

# PART I EXECUTIVE SUMMARY

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## *Project Description*

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In the Asia Pacific Region, a number of activities that provide foundation for moving towards 2002 have already been initiated by the UNEP Environment Assessment Programme for Asia Pacific (EAP-AP). The Norwegian Agency for Development Cooperation (NORAD) and UNEP/EAP-AP agreed to collaborate on a project which aims to strengthen the environmental assessment and monitoring capabilities in South Asia and the Greater Mekong Sub-region. The goal of this project is to strengthen the capacity of and assist national governments in establishing a strong information technology base for data processing, modelling and analysis requirements that supports State of Environment (SoE) assessments and reporting, and improve the basis for decision making in the handling of important/emerging environment problems. The project thus aims to enhance the capacity of national governments in South Asia and the Greater Mekong Sub-region to make accurate environmental assessments; improved decision making towards sustainable development; enhance the availability of information on all aspects of environment and socio-economic development; and establish a strong information network with a uniform format of data. The project would concentrate on real data management (i.e. actual quantitative and spatial data collection and their storage in appropriate format, data exchange, and dissemination), analysis, SoE assessment and reporting at national and regional level.

The purpose is to prepare the Lao PDR SoE report for the period 1999-2000 following the UNEP/EAP-AP guidelines. The SoE report will provide the leaders of Lao PDR with an assessment of the State of the Environment in their nation and possible warnings of future problems. It will also be a contribution to the regional report and an input to the "2002 Global State of Environment Report" and "2002 Earth Summit".

## *Background*

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State of the Environment Reports have been under preparation since 1974 in various forms such as national environment action plans, national conservation strategies, national environmental profiles, etc. The State of the Environment Report 2000: Lao PDR (SoE) report is the first of its kind for Lao PDR. It provides a general picture

of present biophysical and socioeconomic conditions and an overview about how human activities are affecting the environmental conditions. It also provides understanding of the implications of these conditions on human health and economic well being and outcomes of the policy responses that were adopted.

## *Methodology*

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The report was prepared with consultations held with senior government officials (of Lao PDR). The comments and observations from the consultations contributed to a greater depth and breadth about the different aspects dealt. All data used in the preparation of and for presentation in this report are from secondary sources such as - different ministry publications of Lao PDR etc., published reports from international journals, reports of various bilateral organisations like the World Bank, the Asian Development Bank, web sites etc. Certain information was also received via mail (mostly electronic), from time to time. These are incorporated in the report.

## *Contents of the Report*

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The document has been prepared in four main parts:

Part I Executive Summary

Part II Sections 1 - 4 present a national overview of environmental trends by resources and the associated driving forces. In Section 5, a summary sketch of the overarching regional and national environmental criteria deriving from conventions, agreements and treaties have been presented.

Part III Analyses of five key issues in the State-Pressure-Impact-Response (S-P-I-R) framework.

Part IV Summarizes the salient findings, conclusions and broad recommendations.

## *Major Findings*

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Lao People's Democratic Republic is a land-locked country sharing its borders with five nations. Its land area is a little larger than Great Britain's but contains approximately 10% of the population. General physiographic character is undulating with high percentage of sloping land as a national average. The capital Vientiane is located near the Thailand border and the two countries

bear strong cultural and economic ties. Lao PDR has the lowest urbanisation level in Southeast Asia at 23% and yet has the distinction of being the country with the highest per cent annual urban growth at 5.1%. According to the United Nations Development Programme, Lao PDR currently ranks 140th on the Human Development Index with a per capita income of US\$ 350 (Socio-Economic Development Strategy 2001). However, its integration into the Association of Southeast Asian Nations (ASEAN) in 1997 and imminent prospects for membership to the World Trade Organization (WTO) are pointers at the transformations that offer many opportunities and challenges for the Government and people of Lao PDR in the future.

The broad-based study of the national physical resources, ecological resources, human development and human quality of life values, in Part II, led to the identification of five key environmental issues concerning Lao PDR namely, (i) deforestation (ii) water resources (iii) land degradation (iv) biodiversity and (v) urban environment. The major findings from the S-P-I-R analysis in Part III narrowed down following areas of focus:

### **1. Forest Resources**

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Lao PDR forest cover, 47% of total land area, remains among the highest in the region. However, deforestation rate is very rapid. A number of factors contribute to deforestation in the absence of a national resource planning and management framework. Due to which, commercial forest exploitation is increasing, shifting cultivation impacts forest environments increasingly and hydroelectric projects can be an additional pressure. Standards of management practices have to be improved and local community participation has to be adopted over a wide range of aspects like demarcation of forest lands, allocation planning, zoning, setting priorities, and targets, regulating access (for example, to recently logged forests), biodiversity protection, reforestation programme, etc. Definition of production forests must be made to include those that provide products for local use. Logging quota allocation contracts should be made including rehabilitation/regeneration and reforestation clauses. Stable agriculture land has to be made available in uplands with appropriate alternative income options to reduce pressure from shifting cultivation. Land erosion due to high degree of slopes in Lao PDR gets compounded with deforestation in uplands. Loss of soil fertility due to reducing fallow periods combined with the possibility of fertilizer abuse requires pro-active prevention measures. Land degradation cycle needs special attention with respect to the

sedentary cultivation programme prepared for settling upland farmers. Legislation on biodiversity conservation is needed in Lao PDR. Cross border trade of live animals and body parts requires regulation. Biodiversity conservation and land degradation protection can be combined with forest management programmes.

### **2. Water Resources**

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Lao PDR possesses a great wealth in water resources. The country has the highest per capita availability of renewable freshwater resources in Asia. Irrigation and rural water supply are important for Lao PDR development. Irrigation improvement is a countrywide requirement. Gravity irrigation in mountainous areas and pumped water schemes for the lowlands are preferred. The government is pursuing the policy of transferring the irrigation system management responsibility to farmers associations. However, on the whole farmers lack the management skills. Community training is a key success requirement. Rural water supply includes sanitation improvement objectives and is currently focussed on community involvement. Water quality protection and monitoring would also require rural people involvement. Therefore, single agency supervision is being contemplated for its implementation. However, hydropower development as an export earner is being contemplated to achieve the socio-economic development and economic objective for Lao PDR.

### **3. Urban Environment**

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Rural urban migration, tourism and industrial sector growth will contribute to increased waste production, both liquid and solid. Solid waste disposal, wastewater treatment, roads and transportation sectors need attention in the urban environment sector. Solid waste service faces insufficiency of funds and equipment compounded by poor maintenance and displays poor area coverage. There is only one wastewater treatment plant in Lao PDR. Most of urban roads require pavements. Overall, road congestion is not a problem yet due to low vehicle ownership, which has been found to be rising in the two wheeler section, however. Roads and junctions still have capacity although some may require geometric design improvements and other betterment interventions. Transportation plans are seen as precursors of any road development projects. Funds are lacking. Urban Master Plans are needed for most urban centres. Funds may be a limiting factor. Urban development planning and management improvements along with municipal improvements require higher prioritisation in the overall national development planning. Urban electrification

programme requires target enhancement. However, there is not yet a major problem of pollution, but the future industrialisation will be major issue of pollution and should be included in this section.

#### ***4. Others***

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A number of issues are related with a diverse set of needs ranging from human resource development, awareness building, creation of a reliable national database system, an environmental planning and management framework to an environmental assessment system. In effect, only a multi pronged approach can be effective in tackling the current and emerging issues and prepare Lao PDR to face the challenges of sustainable environment management of the

future.

#### ***Recommendations***

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In Part IV, recommendations are put forth that focus on each of these four areas, which should help to minimize the environmental effects as Lao PDR increases its social and economic development pace. Implementing these recommendations can enable the developmental activities to become more culturally, environmentally, and economically sustainable. A table of the recommendations follows.

## 1. Measures for Forest Resources

Thrust Area	Community Involvement Measures	Government-level Measures
<b>Forest Management</b>	<ul style="list-style-type: none"> <li>improve villagers' living standards in pilot areas through village forestry and village development projects.</li> <li>consult and develop land use and development plans to guide forest concessionaires in logging operations</li> <li>improve villagers' ability to manage forest through extensive training</li> </ul>	<ul style="list-style-type: none"> <li>NAFRI develop information database accessible to all government authorities and other interested entities</li> <li>develop policy and legal framework for sustainable forest management</li> <li>develop national guidelines for village forestry systems for sustainable forest management</li> <li>develop land use and development plans</li> <li>allocate forest land to villagers</li> <li>improve forestry staff's ability to manage forest through extensive training</li> </ul>
<b>Reforestation Programmes</b>	<ul style="list-style-type: none"> <li>involve local participation in ongoing reforestation programmes</li> </ul>	<ul style="list-style-type: none"> <li>continue expansion of reforestation efforts through the extension of ongoing Lao-ADB Forest Plantation Project</li> <li>facilitate and expedite drafting of implementing forestry regulations; phased implementation of sustainable forest management regulations to improve forest resource management</li> <li>carbon sequestering through examination of innovative approaches to forest conservation linked to multilateral environmental agreements and international conventions and protocols for development of carbon sinks</li> </ul>
<b>Shifting Cultivation</b>	<ul style="list-style-type: none"> <li>establish and operate land development task forces consisting of district level and project personnel along with local consultants to determine intensification of land use at the district level to implement community-based land resource management through provincial rural development committees.</li> <li>capacity building in the agricultural research extension system to provide: <ol style="list-style-type: none"> <li>planting materials and advice on pest and disease management, crop variety biodiversity and sustainability</li> <li>non-polluting crop production techniques such as organic farming, paddy field aquaculture integrated pest management; and</li> <li>development and utilisation of locally produced bio-pesticides.</li> </ol> </li> </ul>	<ul style="list-style-type: none"> <li>strengthen capacity of the National Agriculture and Forestry Research Institute (NAFRI) to serve as the main body for natural resource planning and land use planning</li> <li>operate (NAFRI) pilot "adaptive research" projects that combine integrated agricultural research and socio-economic research, particularly on degraded lands and remote areas.</li> <li>implement community-based land resource management, coupled with a land allocation policy based on land's capability for sustained food and fibre production, community needs, and labour availability rather than a fixed size limit.</li> <li>capacity building in the agricultural research extension system</li> <li>review and revise agricultural and forest land tax system to reduce tax rate for land owners using "best management practices" such as who practice soil conservation and non-polluting, sustainable land use and penalise farming practices causing pollution, soil erosion or biodiversity reduction.</li> <li>support development of small and medium-scale irrigation projects on steep lands in order to relieve farming pressure</li> <li>establish nurseries in productive areas to produce appropriate seed and seedling for the nation's uplands and lowlands and other environmentally suitable uplands farming products such as tree crops and vegetables (e.g. cardamom, benzoin, sesame and bamboo, etc.).</li> </ul>
<b>Forestry and Land Use Training</b>	<ul style="list-style-type: none"> <li>understanding of government policies, regulations and objectives.</li> <li>understanding of various sustainable and unsustainable farming systems.</li> <li>basic knowledge of soil condition.</li> <li>knowledge of basic survey measurement techniques.</li> <li>understanding of socio-economic and land tenure issues.</li> </ul>	<ul style="list-style-type: none"> <li>understanding of various sustainable and unsustainable farming systems.</li> <li>knowledge of forest classification criteria and their application.</li> <li>ability to interpret aerial photos and topographic maps.</li> <li>basic knowledge of soil condition.</li> <li>knowledge of basic survey measurement techniques.</li> <li>understanding of socio-economic and land tenure issues.</li> <li>ability to communicate effectively with villagers and understand their points of view.</li> </ul>
<b>Biodiversity Conservation</b>	<ul style="list-style-type: none"> <li>implement sustainable biodiversity conservation systems along side forest management in pilot areas in cooperation with villagers and other stakeholders.</li> <li>improve villagers ability to manage forest allocate forest land to villagers and promote sustainable village-based forest management through extensive training.</li> <li>disseminate through appropriate media, the information that has been collected on the 20 NBCAs to community stakeholders.</li> <li>conduct special training and environmental education in biological resource conservation for involved community.</li> <li>run similar projects outside the NBCAs involving local participation.</li> </ul>	<ul style="list-style-type: none"> <li>develop policy and legal framework for sustainable forest management.</li> <li>develop legislative framework for wildlife protection on incentive based policy rather than command and control basis.</li> <li>develop and implement sustainable biodiversity conservation systems along side forest management in pilot areas in cooperation with forest and conservation authorities, villagers and other stakeholders.</li> <li>improve forestry staff's ability to manage forest through extensive training.</li> <li>improve villagers' living standards in pilot areas through village development projects along side village forestry projects</li> <li>institutional and government capacity building support in cataloguing national biodiversity resources.</li> <li>disseminate through appropriate media, the information that has been collected on the 20 NBCAs to all stakeholders</li> <li>conduct special training and environmental education to departmental staff in biological resource conservation</li> <li>document and run similar projects outside the NBCAs.</li> </ul>

## 2. Measures for Water Resources

Thrust Area	Community Involvement Measures	Government-level Measures
<b>Irrigation</b>	<ul style="list-style-type: none"> <li>preparation of community based catchment management plans for priority catchments</li> <li>farmers training in irrigation management, for priority catchments.</li> <li>farmer training in irrigation scheme design and management, irrigation scheduling and O&amp;M with regard to Water Resource Master Plan, SRIDP, FIAT etc.</li> <li>community training in management and preservation of water resources</li> </ul>	<ul style="list-style-type: none"> <li>improvement of meteorology network</li> <li>establish central data compilation centre</li> <li>technician training in irrigation scheme design and management, irrigation scheduling and O&amp;M with regard to Water Resource Master Plan, SRIDP, FIAT etc.</li> </ul>
<b>Rural Water Supply</b>	<ul style="list-style-type: none"> <li>training component for the community preparation before actual participation in water supply and source-protection management system adoption.</li> <li>community training in management and preservation of water resources</li> </ul>	<ul style="list-style-type: none"> <li>establish central data compilation centre</li> <li>community demand assessment studies with regard to Water Resource Management Action Plan.</li> <li>identification study for priority catchments</li> <li>pilot programmes in less accessible villages to define special approaches needed with ethnic minorities</li> </ul>

## 3. Measures for Urban Environment

Thrust Area	Measures
<b>Funds for the urban environment infrastructure</b>	<ul style="list-style-type: none"> <li>implement visitor service tax and other innovative income generators from tourism industry</li> <li>allocate the funds from visitor tax to provincial and municipal level bodies to</li> <li>from ear-marked income, off-set costs of urban environmental management infrastructure and public service maintenance.</li> </ul>
<b>Urban environment framework</b>	<ul style="list-style-type: none"> <li>prepare master plans for urban development</li> </ul>
<b>Urban Transportation</b>	<ul style="list-style-type: none"> <li>urban transport modernisation through the examination of potential for upgrading urban transport systems in Vientiane and secondary towns.</li> <li>examine potential of leveraging grant funds (Global Environment Facility: GEF) for introducing sustainable public transport system utilising hydropower generated electric power.</li> <li>assess feasibility of using renewable energy to reduce rural poverty by providing opportunities of alternative livelihood schemes and thereby off-set pressure on biodiversity.</li> </ul>
<b>Water supply</b>	<ul style="list-style-type: none"> <li>urban water supply development</li> </ul>
<b>Flood and erosion control</b>	<ul style="list-style-type: none"> <li>urban river erosion control and urban flood control in Louangphabang, Pakse, Savannakhet, Thakhek, Bokeo, Xayabury, Bolikhamxay and others. municipalities</li> </ul>

## 4. Institutional Strengthening Measures

Measures	Actions
<b>STEA Institutional Capacity Strengthening Programme</b>	<ul style="list-style-type: none"> <li>upgrade the facilities</li> <li>strengthen capacities at <ul style="list-style-type: none"> <li>research</li> <li>environmental monitoring</li> <li>training of the Environmental Management Unit (EMU) and the National University of Lao PDR (NUOL)</li> </ul> </li> </ul>
<b>Natural Resources Management Unit Institutional Capacity Strengthening</b>	<ul style="list-style-type: none"> <li>upgrade the facilities</li> <li>strengthen capacities at <ul style="list-style-type: none"> <li>research</li> <li>natural resources management of the Forestry School and NUOL</li> </ul> </li> </ul>

Measures	Actions
<b>Decentralised Management Authority</b>	<ul style="list-style-type: none"> <li>• devolve greater authority for natural resources management and environmental protection to local officials</li> <li>• facilitate and promote understanding of important environmental protection issues</li> <li>• create coordination among agencies responsible for different environmental management aspects</li> <li>• strengthen provincial level environmental office and branches (provincial) of central agencies through extensive environmental training</li> </ul>
<b>Decentralised Environment Management Programme</b>	<ul style="list-style-type: none"> <li>• facilitate role of provincial environment offices in environmental policy planning and implementation by providing:                             <ul style="list-style-type: none"> <li>• technical assistance to provincial environment offices</li> <li>• physical assistance</li> </ul> </li> <li>• strengthen institutional capacity</li> </ul>
<b>Integrated Environmental Management</b>	<ul style="list-style-type: none"> <li>• establish interdependent, collaborative and responsive teams across ministries.</li> <li>• involve local stakeholder participation to prepare plans and projects</li> <li>• ensure local stakeholder participation in scheme implementation .</li> </ul>

### 5. Environmental Assessment Database System, Human Resource Development and Awareness Building Measures

Braod Measures	Specific Thrust Areas	Actions
<b>Information Database System Improvement</b>		<ul style="list-style-type: none"> <li>• establish centralised Information Management System (IMS) for environmental resource data for government planning and development agencies and project developers.</li> <li>• assign agency with experience and potential capacity such as STEA to develop and operate IMS in partnership with the development ministries, the The Committee for planning and Cooperation, the Investment Management Committee, and other relevant agencies</li> <li>• fund appropriately in order that data collected by the various agencies can be stored, processed and retrieved easily and without cost to government agency users? establish centralised Information Management System (IMS) for environmental resource data for government planning and development agencies and project developers.</li> </ul>
<b>Human Resource Development</b>	<b>Environmental Assessment and Monitoring</b>	<ul style="list-style-type: none"> <li>• develop multidisciplinary capability within STEA and development sector agencies</li> <li>• establish courses in Lao PDR institutions for advanced studies</li> </ul>
	<b>Environmental Management</b>	<ul style="list-style-type: none"> <li>• provide practical, on-the-job training to managers and technicians over the short and medium terms in the areas of:                             <ul style="list-style-type: none"> <li>• agriculture</li> <li>• forestry</li> <li>• water resource</li> <li>• industrial sector</li> </ul> </li> <li>• provide supplementary training on specific priority environmental problems, such as:                             <ul style="list-style-type: none"> <li>• pollution control and monitoring</li> <li>• protection of water supply sources</li> <li>• watershed management</li> <li>• forestry techniques</li> </ul> </li> </ul>
	<b>Environmental Education and Awareness Building</b>	<ul style="list-style-type: none"> <li>• increase awareness building over various levels through:                             <ul style="list-style-type: none"> <li>• community-consultation on resource management</li> <li>• community-based resource management</li> <li>• introduction of environmental issues in the school curriculum;</li> <li>• public awareness building programmes using mass organisations such as Buddhist associations, the Women's Union etc.; and</li> </ul> </li> <li>• integration of environment into community, district, provincial level planning and consultation programmes</li> </ul>
	<b>Local Government Level</b>	<ul style="list-style-type: none"> <li>• decentralise natural resources and environmental management by supporting local government with:                             <ul style="list-style-type: none"> <li>• Information management</li> <li>• Sanitation and solid waste management</li> <li>• Natural resource conservation and management</li> <li>• Programme development and management</li> <li>• Wastewater management and quality control</li> <li>• Public participation development and public relations</li> <li>• Use of modern office equipment</li> <li>• English language training</li> </ul> </li> </ul>