
		Akha Mou Chi	Mou Chi
		Akha Ya Oe	Ya Oe
		Akha Kong Sat	Kong Sat
42	Singsily ^{*18}		Phou Nou, Pisou
		Phou Yot	Phou Yot
		Tapat	Tapat
		Ban Tang	Ban Tang
		Cha Ho	Cha Ho
		Lao Xeng	Lao Xeng
		Phay (Phong Saly)	Phay (Phong Saly)
		Lao Pane	Lao Pane
		Phong Kou	Phong Kou
		Phong Set	Phong Set
43	Lahu		Mou Xoe
		Lahu Dam	Mou Xoe Dam (Black Lahu)
		Lahu Khao	Mou Xoe Khao (White Lahu)
		Kouy ^{*19}	Kouy Soung
			Kouy Louang
44	Sila		Sida
45	Hanyi		Hanyi
46	Lolo		Lolo
47	Ho		Ho ^{*20}
IV: The Hmong - Iu Mien Language Family (2 groups) ^{*21}			
No.	General Name	Subgroup	Other local names
48	Hmong		
		Hmong Khao	Hmong Daw (White Hmong)
		Mong Lai	Mong Leng, Mong Youa (Green Mong)
		Hmong Dam	Hmong Dam (Black Hmong)
	Iu Mien		Yao
		Lantène	Lao Houay, Lènetène ^{*22}
		Yao Phon May Deng	Yao Phon May Deng
49		Yao Khao	Yao Khao

Notes:

*1 This new classification of the Lao Front for National Construction, dating from August 2000, is based on language families generally recognised by scholars internationally.

*2 In technical literature this family is known as Tai-Kadai.

*3 Refers to the Lao of Northeastern Thailand who migrated to Lao PDR.

*4 Conventional spelling found in the literature.

- *5 Originally from Keng Tung in Burma.
 - *6 The Lao word for Shan.
 - *7 The conventional spelling is Nhang, the outsider term for the group that calls itself Yay.
 - *8 Recent immigrants from the Sze Mao area of Yunnan, not to be confused with the 'Neua' of Sam Neua.
 - *9 Mon-Khmer is the major branch of the larger Austroasiatic Family.
 - *10 Or 'Kwène'.
 - *11 More commonly referred to as 'Phay' in Lao PDR. T'in and Lawa are names used in Thailand.
 - *12 Conventional spelling.
 - *13 Conventional spelling.
 - *14 Conventional spelling.
 - *15 Conventional spelling.
 - *16 This is a problematic classification. The Vietic (or Viet-Meuang) subgroups of Nakai and adjacent areas consist of a number of languages, of which 'Kri' is one. Salang is a local term for this group, and Arem is the Brou term for the same group. 'Tong Leuang' (Lit. 'Yellow Leaf') is the Lao expression for hunter-gatherers that refers to the shelters constructed for short-term residence during cyclical foraging in the forest, the idea being that when the leaves turn yellow it is time to move on. (cf. Chamberlain 1997)
 - *17 The Mlabri (also hunter-gatherers and hence the confusion) do not belong to the Kri group and are misclassified here, rather they are related to Khmou and Pray and are found in Xaygnaboury.
 - *18 This is the Lao term for the larger superstock known as Sino-Tibetan which consists of two main families: Sinitic (Chinese) and Tibeto-Burman. Most of the languages of this family in Laos belong to the Tibeto-Burman family, the only exception are the Chinese Ho.
 - *19 Also found written as 'Sengsaly'.
 - *20 Call themselves Lahu Shi 'Yellow Lahu'.
 - *21 Yunnanese Chinese.
 - *22 The recent name for this family is Hmong-Mien (Iu Mien is the name of a particular group of Yao). The former name for this family found in the literature until about 1985 is Miao-Yao.
- Source: MAF (2010)

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