Lao People's Democratic Republic
PEACE INDEPENDENCE DEMOCRACY UNITY PROSPERITY

FIFTH NATIONAL REPORT

TO THE UNITED NATIONS CONVENTION ON BIOLOGICAL DIVERSITY

MINISTRY OF NATURAL RESOURCES AND ENVIRONMENT

CITATION

2016-MoNRE-IUCN -Fifth national report to the united nations convention on biological diversity – DFRM-MoNRE and Technical support: IUCN - Vientiane, Lao PDR

Technical Support from International Union for Conservation of Nature (IUCN), Lao PDR Country Programme, the Global Environment Facility and the United Nations Environment Programme (UNEP).

PREFACE

As a Developing Country, the Lao PDR faces numerous challenges in terms of sustainable management of biological diversity and resource use. Nevertheless, the Government of the Lao PDR (GoL) has realized the need to protect biodiversity by establishing a national protected area system, as well as enacting laws, decrees, directives and regulations on the management of forest, aquatic animals and wildlife. Moreover, GoL became a signatory to the Convention on Biological Diversity (CBD) – also known as one of the Rio Convention – in 1996. As such, it is committed to the preparation and implementation of a National Biodiversity Strategy and Action Plan (NBSAP) and National Reports (NR). Lao PDR's Fifth National Report to the Convention on Biological Diversity has been prepared by the Department of Forest Resources Management under the Ministry of Natural Resources and Environment (MoNRE) with the gracious support of the Global Environment Facility (GEF), the United Nations Environment Programme (UNEP) and the technical support from the IUCN Lao PDR Country Programme.

This report, prepared in accordance with our obligations under the CBD is a key document providing solid foundation to the Lao PDR's national biodiversity policy. It provides an update on the status, trends and threats to biodiversity. This report also provides critical information on the implementation and progress towards Aichi Biodiversity targets and contributions to the target of the Millennium Development Goals (MDGs). This Fifth National Report has not only given a unique opportunity to measure the status of biodiversity within Lao PDR, but also supplied critical information towards developing policy directions needed to address threats and emerging challenges, as well as formulating future conservation strategies and action plans.

On behalf of the Government of Lao PDR, I would like to express our appreciation to the GEF, UNEP, and the Secretariat of the CBD for the support provided in producing this report. I also note the efforts of the Fifth National Report team in compiling the Report. Finally, I wish to thank all relevant stakeholders whom have contributed through attending meeting and workshops, as well as giving written submissions.

Vientiane Capital, 2016

Sommad PHOLSENA

Minister

Ministry of Nature Resources and Environment (MoNRE)

EXECUTIVE SUMMARY

The Lao PDR is one of the most biodiversity countries in Southeast Asia, with on-going discoveries of new and large species. For example, 28 new species were discovered in 2014. The great range of biodiversity exists thanks to the Lao PDR's abundance of forest and water resources, which cover the entire length of the country. National Protected Areas (NPAs) now cover 14.2 per cent of the country's area, while this coverage of protected areas increases to around 20.2 per cent of the land area with the addition of Provincial Protected Areas and District Protected Areas.

Although the Lao PDR is still rich in natural resources, its biodiversity has been negatively impacted by developments, particularly resulting from private sector investment, including agricultural expansion, forest extraction, mining, as well as infrastructure and hydro dam construction. This report presents that, behind these direct drivers of biodiversity loss, there are a number of indirect drivers that interact in complex ways to cause human-induced changes in biodiversity which involve demographic, economic, socio-political, as well as cultural and religious factors.

Of significance importance on the loss of biodiversity is deforestation. Forests in the Lao PDR have seen a decrease from 17 million hectares (or 71.8% of the total land area) in 1940, to 9.55 million hectares (or 40.33% of the total land area) in 2010. Efforts to address deforestation and environmental degradation have focussed on protecting forests for sustainable ecosystem services, smallholder forestry projects, and participatory sustainable forest management. Community livelihoods are closely linked to forests and the participation of forest-dependent communities is consequently crucial for successful forest management.

The government has been quick to realize the need to protect the country's biodiversity, including its iconic wildlife species. It has established a comprehensive national protected area system and enacted laws, decrees, directives, and regulations on the management of forest, aquatic, and wildlife resources across the country. The next challenge is to improve the enforcement of these laws, decrees, directives, and regulations.

The Lao PDR's First National Biodiversity Strategy and Action Plan (NBSAP) laid out an action plan to 2010 and strategy to 2020, which consisted of seven programmes; (1) Scientific Data and Biodiversity Knowledge Development; (2) Biodiversity Management; (3) Human Resource

Development Institutional; (4) Public Awareness and Involvement; (5) Institutional and Legal Frameworks; (6) NBSAP Implementation and (7) International Cooperation. Under those 7 programs, 27 objectives are to be achieved by 2020 and 203 actions were also identified which were to be undertaken by 2010.

In 2011, the IUCN published an assessment of the 1st NBSAP which summarizes the implementation status per objective and per action under each of the seven programmes. The main conclusion is that significant progress has been made across a range of areas, including biodiversity research, the recording of local knowledge, the expansion of NPAs, the implementation of management plans in a few key NPAs, the drafting of a Biosafety Law, the expansion of ecotourism activities, improved land use planning and land allocation, Ramsar accession, and stricter EIA/ESIA regulation; major achievement has been reached on international cooperation, particularly on the participation of the Lao PDR to multilateral environment agreements. However, additional gaps are to be addressed related to improving human resource capacity and biodiversity management, including efforts to ensure that social and economic benefits from the use of natural products originating from the Lao PDR accrue to the nation.

The mainstreaming of biodiversity has been partially executed in recent years. This report provides details of biodiversity mainstreaming at three levels: (1) at the Ministerial level, by the creation of the Ministry of Natural Resources and Environment (MoNRE); (2) at the sectorial level, by the establishment of the Natural Resource Management and Environment Sector Working Group (SWG) in 2012, and (3) at the Policy level, through the Five-Year National Socio Economic Development Plans (NSEDP). In spite of these achievements, additional efforts are to be made to mainstream biodiversity into the different sectors; by ensuring that biodiversity actions are included in sectorial respective strategies, plans, and programmes.

At the global level, on the progress towards the 2020 Aichi biodiversity targets, there has been strong efforts towards outreach activities which have raised awareness of environmental issues and the values of biodiversity, promoted through representation of environmental education activities during special events and festivals, improved environmental curriculum in schools, media training, and capacity development and training of government staff. Improvements have been made to the legal framework to include biodiversity values into sector strategies, policy, and legislation, while positive steps have been made towards improving the EIA process. In terms of urban planning and improved land use planning, there have been positive efforts made towards developing criteria for sustainable urban areas and a National Master Land Use Plan, while in Agro-biodiversity there

have been a number of positive initiatives including Provincial regulations on biodiversity conservation corridors, and the adoption of forest and land use planning, allocation and Management (FALUPAM), as well as Agro-biodiversity being integrated in the Uplands Development Strategy and 5 year plans of PAFOS, and DAFOs.

There are a number of initiatives in place which promote the conservation and sustainable use of biodiversity, including those which support livelihood development of local people around protected areas, and land use titling. Steps which have promoted organic agriculture, regulations around the timber trade and mining industries, NTFP management, as well as better water resource management have also promoted the use of natural resources in a sustainable way. The GoL has implemented a number of actions to improve forest management, forest law enforcement, and improved protected area management throughout the country, while important steps have been made to conduct research into fish species and fisheries which have informed fishery management practices and aimed at preventing fishery declines.

Guidance on the sustainable management and development of the forest sector in line with national policies has resulted in 51 Production Forest Areas that now have detailed management plans, while village forest management and community forestry has been improved with many examples of the establishment of forest management committees and community-based patrolling of community forests.

Steps have been made to maintain water quality, protect ecosystems, and minimize pollution for the country's important water basins, while guidelines have been written to avoid negative socio-economic and environmental impacts at local, national, and regional levels. Research has identified current invasive plant and animal species that are posing threats to natural and agricultural landscapes, and control measures and activities for some of these species have been formulated. Research is being developed which focus on risks and impacts of pesticide use in agriculture. Integrated Pest Management has also been trialled in parts of the country with the view to optimize the use of local biodiversity, including natural pest enemies, organic fertilizers, and bio-insecticides.

Efforts have been made to classify the status of the Lao PDR's threatened wildlife and plant species (e.g. the creation of Lao PDR's IUCN Red List of Threatened Species and the evaluation of the SE Asia Red List of Plant Species) and a number of important wildlife surveys and population status assessments have taken place. Biodiversity monitoring technologies have been adopted to improve the science base and identify threats and trends, and to prioritize protection and restoration

interventions, including camera-trapping techniques. There has also been an increased focus on ex-situ conservation.

Measures have been taken to protect ecosystems, particularly in northern Laos (e.g. Xiengkhouang, Houaphanh, and Luang Prabang Provinces), including herbicide awareness and management programs, the establishment of fish conservation zones, and incentives to link local livelihoods with ecosystem health. There are many examples of traditional knowledge being used and accepted by partner districts and provinces, reflecting respect for local communities' customary use of natural resources.

A number of steps have been implemented in the Lao PDR since it ratified the Nagoya Protocol in September 2012; legislation has been enacted to harmonize with the international treaty of Access and Benefit Sharing (ABS) from the use of genetic resources.

The Environment Protection Fund (EPF) is as an important financier for capacity building and the management of Conservation Forest and Protection Forest which complements well the Forest and Forest Resource Development Fund, other schemes also provide the potential for financing conservation through various payments for forest environmental services initiatives.

On the contribution to the Millennium Development Goals, from the information compiled from several MDG Progress Reports, MDG reviews, and the UNDAF -2012-2016 report, it can be concluded that the MDG for Goal 7 to ensure environmental sustainability has made a positive start in terms of institutions and processes, but is not currently on track to achieve its targets.

LIST OF ACRONYMS AND ABBREVIATIONS

ABP	AGRO-BIODIVERSITY PROJECT
ADB	Asian Development Bank
ADPC	Asian Disaster Preparedness Center
ARCC	Adaptation and Resilience to Climate Change
ASEAN	Association of South East Asian Nations
BCC	Biodiversity Conservation Corridors Project
CBD	the Convention on Biological Diversity
CC	Climate Change
CITES	Convention on International Trade in Endangered Species
CliPAD	Climate Protection through Avoided Deforestation
CR	Critically Endangered
CSO	Civil Society Organization
CTA	Chief Technical Advisor
DAFO	District Agriculture and Forestry Office
DEQP	Department of Environmental Quality Promotion
DFRM	Department of Forest Resources Management
DLPD	Department of Land Planning and Development
DNS	Dongdok Nature Society
e.g.	for example
EIA	Environmental Impact Assessment
EN	Endangered
ESIA	Environmental and Social Impact Assessment
FALUPAM	Forest and Land Use Planning Allocation and Management
FAO	Food and Agriculture Organization of the United Nations
FCPF	Forest Carbon Partnership Facility
FDI	Foreign Direct Investment
FLEGT	Forest Law Enforcement Governance and Trade
GDP	Gross Domestic Product
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GMS	Greater Mekong Sub-Region
GoL	The Government of Lao PDR
HNN	Hin Nam No
IAS	Invasive Alien Species

IBAs	Important Bird Areas
INGOs	International Non-Government Organizations
IO	International Organizations
IRRI	Internation Rice Research Institute
IUCN	the International Union for Conservation of Nature
KfW	Kreditanstalt für Wiederaufbau (Development Bank)
Lao – WEN	Lao Wildlife Enforcement for Conservation
Lao PDR	Lao People's Democratic Republic
LDC	Least Development Country
LFNC	Lao Front for National Construction (Lao: Neo Lao Sang Xat)
LMB	Lower Mekong Basin
LWU	Lao Women's Union
MAF	Ministry of Agriculture and Forestry
MDGs	Millennium Development Goals
MEM	Ministry of Energy and Mines
MICT	Ministry of Information, Culture and Tourism
MoES	Ministry of Education and Sport
MoNRE	Ministry of Natural Resources and Environment
MoST	Ministry of Science and Technology
MPI	Ministry of Planning and Investment
NAFRI	National Agriculture and Forestry Research Institute
NBCAs	National Biodiversity and Conservation Areas
NBSAP	National Biodiversity Strategy and Action Plan
NEPL	Nam Et-Phou Louey
NGOs	Non-Government Organizations
NPAs	National Protected Areas
NR	National Report
NRE	Natural Resources and Environment
NSEDP	National Socio-Economic Development Plan
NT	Near-Threatened
NTFPs	Non-Timber Forest Products
NUDP	Northern Uplands Development Programme
NUoL	National University of Lao PDR
PAFO	Provincial Agriculture and Forestry Office
PES	Payment for Environmental Services
PoNRE	Provincial Office of Natural Resources and Environment

ProCEEd	Promotion of Climate related Environmental Education
REDD	Reducing Emissions from Deforestation and Forest Degradation
SDC	Swiss Agency for Development and Cooperation
SEA	Strategic Environment Assessment
SIA	Strategic Impact Assessments
TABI	The Agro-Biodiversity Initiative Project
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
VU	Vulnerable
WB	World Bank
WCS	Wildlife Conservation Society

CONTENTS

List of Figures

List of Tables

PART 1. AN UPDATE ON BIODIVERSITY STATUS, TRENDS, AND THREATS TO BIODIVERSITY

Hinboun District, Khammouan Provinvce. Photograph by T. Somdachit / IUCN

CHAPTER 1: INTRODUCTION

1.1 LAO PDR COUNTRY PROFILE

The Lao Peoples' Democratic Republic (Lao PDR), located in the heart of the Greater Mekong Sub-Region (GMS), is surrounded by China, Vietnam, Cambodia, Thailand, and Myanmar. Compared to its neighbours, the Lao PDR is smaller in size, with a lower population. Covering a total land area of 236,800 km2, the country is divided into seventeen provinces, and one municipal province of Vientiane Capital. Demographically, the Lao PDR is home to approximately 6.8 million people. It is estimated that 75-80% of population lives in rural areas.

The country is prone to seven main hazards: floods, droughts, storms, landslides, earthquakes, epidemics, and Unexploded Ordinance (UXO). Among these hazards, floods and droughts are the most recurrent hazards (ADPC & UNDP , 2010). The country was severely impacted by floods triggered by Typhoon Ketsana in 2009 and Haima in 2011. These recurrent natural hazards often result in human and economic loss, mainly affecting poor rural communities whose livelihoods depend on subsistence agricultural activities.

The Lao PDR has an abundance of natural resources including its mineral deposits and a wealth of forests, which cover more than 40% of its total land surface. In addition, the Mekong River and its tributaries provide rich water resources which present the potential for power generation and irrigation development. Hydropower potential has been estimated at 18,000 MW; until now, however, only 25 per cent of this potential has been used (MoNRE, 2012). The Lao PDR therefore has great potential for rapid socioeconomic development, even as it must ensure protection of its productive environment and ecosystems in the long term.

Nevertheless, the Lao PDR is one of the 48 least developed countries (LDC), with a per capita gross domestic product (GDP) of US$ 1,725Agriculture contributes around 23.15%, Industry 32.42%, and Services 37.87% (MPI, 2014). The Lao PDR has made significant progress towards poverty alleviation over the past 2 decades with poverty rates declining from 46% in 1992, to 23.24% in 2012/13 (Lao Statistics Bureau & The World Bank, 2014).

Although agriculture has been gradually declining in terms of its contribution to GDP over recent years, it still continues to play a major role in the Lao PDR. Nevertheless, the provinces that have a shortage in rice production are surplus maize producers. Besides rice, which is one the important economic crops in the Lao PDR, other important crops include coffee, sugarcane, cassava, sweet potato, and other industrial crops (such as rubber, eucalyptus, and acacia).

According to the GoL & United Nations (2015), the country is on target to achieve the

Millennium Development Goal of halving poverty and hunger reduction by 2015. The country's National Socio-Economic Development Plans (NSEDP), moreover, has adapted the Millennium Development Goals (MDGs) and incorporated these into its national priorities and goals. In addition, the most recent 8thFive-Year NSEDP (2016-2020) aims at graduating the country from its current least developed country (LDC) status.

The 8th NSEDP aims to: i) graduate from least developed country (LDC) status by 2020; ii) consolidate regional and international integration in the context of the launching of the ASEAN Economic Community in 2015; (iii) take further steps towards industrialization and modernization and to enhance the well-being of the people and the prosperity of the country in order to achieve the ranking as a upper-middle-income country by 2030 (MPI, 2015).

Although the Lao PDR has strong ambitions for national development by 2020 and has witnessed relative progress, it continues to face a number of key challenges. These include a need for accelerated poverty reduction; maintaining sustainable economic growth; conservation of natural resources, biodiversity and ecosystems; and social development, including development of human resources, and addressing issues of unexploded ordnance (UXO). It also faces challenges in fulfilling its commitments to international conventions that it has ratified (MoNRE, 2012).

1.2 IMPORTANCE OF BIODIVERSITY IN LAO PDR

1.2.1 Biodiversity context in Lao PDR:

The Lao PDR lies at the center of the Indomalayan biogeographical zone and as a result of its relatively wide ranges of latitude and altitude, as well as its rich water resources and tropical climate, it is home to a large number of species of plants, animals, fungi and other organisms. The country covers parts of four of the WWF's 200 Global Ecoregions 1, and there are 27 Important Bird Areas (IBAs) which are distributed over the country with a total area of 23,850 km2. Of the 27 IBAs, eight are located fully outside the protected area system.

The Lao PDR is one of the most biodiversity rich counties in Southeast Asia, with on-going discovery of new species. The great diversity of wildlife exists thanks to the Lao PDR's abundance of forest and water resources, which cover the entire length of the country. The forests and watersheds are important habitats for all species of wildlife and aquatic animals. These habitats are home to many rare and endangered species, some of which are extinct in some parts of the world but are still found in the Lao PDR, such as: Asian elephant (*Elephas maximus*), tiger (*Panthera tigris*), clouded leopard (*Pardofelis nebulosa*), leopard (*Panthera*

[1] Annamite Rang Moist Forest; Indochina Dry Forest; Northern Indochina Sub-tropical Moist Forest; Mekong River and its catchment.

pardus), gaur (*Bos gaurus*), saola (*Pseudoryx nghetinhensis*), gibbon (*Hylobates spp., Nomascus spp*.), Siamese crocodile (*Crocodylus siamensis*), Irrawaddy dolphin (*Orcaella brevirostris*), and white winged duck (*Cairina scutulata*).

The Lao PDR is also located within the centre of the domestication of Asian rice (*Oryza sativa L.*). The centre of origin of the glutinous rice types is, moreover, recognised to be within the Lao PDR and northern Thailand. Rice is a globally important crop species and the Lao PDR probably has the highest number of varieties amongst any country of a similar size in the world. Over 13,000 samples were collected between 1995 and 2000, and stored at International Rice Research Institute (IRRI) gene bank (ABP, 2015).

Wetlands in the Lao PDR, like many other countries, play an important role in water regulation, and combating droughts. The country has about 30 significant wetland sites, which cover and estimated 1 million hectares (Claridge, 1996). These wetland habitats support a remarkable level of biodiversity. More than 481 fish species have been identified in the Lao PDR, including 22 introduced species, and new species are regularly discovered. Among other aquatic animals, approximately 37 amphibians, 7 species of crab and 10 species of shrimps have been recorded, but these records cover only about 15% of the estimate total (Phonvisay, 2013).

Though much of the population of the Lao PDR relies heavily on the social and economic benefits derived from use of its biological resources, there has been little progress in ensuring that these benefits are evenly distributed. Examples of these important resources include Non-Timber Forest Products (NTFPs) such as medicinal plants, orchids, rattan, and bamboo species which are traded domestically and internationally. Although some taxes are collected on these items, there is no system in place to ensure that communities from which the materials originate benefit financially from their sales (IUCN, 2011).

Although the Lao PDR is still rich ecologically, biodiversity has been significantly reduced by a range of factors, including population growth, land use change, resource extraction, and the transition from subsistence farming to a market economy. The government, nevertheless, has been quick to realize the need to protect biodiversity, aquatic animals and wildlife in the Lao PDR by establishing the national protected area system in the country and it has enacted laws, decrees, directives and regulations on the management of forests, aquatic animals, and wildlife all over the country.

Moreover, in 2015 the decree for Protected Areas (No.: 134/G) was published in order to make the Protected Areas become abundant and sustainable by focusing on environmental protection, watershed protection, prevention from erosion, protection of soil quality, protection of strategic zones for national defence & security, adaptation and reduction of climate changes, global warming mitigation measures, contributing to the improvement of living conditions for people of all ethnic groups, and developing the national socio-economic status (Lao PDR, 2015).

1.2.2 Social-economic and cultural values of biodiversity:

The goal of GoL is to graduate from LDC status by the year 2020. During the period of 2011-2015, the sustainability of development by integrating economic development with socio-cultural development and environmental protection to the nation's advantage is one of the main objectives of 7th NSEDP (MPI, 2011). Therefore, it can be concluded that environmental management is a key factor for sustainable development in the Lao PDR. To strengthen this point, Laurila-Plant et al. (2015) supported the theory that one of the aims of environmental management is biodiversity conservation (preventing the loss of biodiversity), being biodiversity globally recognized as a foundation of healthy ecosystems.

In the Lao PDR where more than 50% of GDP results from agriculture, forestry, livestock and fisheries, the population has a high economic dependence on biodiversity. Together with rice farming, biological resources underpin the majority of Laotians' livelihoods − about 80% of the country's 5.8 million people live in rural areas, and depend largely on harvesting wild plant and animal products for their day-to-day subsistence and income.

In the Lao PDR where the majority of people live in rural areas and rely on natural resources, biodiversity plays a fundamental role in human welfare through the generation of ecosystem services following the stance of the Convention of Biological Diversity, which states: "Healthy ecosystems provide services that are the foundation for human well-being including health. Ecosystem services are the benefits people obtain from ecosystems: provisioning services (also known as goods) such as food and water; regulating services such as food, pest, and disease control; cultural services such as spiritual and recreational benefits; and supporting services, such as nutrient cycling, that maintain the conditions for life on Earth" (CBD, Ecosystem Service for Human Well-Being, 2008, p1).

The Millennium Ecosystem Assessment (MA) classifies ecosystems services into four categories: provisioning, such as the production of food and water; regulating, such as the control of climate and disease; supporting, such as nutrient cycles and crop pollination; and cultural, such as spiritual and recreation benefit (MA, 2005).

Primary provisioning ecosystem services at the district and provincial levels in the Lao PDR are watershed services (clean and reliable water from forested areas), and biodiversity services and services from forests such as: NTFPs, wildlife, and timber.

We depend on ecosystem services for our security and health; they strongly affect our social relations and give us freedom and choice. Especially in Lao context, their relevance and significance vary depending on the actors: Private sector hydropower companies have a bias towards the regulating and supporting ecosystem services – siltation control, water flows regulation - whereas local communities are primarily and directly concerned with provisioning ecosystem services such as crop production, NTFPs, fisheries, fresh and clean water, raw materials and medicinal plants.

Since rural people depend on forests and NTFPs for their livelihoods, the loss/change will cause significant social and economic impacts. Over-exploitation or extinction of NTFPs and wildlife affects food patterns, which could in turn result in malnutrition.

It can be also presented that biodiversity contributes directly to poverty reduction in at least four key areas: food security, health improvements, income generation, and by reducing vulnerability to disasters. Biodiversity conservation is, therefore, key to achieve MDGs. And it does not only link to the environmental sustainability goal, MDG7, but also provides a source of support to development and poverty reduction targets.

Though much of the population of the Lao PDR relies heavily on the social and economic benefits derived from use of its biological resources, there has been little progress in ensuring that these benefits are distributed. Nevertheless, from the information mentioned above, it can be seen that biodiversity does not only link to socio-economic well-being in the Lao PDR, but also links to human well-being.

Nevertheless, CBD (2010) states that not only the poor depend on biodiversity, but that biodiversity is important for everyone. For example: destruction and/or degradation of forested areas could lead to natural disasters such as flooding, landslides. These natural disasters also have an impact on the greater socio-economy in the Lao PDR such as: road access and food production.

As a result, biodiversity conservation is necessary in order to ensure sustainable development. Consequently the integration of biodiversity and ecosystem values into policy and decision-making requires going beyond service identification. Decision makers, from the public and private sector must identify, define, and target where and what these values are; what is affected and to whom they are significant. Then the conservation and enhancement of those identified and valued ecosystem services are to be prioritized.

1.2.3 The value of biodiversity in the Lao PDR economy

As stated above, one of the key steps to maintain biodiversity and its ecosystems services, crucial for socio-economic and human wellbeing, is valuation.

Food is clearly the main service provided by ecosystems in the Lao PDR, especially at the district and provincial level. However, other services such as clean air are often neglected and are and will be of huge value to the Lao PDR and everyone on this planet.

Unfortunately, to date in the Lao PDR, there has been little appreciation of the importance of biodiversity in economic terms. Natural resources and biodiversity conservation has often been seen as an uneconomic or unproductive effort. However, we often tend to think in terms of monetary flows or financial assets when taking decisions. Consequently, there is a need to

further assess and integrated economic values of biodiversity and economic services into the decision making process.

In the Lao PDR, the most comprehensive analysis of the economic value of biodiversity, although now several years old, was carried out as a background report for the Lao PDR's National Biodiversity Strategy and Action Plan by IUCN(IUCN, 2002). The study reports that the Lao PDR's 945,000ha of rivers, water bodies and other natural and constructed wetlands are found to provide fish and other aquatic animals worth an estimated US$101.01 million per year for household subsistence, income and small-scale trade, at an average of US$106/ha. The same study meanwhile finds that, across all of the recorded 11.6 million ha of forest in the country, local non-timber forest product use is worth US$159.87 million per year, or US$14/ha for household subsistence, and US$25.65 million or US$2.2/ha for household income (an average of US$36 per household). The domestic commercial value of NTFPs is US$15.25 million, or US$1.3/ha, and exports are worth US$31.80 million, or US$2.7/ha. Forests also yield fuel wood and charcoal worth US$3.77 million a year at the local level (average of US$40 per household, or US$0.3/ha) and US$0.82 million, or US$0.07/ha for commercial users, and timber products to a value of US$17.05 a year.

Phongvisay (2013) confirmed that the people of the Lao PDR, especially people who live in the rural communities, still depend upon the fish and other aquatic animals for their reliable sources of animal and protein intake. The same study also highlighted that around 24.5 kg of inland fish is estimated for fish consumption per capita (kg/capita/year), while other aquatic animals account for approximately 4.1 kg and sea products at around 0.4 kg, to make a total of 29 kg per capital per year of fish and aquatic products which are consumed. This consumption per capita, and per year, can then be easily converted into monetary values – by multiplying the average cost per kilo of those aquatic products– and to show the financial value of aquatic biodiversity.

The Lao PDR's wetlands provide vital environmental, economic, and cultural services to the country's people. In addition to ecosystem services such as providing habitat for a wide variety of species, flood protection and groundwater renewal, wetlands also supply natural resources that are central to livelihoods in the Lao PDR, from fish, fodder, and tourism opportunities. But the value of wetlands is to still be estimated. In the capital, Vientiane, the value of That Luang Marsh ecosystem services has been assessed by IUCN and WWF (Gerrard, 2004) and illustrated as an example of economic valuation techniques by USAID(Talberth, 2015):

- the "avoided cost" technique : ..*without the marsh, by the year 2020, damages from annual flood events are expected to be over US$3.5 million higher than they are now, or*
- the "replacement cost" technique : ...*without the marsh, the city would have to spend over US$ 1.7 million replacing its water purification services with new water treatments.*

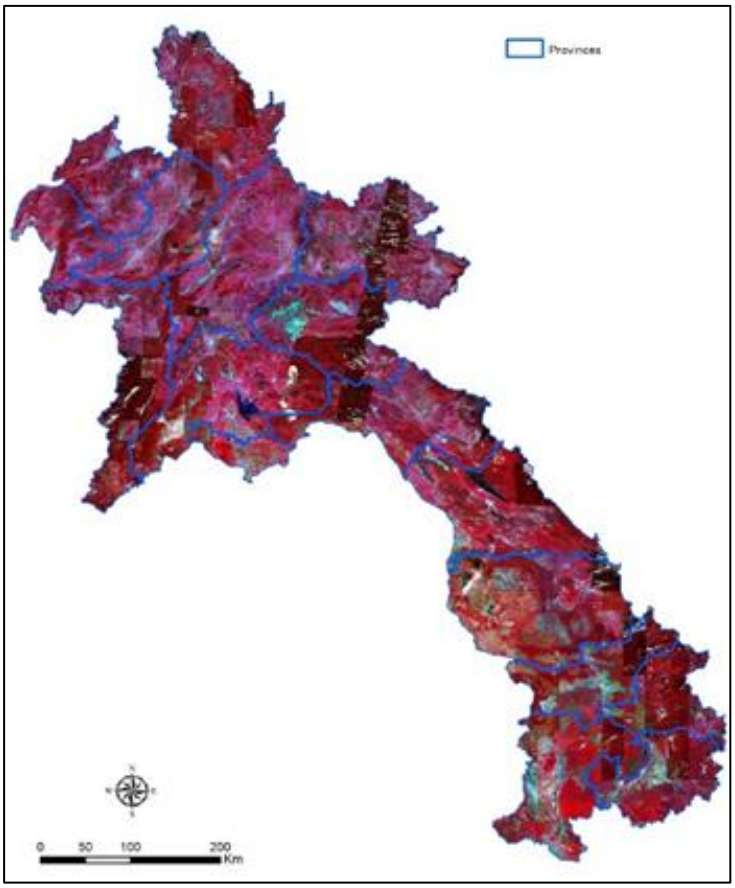
From the information above, it can be confirmed that not only does the economy in the Lao PDR depend on the natural resources; Lao people also receive measurable economic benefit from biodiversity. Tourism, hydropower, and agricultural production are major areas of future economic growth for the Lao PDR. All of these sub-sectors depend on biodiversity, including reliance on agro-biodiversity, protected areas, and the watershed catchment protection functions of forests. Therefore, it can be predicted that the decline of biodiversity will have a negative impact on theLao PDR's economy and that its valuation and conservation is needed now more than ever.

CHAPTER 2: TRENDS OF BIODIVERSITY IN LAO PDR

2.1 CHANGES IN FOREST AREAS

Industrial exploitation of forest resources has a long-standing history in the Lao PDR, which can be traced back to its colonization, starting in the early 1900s. The exploitation, however, became systematic and evident in the mid-20th century, when the country turned more towards a forest resource-based economy (Fujisaki, 2012). According to a recent national survey carried out in 2010, forests in the Lao PDR cover approximately 9.55 million hectares, or 40.3% of the total land area of the country.

Figure 1: Rapid Eye satellite imagery used to assess forest cover in 2015



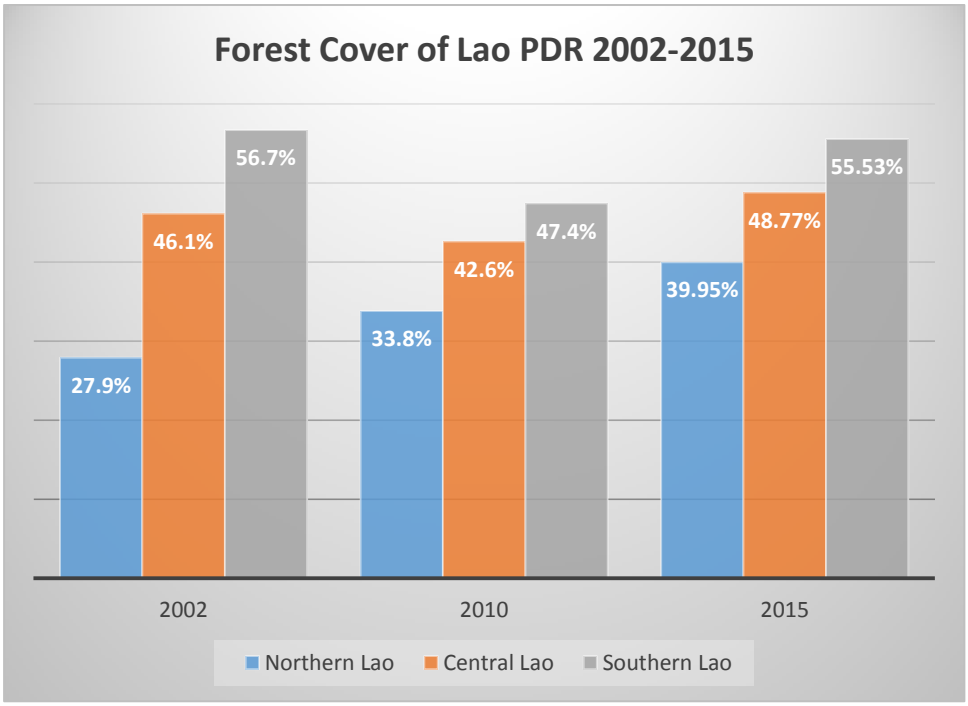
Source: 2016, MAF and Japan's Programme Grant Aid for Environment and Climate Change FPP-TA6

Areas of forest cover in the Lao PDR have changed over time. As shown in Figure 2 (the percentage of forest areas by region from 2002 to 2015), the forest areas in the northern part of country have increased by about 0.75% per year, whereas the forest areas in central and southern part have decreased consequently about 0.43% and 1.16% per year. Overall, the forest areas in each region (southern, central and northern) in 2010 are less than 50%.

In the Lao PDR, national forest cover assessment has been conducted six times, in 1940, 1982, 1995, 2002, 2010 and 2015 (Figure 3: forest covers change in Lao PDR). The forest has decreased from 17 million hectares, or 71.8% of the total land area in 1940, to 11.6 million hectares, or 49% of the total land area in 1982 to 9.8 million hectares, or 41.4% of the total land area in 2002, to 9.55 million hectares, or 40.33% of the total land area, in 2010.

However, further studies conducted by MAF and Japan's Programme Grant Aid for Environment and Climate Change FPP-TA6 indicate that the proportion of forest cover in 2015 was 46.7% (see table 1). The study shows that there has been a 6.5% increase in forest cover between 2010 and 2015, which equals to 1.29% annual increase. According to this study, the forest cover increase has been rapid in all regions: Southern Lao = 1.7% / year; Central Lao = 1.2% / year; and Northern Lao = 1.2% / year. The current trend of decreasing potential forest category and increasing current forest cover would indicate significant regeneration of fallows to forest. This trend was completely opposite between 2002 and 2010 in South and Central regions, where forest cover actually declined and potential forests increased.[2]

Figure 2: The percentage of forest cover by regions 2002-2015



[2]Forest Cover Assessment Lao PDR 2015 - Ministry of Agriculture and Forestry Department of Forestry - Japan's Programme Grant Aid for Environment and Climate Change, The Forest Preservation Programme In Lao People's Democratic Republic, Technical Assistance 6.

Table 1: Forest cover change in Lao PDR from 2010-2015.

North	Current forest	Potential forest	Other wooded	Permanent agriculture	Other non-forest
Proportion 2010 (%)	33.87	57.14	0.04	4.11	3.76
Proportion 2015 (%)	39.95	52.97	0.02	4.01	1.72
South	**Current forest**	**Potential forest**	**Other wooded**	**Permanent agriculture**	**Other non-forest**
Proportion 2010 (%)	47.20	34.34	1.48	9.26	7.83
Proportion 2015 (%)	55.53	22.36	1.23	15.73	2.13
Central	**Current forest**	**Potential forest**	**Other wooded**	**Permanent agriculture**	**Other non-forest**
Proportion 2010 (%)	42.71	41.21	1.49	5.45	9.14
Proportion 2015 (%)	48.77	32.31	1.15	8.56	5.36
Lao PDR	**Current forest**	**Potential forest**	**Other wooded**	**Permanent agriculture**	**Other non-forest**
Proportion 2010 (%)	40.25	45.98	0.88	5.95	6.51
Proportion 2015 (%)	46.72	38.16	0.73	8.90	3.00

Source: 2016, MAF and Japan's Programme Grant Aid for Environment and Climate Change FPP-TA6

The indisputable environmental issues related to declining forest cover are generally local and caused by factors beyond the traditional realm of forestry; i.e. commercial logging and/or illegal logging as well as household utilization of wood for construction and energy. In many studies the main factors behind deforestation have been found to be the expansion of permanent agriculture, and, in particular, shifting cultivation.

Overall, the loss of forest area has resulted in a loss of biodiversity and ecosystem services and reduced the extent to which local people can rely on wild food to meet their food security and nutritional needs. The loss of forest, moreover, can be attributed to the change in the country's status regarding greenhouse gas emission, where it was previously recorded as a net sink of CO2 in 1990 and then a net producer of CO2 in 2000(MoNRE, 2013). Nevertheless, to address deforestation, the government is promoting community participation, Payment for Ecosystems Services (PES) and sustainable forest management, and has applied Forest Stewardship Council standards (FSC) to all production forest areas (MoNRE, 2012).

The demand for wood products within and outside the Lao PDR is increasing rapidly. Wood products provided by the forestry sector include lumber, furniture, doors, parquet flooring, and posts. Most houses in urban areas are now built with bricks and a large proportion of production serves to meet increasing demands associated with construction. The increase is resulting in a heightened demand for doors, flooring, furniture, and other household items (FAO, 2002).

In 2001, log production contributed 3.2% of the national GDP; this share would have been higher if subsistence use and processing of wood and NTFPs were included. In terms of energy consumption, charcoal and fuel wood are the dominant sources of energy for cooking, and also for providing heating during the cold weather months in highland areas (MoNRE, 2013).

2.2 CHANGES IN NATIONAL PROTECTED AREAS SYSTEM

The system of National Protected Areas (NPAs) in the Lao PDR was legally established in 1993 and was officially termed the National Biodiversity Conservation Areas (NBCAs) through the Prime Minister's (PM) Decree 164. Moreover, the decree of Protected Areas (no. 134/G) determining principles, regulations and standards related to the establishment, allocation, protection, development, utilization and inspection of Protected Areas was published on 13 May, 2015 (Lao PDR, 2015). The objective of this decree is to promote the sustainability of these Protected Areas in terms of environment protection, watershed protection, prevention from erosion, protection of soil quality, protection of strategic zones for national defense & security, adaptation and reduction of the impacts of climate change, contributing to the improvement of the living conditions for people of all ethnic groups, and developing the national socio-economy. Four levels of Protected Areas[3] are also classified in the decree of Protected Areas.

Much of the Lao PDR's biodiversity conserved under Protected Areas is determined for the purpose of conservation and protection of flora and fauna species, forestry eco-systems and natural values, history, culture, tourism, environment, education, and scientific research (Lao PDR, 2015).

There are currently 24 National Protected Areas, covering almost 3.7 million hectares, or more than 15 % of the country's land area (Figure: 3). Figure 3 shows that the total area of National Protected Areas has increased. Twenty-one National Biodiversity and Conservation Areas (NBCAs) or National Protected Areas (NPAs) plus two corridors were established before 2010. Later, Phousabodh – PoungChong was declared in 2011, then two more areas were established in 2012 (Annex: 1). Locations of the NBCAs are shown in Figure 4 (NPAs map).

Additionally, another 0.9 million hectares have been designated as Protection or Conservation Forests at the provincial and district levels, bringing the total land area which is under some kind of protection to more than 18% of the total area of the country.

[3] 1)National Protected Areas; 2) Provincial and Capital City Protected Areas; 3) District and Municipality Protected Areas; 4) Village Protected Areas

Figure 3: National Protected Areas (NPAs) increased over the time.

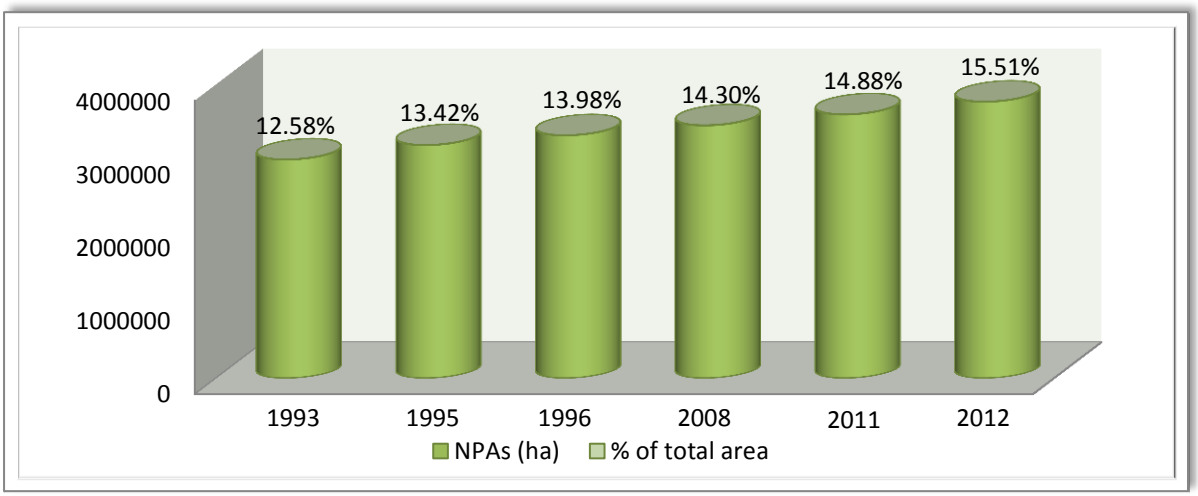
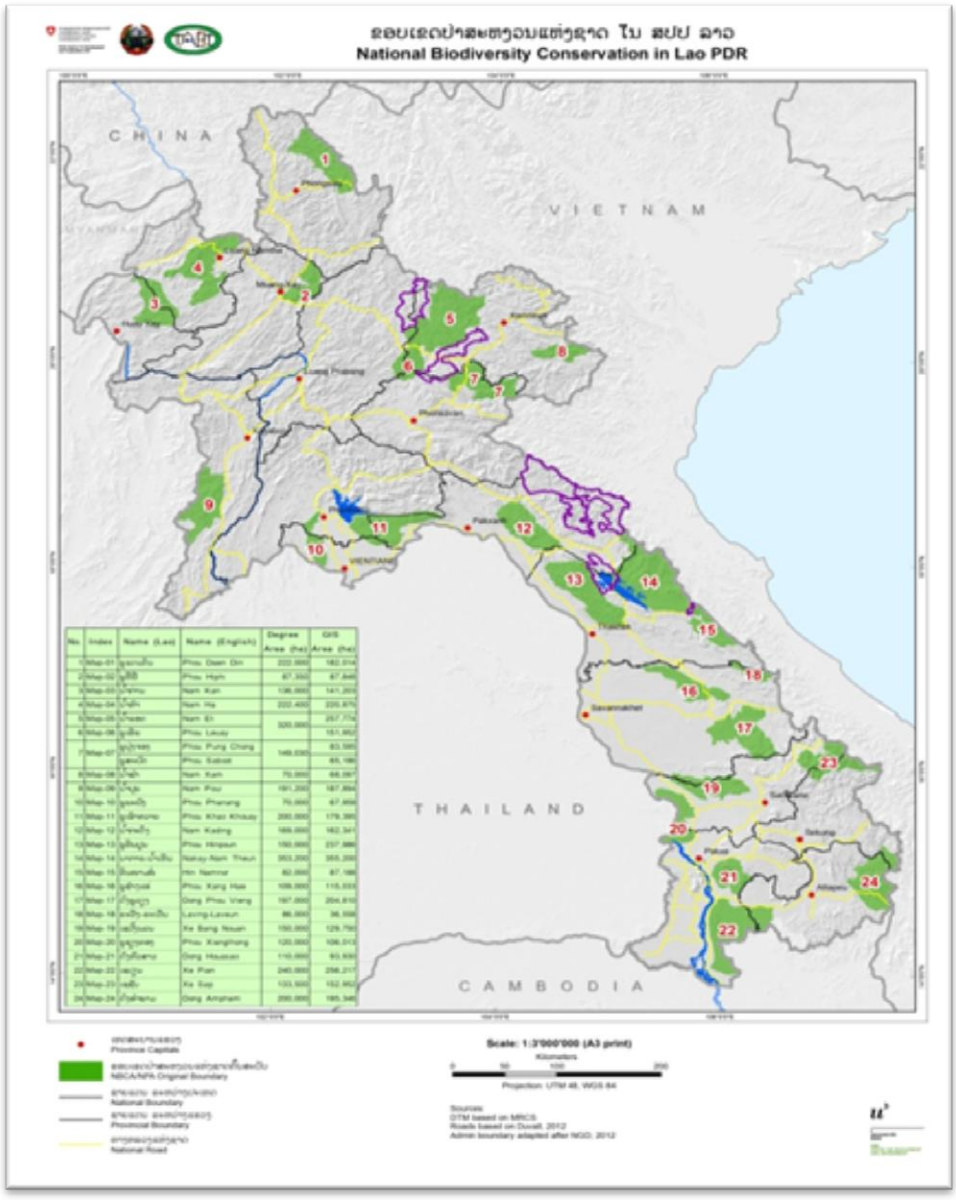


Figure 4: National Biodiversity Conservation in Lao PDR.



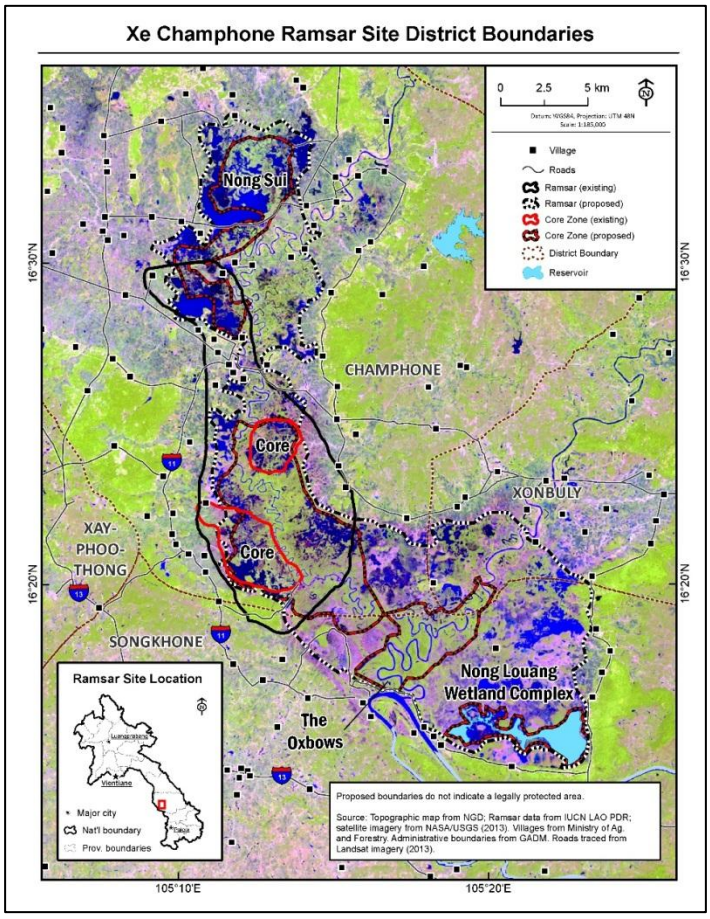
2.3 STATUS OF WETLANDS

IUCN has worked with the GoL on the process of accession to the Ramsar Convention since 2003. Upon joining the Ramsar Convention on 28 September 2010, the GoL had designated the country's first two wetlands of national significance, the Xe Champhone and Beung Kiat Ngong Wetlands. The commitment from the GoL to protect its vital natural wetland resources comes at a crucial point in the nation's rapid and transformative economic development.

Both the Xe Champhone and Beung Kiat Ngong Wetlands are ecologically significant areas and make vastly important contributions to sustaining the livelihoods of people who live in and around them.

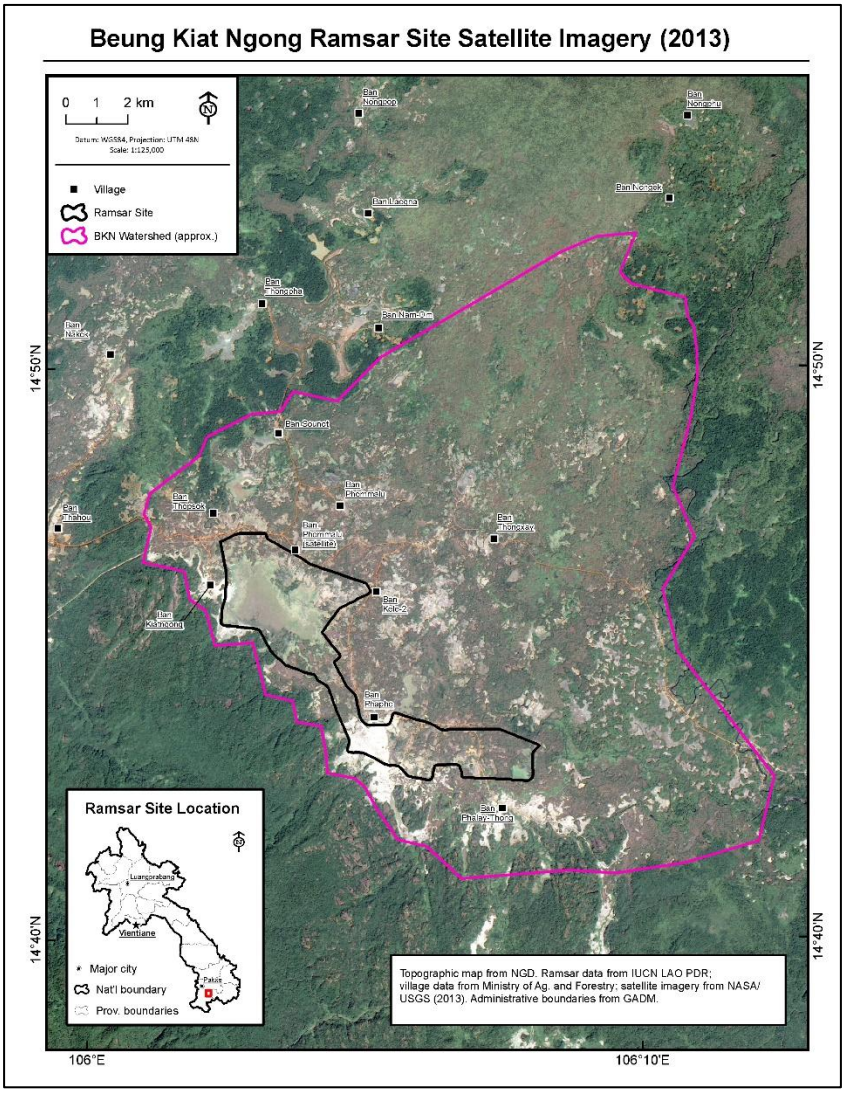
The Xe Champhone Wetlands comprise a large floodplain which nourishes perennial rivers and a wide variety of scattered lakes and ponds. The wetlands provide important food, and support the livelihoods for the approximately 20,000 people who live in and around the site (see figure: 5). Thousands of cattle are also raised in the area and the wetlands have become increasingly critical to both people and livestock during the dry season. Of the many lakes and ponds, some form habitat for the critically endangered Siamese crocodiles (*Crocodylus siamensis)*, and are home to several species of turtles.

Figure 5: Xe Champhone Ramsar Site



The Beung Kiat Ngong Wetlands are located on a large floodplain and are made up of a large freshwater marsh and a seasonal wetland with a number of scattered ponds and paddy fields (see figure: 6).The site is especially important for fish, which rely on the permanent wetlands for survival during the dry season. Fish spawning takes place both inside the wetlands, and during the wet season when some of the fish migrate to upstream tributaries. Fish species identified from the site include walking catfish (*Clarias spp.),* snakeheads (*Channa striata*) and swamp eels (*Monopterus albus*). The wetlands support some 11,500 villagers who live in the site and who are primarily reliant for their income on wild-capture fisheries, subsistence agriculture and NTFPs. Subsequently, the economic value of fishery and NTFP products from the Beung Kiat Ngong Wetland is estimated to be more than USD 850,000 per year.

Figure 6: Beung Kiat Ngong Ramsar Site



CHAPTER 3: MAIN THREATS OR PRESSURES TO BIODIVERSITY IN THE LAO PDR

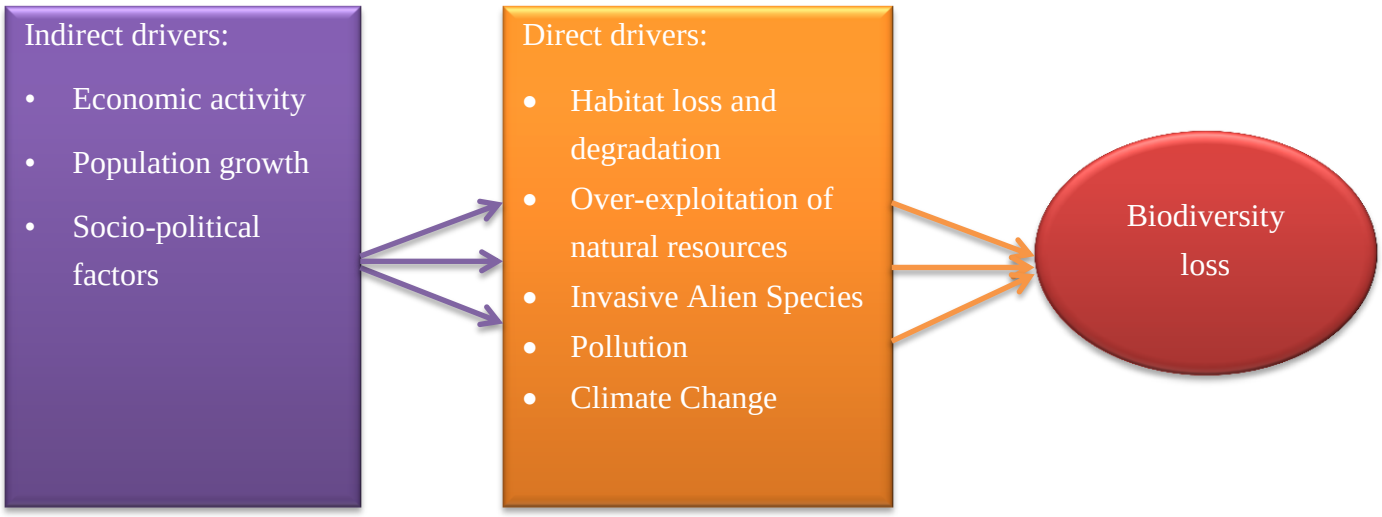
As stated above, biodiversity is globally recognized as a foundation of healthy ecosystems (Laurila-Plant, et al., 2015). Much of the Lao PDR's biodiversity is conserved under Protected Areas, which is are determined for the purpose of conservation and protection of Flora and Fauna species, forestry eco-systems & natural values, as well as history, culture, tourism, environment, education, and science scientific research (Lao PDR, 2015). As mentioned earlier, there are currently 24 National Protected Areas (NPAs) or National Biodiversity and Conservation Areas (NBCAs), covering almost 3.7 million hectares, or more than 15 % of the country's land area.

Biodiversity in the Lao PDR, however, remains exposed to several threats which have led to a decline in most of the country's flora and fauna numbers, including the extinction of several species. Between 1998 and 2010, there were over 74 Globally Threatened species on by the IUCN Red List[4] for Lao PDR, consisting of 20 plants, 5 amphibians, 38 mammals, and 11 retiles. Nevertheless, the records from 1998 – 2015 present over 100 Globally Threatened species (see annex 06) on the IUCN Red List (including 41 plants, 9 amphibians, 25 birds, 45 mammals, and 17 reptiles) found in Lao PDR, and an additional 68 Globally Near-Threatened (NT) species.

It can be seen that both flora and fauna in the Lao PDR have been are consistently threatened, and the number of threatened species has increased for over time. Threats to biodiversity are numerous and human activities are responsible for most of them. It seems that over-exploitation, agriculture expansion, and infrastructure development are the top 3 three pressures to biodiversity in the Lao PDR (Ounchith, 2015). Moreover, biodiversity loss is caused by both direct and indirect drivers. Direct drivers are often the result of development, particularly from private sector activities such as agriculture expansion, forest extraction, mining, infrastructure and construction of hydro dams. This study also presents that, behind these direct drivers of biodiversity loss, there are a number of indirect drivers that interact in complex ways to cause human-induced changes in biodiversity such as demographic changes, as well as economic, socio-political, cultural and religious factors (see Figure 7).

[4] http://www.iucnredlist.org

Figure 7: Pressure to biodiversity loss in Lao PDR



3.1. DIRECT DRIVERS TO BIODIVERSITY LOSS

Habitat loss and degradation:

Habitat loss and degradation are the primary threats to the survival of wildlife in the Lao PDR, and are mostly caused by the expansion of agricultural land, forest product extraction, infrastructure expansion, and fires.

Forest Product extraction:

The Lao PDR is rich in forests. They are a vital economic resource and provide an essential contribution to the consumption and income of the rural poor, as well as conserving biodiversity, soil, and water values. The rural population, who make up about 80 per cent of the Lao population, relies heavily on the forest for food, fuel, fiber, and shelter. Despite the importance of the resource, deforestation and forest degradation are accelerating at an alarming rate. Timber harvesting, fuel wood gathering, charcoal making, and NTFP (e.g. rattan, bamboo, resin, and other products) collection result to in widespread deforestation and forest degradation. With the development of new international financing mechanisms to address the benefits that forests provide, reducing emissions from deforestation and degradation has been identified as the most cost effective way to mitigate climate change. Therefore, avoiding deforestation has become a priority for the Lao PDR (MoNRE, 2012).

Agriculture expansion:

As demands on agricultural products increase more and more, land is brought under cultivation for which forests are cleared and grass-lands ploughed. Chemical products are increasingly used and during the process of clearing the land, wood is simply burned.

Between 2002 and 2009, the rate of forest land conversion attributed to agricultural expansion increased, for both large concession areas and small investments. Recently, the rapid emergence of concession-based commercial contract farming has been identified as one of the key drivers to deforestation. The main commodities of interest in the Lao PDR include maize, coffee, soybeans and cassava (MoNRE, 2012). A study of Moore et al. (2011) found that the transition to commercial agriculture, such as maize and Job's tears (*Coix lacryma-jobi*) has had noticeable effect on land-use, with an increase in monoculture. The same study also found that cash crops, in particular maize, are more demanding on the soil's nutrients and cause greater soil erosion than upland rice.

In recent years, the GoL has introduced a number of policy instruments and incentives to boost forest cover by promoting the development of forest plantations throughout the country. For example, one of the main forest policies is to restore forest cover to 70% by the year 2020 (MAF, 2005). As a result, the area of plantations, especially rubber plantations, has increased significantly from just less than 1,000 ha in 1990 to over 200,000 ha in 2007. However, tree plantations are likely to be a small part (perhaps 500,000 hectares) of the overall forest restoration plan of 7 million hectares. Most of these plantations are expected to provide social and environmental benefits to local communities and their economies (Phimmavong, et al., 2009). It is believed that the establishment of plantations on degraded forest and agricultural land generates a negative impact, not only for local communities and their livelihoods, but also for wildlife species.

Infrastructure expansion:

Hydropower and mining: are very dynamic sectors in the Lao PDR and have the potential to make a great contribution to economic development and poverty alleviation. The Lao power sector is under the process of development. In particular, the hydropower sector has the potential to play a key role in achieving the social and economic development objectives of the Government of the Lao People's Democratic Republic (Lao PDR) by expanding the availability of low cost, reliable electricity within the country and earning revenue from export sales to the region (MEM, 2015). The mining sector is also one of the biggest contributors to national revenue in the Lao PDR. It is one of the four priority sectors (the other being energy, agriculture and tourism) for investment and industrialization. Foreign Direct Investment (FDI) from 1989-2014 in the mining sector accounted for 24% (MPI, 2015) of overall investment in the industry.

Both hydropower and mining have serious environmental implications if they are not effectively addressed accordingly to their Social and Environment Management Plan, which effect not only

at the local level. One report on an environmental perspective on hydropower and mining development in the Lao PDR (Stenhouse & Bojoe, 2010) expressed that the significance and scope of these effects is related to the size of the project and its location. The same report states that there are several mining concessions and hydropower projects which overlap with NPAs which are areas of high biodiversity.

Based on the latest assessment, in line with the government policy to respond to regional demand, thirty-one potential sites for hydropower dams have been identified in forest areas, amounting to 140,635 hectares (MAF, 2005). The hydropower sites are one of the drivers of deforestation as they represent areas designated for development and are seen as financially attractive logging sites as no regeneration of forests is required after logging (MoNRE, 2012).

Transport corridors: given its strategic location, the Lao PDR aims to become a land link and centre of logistics for the GMS. In recent decades, the development of road networks and transport within the country has given rise to fairly rapid north-south and east-west economic corridors with international linkages. Given its strategic location, the Lao PDR aims to become a land link and centre of logistics for the GMS. (MoNRE, 2012).

Road construction provides convenient transport facilities infrastructure to Lao people. However, it can also be a threat for wildlife habitat and biodiversity. Apart from the direct impacts of their construction; land clearing, and damage to freshwater ecosystems and waterways by erosion, roads also 'open up' previously inaccessible forest and natural areas which allows exploitative activities to take place (wildlife hunting, logging and encroachment).

Tourism: according to the Lao PDR Tourism Strategy 2006-2020, from 1990 to 2000 - the Visit Laos Year had begun – the number of tourists significantly increased during this period, from 14.400 tourists in 1990, to 737,208 tourists in 2000. The tourism industry's contribution to the national and local economies is also growing. Based on its geographical location, natural abundance, historical and cultural aspects, the Lao PDR has a special character that attracts more tourists to rural remote areas, especially to ethnic villages and natural sites; protected forests, caves and, rivers. The negative environmental impacts of tourism development relate to the physical development of facilities (in terms of construction and infrastructure development, and as well as deforestation and intensified or unsustainable land use).

Tourism in the Lao PDR is just at its inception and is not considered as one of the major threats to biodiversity; however some best improved practices should start to be disseminated in key crowded places such as the main country caves, and waterfalls. For example, the development of paths, the use of non-fuel boats in caves is to be practiced.

Forest/brush fire:

Fires (human and naturally induced) are known to have played a role in affecting the ecology of forests in the Lao PDR. Savannah burning occurs every year, especially in dry season. In addition to savannah burning, scrub forest and rangeland are also burned as a result of

uncontrolled slash-and-burn, which includes burning dry grasses for animal grazing (MoNRE, 2013). There are, however, no records of burned areas.

Over-exploitation of natural resources:

Overhunting and over-harvesting contribute greatly to the loss of biodiversity, killing numerous species over recent years. There is a long tradition of hunting in Lao PDR; rural communities are dependent on hunting and harvesting of wild products to supplement seasonal rice harvests. Hunting for trade has a greater impact on wildlife than hunting for local subsistence and is often conducted by outsiders; even where locals are the main hunters, they are usually acting to supply externally initiated opportunities. In Lao PDR, especially in the rural area, hunting is more related to men and collection of NTFPs can be more with females depending on the NTFP. Men are more involved in timber collection.

Commercialization and trade in wildlife products has also increased with higher prices and improved access to previously remote areas. The wildlife trade is threatening the very existence of certain species and natural communities. The pressure on NTFPs and wildlife in the Lao PDR has also increased greatly because of internal and external trade demand.

The majority of the Lao population is highly dependent on forest and NTFPs for their subsistence. NTFPs are a traditional and important component of the subsistence livelihoods of the majority of Lao's population. Some NTFPs such as *Styrax benzoin* (the resin extracts from *Styrax tonkinensis* and use for incense), resins, sticklac, cardamom were traded locally amongst the Lao population as well as with the neighbouring countries (Stuart-Fox, 1998). It has become increasingly common to find villagers using NTFP sales as means of obtaining rice, their staple food, in addition to the more normal household and other cash requirements.

Nevertheless, traditional hunting (only for consumption) may not have too much impact to NTFPs. But a commercial market for wild animals, dead or alive, which have bought people to go hunting, For example, animal parts required for traditional medicines or valued meat increases the threat of over harvesting.

There is, however, a growing trend among the younger generation to reject the perception that these animal based medicines are of any value, and there is a trend towards stopping to eat meat from endangered species. Wildlife however is still at great threat from the existing generation's demands.

Invasive Alien Species:

Many Invasive Alien Species (IAS) have been introduced into the Lower Mekong Basin (LMB) region for economic and aesthetic purposes, while several others have entered accidentally (Miththapala, 2007). The spread of IAS in the region has been aggravated by rapid development activities such as modification of inland water systems for water management projects (e.g.

dams, diversions), and aquaculture development (e.g. inland fish farming). Those IAS species are a major threat to wetlands and livelihoods in the LMB (IUCN, 2006).

For instance, Giant Mimosa (*Mimosa pigra)* is one of the worst environmental weeds of the Mekong River Basin, also on the list of 100 of the world's worst IAS, and can be found in upland agricultural systems in Northern Provincesofthe Lao PDR (Miththapala, 2007). IUCN (2006) highlighted that "It is a serious agricultural weed in the LMB often establishing in areas along streams and canals and then invading adjacent rice fields" (.p3).

Moreover, some aquatic fauna have been introduced for aquaculture in Lao PDR. They have proven to be negative to the native species (Miththapala, 2007). Tilapia *(Oreochromis spp.)* is a native from Africa, this fish species have been introduced as aquaculture in Lao PDR where it has been declared an invasive species.

Miththapala (2007) also highlighted that IAS are directly and indirectly affecting human livelihoods; especially inland water systems are particularly vulnerable.

Pollution:

Environmental pollutants can generate various toxicities that can prevent normal growth of biological organisms and their reproductive and survival capabilities. Water pollution from industrial sources has been identified in the Lower Mekong Basin (LMB), especially in the capital cities of Vientiane and Phnom Penh, and more generally in northeast Thailand and the Mekong Delta. Elevated levels of heavy metals have been found mainly, down-stream of Phnom Penh and on the Mekong Delta, in areas with heavy boat traffic and high population densities (MRC, 2010) .

Forms of pollution that affect biodiversity in the Lao PDR include nutrient and chemical run-off from agricultural areas and urban lands. For example, excessive fertilizer, pesticide, and herbicide use leads to excessive levels of nutrients in soil, and has also caused increasing environment pollution. Likewise, pesticides deter beneficial insects.

Therefore, it can be seen that the aquatic systems are affected with water pollution from domestic, aqua cultural and agricultural sectors.

Moreover, pesticides and agro-chemicals can have a negative impact on water quality which can affect aquatic biodiversity and other forms of biodiversity. Lao Farmers have used pesticide in their agricultural activities.

The GoL has addressed the above issues by adopting the integrated water resources management (IWRM) approach, among others. Moreover, the GoL has recently passed the Fisheries and Aquaculture Law and is also promoting the role of community-based resource management that build on regulatory systems.

Climate Change:

As a result of the Lao PDR's geographical location, its climate is dominated by monsoonal variability, with the southwest monsoon particularly contributing to high rainfall and high temperatures from May to September. The monsoon contributes to a seasonal cycle of rainfall where more than 70 percent occurs during the wet season.

According to the USAID Mekong Adaptation and Resilience to Climate Change (USAID Mekong ARCC) project, the Lao PDR will likely experience pronounced changes in rainfall and temperature patterns by 2050 with significant ramifications for ecosystems, and the communities and the livelihoods that support them. USAID Mekong ARCC also states that large rainfall events (e.g. greater than 100 mm/day) will occur more frequently and daily maximum temperatures will rise by roughly 2°C to 3°C in the Lao PDR, with higher increases to the south.

3.2. INDIRECT DRIVERS TO BIODIVERSITY LOSS

Biodiversity loss is occurring as a consequence of the above-mentioned direct drivers. However, these direct drivers are being fed by indirect driver of biodiversity loss. They are the root causes of changes in ecosystems. Four main indirect drivers that influence biodiversity in the Lao PDR are:

Economic activity:

According to the World Bank, the Lao PDR is one of the fastest growing economies in the East Asia and Pacific region with a GNI per capita of $1,600 in 2014. GDP growth averaged 7 percent over the last decade, with increasing use of the country's natural resources – mostly water, minerals and forests – contributing one third of output growth (World Bank, 2015).

As previously mentioned, natural resources – forestry, agriculture land, water, and minerals – comprises more than half of the Lao PDR's total wealth. For instance, in 2001, log production contributed 3.2% of national GDP; this share anyway would have been higher if subsistence use and processing of wood and NTFPs were included (MoNRE, 2013).

An unsustainable consumption and production, resulting from an increase of living standards, seems to change natural resources use and impacting negatively in the national biodiversity. As a result, the country is working to ensure that the economic activities are sustainably managed.

Population growth:

The ADB (2006) reported that in 2005, the Lao PDR population was 5.9 million, a lower population, compared to neighbouring countries such as Thailand (64.1 million), Vietnam (83.6 million), and Cambodia (14.8 million). Based on Lao Statistic Bureau, the Lao PDR ended 2012 with a population of 6.5 million.

Moreover, the Lao PDR is one of the Asian countries was projected to have the largest increases in urban populations (more than 100%) over the 25 years until 2030 (ADB, 2006). With this growth, there will also be an increase in demand for land, food, water, energy, and other resources.

The growth of population in the Lao PDR will predictably result in increased food demand. In a context of lack of available land, inadequate irrigation, rising fertilizer prices, changing of climate and inability to get insurance and loans, the increased demand for goods and services to meet the needs of a growing population will exert more pressure on the components of biodiversity.

Moreover, population growth leads to the extension of agricultural areas; especially in the northern uplands of the Lao PDR, where extensive shifting cultivation is practiced for subsistence. And it is more the changing consumption patterns that change production patterns as well (from subsistence to more economic based production).

Forest loss has primarily been due to a widespread transition to commercial agriculture which requires additional land and causes greater soil degradation than traditional shifting agriculture. As a result, the forest has been decreasing from 17 million hectares in 1940 to 11.6 million hectares (48.98%) in 1982 to 9.8 million hectares (41.38%) in 2002 to 9.5 million hectares (40.32%) in 2010.

Socio-political factors:

Based on Government of the Lao PDR & United Nations (2015), the country already achieved the Millennium Development Goal target of halving poverty and hunger by 2015. The NSEDP, moreover, has adapted the Millennium Development Goals (MDGs) and incorporated these into national priorities and goals. In addition, the most recent 8th Five-Year NSEDP (2016-2020) aims at graduating from least developed country (LDC) status. Managing natural resources to achieve long-term development and sustainability is also a key focus of the 8th NSEDP.

Although the Lao PDR is rich ecologically, biodiversity has been significantly reduced by population growth, land use changes, resource extraction and the transition from subsistence farming to a market economy. The government, nevertheless, has been quick to realize the need to protect biodiversity, aquatic animals and wildlife in the Lao PDR by establishing the NPA system in the country and enacting laws, decrees, directives and regulations on the management of forest, aquatic animals and wildlife all over the country.

Moreover, in 2015 the decree for Protected Areas (No.: 134/G) was published in order to make these areas become abundant and sustainable by focusing on environment protection, watershed protection, prevention from erosion, protection of soil quality, protection of strategic zone for national defence & security, adaptation and reduction of climate changes, solving the global

warming, contributing to the improvement of living conditions for people of all ethnic groups and developing the national socio-economy (Lao PDR, 2015).

Moreover, the Lao PDR has legal requirements to undertake Environmental and Social Impact Assessment (ESIA) for development projects. However, such requirements do not always adequately integrate biodiversity and ecosystem services. In many cases this poor integration is due to: i) a tendency to downplay the importance and service provided by biodiversity, ii) the lack of understanding of ESIA: people doing the EIAs have no real appreciation of how to assess impacts and how to mitigate, and iii) the inadequate level of engagement with the communities, beneficiaries of biodiversity and ecosystem services.

PART 2. THE NATIONAL BIODIVERSITY STRATEGY AND ACTION PLAN, ITS IMPLEMENTATION, AND THE MAINSTREAMING OF BIODIVERSITY

P. Phiapalth, IUCN Lao PDR / IUCN

CHAPTER 4: NBSAP IMPLEMENTATION STATUS

In 1996, the Government of Lao PDR acceded to the United Nations International Convention on Biological Diversity (CBD). In meeting the requirements of the convention, in 2004, the government of Lao PDR formulated and approved its first National Biodiversity Strategy and Action Plan (NBSAP) which laid out an action plan up to 2010 and a strategy up to 2020 (Lao-PDR, 2004). The 1st NBSAP consists of seven programmes; Scientific Data and Biodiversity Knowledge Development; Biodiversity Management; Human Resource Development Institutional; Public Awareness and Involvement; Institutional and Legal Frameworks; NBSAP Implementation; International Cooperation. Objectives have been assigned to each programme, with specific actions allocated to each objective (see Annex 2 for a full list of objectives and actions).

THE NATIONAL BIODIVERSITY STRATEGY TO 2020 AND ACTION PLAN TO 2010

The overall goal of the National Biodiversity Strategy to 2020 and Action Plan to 2010 is to *maintain the country's diverse biodiversity as one key to poverty alleviation and protect the current asset base of the poor as support to the implementation of the government's priority* programmes. In order to achieve this overall goal seven programs have been identified to respond to the following seven goals : (i) Improve Biodiversity data and fill data gaps through basic and applied research., (ii) Improve biodiversity management and monitoring, (iii) Improve government human resource capacity with biodiversity issues, (iv) Increase public awareness of, and encourage participation in the sustainable management of biodiversity (v)Adjust national legislation and regulations related to biodiversity and harmonise them with MEAs, (vi) Secure the NBSAP's implementation and (vii) 'Promote international cooperation driven by country needs.

Under those seven programs, 27 objectives to be achieved by 2020 and 203 actions to be undertaken by 2010 were identified. Those programs, objectives and actions can be found in Annex 2 along with the actions taken mainly during the action plan period.

SUMMARY OF IMPLEMENTATION PER OBJECTIVE

In 2011, IUCN published an assessment of the 1st NBSAP strategy and action plan(IUCN, 2011), which identified that significant progress was made across a range of areas since the 1st NBSAP implementation in 2004, including biodiversity research, the recording of local knowledge, expansion of NPAs, implementation of management plans in a few key NPAs, the drafting of a Biosafety Law, the expansion of ecotourism, improved land use planning and land allocation, Ramsar accession, and stricter EIA/ESIA laws. The report also highlighted gaps in the 1st NBSAP implementation, and suggested work which should be considered as priorities for the future 2nd NBSAP.

The below information (see table 2) provides a summary of the implementation status per objective for the seven programs of the 1st NBSAP the details per action are provided in Annex 2.

Table 2: A summary of the implementation status per objective for the seven programs of the 1st NBSAP

PROGRAMME1:*Scientific Data and Biodiversity Knowledge Development*

Objective 1: Identify important biological diversity components and improve the knowledge base:

While significant progress has been made towards the targeted actions (see annex 2), there is a need for government to provide a more specific focus on biodiversity research, on the impacts of climate change and climate change adaptation, and on research into the impacts of climate change on biodiversity and specific ecosystems. There is also a need to work on setting goals for the creation and maintenance of a centralized biodiversity database.

Objective 2: Recognize and ensure the contribution of the ethno biological knowledge of Lao PDR's local and indigenous peoples in the conservation of biodiversity.

While there has been significant progress made on knowledge sharing between NPAs, guidelines of legal names for species, and sharing information on the status of biodiversity in the Lao PDR, there are a number of areas where work is still needed; guidelines for the creation of a National Biodiversity Database or National Biodiversity Information Centre, determining goals for safeguarding intellectual property rights, and assigning legal names to species (especially flora). Nevertheless, promotion and development of these knowledge and practices including the local community action participation is urgently required.

Objective 3: Ensure the provision of knowledge, information and understanding of the nation's biodiversity which is required for its effective utilization, conservation and management.

While there has been significant progress made on knowledge sharing between NPAs, guidelines of legal names for species, and sharing information on the status of biodiversity in the Laos PDR, there are a number of areas of work which are still needed; guidelines for the creation of a National Biodiversity Database or National Biodiversity Information Centre, determining goals for safeguarding intellectual property rights, and assigning legal names to species (especially flora).

PROGRAMME 2: *Biodiversity Management*

Objective 1: Establish and manage a comprehensive and representative system of PAs that covers the nation's biodiversity.

A lot of progress has been made towards establishing and managing a system of NBCAs/NPAs.

Accomplishments include an extensive evaluation of the NPA system (DoF), approving NPA management plans, creating new NPAs, and creating detailed PA zoning. Two Ramsar sites were designated. Management plans are needed for more NBCA/NPAs and more resources need to be allocated towards the management of existing NBCA/NPAs.

Objective 2: improve the standards of management and protection of the nation's biodiversity.

While there have been a lot of positive steps towards improving the standards of management and protection of biodiversity (upgrading provincial protected areas to NPAs and approval of 4 NPA master plans, improved boundary demarcation of some NPAs, revising the Forest Law and the decree of NPAs), there is still more work to do in terms of sourcing sufficient and sustainable financing mechanisms to implement NBCA management plans, as well as seeking opportunities to match NBCA management plans with poverty reduction plans.

Objective 3: Conserve threatened and endangered species by enabling the species to survive in their natural habitats.

While the Lao PDR has made progress towards protecting its threatened and endangered species, there is still much work to do in the face of rapid development and as the natural resource sector continues to expand. There is a need to further strengthen EIA and ESIA standards to ensure that biodiversity surveys are carried out as part of investment approval processes. More funds should also be allocated to CITES implementation in the Lao PDR.

Objective 4: Establish and maintain ex-situ research and conservation facility.

Ex-situ research and conservation is not practiced widely in the Lao PDR. New and existing projects such as Pha Tad Khe Botanical Gardens and the Free the Bears Project, are valuable in terms of direct conservation (i.e. wildlife rehabilitation) and have the potential to raise public awareness about biodiversity and conservation, but they need continued support. The establishment of a Natural History Museum and development of ex-situ conservation guidelines are still needed.

Objective 5: Ensure that the social and economic benefits from the use of genetic materials and products originating in Lao PDR accrue to the nation.

Opportunities for benefit sharing arising from the utilization of genetic resources in the Lao PDR are limited, and there is little evidence that ABS has been effectively implemented in relevant laws. There is a need to build stronger emphasis on ensuring that value is added to goods through processing before leaving the country.

Objective 6: Protect indigenous biodiversity from the uncontrolled introduction and spread of alien species and genetically modified organisms (GMOs).

A number of major accomplishments have been made; establishing Biosafety coordination committees, the submission of a Biosafety Law to the National Assembly, and improving LMO monitoring. Progress with monitoring and controlling alien invasive species has been limited and more attention should be given. There is also a need to strengthen law enforcement related to the import and export of plants and animals.

Objective. 7: Promote ecologically sustainable management practices for ecotourism.

In general, this objective was well implemented. Ecotourism trainings opportunities have expanded and more information is available to tourists to encourage them to follow socially and environmentally responsible practices while traveling. In the future, further steps may be taken to ensure that local communities and ecosystems benefit from tourism activities.

Objective 8: Support the conservation of biodiversity through ecological sustainable forestry management practices.

Strong efforts have been made to improve forest management; assigning forest categories and expanding production, protection and conservation of forests. Areas that require further work in relation to this objective include more extensive implementation of Land Use Planning that takes into account principles of environmental sustainability. A comprehensive policy for forest management, particularly for logging and fuel woods; monitoring of impacts of plantations on surrounding ecosystems; and the writing of management plans for a larger number production forests.

Objective 9: Promote industrial, energy and mining development by minimizing the impacts on biodiversity during industrial development processes.

Key achievements have included the establishment of department divisions to specifically promote environmentally responsible investments, focusing on EIAs and ESIAs. In addition, various laws and standards have been updated. It seems that the biggest obstacle to address in the course of the NBSAP is the monitoring of environmental impacts of investments and enforcing laws accordingly (such as enforcing the polluter pays principle).

Objective 10: Support the conservation of biodiversity through ecologically sustainable agriculture.

Land Use Planning has been aimed at reducing shifting cultivation in selected areas. Farmers' access to credit has increased, and research has been done undertaken into rice species. Expansion of Land Use Planning (LUP) that follows sustainability principles has been encouraged. Identified future priorities include assigning agro-ecological zones for farmers so as to avoid the unproductive use of land, assessing downstream impacts of catchment deforestation, and developing laws and regulations on bank protection, banning disposal of

waste into river bodies

Objective 11: Manage water resources for socio-economic development.

The major accomplishments in water resource management have been the accession to the Ramsar Convention of two Ramsar sites, and setting up the country's first two watershed Committees. However, there is a need to continue to clarify responsibility for wetlands and water resource management, further progress in assessing the downstream impacts of catchment deforestation, developing laws and regulation on bank protection, and banning disposal of waste into river bodies.

Objective 12: Support the conservation of biodiversity in urban areas.

Although there have been efforts to improve urban planning, and pollution and waste management by creating environmental standards and disseminating regulations, it is not clear how these actions have translated into 'on-the-ground' impacts, in terms of green spaces in urban areas, or conservation of biodiversity in urban areas.

PROGRAMME 3: *Human Resource Development*

Objective 1: Raise the awareness and capacity of government staff at all levels.

While there are examples of efforts to educate government staff about biodiversity conservation, most of these have been targeted at the Central levels of government and also at agencies that are directly involved in natural resource management and environmental conservation (e.g. MAF). There is a need to target provincial and district level government staff, and involve other sectors that are indirectly involved in biodiversity conservation (e.g. MPI, MPW).

Objective 2: Improve the research capacity of national experts in different fields related to biodiversity.

The donor and international research community has made a large and positive contribution to human resource development in fields related to biodiversity, by supporting training programs and scholarships for graduate degree studies. As a result of this support, the capacity of Lao researchers is improving.

Objective 3: Improved the management capacity at all levels.

There have been efforts to improve the management capacity of government staff, but there is a need to develop more of a strategic direction and clear capacity development program.

PROGRAMME 4: *Public Awareness and Involvement*

Objective 1: Improve public awareness and education.

While efforts have been made to expand public awareness and increase the amount and

effectiveness of education programs, government stakeholders have reported difficulties with this. And There is also a need to train media professionals in the values of Lao's biodiversity such as the connection between biodiversity and livelihoods. Further investigation into non-traditional methods are also required, in order to better reach engage the public (i.e. not only through TV and radio), as well as reaching out to the private sector, and developing outreach programs that are targeted at multi-ethnic groups.

Objective. 2 Encourage and support public participation.

There is a need to further develop guidelines which ensure public participation of natural resource management projects.

Objective 3. Introduce biodiversity related studies to educational curricula.

There are examples of biodiversity related studies that have been introduced to university and high school curriculum, but an adequate assessment is needed to determine its quality, level of emphasis on biodiversity conservation, and to what extent these curricula are actually being followed in schools.

PROGRAMME 5: *Institutional and Legal Frameworks*

Objective 1: Strengthen Institutional Cooperation and enhance inter-department coordination in the conservation and sustainable use of biodiversity.

There is a need to clarify the responsibilities of different sectors related to biodiversity and biodiversity planning needs to be implemented at all levels of government (national to local).

PROGRAMME 6: *NBSAP Implementation*

Objective 1: Implement the strategy and action plan through priority actions within established times.

In order to move away from biodiversity conservation projects that are donor driven, and more towards an approach that is in-line with the action plan and strategy of the NBSAP, there is a need to identify time frames, priority actions, estimated budgets, potential funding sources, and indicators for successful implementation.

Objective. 2: Secure sufficient funding for the NBSAP's implementation.

Despite the various funding windows, funds have not been sufficient to successfully carry out many of the actions laid out in the 1st NBSAP, and there is a need to develop sustainable finance mechanisms and allocate more funds to high priority actions.

PROGRAMME 7: *International Cooperation*

Objective 1: Ensure continued and effective international and regional co-operation with international governmental and non-governmental organisations in the conservation of

biodiversity

Significant progress in regional and international collaboration, i.e. IUCN, WCS, WWF and others have established technology transfer programs that enable government staff and researchers to upgrade their knowledge through courses and on the job-training. ASEAN and MRC has played a key role. Trans-boundary biodiversity issues should be a priority in future.

Objective 2: Support and encourage the Lao PDR's participation in Multilateral Environmental Agreements.

While the Lao PDR has acceded to many multilateral environmental agreements, bilateral NPA agreements (Nam Ha and Hin Nam No NPAs), and has signed MoUs with Cambodia and Thailand targeted at species conservation, there is more coordination required between all MEAs and a need for better communication and reporting efficiency (i.e. a single steering committee could be established to liaise between institutional structures responsible for MEAs.

OVERALL ASSESSMENT

Based on the above presented summary of implementation per objective, the following table (see table 3) has been developed to present estimations of the 1st NBSAP degree of implementation, illustrated in the following manner:

Table 3: The estimations of the 1stNBSAP degree of implementation

Symbol	Degree of Implementation
	Achieved
	Partially achieved
	Not achieved

PROGRAM/ OBJECTIVES	LEVEL of IMPLEMENTATIONS
PROGRAMME1: SCIENTIFIC DATA AND BIODIVERSITY KNOWLEDGE DEVELOPMENT	
Objective 1: Identify important biological diversity components and improve the knowledge base:	
Objective 2: Recognize and ensure the contribution of the ethno biological knowledge of Lao PDR's local and indigenous peoples in the conservation of biodiversity.	
Objective 3: Ensure the provision of knowledge, information and understanding of the nation's biodiversity which is required for its effective utilization, conservation and management.	

PROGRAMME 2: BIODIVERSITY MANAGEMENT

Objective 1: Establish and manage a comprehensive and representative system of PAs that covers the nation's biodiversity.

Objective: 2 improve the standards of management and protection of the nation's biodiversity.

Objective 3: Conserve threatened and endangered species by enabling the species to survive in their natural habitats.

Objective 4: Establish and maintain ex-situ research and conservation facility.

Objective. 5 Ensure that the social and economic benefits from the use of genetic materials and products originating in Lao PDR accrue to the nation.

Objective 6: Protect indigenous biodiversity from the uncontrolled introduction and spread of alien species and genetically modified organisms (GMOs).

Objective. 7: Promote ecologically sustainable management practices for ecotourism.

Objective 8: Support the conservation of biodiversity through ecological sustainable forestry management practices.

Objective 9: Promote industrial, energy and mining development by minimizing the impacts on biodiversity during industrial development processes.

Objective 10: Support the conservation of biodiversity through ecologically sustainable agriculture.

Objective 11: Manage water resources for socio-economic development.

Objective 12: Support the conservation of biodiversity in urban areas.

PROGRAMME 3: HUMAN RESOURCE DEVELOPMENT

Objective 1: Raise the awareness and capacity of government staff at all levels.

Objective 2: Improve the research capacity of national experts in different fields related to biodiversity.

Objective 3: Improved the management capacity at all levels.

PROGRAMME 4: PUBLIC AWARENESS AND INVOLVEMENT

Objective 1: Improve public awareness and education.

Objective. 2 Encourage and support public participation.

Objective 3. Introduce biodiversity related studies to educational curricula.

PROGRAMME 5: INSTITUTIONAL AND LEGAL FRAMEWORKS

Objective 1: Strengthen Institutional Cooperation and enhance inter-department coordination in the conservation and sustainable use of biodiversity.

PROGRAMME 6: NBSAP IMPLEMENTATION

Objective 1: Implement the strategy and action plan through priority actions within established times.

Objective. 2: Secure sufficient funding for the NBSAP's implementation.

PROGRAMME 7: INTERNATIONAL COOPERATION

Objective 1: Ensure continued and effective international and regional co-operation with int. governmental and non-governmental org. in the conservation of biodiversity

Objective 2: Support and encourage the Lao PDR's participation in Multilateral Environmental Agreements.

CHAPTER 5: MAINSTREAMING BIODIVERSITY

This chapter presents the ways that biodiversity has been mainstreamed into national planning and development at three levels. Firstly, biodiversity has been mainstreamed at the Ministerial level by the creation of the Ministry of Natural Resources and Environment (MoNRE). Biodiversity has been mainstreamed at the sectorial level by the establishment of the Natural Resource Management and Environment Sector Working Group (SWG) in 2012. Thirdly, Biodiversity mainstreaming has taken place at the Policy level, through the five-year National Socio Economic Development Plans (NSEDP).

THE MINISTRY OF NATURAL RESOURCES AND ENVIRONMENT

- A Ministry dedicated to Natural Resources and Environment

The Water Resources and Environment Administration (WREA), which was formed through the restructure of the Science, Technology and Environment Agency (STEA), had the mandate to manage environmental matters in the Lao PDR. Its role was also to coordinate with other sectors at central and local levels to develop policies, strategies, and action plans on the environment. The goal of WREA was to create the conditions for other sectors and local authorities to establish environmental management and monitoring units (EMMUs). EMMUs have been established at provincial, municipal, and special zone levels. The National Environmental Committee (NEC) was established by a Prime Ministerial Decree to direct environmental management and address environmental issues in a uniform manner. Provincial authorities established their own provincial environmental committees- PECs (MONRE-UNEP, 2012).

In 2011, The Ministry of Environment and Natural Resources (MoNRE) was created by merging the WREA with departments of the National Land Management Authority (NLMA) and portfolios of other ministries, including the Geology Department, Forest Conservation, and Divisions within the Ministry of Agriculture and Forestry (MAF)(MoNRE, 2011)

MONRE became the Ministry responsible for the effective management of natural resources and environment, including water resources, forest/biodiversity, land, minerals, and environmental quality. It was a new ministry and comprised of the Department of Environmental and Social Impact Assessment (DESIA), Pollution and Control Department, (PCD), Department of Environmental quality and promotion (DEQP), Department of Water Resources (DWR), Department of Meteorology and Hydrology (DMH), Department of Disaster Management and Climate Change (DDMCC), Department of Forest Resources Management (DFRM), Department of Land Management (DoLM), Department of Land Planning and Development (DLPD), and Department of Geology and Minerals (DGM).

THE NATURAL RESOURCE MANAGEMENT AND ENVIRONMENT SECTOR WORKING GROUP –

An enhanced dialogue platform on Natural Resources and Environment

The technical and management capacity of the recently created MoNRE and its bodies remained weak due to a limited number of qualified staff and budget and most activities were to be carried out with technical assistance and operational supports by international financing and/or donor agencies (World Bank, 2014).

In order to build this support and partnership with the international community, improve sectorial aid coordination and effectiveness (as set out in the Vientiane Declaration Country Action Plan), and also support the implementation of the NSEDPs, the GoL launched the Sector Working Groups (SWGs).

The SWGs bring together representatives from Government (Line Ministries as Chairs of SWGs based their sectorial expertise), Development Partners (as Co-Chairs based on their substantive contributions), civil societies, private sector, and other related stakeholders (The National Round table Process, 2014).

In 2012, in line with the country's needs and after extensive consultations, the Government expanded the groups from eight to ten by splitting the Agriculture, Rural Development and Natural Resource Management SWG and the Macroeconomics, Trade and Private Sector SWG.As of 2014, ten SWGs are operational, namely the Natural Resource Management and Environment SWG (1), the Agriculture and Rural Development SWG (2), the Health SWG (3), (4) Education (4), Infrastructure SWG (5), Governance SWG (6), Macro-Economics SWG (7), Trade and Private Sector Development SWG (8), UXO (Mine Action) SWG (9), and the Illicit Drug Control SWG (10).

The SWG on Natural Resources and Environment, chaired by the Ministry of Natural Resources and Environment (MoNRE) and co-Chaired by Germany and the World Bank (WB) is the main forum for policy dialogue addressing environment and biodiversity issues. The SWG on Natural Resources and Environment is composed of five Sub-Sector Working Groups (SSWG); namely the Land, Forest Management SSWG, the Geology and Mining SSWG, the Water Resource and Disaster SSWG, and the Environment and Climate Change SSWG.

Some members of the groups mentioned above also contribute to the dialogue on agriculture and rural development related issues, especially on lands and forestry discussed under the Agriculture and Rural Development SWG, and particularly with the Agro-biodiversity SSWG. In addition to these formal groups, the technical and financial partners have established a "National Protected Area Network Group " that meets regularly, 5-7 times per year, to discuss environmental topics around biodiversity and national protected areas.

NATIONAL PLANNING

Reconciling natural resource and environment into the national planning

At the planning level, the five-year National Socio Economic Development Plans (NSEDP) are overarching policies and plans that have been incorporating sustainable aspects and defining goals in the area of economy, society, and environment. The most recent, the 8th National Socio Economic Development Plan (2016 - 2020) (8th NSEDP) is set in the context of the government's longer term planning and, in particular the 10 year plan to 2025 and the 2030 Vision. The overall objective of the 8th NSEDP is to achieve continued political stability, peace, and order in the society; the poverty of the people is reduced significantly in all areas; and that the country is developed out of the status of a LDC by 2020 through continuous, inclusive along with sustainable growth and green growth development; maximum effective management and utilization of natural resources; the development enhanced through the national potentials and advantages; and has participated, with ownership, in regional and international integration. The overall goal to acknowledge and enhance environmental management is particularly reflected in the 3rd outcome of the 8th NSEDP:

> *Natural resources and environment are effectively protected and utilized according to green and sustainable direction; Readiness for coping with natural disasters and climate change effectively and reconstructing the damages from natural disasters for the better.*

Since the NSEDP is the guiding document for sectorial strategies and plan, the effective management of natural resources and environment is increasingly mainstreamed into the national development.

PART 3. PROGRESS TOWARDS AICHI BIODIVERSITY TARGETS AND CONTRIBUTIONS TO THE TARGETS OF THE MILLENNIUM DEVELOPMENT GOALS

CHAPTER 6: IMPLEMENTING 2020 AICHI BIODIVERSITY TARGETS

The Convention on Biological Diversity (CBD) developed the Strategic Plan for Biodiversity for the period from 2011 to 2020 to serve as a flexible framework for the establishment of national targets. The Strategic Plan is comprised of strategic goals and targets known as the Aichi Biodiversity Targets. The objective of the Strategic Plan is to ensure the equitable and efficient use of biodiversity resources The CBD Parties decided that the fifth National Reports should focus on implementation of the 2011-2020 Strategic Plan and the progress made towards achieving the Aichi Biodiversity Targets.

In the Lao PDR, the eight NBSAP/NR Working Groups (Annex 3) identified the activities and contribution toward the Aichi Targets. The Department of Forest and Resource Management, including governmental institutions, international organizations, as well as national non-profits, established these working groups, which were organized as follows: (i) Education and Research Group, (ii) the Agriculture and Forestry Group, (iii) the Social and Environmental Group, (iv) the Science and Technology Group, (v) the Energy and Mining Group, (vi) the Culture and Tourism Group and (vii) the Development Partners Group. In addition to contributions from these working groups, key input was provided by several organizations engaged in environmental, biodiversity and conservation work in the Lao PDR, which goes far beyond the organizations involved in the Working Groups. The list of projects and contributors is presented in Annex 4.

The Lao PDR depends on its natural resources and rich biodiversity. While the overall trends indicate that biodiversity is decreasing, efforts have been made to implement a range of measures and mechanisms to address this problem and achieve the Convention's Strategic Plan and Aichi Targets. The following table (see table 4) presents each target with a summary of key projects and program contributors and the main activities and outcomes (details on the activities are presented in the Annex 5).

Table 4: A colored box besides each Aichi target indicates the current status of implementation and the trend change.

STATUS		TREND	
	On Track / Good Progress		Improving
	More efforts to be made		Little Change
	Very little progress		Getting worse

Aichi Targets	Contribution/National Progress	Level of Progress
	**By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.**	

- There has been a strong investment towards outreach activities which have raised awareness of environmental issues and the values of biodiversity, promoted through representation of environmental education activities during special events and festivals (e.g. International Biodiversity Day, That Luang festival).
- An Environmental Curriculum has drawn on regional issues (e.g. from curriculum projects in Indonesia) and has been developed for many levels, from primary school to university, and also focused on building capacity of government staff (e.g. REDD+ and PES/ Protected Area Management training).
- Environmental awareness has also been included in media training, with many projects which have focused on developing environmental journalism has been conducted for print, radio and TV journalists.
- The Lao PDR has also been represented regionally by the DEQP/MoNRE and the Ministry of Education in the ASEAN Working Group on Environmental Education yearly meetings.

Key projects / stakeholders :Dong Dok Nature Society, ProCEED, CliPAD,TABI,GiZBCC project

	**By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems**	

- Improvements have been made to the legal framework to include biodiversity values into sector strategies, policy, and legislation which has occurred mainly at the national level.
- Changes to the Forest Law, Water Resource Law, National Land Use Master Plan, Decree on Land Survey, Decree on Land Allocation and Use, Law on Disaster and Climate Change, an update of the Decree on Compensation and Resettlement, the development of the Environmental Conservation Law and Land Law under MoNRE, and the revision of the Tourism Law.
- Other significant changes include a revision of the National Strategy on Environmental and Climate Change Education and Awareness 2016-2030 and a review of the division of labour between central and local level on natural resource and environment management, focusing on human resource and budget allocation in accordance with the government policy on Sam Sang.
- Positive steps have been made towards improving the EIA process. Legislation, technical guidelines, and checklists have been developed and improved and social and environmental impact assessments have been applied to investment projects. In addition, the Decree on

Strategic Environment Assessment (SEA) has been launched. Other significant steps related to EIA include the establishment of Environmental Compliance Certificates and the implementation of Environmental management units have been completed in 17 Districts.

- In terms of urban planning and improved land use planning, generally, there have been positive efforts made.
- Criteria for sustainable cities have been developed and promoted in Vientiane capital, Huaphanh province, and Luang Prabang province.
- National Land-Use planning has been developed and 7 provinces have prepared Integrated Spatial Planning, based on developed guidelines.
- The development and implementation of a National Master Land Use Plan and Integrated Land Allocation has also been completed across the country.
- In relation to biodiversity conservation and Agro-Biodiversity (ABD), there are a number of positive initiatives including Provincial regulations on biodiversity conservation corridors, Participatory and ABD friendly "Forest and Land Use Planning, Allocation and Management (FALUPAM)," as well as ABD being integrated in the Uplands Development Strategy and 5 year plans of PAFOS and DAFOs.

Key projects / stakeholders:MICT, NRE Working Group, CliPAD, DFRM/MoNRE, TABI-PAFOs, NAFRI/FAO and ABP project, NDP, MAF, GiZ

By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio economic conditions

- Legislation relevant to environmental and forest conservation is currently under revision (Decree no96/PM on Commercial Plantation and Environmental conservation, and Agreement no 0116/DF; regulation on Village forest conservation no 0535/DF; and agreement on timber measurement and quality for internal and export).
- There are also a number of initiatives in place which promote the conservation and sustainable use of biodiversity, including those which support livelihood development of local people around protected areas, and land use titling.
- Local people's involvement in biodiversity monitoring, PES, and Village Forest Management Agreements has also been promoted, while REDD+ has advanced, particularly with the Lao PDR being accepted into the World Bank's FCPF Carbon Fund.

Key projects / stakeholders :CliPAD,WCS, PAFOs, DAFOs, TABI, WCS, Hin Nam No NPA, BCC, GiZ

By 2020, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits

- There have been a number of steps that have been made towards the use of natural resources in a sustainable way, particularly related to organic agriculture, regulations around the timber trade and mining, NTFP management, as well as water resource management.
- National organic agriculture standards and a national labelling system for organic products have been developed, organic farmer's markets have been promoted, and a Lao Certification Body and procedures for organic certification have been established.
- Voluntary Partnership Agreements (VPAs) have been established through partnership between the GoL and EU, and a National Steering Committee for forest law enforcement has been implemented.
- Mining legislation and mining licensing systems have been improved by the establishment of regulations, checklist and guidelines focusing on sustainable mining.
- Systems of villager generated Quotas for NTFP extraction have been developed and used in two provinces and detailed assessments of aquifer recharge (along with other aquifer properties) is being carried out in the Nam Ngum basin and in less detail at the national scale.

Key projects / stakeholders :Promotion of Organic Farming and Marketing in Lao PDR – PROFIL-HELVETAS, IWMI, DoA, MAF, TABI-PAFOs

By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.

- The GoL has implemented a number of actions associated with this target and there has been a strong focus on improving forest management, forest law enforcement, and improved protected area management.
- The creation of a village forest working groups under the Sub-Sector Forest Working Group, as well as training in field monitoring and forest planning, awareness campaigns, and increased opportunities for consultation meetings to exchange experiences have the overall aim of improve regulations for village forest management planning and management.
- The re-delineation of forests (i.e. state forest land) has commenced, with a pilot in Luang Prabang, and the method for re-delineation is being developed for other areas.
- An improved "Participatory Forest and Land Use Planning, Allocation and Planning Process" has been developed and implemented which aims to stabilise upland land use, prevent habitat loss, and rejuvenate lost habitat.
- Community forestry programs have been promoted which target forest fire control,

management of NTFP extraction, conservation forest management, and NTFP processing and marketing.

- The Forest Law Enforcement Governance and Trade (FLEGT) process has been established, with the approval of negotiations between the GoL and EU for Voluntary Partnership Agreements (VPAs) in June 2015 and the establishment of a National Steering Committee for FLEGT in August 2015.
- A Provincial Law Enforcement Action Plan has been officially endorsed.
- Of the 24 NPAs in the Laos PDR, 15 currently have management plans, which is an improved situation.
- The GoL has designated the country's first two wetlands of national significance - the Xe Champhone and Beung Khiat Ngong Wetlands - in 2010.
- A study on surface water – groundwater interactions is underway in the Beung Khiat Ngong wetland area which may be useful for improved wetland management.

Key projects / stakeholders : BCC Project-ADB, GiZ, CliPAD FC, DoF, DALAM, SUMALOM- NamTon Project – KfW, PAFO, PoNRE, DAFO, DoNRE, TABI, IUCN, IWMI

By 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.

- The publication of the Aquatic Resources Law is relevant to this target.
- There has also been a large amount of research into fish species and fisheries which have informed fishery management practices and aimed at preventing fishery declines (e.g. research into the creation of wetlands on reservoir drawdown areas, and research into the design of fish passages across irrigation weirs).
- Fisheries have been supported to breed and distribute native fish species in Houaphanh and Xiengkhouang provinces and fish conservation zones have been established and improved in Luang Prabang, Xiengkhouang, and Houaphanh provinces.
- Fish conservation zone regulations, including the installation of signboards on-site, have also been completed at some sites. Farmers have also been supported to use appropriate farming systems along specific watersheds.

Key projects / stakeholders : TABI, SUMALOM Project – KfW, IWMI/ICEM/NUoL/NAFRI/THPC, PAFOs, LNFC, IUCN, GiZ, OxFAM, and ABP, MoNRE

By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.

- Approximately 400,000 hectares of land (or which about 240,000 is forest land) are now

under active, sustainable management, via the FALUPAM program, mainly in northern Laos (Luang Prabang, Houaphanh, and Xiang Khouang).

- The Forestry Strategy 2020 (FS 2020) has been developed to provide guidance on the sustainable management and development of the forest sector in line with national policies and there are currently 51 Production Forest Areas that have detailed management plans.
- A range of education and research initiatives have been implemented within the NUoL Faculty of Forestry, and NAFRI and NUoL have carried out extensive work on NTFP management and forest management for community sustainable development.
- Integrated Pest Management has been carried out and farmer field schools have been established for rice and vegetable production in six provinces has been conducted with the view to optimize the use of local biodiversity, including natural pest enemies, organic fertilizers, and bio-insecticides.

Key projects / stakeholders :MAF, DOA/MAF, FAO/ABP, NUoL

By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.

- Steps have been made to maintain water quality, protect ecosystems, and minimize pollution.
- Integrated Water Management Plans (IWRMPs) have been written for ten priority river basins, while the revised Water Law provides guidelines for avoiding negative socio-economic and environmental impacts at local, national, and regional levels.
- Research priorities for water bodies, watersheds, and aquifer recharge areas have been identified for priority river basins and other potential sub-basins, and a centralized pollution database covering solid waste, hazardous material, soil pollution, air and noise emissions, and wastewater has been made for 6 targeted cities located on the Mekong River.
- In addition, research projects are being developed which focus on risks and impacts of pesticide use in agriculture in northern Laos.
- Finally, awareness raising activities are taking place in targeted watersheds.

Key projects / stakeholders :NAFRI/ IWMI/ NUOL-FS, DWR/MoNRE – KfW

By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.

- Research has identified current invasive plant and animal species that are posing threats to natural and agricultural landscapes, and control measures and activities for some of these species have been formulated.
- Improved regulations are in place to protect crops and livestock in priority areas, and the

Biotechnology Safety Law has been written which has created opportunities to train government, while addressing Biosafety issues.

Key projects / stakeholders : TABI, PAFOs, NAFRI, ABP Project, Department of Agriculture, MAF, MOH, MoNRE, MoST.

By 2015 the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning

- This Aichi Target is considered as "Non Applicable" to the Lao PDR due to the fact that the country is land locked.

By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes

- Initiatives that meet this target include (i) improved forest management plans, the establishment of forest management committees and community-based patrolling of community forests (e.g. for 67 villages under the BCC Project – ABD), (ii) the establishment of co-management agreements for PA management and (iii) regular management effective assessments for certain NPAs (e.g. in Hin Nam No NPA).
- Hin Nam No NPA has also received tentative listing to receive world heritage status to become the first location in the Lao PDR to do so.
- Law enforcement and priority sites zoning consultation planning meetings, as well as SMART system training has been conducted for some NPAs (e.g. for Nakai Nam Theun and Hin Nam No NPA), while regulations for biodiversity conservation corridors have been issued for three provinces: Attapeu, Champasak and Sekong.
- Capacity building and education efforts have been made for selected NPA staff (e.g. NEPL and Hin Nam No NPAs) through a PA Management Certificate Course held at NUoL's Faculty of Forestry (with support from WCS), while NUoL has been involved in a number of other regional ecological research projects (e.g. groundwater resource studies with Khon Kaen University).
- Finally, state forest lands (3 forest categories) are being reviewed and redeliniated to ensure that the gazetted Protected Areas are actually manageable, include representative biodiversity and landscapes, and are thus able to be protected.

Key projects / stakeholders :Project Anoulak, TABI/ SUFORD/ WB/ with DFRM, NUoL, BCC-ADB, DFRM, MoNRE, HNN

By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.

- Efforts have been made to classify the status of the Lao PDR's threatened wildlife and plant species (e.g. the creation of Lao PDR's IUCN Red List and the evaluation of the SE Asia Red List for plant species).
- A number of important wildlife surveys and population status assessments have been carried out for wildlife species including primates and small carnivores, particularly in key NPAs, while the recent PBSAPs for Xieng Khouang and Attapeau Provinces have included critical species for conservation/sustainable use.
- Law enforcement strategies and priority site zoning for patrolling systems have been improved and made more efficient in certain areas, while counter measures against timber and wildlife illegal trade are improving with enhanced capacity and better coordination between government agencies, attributable to the Wildlife Enforcement Network and other projects, and new technologies and approaches.
- A National Ivory Action Plan for the Lao PDR, 2015-2016 was also adopted by the CITES secretariat, while the Ministry of Science and Technology provides support for the CITES Management Authority as the National Scientific Author of CITES.

Key projects / stakeholders :NUoL, MoST, IUCN/ ABP, Project Anoulak, WMPA

By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity

- Relevant legal frameworks for this target include the Biotechnology Safety Law which was approved in 2014 and the National Policy on Rice Production for Food Security which is in draft.
- A number of research projects and studies have been conducted on relevant taxa including wild mushrooms, medicinal plants and orchids, ethnobotany, and indigenous rice varieties, the as well as micro-organism and fungi diversity.
- The Ecology and Biotechnology Service Centre has been established as a place where research results can be delivered to the public, while the BEI serves as a repository for ex-situ conservation, with more than 120 orchid species and 140 edible plants collected in the system at BEI, including 15 plant and 26 animal species identified by CITES (some of which are threatened), and a total of 5,101 species stored within the herbarium of the institute for education and preservation.
- Ex-situ conservation of native plant species is also being implemented through a demonstration garden of medicinal plants has been established in Xieng Khouang Province, while ethno-botanical plots have been established at Pha Tad Ke Botanical Garden in Luang

Prabang.

- This target is also being implemented by a combination of (a) baseline surveys of Agro-Biodiversity, by (b) forest and land use planning which promotes the value and role of Agro-Biodiversity in multi-functional landscapes, and (c) by the implementation of activities (via sub-Projects) that develop and promote the role of sustainable go-Biodiversity management and use in livelihoods, the genetic diversity of cultivated plants is pro-actively maintained (TABI), providing a strategy to safeguard these genetic resource.
- Species groups include bananas, citrus, tea, mushrooms, a wide range of vegetables and crops found in healthy upland fields and bush fallows, orchids and medicinal plants, and fish conservation zones.
- Results of baselines surveys in Kham (Laung Prabang) and Ngum (Xieng Khouang Province) rivers resulted in villagers listing a total of 185 fish species, while an inventory study of 223 ha upland forest area (Donglong-Dongsouth, Xieng Khouang Province) listed 241 medicinal species of which one (Bistorta balaecceum) is a new record for Laos.

Key project stakeholders :ABP, ITM, Darwin Initiative, TABI with PAFOs and DAFOs, MoST, NUoL

By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.

- Measures have been taken to protect ecosystems, particularly in Northern Lao PDR (e.g. Xiengkhouang, Houaphanh, and Luang Prabang Provinces), including herbicide awareness and management programs, the establishment of fish conservation zones, and incentives to link local livelihoods with ecosystem health (e.g. river weed collection and processing).
- In addition, approximately 400,000 hectares of land (or which about 240,000 is forest land) have gone through the FALUPAM program, which aims specifically to 'recognize' and manage ecosystems which are important for livelihoods (upland 'multi-cropped' fields rotated with a diverse range of bush fallows, forest of various types, grasslands, stream and riverine ecosystems, and wet rice fields ecosystems).

Key projects / stakeholders:TABI, MAF.

By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.

- Efforts are in place to restore forest lands and forest regeneration is listed as one of the main REDD+ activities to be implemented as part of the Carbon Fund Emission Reduction Programme.

Key projects / stakeholders :DFRM, DoF, BCC Project-ADB

By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation

- A number of steps have been implemented in the Lao PDR since it ratified the Nagoya Protocol in September 2012.
- Legislation has been enacted to harmonize with the international treaty of Access and Benefit Sharing (ABS) from the use of genetic resources is in place and is being piloted in at least 3 selected areas and an ABS framework has been formulated.
- A national ABS policy assessment framework has been developed.
- A range of public awareness, information sharing, capacity building among key stakeholders, and collaboration at the national and regional levels have been established to promote the Nagoya Protocol and National ABS Framework.

Key projects / stakeholders :MoST

By 2015 each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan.

- The Lao PDR is currently finalizing its NBSAP 2016-2025.
- Key steps leading to the NBSAP 2016-2025 include the publication of IUCN's 'Assessment of Lao PDR's 1st National Biodiversity Strategy to 2020 and Action Plan to 2010' (2012), the Stakeholder Mapping & Capacity Assessment on Reporting of the Convention of Biological Diversity (CBD) & Implementation of the National Biodiversity Strategy and Action Plan (NBSAP) (2010).
- A series of Technical Groups mandated to monitor and report on the NBSAP related activities and a National Steering Group for the CBD have also been created.
- A Sub-Sector Working Group on Agro-biodiversity has been developed which has a multi-sectorial approach, and two PBSAPs have been prepared.

Key projects / stakeholders :IUCN/ ABP, MAF

By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels.

- The forest and land use planning process (FALUPAM) incorporates traditional knowledge and management of upland landscapes which have been accepted by partner districts and provinces, reflecting respect for local communities' customary use of natural resources.
- Village and District Conservation Areas have been established for NTFPs, including wild tea,

meliantha and medicinal plants, while other projects have been developed based on the local management of Agro-biodiversity resources which are appreciated by both local communities and also GoL institutions.

- Another example is the Medical and Traditional Medicine Institute, which has built 11 gardens in communities to promote plant conservation for sustainable use.
- The Hin Nam No NPA also provides an example of the incorporation of traditional knowledge in decision making processes. The area has been divided into management blocks based on customary rights from 18 guardian villages and the villagers of these 18 villages have management responsibilities, and access and use rights which are captured in endorsed co-management agreements (co-management by-law).

Key projects / stakeholders :NUoL, ABP, TABI-MAF, TABI-POE, TABI-CDE, MoST

By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied

- A number of biodiversity monitoring technologies have been adopted to improve the science based and identify threats and trends, as well as to prioritize protection and restoration interventions, including camera-trapping techniques (e.g. in Attapeu and Sekong provinces).
- There has also been an emphasis on Biosafety, with the creation of the Lao Information Sharing and Biosafety Clearing House (BCH) and the promotion of the Biosafety Law and associated awareness raising activities.

Key projects / stakeholders :BCC Project – ADB, MoST, MAF

By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan for Biodiversity 2011-2020 from all sources, and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization should increase substantially from the current levels.

- The Environment Protection Fund (EPF) is emerging as an important financier for capacity building and the management of Conservation Forest and Protection Forest which complements well the Forest and Forest Resource Development Fund.
- The World Bank has mobilized 60 million US$ to: (i) improve the financing capacity of the Environment Protection Fund (EPF); (ii) support capacity building of national, provincial, and district institutions to implement the Lao legislation on environment and social impact, particularly the capacity to manage NPAs and protect wildlife against threats from infrastructure development and illegal use or trade of natural resources; (iii) strengthening the university environment and social curriculum; and (iv) broadening project support to forested upper-watersheds of rivers important to hydropower, agriculture irrigation, and flood prevention.
- In addition, the DEQP has successfully mobilized GEF resources for biodiversity conservation; i.a. the 2015 approved 'Sustainable Forest and Land Management in the Dry

Dipterocarp Forest Ecosystems of Southern Lao PDR,' while Ecotourism in Laos is continuing to grow and represents a successful financing approach to protect nature, while at the same time generating revenue for local people (e.g. the Nam Nern Night Safari in Nam Et Phou Louey NPA).

- Schemes of various payments for forest environmental services have been included in the draft Forestry Law and Prime Minister Decrees on Conservation Forest and Protection Forest.

Key projects / stakeholders :LENS2 Project – EPF, WCS, MoNRE, DFRM

CHAPTER 7: BIODIVERSITY CONTRIBUTION TO THE MILLENNIUM DEVELOPMENT GOALS

The Government of Lao PDR endorsed the Millennium Declaration at the UN Millennium Summit in September 2000, which defined eight Millennium Development Goals (MDG's), which have been over the time integrated in to the National Social and Economic Development Plan (NSEDP).Due to the specific condition of Lao PDR, in 2010 the Lao Government adopted an additional MDG, namely reduce the impact of Unexploded Ordnance (UXO) as the 9th MDG for Lao PDR.

There are three MDG Progress Reports 2004, 2008 and 2013 as well as the 2015 Summary Review of The Millennium Development Goals, Lessons Learnt for the Post-2015 Period and UN- Lao PDR Evaluation Report – UNDAF -2012-2016 conclude that MDGs for Goal 7 on Ensure environmental sustainability is not on track to achieving the targets, but has made a good start in terms of institutions and processes(UN & Gov-of-Lao-PDR, 2013; Gov-Lao-PDR, 2015; Askwith, et al., 2015)For target 7A, on how to integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resource, only one indicator on the proportion of land area covered by forest is of direct relevance to biodiversity conservation. In reference to this indicator Lao PDR is off-track on the national target for forest cover, which has decreased significantly over the past decade. (UN, 2015). However UN- Lao PDR Evaluation Report – UNDAF -2012-2016 the country has progressed in terms of strengthening governance processes and institutions to limit the loss of forests and biodiversity by enhancing the role of community to all types of forests and the promotion of sustainable forest management plans (Askwith, et al., 2015).

Goal 7. Target 7A: Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources

	1982	1992	2002	2010	Target 2015
7.1- Proportion of land area covered by forest	49.10%	47.20%	41.50%	40.34%	65 %

Source :(UN, 2015)

As stated in the above table, forest area covers approximately 40% of the country and the government aims to achieve 70% of forest cover by 2020 (as stated in the8th NSEDP) but unsustainable forest management practices persist, including illegal logging and harvesting. Budget allocations for forest management, capacity development and law enforcement are still limited and rely largely on international support. In 2015, the government was still in the process of revising major laws, including the National Land Policy and the Forestry Law. The review of the Forestry Strategy for 2020 (FS2020) conducted by the Sub Sector Working Group on Forestry (SSWG-Forestry) in 2014 contributed to this process and most challenges limiting its implementation were identified(SWG-ARD, 2015)

For target 7B, on how to Reduce biodiversity loss, several indicators of relevance to biodiversity conservation (see table below) have been identified. Unfortunately, for those indicators only reference values are available and the current quantitative values are yet to be collected. However, the overall qualitative conclusion for this target is that Lao PDR's rich biodiversity is facing serious threats from the degradation and disappearance of habitat, poaching and wildlife trade.

Target 7B: Reduce biodiversity loss, achieving, by 2010, a significant reduction in the rate of loss

	2011
7.4.Number of fish conservation zones	197
7.5. Proportion of renewable internal freshwater resources used	1.3%
7.6. Proportion of land area under protection:	20.18%
a) Conservation forests (national, provincial, district), of which:	14.2%
b) Protected Areas	
	2012
7.7. Number of species threatened with extinction	
Mammals	44
Reptiles	8
Birds	36
Fish	7
Amphibians	1

Source :(UN, 2015)

The government has designated 20 national Protected Areas covering 3,390,700 hectares or 14.3 percent of the country as National Protected Areas (also called National Biodiversity Conservation Areas). Additionally, there are two green corridors and various district and province protected areas. Altogether one-fifth of the country's area is under some degree of protection. Notwithstanding these efforts, more and more species are threatened with extinction (115 in 2010, 167 in 2011). The overall conclusion on a reduced biodiversity loss is to be confirmed by adequate surveys and analysis at the national level (Minitry of Planning and Investment- Dept. of Int. Cooperation, 2015)

BIBLIOGRAPHY

ABP, 2015. *Lao PDR National Agro-Biodiversity Programme Strategy and Action Plan II,* Vientiane Capital: s.n.

ADB, 2006. *Urbanization and sustainability in Asia,* Philippines: ADB.

ADPC & UNDP , 2010. *Developing A National Risk Profile of Lao PDR,* s.l.: s.n.

Askwith, Esser, Low & Sysaneth, 2015. *Lao PDR Evaluation Report - UNDAF 2012-206,* Vientiane: s.n.

Claridge, G., 1996. *An Inventory of Wetlands in the Lao PDR,* Vientiane: IUCN.

FAO, 2002. *An overview of forest products statistics in South and Southest Asai,* Bangkok, Thailand: FAO Regional Office for Asia and the Pacific.

Fujisaki, T., 2012. *Lao PDR REDD+: State of Play,* s.l.: Institute for Global Environmental Strategies (IGES).

Gerrard, P., 2004. *Integrating Wetland Ecosystem Values into Urban Planning: The Case of That Luang Marsh,* Vientiane, Lao PDR: IUCN and WWF.

Gov-Lao-PDR, 2015. *The MDGs and lessons learnt for the Post-2015 Period : A summary review,* Vientiane: s.n.

IUCN, 2002. *Lao PDR Biodiversity: Economic Assessment,* Vientiane: IUCN.

IUCN, 2006. *Invassive Alien Species in the Lower Mekong Basin,* s.l.: Regional Conservation Programme - Ecosystem and Livelihoods Group, IUCN, Asai.

IUCN, 2011. *NBSAP Assessment : An assessment of LAO PDR's National Biodiversity Strategy to 2020 and Action Plan to 2010,* Gland, Switzerland: s.n.

IUCN, 2011. *NBSAP Assessment: An assessment of Lao PDR's National Biodiversity Strategy to 2020 and Action Plan to 2010,* s.l.: Gland Switzerland and Vientiane, Lao PDR.

Lao PDR, 2015. *Decree of Protected Areas,* Vientiane Capital: Government of Lao PDR.

Lao Statistics Bureau & The World Bank, 2014. *Poverty Profile in Lao PDR: Poverty Report for the Lao Consumption and Expenditure Survey n2012-2013,* Vientiane: Ministry of Planning and Investment and Worl Bank.

Lao-PDR, 2004. *National Biodiversity Strategy to 2020 and Action Plan to 2010,* Vientiane: s.n.

Laurila-Plant, M., Lehikoinen, A., Uusitalo, L. & Venesjarvi, R., 2015. How to value biodiversity in environmental management?. *ELSEVIER,* pp. 1-11.

MA, 2005. *Ecosystem and Human Well-being: Synthesis.* , Washington, DC.: Island Press.

MAF, 2005. *Forest strategy to the year 2020 of the Lao PDR,* Vientiane, Lao PDR: Ministry of Agriculture and Forestry .

MAF, 2005. *Report on the Assessment of Forest Cover and Land Use During 1992-2002,* Vientiane, Lao PDR: Department of Forestry, Ministry of Agriculture and Forestry.

MEM, 2015. *Ministry of Energy and Mines, Department of Energy Business.* [Online] Available at: http://www.poweringprogress.org/new/2-uncategorised/3-hydropower-in-lao-pdr
[Accessed 5 Novemeber 2015].

Minitry of Planning and Investment- Dept. of Int. Cooperation, 2015. *Background Document for the 12th High Level Round Table Meeting,* Vientiane: s.n.

Miththapala, S., 2007. *A strategy for addressing issues pf aquatic invasive alien species in the Lower Mekong Basin,* Lao PDR: Mekong Wetland Biodiversity Programme and Regional Species Conservation Programme, & IUCN.

MoNRE, 2011. *http://www.monre.gov.la/wrea/the-news/450-new-minister-to-oversee-proper-use-of-resources.html.*[Online]
[Accessed 21 12 2015].

MoNRE, 2012. *Lao Environment Outlook 2012,* Vientiane Capital: Ministry of Natural Resource and Environment.

MoNRE, 2012. *National Rio+20 Report for Lao PDR,* Vientiane, Lao PDR: s.n.

MoNRE, 2013. *Second National Communication on Climate Change of Lao PDR,* Vientiane Capital: Ministry of Naural Resources and Environment.

MoNRE, 2013. *Second National Communication on Climate Change of Lao PDR,* Vientiane Capital: Ministry of Naural Resources and Environment.

MONRE-UNEP, 2012. *Lao Environment Outlook 2012,* Vientiane: s.n.

MPI, 2011. *The Seventh Five-Year National Socio-Economic Development Plan 2011-2015,* s.l.: Lao People's Democratic Republic, Ministry of Planning and Investment (MPI).

MPI,2014.[Online]Availableat:http://www.nsc.gov.la/la/Population.php
[Accessed 21 October 2015].

MPI,2015.[Online] Available at: http://www.investlaos.gov.la/

MPI, 2015. *Five Year National Socio-Economic Development VIII (2016-2020). 5th Draft, Translation Edit 01,* Vientiane Capital: Ministry of Planning and Investment.

MRC, 2010. *State of the basin report 2010 ,* Vientiane: MRC.

Ounchith, P., 2015. *Threats to biodiversity: Implcations for socio-economic well-being in Lao PDR,* Vientiane, Lao PDR: s.n.

Phimmavong, S., Ozarska, B., Midgley, S. & Keenan, R., 2009. Forest Platation Development in Laos: Histiry, Development and Impact for Rural Communities. *BioOne,* Volume 11, pp. 501-513.

Phonvisay, S., 2013. *An intorduction to the Fisheries of Lao PDR,* s.l.: Mekong River Commission (MRC).

Stenhouse, R. & Bojoe, J., 2010. *Lao PDR Development Report 2010: Natural Resources Management for Sustainable Development. Background Paper: An environmental perspective on Hydropower and Mining Development in the Lao PDR,* Vientiane, Lao PDR: World Bank.

Stuart-Fox, M., 1998. The Lao kingdpm of Lan Xang: rise and decline. *White Lotus, Bangkok, Thailand,* p. 234.

SWG-ARD, 2015. *Sector Working Group on Agriculture and Rural Development (SWG-ARD)-Progress Report – 2015 (DRAFT – Sept 2015),* Vientiane: s.n.

Talberth, J., 2015. *Valuating Ecosystem Services in the Lower Mekong Basin: Country Report for Lao PDR,* Lao PDR: USAID Mekong Adaptation and Resilience to Climate Climate Change.

The National Round table Process, 2014. *http://www.rtm.org.la.* [Online] [Accessed 27 January 2015].

UN, 2015. *Country Analysis Report: Lao PDR Analysis to inform the Lao People's Democratic Republic–United Nations Partnership Framework (2017-2021),* Vientiane: s.n.

UN & Gov-of-Lao-PDR, 2013. *The MDG Progress report for the Lao PDR 2013,* Vientiane: s.n.

World Bank, 2014. *Environmental and Social Management Framework - SECOND LAO ENVIRONMENT AND SOCIAL PROJECT (LENS2),* Washington: World Bank Group.

World Bank, 2015. *Lao PDR Environment Improves to Help Business.* [Online] Available at: http://www.worldbank.org/en/news/press-release/2015/10/28/lao-pdr-environment-improves-to-help-business

ANNEXES AND APPENDICES

ANNEX 01: LIST OF NATIONAL BIODIVERSITY CONSERVATION AREA IN LAO PDR

No	Area Name	Area(ha)	Location/Provinces	Coordinate		Decree	Date of established
				latitude	Longitude		
NBCAs							
1	Phou Khao Khoay	200,000	Bolikhamxay, VTE, Vientiane P	102· 31' - 103· 30' E	18· 14' - 18· 33' N	164/PM	29/10/1993
2	Nam Kading	169,000	Bolikhamxay	100· 31' - 101· 00' E	18· 11' 00"- 21· 09' N	164/PM	29/10/1993
3	Xe Bang Nouan	150,000	Saravane,Savannakhet	105· 30' - 106· 30' E	15· 30' - 16· 01' N	164/PM	29/10/1993
4	Xepian	240,000	Champasak,Attapeu	105· 55' - 106· 30' E	14· 02' - 14· 45' N	164/PM	29/10/1993
5	Nam Poui	191,200	xayabury	101· 05' - 101· 31' E	18· 13' - 19· 02' N	164/PM	29/10/1993
6	Phou Xieng Thong	120,000	Champasak,Saravane	105· 05' - 105· 45' E	15· 20' - 15· 55' N	164/PM	29/10/1993
7	Phou Xang Hae	109,900	Savannakhet	105· 09' - 106· 06' E	16· 42' - 17· 04'N	164/PM	29/10/1993
8	Nam Ha	222,400	Luang Namtha	101· 08'- 101· 28' E	20· 33' - 20· 53'N	164/PM	29/10/1993
9	Nakai Namtheun	353,200	Khammouane, Bolikhamxay	104· 50'- 105· 10' E	17· 35'- 18· 15' N	164/PM	29/10/1993
10	Phou Daen Din	222,000	Phongsaly	102· 00' - 102· 35' E	21· 52'"- 21· 15' N	164/PM	29/10/1993
11	Phou Leuay	150,000	Houa phanh, Louang Prabang,Xieng Khoang	103· 02' - 103' 32'E	19· 50'- 20· 01' N	164/PM	29/10/1993
12	Nam Et	170,000	Houa phanh, Louang Prabang,Xieng Khoang	103· 15' - 103· 75' E	20· 03' - 20· 56' N	164/PM	29/10/1993
13	Nam Xam	70,000	Houa phanh	104· 18' - 104· 49' E	20· 02' - 20· 15' N	164/PM	29/10/1993
14	Phou Hinpoun	150,000	Khammouane	104· 25' - 104· 10'E	17· 27' - 18· 05' N	164/PM	29/10/1993
15	Dong Houa Sao	110,000	Champasak	105· 55'- 106· 17'E	14· 50' - 15· 11' N	164/PM	29/10/1993
16	Dong Ampham	200,000	Attapeu,Xekong	107· 08' - 107· 38' E	14· 40' - 15· 19' N	164/PM	29/10/1993
17	Phou Phanang	70,000	Vientiane P	102· 12' - 102· 27' E	18· 01' - 18· 25' N	164/PM	29/10/1993

No	Area Name	Area(ha)	Location/Provinces	Coordinate		Decree	Date of established
18	Hin Namnor	82,000	Khammouane	105· 43' - 106· 09'E	17· 13' - 17· 46' N	164/PM	29/10/1993
19	Xe Sap	133,000	Salavanh, Xekong	106· 41' 40" - 107· 28' 0" E	14· 56'40"- 16· 19' 0"N	210/PM-B	9/2/1996
20	Dong Phou Vieng	197,000	Savannakhet	105· 51' 0"- 106· 32' 0"E	16· 07' 0 "- 16· 44' 0 "N	579/PM	7/7/1995
21	Nam Kan	136,000	Borkeo,Louang Nam tha	100· 34' 50"- 100· 58' 04" E	20· 18'- 20· 50' N	163/PM	19/09/2008
22	Phousabodh - PoungChong	149,030	Xieng Khoang	100· 34' 50"- 101· 58' 40" E	20· 18' 40"- 20· 50' 40"N	017/PM	11/1/2011
23	Phou Hiphi	87,350	Oudomxay	100· 50' 22"- 101· 59' 37" E	20· 30' 15"- 20' 55' 17"N	396/PM	11/9/2012
24	Laving - Laveun	86,000	Savannakhet	106· 06' 00"- 106· 34' 00" E	16· 48' 50"- 17· 06' 10"N	397/PM	11/9/2012
Sub Total Area I		***3,768,080***					
Corridor							
1	Nakai-Namtheun NPA - Phou Hinpoun NPA Corridor	73,860	Bolikhamxay-Khammouane	104˙48' 45"	18˙04'30"	193/PM	19/12/2000
2	Nakai-Namtheun NPA - Hin Nam Nor corridor	3,310	Khammouane	105˙ 46' 00" - 05˙48' 57“	17˙40' 20" - 17˙ 40' 00"	193/PM	19/12/2000
Sub Total Area II		***77,170***					
Total Areas		***3,845,250***					

ANNEX 02: NBSAP –ACTIVITIES UNDERTAKEN AT THE ACTION LEVEL OF THE 1ST NBSAP

PROGRAMME1: SCIENTIFIC DATA AND BIODIVERSITY KNOWLEDGE DEVELOPMENT

Objective 1: Identify important biological diversity components and improve the knowledge base:

- Action 1 - Although research needs and data gaps have been assessed at the project-level, there is still a need to assess broader research needs and data gaps.
- Action 2- NAFRI, DoF, and DLF have each created 5 year research plans as part of their 5 year strategies (NAFRI specified that their research plan included a focus on research related to indigenous knowledge and the current status biodiversity in Lao PDR).
- Action 3- Research Cooperation with international institutions can be evidenced by a number of projects on a range of topics related to biodiversity; wildlife species, botanical surveys, NTFP distribution and management, fuel wood, indigenous rice varieties, fisheries and aquaculture, insects, microorganisms (limited surveys), and medicinal plants.
- Action 4- NAFRI, NAST, DoA and NUoL/TRMI have reported on being involved in trainings that sought to upgrade research methodologies to international standards, for example related to research design, data analysis, and biodiversity assessments. Overseas tertiary studies of government staff and the co-operation with international institutions on specific research projects have also improved research methodologies (and improved laboratory equipment).
- Action 5- Progress has been made to identify wetland and forest ecosystems and habitats and some research projects have aimed at clarifying the current status and distribution of threatened species.
- Action 6- Progress has been made in efforts to improve knowledge of taxonomy, evidenced by the publishing of a number of taxonomy books, the development of BSc and MSc curriculum at NUoL Faculty of Science (Department of Biology) in botany, zoology, and creating biodiversity/ taxonomy databases (NUoL and NAFRI).
- Action 7- Studies which have focussed on the taxonomy and distribution of lesser known terrestrial and aquatic plants, animals and microorganisms include studies about reptile and amphibian biodiversity in Khammouane and Luang Namtha Provinces (NUoL Faculty of Forestry), rare plant species in select districts of Khammouane, Houaphan and Vientiane provinces (NAFRI and NUoL), surveys on fresh water algae, trees, beans, bamboo and orchids (NUoL), which resulted in the discovery of some new species, and surveys on earthworm biodiversity and soil micro-organisms

(NUoL)

- Action 8- NAFRI reported that research stations had been established for 1 - rattan research, and 2) tree growth research.

- Action 9- Research projects have focused not only on distribution surveys and taxonomy, but also on conservation and sustainable use; for example on the sustainable use of NTFPs and fisheries.

- Action 10- Information is not readily available about the biodiversity components which are inadequately understood or in urgent need to be understood.

- Action 11 - While the body of knowledge on terrestrial and aquatic biodiversity is growing, there is still a need to develop strategic plans that identified specific components of biodiversity that are inadequately understood or urgently need to be known.

Objective 2: Recognize and ensure the contribution of the ethno biological knowledge of Lao PDR's local and indigenous peoples in the conservation of biodiversity.

- Action 1 - The GoL has provided incentives for local and indigenous people's involvement in forest management and local communities play a key role in assisting NPA staff in planning, patrolling, preventing forest fires, and conducting wildlife surveys. The Sustainable Forest Management and Rural Development Project (SUFFORD) supported the establishment of village forest committees, sustainable NTFP harvesting systems, and the development of fish conservation areas. Other examples of projects which involve local people include the CATCH UP project (Comprehensive Analysis of Trajectories of Change in the Uplands) and SIDA's Upland Research Development Program (URDP).

- Action 2 - There are examples of projects which have focused on ensuring equitable benefit sharing from use of knowledge and practices, including the 'Prosperity Initiative Project' (implemented by SNV, PAFO and DAFO) on bamboo marketing and FAO's project on 'Enhancing Sustainable Forest Harvesting in Asia.'

- Action 3- There have been a variety of projects focused on knowledge and practices of local people for nutritional and medical uses, as well as for wildlife and PA management. Examples include the 'Traditional Medicine Research Institute (TMRI)' surveys on the use of medical plants and animal parts, the DoA's work on applying local knowledge of utilization of wild plants to protect crops, and a NUoL study on traditional consumption of wild plants in villages in Vang Vieng. The DoA has worked on recording local people's techniques for recycling agricultural waste after the harvest season. The work of the PADETC (Participatory Development Training Centre), The Life Skill Development Association (LSDA), and the Green Club Activities Project/ WWF Laos are also relevant.

Action 4 and 5 - The GoL (The Department of Livestock and Fisheries and DoF) acknowledges the value of knowledge and practices of indigenous people (especially related to nature conservation) and has emphasised the importance of hold

consultation meetings with local people so that they can understand their beliefs and disseminate their knowledge.

Objective 3: Ensure the provision of knowledge, information and understanding of the nation's biodiversity which is required for its effective utilization, conservation and management.

- Action 1 - The GoL (especially DoF and DoFI) have participated in regional meetings and workshops (primarily in Vietnam, China, Thailand, and Cambodia) relevant to international biodiversity conventions, such as CBD, RAMSAR, and CITES. The DoF also organizes annual central-level meetings in which all NPA staff participate.

- Action 2 - Economic tree species have been compiled and identified by DoF, the Lao Red List on aquatic animals and wildlife has been updated by DoF, and Rattan species were identified by NAFRI.

- Action 3 - While interpretative materials (posters, guide books, books) have been produced and disseminated to the general public, customs officials, and MAF officials in order to increase understanding of flora and fauna species names, there is still a lot more work need to apply the Lao language legal names to species, especially flora.

- Action 4 - While there is not currently a National Biodiversity Information Centre, there have been some small scale databases created by individual institutions to record biodiversity information relevant to individual institutions.

- Action 5 - The publication of the 4th National Report on Status of Biodiversity in Laos has provided the most recent report on the status of biodiversity.

- Action 6 - The development of mechanisms to improve research and coordination for safeguarding intellectual property rights is a priority action and area for further improvement.

- Action 7 - Periodical articles on websites, newspaper, magazines, including policy briefs on biodiversity in Laos are being produced. For example, under FAO's project on Capacity Building and Regional Collaboration for Enhancing the Conservation and Sustainable Use of Plant Genetic Resources in Asia, a website on Plant Genetic Resources Food and Agriculture (PGRFA) and conservation of those resources was established.

PROGRAMME 2: BIODIVERSITY MANAGEMENT

Objective 1: Establish and manage a comprehensive and representative system of PAs that covers the nation's biodiversity.

(Action 1) Meetings have been held which have aimed at reviewing and revising the NPA system and ensuring that Lao NPA categories correspond to the IUCN NBCA categories. The Forestry Strategy to 2020 and Action Plan to 2015 have also been revised in a participatory manner. This work was supported by Sida and JICA under the project Forest Strategy Implementation 2020 (FSIP 2020), with IUCN supporting

the application of IUCN's NPA classification system and piloting activities in NPAs. IUCN has worked with DoFI to improve the capacity for patrolling in NPAs. Provincial PAs have been upgraded to NPAs (Nam Kan, Lavin-Laveune and Phou Puong Chong-Phou Saboth). Management plans have been written for some NPAs, and boundary demarcation has been completed for some NPAs.

- Action 2 - DoF has worked closely on zoning NPAs (strict protection zones, managed use zones and buffer zone) as well as 49 areas as protection forests. The country's river systems have also been classified, with a focus on watershed systems and watershed management and Watershed Management Committees were assigned at all levels. In 2010, two wetland sites were selected as Ramsar sites (Beung Kiat Ngong wetlands in Champassak province and and Xe Champhone wetland in Savannakhet province).

- Action 3 - NPA corridors have been identified and designated (Nakai-NamTheun-Hin Nam No and Phou Hin Boun-Nakai-Nam Theun) under the Prime Minister Decree No: 193/PM, dated 29th December, 2000. The area between Dong Houa Sao and Xepian NPAs were under consideration as a future corridor (supported by the WWF/ ADB CEP-BCI project). As part of planning for corridors, the BCI project carried out a study on sustainable financing of NPAs and these lessons will be applied to the corridors.

Objective: 2 improve the standards of management and protection of the nation's biodiversity.

- Action 2 - Targets for improved NBCA/NPA management were identified by DoF – 1 - MAF and DOF must strengthen capacity of technical staff at all levels of government and 2 - , NPAs should have a minimum of 15 technical staff. Other activities of interest included the revision of the Forest Law in 2007, the state decree on protected areas was drafted in was being finalized at the time of the 4th National report. In addition, DoF explained that there have been efforts to integrate NBCA management plans into cross sector planning at the provincial and districts levels through involvement in yearly and every 5 year district and provincial planning processes.

- Action 3 &4 - There are very limited financial resources to set up sustainable financing mechanisms for NBCA management, including for the salaries of NPA officials and staff. Some NBCAs with sufficient funds are supported by projects or private investors (e.g. Na Kai-Nam Theun NBCA is supported by Nam Theun).

- Action 5 &7 - Local people participate in NBCA management through working on boundary demarcation and zoning activities, and patrolling. Local people are also involved in awareness raising activities (e.g. organizing events for the public surrounding World Environment Day, National Tree Planting Day, Fish Release and Wildlife Day, International Day for Biodiversity) Village funds have also been developed in exchange for local people's participation in management activities.

- Action 6 - Short course trainings in protected area management and biodiversity conservation have been delivered to NPA staff and government officials from some NPAs (with the

support of GiZ) and NEPL (via the NUoL Faculty of Forestry and WCS, but this kind of training has not been delivered to a wide audience. The provision of new equipment and incentives such as DSA, trainings, and study opportunities for NPA staff has also contributed to improving the management capacity of NBCAs staffs, particularly in Nam Kading, Na Kai- Nam Theun, Xe Pian, Phou Khao Khouay, Nam Et Phou Leui and Nam Ha NBCAs.

- Action 8 - Implement ICAD objectives.

- Action 9 - ICAD objectives have been part of the government's NBCA management practices since 1995. DoF, MoNRE and others have made efforts to respect traditional beliefs about conservation when conducting zoning. For example, when doing village zoning, there are efforts to respect traditional fish conservation zones, sacred sites, and local monuments. For example, when doing upcoming detailed zoning for Xe Champhone Ramsar site, the Ramsar Field Management Team and Provincial Ramsar Committee will incorporate wildlife habitat and conservation areas (reported by IUCN Lao PDR).

- Action 10 - Year-round bans on hunting and harvesting in substantial core areas within NBCAs has been done in the 5 or 6 NBCAs that have funding support to ensure adequate protection and application of strict management zones.

Objective 3: Conserve threatened and endangered species by enabling the species to survive in their natural habitats.

- Action 1 - Monitoring of the threatened and endangered species in Laos has been limited to a small number of specific projects on iconic species; monitoring of tigers in Nam Et-Phou Leui NPA by WCS, Eld's Deer in Savannakhet by WWF, Siamese Crocodile by WCS, and Saola and gibbon by IUCN, to provide a few examples. The important "Status of Wildlife of Lao PDR" report has not been updated since 1999.

- Action 2 - In 2007, DoF worked with international organizations to establish a "Lao Red Lists" of endangered and threatened species of fauna. The threatened and endangered species in Lao PDR are under Category I (strict management) and include: Lesser One Horned Rhinoceros, Kouprey, Asian Elephant, Banteng, Sun Bear, Tiger, Eld's deer, Siamese Crocodile, Chinese Three Striped Box Turtle, Green Peafowl, and Great Hornbill. There is not yet a "Red List" of species of flora.

- Action 3 - The "Lao Red List" is somewhat different from international standards, such as IUCN's Red List because the classifications are based on population surveys that are more limited than what international standards require.

- Action 4 - The Guidelines for Implementing CITES (issued by DoF in 2006 - form the basis of work by the DoA, DoF, and the Department of Livestock and Fisheries; checking flora and fauna being imported and exported, mainly at international check points. Other guidelines for the long-term conservation of species have not been identified.

- Action 5 - Laos has taken steps to monitor illegal hunting and trading. For example, the DFRC and customs officials have worked with local people on patrolling, observe

wildlife trade markets, establishing road check points, confiscating hunting guns, and educating target groups. However, illegal trade in wildlife resources is still occurring, and there are currently insufficient funds to address the problem. More funds should be allocated towards CITES implementation.

- Action 6 - Wildlife monitoring has taken place on specific projects and locations and data from these projects has been helping to identify the presence and distribution of vulnerable species in certain locations (e.g. within NPAs). However, this kind of research is limited and there is still a need to develop and apply mechanism to identify vulnerable species.

- Action 7 - Certain flagship/ keystone species have been identified for specific management a activity which have raised overall wildlife conservation efforts (e.g. tigers in NEPL, Saola, Eld's Deer).

- Action 8 - The implementation of laws relevant to wildlife protection (The Aquatic and Wildlife Law 2007, the Forestry Law, Fisheries Law, the Environment Protection Law, Land Law, Agriculture Law, Water Resources Law) has been supported by the ASEN-WEN which has been implemented through collaboration with DoF and DoFI. Laws are widely disseminated via Lao National Assembly members and Provincial governors. Wildlife monitoring falls under DoFI's responsibility and DoFI actively cooperates with ASEAN-WEN.

- Action 9 - Key species, normally flagship species have been identified for specific management.

- Action 10 - Specific recovery plans have been created for some species, including a National Tiger Action Plan for Lao PDR 2010-2020, a bilateral MoU between Laos and Cambodia on Irrawaddy Dolphin trans-boundary conservation; a MoU on Mekong Giant Fish conservation between Laos and Thailand; and a Gibbon Conservation Action Plan (2011-2020) has recently been launched. Other flagship species that have been the focus of conservation efforts include: Saola, Eld's Deer, Asian Elephants, Siamese crocodiles, Great Hornbill, and Green Peafowl. Many of these species specific conservation efforts are funded by international donors.

- Action 11 - DLF reported that a trans-boundary approach has been used to manage the migration across borders of key species.

Objective 4: Establish and maintain ex-situ research and conservation facility.

- Action 1 - There is limited progress on regulating and managing the collection of biological resources from natural habitats to ensure that ecosystems and the in-situ populations are not disturbed.

- Action 2 &3 - There are many examples of projects that work on ensuring that ex-situ biodiversity is controlled and managed effectively. For example, IRRI's work, TRMI (medicinal plant conservation), LaRReC (aquaculture and fish biodiversity), the Forest Research Centre (rattan conservation), and the Department of Livestock and

Fishery (elephant breeding program).

- Action 4 - The Integration of ex-situ measures through research and develop appropriate approaches for the recovery, rehabilitation and reintroduction of endangered species into their natural habitats has been limited.

- Action 5 - There are plans to establish a National Natural History Museum, but this activity was not yet realized.

- Action 6 - Pha Tad Kae botanic garden, a privately owned botanical garden in Luang Prabang, is currently under development and is the best example of ex-situ conservation for plant biodiversity in Laos.

Objective. 5 Ensure that the social and economic benefits from the use of genetic materials and products originating in Lao PDR accrue to the nation.

- Action 1 - Though the Domestic Investment Law, Law of Promotion of Foreign Investment, and Intellectual Protection Law mention the issue of Access and Benefit Sharing, there has not been a law developed dedicated specifically to ABS, and there are no indications that the ABS components of pre-existing laws have been effectively implemented.

- Action 2 - National rules for protection of traditional knowledge have not been drafted.

- Action 3 - Human resources capacity has been developed in the field of modern biotechnology, through staff attending short and long training courses, MSc. Programs (8 staff from STRI) and PhD programs (1 staff from STRI). In addition, the FAO supported the Capacity Building and Regional Collaboration for Enhancing the Conservation and Sustainable Use of Plant Genetic Resources in Asia, the National Implementation Sharing Mechanism for Monitoring the Implementation of the Global Plan of Action (NISM-GPA). The FAO also developed the Plant Genetic Resources for Food and Agriculture PGRAF website to store data and development of technical and policy advice and awareness raising materials.

- Action 4 - International ABS regulations were not yet translated into national regulations.

- Action 5 - The GoL, especially the STRI, has participated in all COP/MOP meetings, (for example, in Nagoya, Japan, 11-15/10/2011 - .

- Action 6 - Nothing reported for this action.

- Action 7 - Even though some NTFPs (such as medicinal plants, orchids, rattan, and bamboo) are traded internationally and some taxes are collected on these items, there is not a system in place to ensure that communities from which the materials originate benefit. Because it is mostly raw goods that are exported, local communities do not benefit from the value added of processing.

Objective 6: Protect indigenous biodiversity from the uncontrolled introduction and spread of alien species and genetically modified organisms (GMOs).

- Action 1 &2 - NAST reported that Lao PDR became a signatory to the Cartagena Protocol on Biosafety (CPB) in 2004 and Laos' efforts to comply with the protocol can be evidenced by the draft Lao Biosafety Law reflects the Cartagena Protocol's requirements regarding import and export of animals and plants. The National Steering Coordination Committee is the national focal point on the Biosafety protocol is administered by the Minister of Sciences and Technology.

- Action 3 &4 - A number of national bodies and Steering Committees work on matters related to the execution of the functions required by the CBD, namely NAFRI's National Coordination Committee on Biosafety and the National Steering Coordination Committee is the national focal point on the Biosafety protocol is administered by the Minister of Sciences and Technology. The Steering Committee has had some progress. For example, STRI reported that the Steering Committee has been working on Implementation of the National Biosafety Framework (INBF) 2009 – 2013 through work on developing and strengthening capacity and monitoring alien invasive species.

- Action 5 - The GoL has completed the National Biosafety Framework for Lao PDR in December 2004. This framework also covers government mechanisms for public education, awareness and participation.

- Action 6 - STRI stated that they also worked on monitoring plants and animals according to national laws and regulations. According the DoA, that though STRI is working on monitoring GMOs and LMOs, there is no specific institute or organization responsible on alien species work and this represents a major gap.

- Action 7 - DoA and DLF reported that while there are no quarantine law developed, there are specific regulations passed by the National Assembly on specific species and diseases.

- Action 8 - DoA and DLF reported that though more monitoring of invasive species is needed, there have been efforts to check for alien invasive species at the border crossing check points.

- Action 9 - NAST also reported that the Implementation of National Biosafety Framework (INBF) project is working on developing guidelines for risk assessment and monitoring for relevant sectors.

- Action 10 - The Lao Biosafety Clearing House provides information on Laws and Regulations concerning the Conservation, Trans-boundary movement, and Sustainable use of Biological Diversity of Living Modified Organisms (LMOs).

- Action 11 - The National Science, Technology and Environment Authority (former STEA) acts as coordinating agency and worked with relevant stakeholders to draft the Biosafety Law in December 2004.

Objective. 7: Promote ecologically sustainable management practices for ecotourism.

- Action 1 - The Lao National Tourism Authority (LNTA) is responsible for all tourism development in the country. LNTA has worked as a central point in coordinating with

government sectors (transportation, security and forestry) and international donors and organizations to guide and regulate the sector to achieve target objectives.

- Action 2 - The LNTA has focused in working with both public and private sectors to promote sustainable growth of tourism.

- Action 3 - LNTA has focused on identifying best practices in tourism and building human resource capacity. For example, LNTA organized trainings for provincial and district staff. At the village level, LNTA organized awareness raising activities on tourism. In addition, tourism service training was also organized to local tourism service providers. Private sector tourism operators provide their staff with training in hospitality and cooking.

- Action 4 - There have been efforts to encourage local people to act as guides and receive benefits from conserving the surrounding environment (as well as home-stays, selling handicrafts and food, and providing local transportation), especially in NPAs (for example, through trekking tours). Efforts to improve ecotourism services will ensure that each tourist spends more money in the country will increase benefits to local people.

- Action 5 - Standards are in place to ensure high quality of eco-tourism management. In each province, there is a Tourism Management Unit that provides guidance to private tourism businesses and districts with tourism sites on how to effectively manage tourism. In addition, any people entering NPAs for trekking are supplied with rules on how to avoid damaging the environment during trekking.

- Action 6 - The Ecotourism Division of the LNTA Planning Department has been established is mandated to manage ecotourism activities throughout the country. The Lao Tour Operator Association has also been established through financial support from EU. In addition, the Lao Hotel and Restaurant Association has been established in last 5 years. The Tourism Training Division under National Tourism Authority runs courses in collaboration with the Lao Tourism Training Centre in Vientiane and organizes courses in other provinces. The National University of Laos has also developed ecotourism curriculum for students studying Bachelor Degrees in forestry and economics.

- Action 7 - The GoL and other relevant stakeholders focus on environmental protection in ecotourism areas. For example, when trekking in most NPAs, each tourists has to pay 1-2 US$ per day to the NPA authority, which is channelled into environmental conservation activities (servicing amenities and funding staff salaries).

- Action 8 - Research has been done to assess and evaluate the long-term potential of ecotourism projects implemented over the last five years (for example in Vang Vieng). There has also been more emphasis and dialogue on the importance of tourism to Laos' economy, and many tourist information centres have been opened in provincial areas. The LNTA joins national, regional and international events every year to support information sharing/exchange regarding ecotourism development.

ecotourismlaos.com, a website hosted by the LNTA is a good source about ecotourism in Lao PDR.

Objective 8: Support the conservation of biodiversity through ecological sustainable forestry management practices.

- Action 1 - Progress has been made with delineating forest types. The Forest Law No: 06/NA, dated 24th December 2007 defines different forest types. Forests are categorized as: Protection Forest, Conservation Forest and Production Forest. Protection Forests include 46 areas (covering 3.5 million hectares). Conservation Forests include 24 national sites (covering 3.4 million hectares), 65 provincial areas (covering 505,910 hectares) and 146 district areas (covering 400,224 hectares). Production Forests consist of 51 areas (covering 3.1 million hectares).

- Action 2 - Specific regulations have been developed to govern land use within each forest category and each forest category has its own regulation and state decree to address management. For example, protection forests are governed by state decree No: 333/PM 2010 and Production forest are governed by state decree No: 59/MP. In addition, production forests are governed by MAF regulation No: 0204/MAF, dated 03/10/2003 on establishment and sustainable management of production forest. A state decree on protected areas is currently was being drafted (2012 - .

- Action 3 - There has been substantial work on improving management of production forests, with the number of production forests increased from 2 in 2004 to 51 in 2012 (mostly due to the SUFORD project). Many of these production forests have management plans, along with district and village management committees which have been setup to monitor the sites.

- Action 4 - Forest certification has taken place for some production forests (for example, Dong Phou Xoy and Dong Si Thouane) by SMART WOOD, an international authority that certifies that wood exported to EU and US markets is from sustainable sources. WWF has worked closely with the MAF and MIC on the Forest Certification Project (focussing on rattan)in Khammouane Savannakhet, Saravan, and Bolikhamxay provinces.

- Action 5 - DoF reported that Forest Inventory Division created a regulation on logging which states that after an area is logged, it should lie fallow for a period of 15 years.

- Action 6 - There were efforts made by the government of Laos to promote tree plantations. The government offers low credit loans to companies and individuals investing in tree plantations such as Agar wood, Teak, Eucalyptus and Rubber. Well-known companies including Oji Lao, Huang Eng and Thai Houa have invested in tree plantations. The government also promotes planting trees for environmental protection under PM decree No: 96/PM, dated 11/June/2003, which encourages planting trees along roads, open spaces and parks.

- Action 7 &8 - State decrees encouraging the sustainable collection of NTFPs and medicinal

plants include the decree on NTFPs No: 17/MP 2007 and the decree on medicinal plants No: 155/PM, dated 3o Sept. 2003. SNV is one of the main stakeholders supporting sustainable rattan and bamboo harvesting for poverty alleviation in Champhone district, Savannakhet; Sangthong district, Vientiane Capital; and, Houaphan province. DoF reported that the government actively supports local people to utilize the potential of NTFPs in their areas for additional household income. IUCN's Livelihoods and Landscapes project (LLS) supported local people to sustainably manage and market Malva Nuts in Pathoumphone district, Champasack province in 2008. In addition, many companies are investing in NTFP production and encouraging local people to harvest them. For example, the Sumura Company supports local people to plant medical plants in Lao Nguam district, Saravanh Province.

- Action 9 - The GoL encourages local, public and private sector participation in protection and utilization of forest resources. Land and Forest Allocation involve local people as well as various levels of government and include allocating production land to local people (e.g. through the GoL's work with SIDA, and also the SUFORD project).

- Action 10 - Forestry officials have participated in long and short term trainings at international and national institutions and the number of officials holding tertiary qualifications from overseas institutions has increased. While more BSc. students are graduating from the NUoL, the number of jobs available to students is limited.

- Action 11 - Standards in place to ensure that plantations minimise their impacts on ecosystems include the prime minister decree No: 96/PM, dated 11 June 2003 on planting trees for commercial and environmental protection and regulation No: 0196/MAF, 2000 on sustainable forest development and tree plantations. Though these regulations set out a good standard, there are challenges in their implementation, especially related to monitoring and preventing the negative impacts of plantation developments (such as pesticides).

- Action 12 - DoF reports that though in general, the rural population in Laos does not suffer from a shortage of fuel woods (they collect from their own production land as well as from the community forestry areas), there have been efforts to regulate fuel food. MAF recently issued regulation No: 0819/MAF dated 14 March 2011, on management and utilization of woods for fire wood, fuel and for commercial purpose.

- Action 13 - Head water forests have been identified for protection (DoF), but there are limited financial resources available to manage these forests.

- Action 14 - While forest resource data is stored in various locations (the Forest Inventory and Planning Division, DoF under SUFORD, DFRC), more work could be done to improve regular monitoring of forest resource data and its accessibility. More work is also needed to ensure the quality of the data that is currently available.

Objective 9: Promote industrial, energy and mining development by minimizing the impacts on biodiversity during industrial development processes.

- Action 1 - Ministry of Energy and Mining has taken steps to make stricter EIA and ESIA requirements. The Prime minister No: 112/PM, which aims to reduce factory emissions, requires external consultants be hired to conduct EIAs or ESIA for certain types of projects before proceeding and also that all factories and manufacturers must conduct EIAs and write a proper environmental management plan before proceeding. The ESIA division was also established in 2007. An ESIA state decree was established in 2009. The Ministry of Public Work and Transportation created the Environmental and Social Division at the Public work and Transportation Institute to assess the impacts of industrial development.

- Action 2 - The GoL initiated more comprehensive environmental standards and EIA regulations with the creation on the decree on environmental standards and emissions standards (2009 -, which applies to all sectors. However, there is still a need to further develop clear guidelines for the implementation of regulations and standards specific to certain industries (i.e. mining).

- Action 3 - The Ministry of Energy and Mining requires environment management plans before private sector project approval, and this required companies to understand the Lao PDR's environmental regulations. To encourage private sector to act responsibly, the Ministry of Public Work and Transportation reported that they disseminated laws and regulations on water supply and construction for private companies. WREA developed a compensation system that is put into place whenever an investment project has a damaging impact on local communities. Stora Enso is an example of a company that conducts best practice, going beyond basic EIA requirements include a private paper and wood company.

- Action 4 - The MEM has contributed to new energy policy, based on lessons learned from renewable energy projects. The Renewable Energy Strategy for Lao PDR (2010 - sets a target of 30% renewable energy for the country by 2020 and lays out a plan for reducing reliance on fossil fuels.

- Action 5 - The GoL has promoted the utilization of renewable energies (NAST and STI), evidenced by the installation of biomass, solar, biofuel, efficient cook stoves, and bio-digestors. The Lao Institute for Renewable Energy works on hydropower, bio-energy, solar water purification and wastewater treatment projects throughout the country. Renewable energies have also been promoted by private industry (Sunlabob) and the NGO sector (SNV).

- Action 6 - The Ministry of Industrial and Commerce reported that factories and manufacturers must use new technology in order to reduce emissions, smoke, CO2, dust and fuel woods.

- Action 7 - Legal guidelines have been established for project developers (MEM) and laws have been updated (MIC, WREA). However, improving the enforcement of laws has proven to be challenging.

- Action 8 - No stakeholders reported developing a strategy on mining

- Action 9 - No stakeholders reported promoting the use of cost benefit analysis as a selection instrument for investments.

- Action 10 - MEM reported that they work to protect headwaters.

- Action 11 - The MEM reported that government helps to improve facilities in existing industrial development zones and to expand industrial zones. For example, at Khok Sa Ad zone in Saythany district, Vientiane capital, infrastructure has been developed such as roads, water supply, electricity and communications amenities. MIC reported that industrial zones have been identified in every province.

- Action 12 - According to MIC, development of new industrial zones must involve consultation with all key stakeholders, including local communities.

- Action 13 - MIC has a policy of promoting environmental friendly technologies. For example, in response to government restrictions on CFCs and HCFCs, companies have started using cleaner technology, such as using solar energy and biogas.

- Action 14 - The MIC has used government funds and donor funds to conduct training for various investors on laws, regulations and guidelines.

- Action 15 - The MIC has introduced polluter-pays standards, as part of the Environmental Protection Law. Efforts are needed to clarify the effectiveness of these standards and ensure enforcement by utilizing adequate human resources to support monitoring.
- Action 16 - The MIC distributes their code of conduct to investors.

- Action 17 - GoL has been working with relevant sectors on monitoring to ensure that the high environmental standards are being met. The Industry Law and decree on EIAs is enforced to maintain high environmental standards and addresses many issues related to industrial development. There is also a regulation on waste and pollution management.

Objective 10: Support the conservation of biodiversity through ecologically sustainable agriculture.

- Action 1 - The DoA reported that the Agriculture Law was revised in 2009.

- Action 2 – Promote irrigation management transfer and strengthen community managed irrigation programmes.

- Action 3 - Various efforts have been made to introduce participatory land allocation and land use tenure.

- Action 4 - Many stakeholders reported on efforts to switch upland farmers to sedentary agriculture, based on GoL's target of ending shifting cultivation by 2015. NAFRI reported that they cooperated with CIDRAD (Funded by AFD) to promote non-shifting cultivation agriculture practices in Xieng Khouang and Xayabouri provinces. NAFES also reported that the Areas Development Programme (ADP) and NNRBDSP have been working on this action as well by focusing on sustainable production in

upland areas.

- Action 5 - In addition to land allocation, GoL has also supported people in accessing funds to invest in agriculture land (Lao upland Food Security Project, under World Bank, TABI, and projects supported by CIAT and SIDA).

- Action 6 - NAFRI has completed land use classification in all districts in Lao PDR including the 47 poorest districts. NAFRI plans to complete land allocation for the remaining districts by 2012. NAFRI has also conducted agro ecosystem zoning in Luang Prabang, Oudomxai, Luang Namtha and Bokeo provinces. TABI has also conducted agro ecosystem zonings for its target areas (Huaphanh province, Luang Prabang province, Xiengkhouang province).

- Action 7 - Cattle has been identified as a regional trading opportunity for the Lao PDR (DoA).

- Action 8 - DoA discussed efforts to develop a structure for the Agriculture Sectors based on current needs.

- Action 9 - The MAF has been working closely with MIC to exchange information about trade in agricultural products.

- Action 10 - NAFRI reported that they tested new hybrid rice species and did research on rice species that are resistant to flood, drought, pests, and diseases in the hope of identifying species resistant to climate change. NAFRI also reported working on artificial insemination of cows to increase their weight. LARReC reported trialled raising various fish species through aquaculture. MRC also has ongoing work on trialling climate change resistant rice species.

- Action 11 - NAFRI has researched domestication of NTFPs in fallow lands in Luang Prabang province, Oudomxay province, and Bokeo province.

Objective 11: Manage water resources for socio-economic development.

- Action 1 - NAFRI reported carrying out a Forest Development Fund project on Forest Head Water Management Project in Protection Forests in Houayxay and Tonpheung districts from 2010 to 2012. WREA was heavily involved in preparations for Lao PDR's accession to the Ramsar convention in September of 2010. Two initial Ramsar sites have been designated (Xe Champhone wetlands in Savannakhet province and Beung Kiat Ngong wetlands in Champassak province). Since accession, IUCN and WREA's Department of Environment have been working together on setting up the institutional structure to govern Ramsar implementation. WWF has been involved in managing and protecting That Luang marsh in Vientiane Capital focusing on water treatment and restoration from June 2009 to May 2010.

- Action 3 - Policies and regulations on water resources management have been created. A decree was passed to allow for the creation of River Basin Committees and the Department of Water Resources has developed watershed committees for main watershed systems in the country (in Nam Kading, Nam Theun, Nam Ngum).

- Action 4 - There has been limited progress on assessing the downstream impacts of catchment deforestation.

- Action 5 - There has been limited progress on developing laws and regulation on bank protection.

- Action 6 - It is unknown what measures are in place to ban the disposal of all waste into river bodies.

- Action 7 - DLF reported that they signed an MOU with Thailand and Cambodia on giant catfish (Pa Buk or Pangsius micronemus) and Irrawaddy dolphin conservation. MRC has been working closely with Mekong Committees of all Mekong countries to discuss hydropower dam development on the Mekong River. MRC, Laos and the other Mekong countries have a forum for discussing issues of navigating the Mekong, watershed management and basin development.

Objective 12: Support the conservation of biodiversity in urban areas.

- Action 1 - Natural ecosystems have been considered at Provincial-level urban planning, via the "green cities, green roads and green schools" strategy which sets the goal of planting one million trees in Lao cities per year.

- Action 2 - The National Environmental and Pollution Control Standard (established in 2009 - have been updated to state decrees.

- Action 3 - The level of awareness of government and private sector has been raised and involvement has been promoted for improved waste management and chemical waste management as a result of the dissemination of laws by the MPT.

- Action 4 - National Day and other important government holidays promote green cities, through tree planting and other 'clean-up' activities.

- Action 5 - The Ministry of Public work and Transportation reported that they have developed urbanization plans for 147 cities in Laos. PT completed implementation the 2nd City Development Project for 4 major cities in Lao PDR (Luang Prabang, Thakek, Savannakhet and Pakse). MPT also carried out a small Cities Development Project.

- Action 7 - MPT reported disseminating the urban planning law so that local authorities could understand the government policy on biodiversity conservation in urban areas. In addition, MPT drafted a regulation on architecture management.

PROGRAMME 3: HUMAN RESOURCE DEVELOPMENT

Objective 1: Raise the awareness and capacity of government staff at all levels.

- Action 1 - Conservation biodiversity issues have been integrating into the curriculum of the Faculty of Environmental Science, Faculty of Forestry, Faculty of Science and Faculty of Agriculture at the National University of Laos. NUoL has also trained NPA staff in NPA management. DoF, DLF, and WREA reported on efforts to raise public awareness, including national TV and radio programs that focus on conservation.

- Action 2 - The Agro-Biodiversity Initiative (TABI) has promoted the link between biodiversity and poverty reduction. There are also other examples of projects which have sought to value biodiversity through a PES model (WCS) and promote marketing of natural products (NTFPs) for generating livelihoods and rural development (GIZ, SNV). The Poverty Alleviation fund under MPI allows for projects which can be used to fund fish conservation areas and village production forests.

- Action 3 - Examples of projects which link poverty and environmental management include the case studies on the socioeconomic and environmental impacts of key investment projects on local people (UNDP/UNEP-PEI, IUCN and NERI). DoF held workshops to share ideas on the connection between poverty and environmental management.

- Action 4 - Through the TABI project, IUCN has organized meeting with various central level government staff about CBD in the Lao context.

Objective 2: Improve the research capacity of national experts in different fields related to biodiversity.

- Action 1 - Efforts to assess research capacity and develop a plan or set specific goals for improvement may have taken place, but have not been effectively communicated to a broader audience.

- Action 2 - There are many examples of international researchers supporting or leading research in collaboration with local partners. There is still a need to develop clear mechanisms and procedures which ensure that international researchers build the capacity of local researchers and transfer skills to Lao staff and students.

- Action 3 - There were many efforts made to improve staff research capacity through training courses and involving them in research led by international organizations. For example, DoF staff supported a bird survey during the Avian Flu outbreak in 2009; and, Douc Langur and Gibbon studies with IUCN Lao PDR in Nam Poui and Hin Nam Nor NPAs.

- Action 4 - There has been extensive cooperation with the international research community.

- Action 5 &6 - While there were numerous efforts to increase scientific knowledge of government staff through short and long term trainings and study both domestically and abroad, a specific skills improvement program is required to move away from a situation where trainings and advanced degrees are donor-driven.

- Action 7 - Many field surveys have transferred skills in using modern equipment and techniques to Lao counterparts to improve their capacity beyond the life of the project. For example, the Tiger conservation project in Nam Et –Phou Leui NPA (WCS), the Division of Forest Resources Conservation (DoF) saola, crocodile, gibbon, and NTFP surveying.

- Action 8 - While there has been limited progress in plant taxonomy training (NUoL Faculty

of Forestry and Faculty of Science),for example through collaboration between NUoL and the Darwin Initiative collaborate to provide taxonomy training, overall, there has not been a long term taxonomy training program developed.

- Action 9 - Scientific teams are usually formed to work on specific research projects or mandates and there is a need to further strengthen these groups/ teams to create continual collaboration over the long-term.

Objective 3: Improved the management capacity at all levels.

- Action 1 - Though there is no specific government program to assess and address training needs at all levels, there have been efforts to do this—some through government funding and some through projects with international donors.

- Action 2 - WCS and NUOL led a series of trainings on biodiversity and protected areas management for national and provincial staff.

- Action 3 - Staff received some informal training through participation in species surveys with international organizations. In a few project sites (Na Kai Nam Theun, Nam Et Phou Leui, Nam Poui, Nam Ha NPAs), staff have received direct support to attend training programs from donors.

- Action 5 - Capacity building through short and long-term training by focusing on specific skills identified through the training needs assessment has been limited since few needs assessments have been carried out.

PROGRAMME 4: PUBLIC AWARENESS AND INVOLVEMENT

Objective 1: Improve public awareness and education.

- Action 1 - Various methods have been used to raise the public's awareness of biodiversity conservation, such as cartoons, stickers, plays, reports and developing school curriculum related to biodiversity conservation. MAF have also sponsored weekly television and radio shows on environmental issues and sometimes these shows focus on biodiversity conservation. The RIGHTS-LINK Lao project is indirectly related to biodiversity conservation. The project focuses on public awareness on Land and Natural Resource issues (which often have a biodiversity component). The project aims to improve stakeholder capacity, knowledge and policy dialogue on land related issues. Posters and other promotion materials were developed and distributed to target people.

DLF's work setting up fish conservation zones and the Poverty Reduction Fund's work (under MPI and the National Standing Committee for Poverty Reduction and Rural Development) by creating fish conservation zones and production forests involves educating local people specifically on the connection between biodiversity conservation and poverty reduction.

- Action 2 - DoF, NAST and DLF reported being involved in activities and campaigns to increase public awareness of biodiversity, including DoF and DLF's involvement in

celebrations for Tree Planting Day, Biodiversity Day, Fish Release and Wildlife Day.

- Action 3 - DoF, NAST and DLF reported being involved in activities and campaigns to increase public awareness of biodiversity, including DoF and DLF's involvement in celebrations for Tree Planting Day, Biodiversity Day, Fish Release and Wildlife Day.

- Action 4 - The GoL reaches out to the public primarily through TV and radio, as well by newspapers, websites, and magazines.

- Action 5 - The production and distribution of field guides in Lao language has included: TMRI's traditional medicine manual; NUoL's wild orchid guidelines; SNV's Natural Resource Management Toolkits, bamboo conservation toolkits, and agroforestry toolkit; DLF's field guides on animals and fisheries; SDC's guides to tree species in Xieng Khouang Province; and, NAFRI's guide to NTFPs.

- Action 6 - TV and radio have been used as the primary methods for easing communication between government and the public, while newspapers, magazines, and websites are also used.

- Action 7 - While efforts to education the public on CBD principles have been successful, efforts to inform the private sector have been limited.

- Action 8 - Disseminating information through the media has been a successful method of informing local people about biodiversity conservation messages. However, there has not been a specific emphasis put on disseminating information to indigenous people.

- Action 9 - WREA reported that the State of Environment Report includes the status of biodiversity.

- Action 10 - Feedback from various government departments indicate that TV and radio have been used as the primary methods for easing communication between government and the public. As mentioned above, WREA and MAF each have regular television shows. NAST also reported regularly airing television shows and NAST, DLF and DoA reported using their websites, newspapers and magazines to reach the public. However, many stakeholders reported that they find it difficult to educate the public on environmental issues.

Objective. 2 Encourage and support public participation.

- Action 1 - No stakeholders reported that specific public involvement guidelines were developed.

- Action 2 - Although there is a strong preference for projects with public participation, there is not a formal process in place to ensure that this takes place and is often dependent on the nature of specific mandate of individual projects.

- Action 3 - Public involvement is encouraged in key events such as Tree Planting Day, Biodiversity Day, Fish Release and Wildlife Day. In addition, pre-existing groups such as Youth Union Organization, the Lao Women's Union and student groups have received environmental and biodiversity training.

- Action 4 - Introducing public participation as a guiding principle for all natural resource management activities is a broad objective and difficult to measure.

Objective 3. Introduce biodiversity related studies to educational curricula.

- Action 1 &2 - NUoL reported working with WCS to develop a biodiversity and Protected Area Certificate Course for government staff in 2009. The Faculty of Environmental Science, Faculty of Science (Department of Biology), and Faculty of Forestry (ecotourism and NTFP management) are teaching courses relevant to biodiversity conservation at the BSc. level.

- Action 3 &4 - WREA reported that they were involved in designing environmental education curricula for primary and secondary schools, colleges and the universities (relevant to action 3 and 4 - as part of both formal and informal study.

- Action 4 - WREA reported that they were involved in designing environmental education curricula for primary and secondary schools, colleges and the universities (relevant to action 3 and 4 - as part of both formal and informal study.

PROGRAMME 5: INSTITUTIONAL AND LEGAL FRAMEWORKS

Objective 1: Strengthen Institutional Cooperation and enhance inter-department coordination in the conservation and sustainable use of biodiversity.

- Action 1 - In the course of the 1st NBSAP, various natural resource laws related to biodiversity have been updated and revised. The first Forestry Law (issued in 1996 - was revised in 2007. Aquatic animals and wildlife issues were removed from Forestry Law and added to a new Wildlife and Aquatic Animal Law. In 2009, the Fishery Law was developed. Agriculture Law and Environmental Law are currently being revised and the draft State Decree on National Protected Areas is awaiting approval. In addition, NAFRI have been involved in drafting biodiversity guidelines for EIAs with support from FAO. These guidelines will be incorporated into the pending National EIA regulation.

- Action 2 - There have been efforts to clarify responsibility of various government divisions for various aspects of biodiversity conservation.

- Action 3 - In order to improve government cooperation and coordination in biodiversity planning, in 2009, main responsibility for coordinating CBD implementation was transferred from WREA to Ministry of Agriculture and Forestry.

- Action 4 - There have been efforts to address conservation and sustainable use of biodiversity into sector macro level planning through integration into many national strategies and programs.

- Action 5 - The inclusion of biodiversity goals and principles into planning schemes and strategic plans at all levels has been very challenging.

- Action 6 - The Lao National Assembly is currently in the process of approving a draft

Biosafety Law that reflects requirements of the Cartagena Protocol on Biosafety which Lao PDR signed in 2004. The Agriculture Law and Environmental Law are currently being revised to meet the requirements of international conventions.

- Action 7 - Laos has acceded to eight biodiversity relevant international environmental conventions CBD, UNFCC, UNCCD, CITES, World Heritage, Convention on Migratory Species, Cartagena Protocol and RAMSAR. The most recent accession was the Ramsar convention on Wetlands in 2010. The GoL is currently arranging to sign the new UN protocol on Access and Benefit Sharing from the utilization of genetic resources, also known as the Nagoya Protocol.

PROGRAMME 6: NBSAP IMPLEMENTATION

Objective 1: Implement the strategy and action plan through priority actions within established times.

- Action 1 - Biodiversity conservation projects have tended to be donor driven rather than following the action plan and strategy laid out in the 1st NBSAP. And, with the lack of success indicators, it is challenging to assess the progress the 1st NBSAP has made.

- Action 2 - Though there were many projects implemented between 2004 and 2011 that are in line with the objectives and actions laid out in the 1st NBSAP, the main shortcoming in implementation of the 1st NBSAP stems from the fact that no time frames, priority actions, estimated budgets, potential funding sources, or success indicators were determined.

Objective. 2: Secure sufficient funding for the NBSAP's implementation.

- Action 1 - Overall, efforts to ensure sufficient and sustainable funding sources for NBSAP implementation have been limited and no overall assessment (direct or indirect) have been made. This situation, coupled with lack of prioritization of actions, has made it difficult for government and donors to direct funds directly to NBSAP implementation.

- Action 2 - There have been some successes with increasing state budget for biodiversity Conservation.

- Action 4 - Funds for training and research activities have included the Forest Rehabilitation Fund and Environment Protection Fund.

- Action 5 - The Lao government is pursuing various methods of strengthening the degree to which biodiversity is integrated into the operation of existing financial institutions. Some methods under consideration include: REDD, PES, Tourism Development Fund, Forest Development Fund, and the Environmental Protection Fund.

- Action 6 - There have been some successes with increasing state budget for biodiversity Conservation.

- Action 7 - NPAs have tried to reduce their costs by involving local people in patrolling, boundary demarcation and working to prevent forest fires. In addition, in an attempt to be

partially self-sustaining, some NPAs such as Nam Ha, Phou Khao Khouay, Phou Hin Poun and Xe Pian collect small fees from tourists who enter the NPAs for trekking. These fees help fund management activities. Many NPAs remain under funded and under staffed and most still lack management plans.

- Action 8 - There have some efforts to ensure that biodiversity goods and services are sustainably managed and sold at a fair price. That said, there are many biodiversity goods and services for which this is not the case and much more work is needed to ensure that consumers pay a fair price for these goods and services.

PROGRAMME 7: INTERNATIONAL COOPERATION

Objective 1: Ensure continued and effective international and regional co-operation with int. governmental and non-governmental org. in the conservation of biodiversity

- Action 1 - DoF reported that there was significant bi-lateral and multi-lateral cooperation (with international and regional government and non-government organizations) during the period of the 1st NBSAP.

- Action 2 - DoF, NAST and DLF reported that GoL has taken steps to promote information sharing and exchange experiences.

- Action 3 - Regarding action 3, enhance international collaboration in research related to biological diversity, see Program 3, objective 2, and action 4.

- Action 4 - As demonstrated by the many examples of donor support for biodiversity conservation projects, especially from key large donors such as MRC, GMS, ADB and World Bank, biodiversity conservation is a significant part of donor portfolios.

- Action 5 - No stakeholders reported taking steps to ensure that impacts on biodiversity are considered when planning internationally supported projects and programmes that are not directly focused on biodiversity conservation.

- Action 6 - During the 1st NBSAP, there were also efforts to transfer technology relevant to biodiversity conservation to local partners.

Objective 2: Support and encourage the Lao PDR's participation in Multilateral Environmental Agreements.

- Action 1 - Laos has acceded to many multilateral environmental agreements; CBD, UNFCCC, UNCCD, RAMSAR, CITES, World Heritage Convention, Migratory Species Convention, Cartagena Protocol, ASEAN-WEN, and MRC agreement on Cooperation for the Sustainable Development of Mekong River Basin. In 2004, IUCN carried out a comparative assessment on Lao PDR's engagement in each MEA and this assessment should be updated.

- Action 2 - There has been strong progress towards the full implementation of the CBD, CCD and RAMSAR agreements. However, CBD was the only MEAs with an action plan for implementation at the time of the 4th National Report.

- Action 3 - MEAs which do not have an action plan for implementation have been limited by a lack of funds to support implementation, for example CITES. The fact that GoL is now preparing to sign onto the ABS Protocol, is an example of promotion of new agreements.

- Action 4 - Laos has a few examples of taking steps to maintain and strengthen the country's participation in multilateral efforts related to biodiversity in areas outside of national boundaries.

ANNEX 03: NATIONAL REPORT AND NBSAP WORKING GROUPS AND FOCAL POINTS

Department of Forest Recourses and Management (DFRM):Mr. Vongdeaun Syhalath, DG of DFRM.

- Dr. Inthavy Akkarath, DDG of DFRM.
- Mr. Lamphan Kommadam, Head of Conservation Forest Management Division, DFRM.
- Mr. Hongthong Amphaychith, Head of Protection Forest Division, DFRM.
- Mr. Somvang Syhalath, Head of the Survey Division, DFRM.
- Mr. Saly Sinsavant, Head of Planning and Cooperation Division, DFRM.
- Mr. Somsack Sychomphou, Head of Administrative Division, DFRM.
- Mr. Sangvan Bouavong, Head of Aquatic and Wildlife Conservation Division, DFRM.

Education and Research Group : Dr. Somchanh Bounphanmy, Faculty of Sciences, National University of Lao PDR (NUoL)

- Mr. Khamphone Sengdara, National Agriculture and Forest Research Institute (NAFRI), Ministry of Agriculture and Forestry
- Mr. Khamseng Nanthavong, Faculty of Forestry, NUoL
- Dr. Phoutthasone Sybounnavong, Faculty of Agriculture, NUoL
- Dr. Bounsavanh Douangbouppha, Faculty of Environmental Science
- Mr. Mouachan Sayvue, Institute of Traditional Medicine

Agriculture and Forestry Group :Mr. Vandy Phetpasert. Department of Agriculture, MAF

- Mr. Phouvong Keppaseurt, Department of Forestry, MAF
- Mrs. Onkham Insomvilay, Department of Livestock and Fisheries, MAF
- Mr. Khansay Sayyavong, Department of Agriculture Extension and Cooperatives, MAF
- Representative from Department of Planning and Cooperation, MAF

Social and Environmental Group : Mr. Vonepasao Orlaseng, Department of Environment Quality Promotion, Ministry of Natural Resources and Environment (MoNRE)

- Mr. Sykhamphong Paodala, Department of Water Resources, MoNRE
- Dr. Douangmany Luangmany, Lao National Mekong Committee Secretariat
- Mr. Phouthone Lathvongsay, Department of Land Management
- Representative from Department of Disaster Management and Climate Change, MoNRE

Science and Technology Group : Mrs. Kongchay Phimmakong, Ministry of Sciences and Technology (MoST)

- Ms. Viengpasith Vanisalet, MoST

Energy and Mining Group : Mr. Phokin Meungchanh, Ministry of Energy and Mines (MEM)

- Representative from Department of Energy Business, MEM
- Representative from Department of Mines, MEM
- Mr. Soulasack Phonthachak, Ministry of Public work and Transportation (MPWT)

Culture and Tourism Group : Mr. Somxay Sipaseuth, Department of Tourism Development, Ministry of Information, Culture and Tourism (MICT)

- Representative from Department of Tourism, MICT

Development Partner Group : Mr. Adam Starr, IUCN LAO PDR Country Manager

- Representative from LBA
- Representative from WWF
- Representative from FAO
- Representative from UNDP
- Representative from WB
- Representative from GIZ
- Representative from ADB

ANNEX 04: LIST OF PROJECTS AND DEVELOPMENT PARTNERS CONTRIBUTORS TO CHAPTER 6

Program / Project / Initiative	Agency / Donor	Main hosting/counterpart Institution	Contact Person/contact person of contributor
ABP - Agrobiodiversity Programme	**FAO** - Food and Agriculture Organization of the United Nations **UNDP** – United Nations Development Programme	MAF - Ministry of Agriculture and Forestry	Ole Pedersen Chief Technical Advisor E: olesped@gmail.com
BCC- Greater Mekong Subregional Biodiversity Conservation Corridors	**ADB** - Asian Development Bank	GMS governments	Sisavanh Phanouvong Sr. Project Officer Environment and Natural Resources, ADB Lao resident Mission. Tel: (856-21)250444 Ext. 116. Email:sphanouvong@adb.org
CEP - Core Environment Programme	**ADB** - Asian Development Bank		Sisavanh Phanouvong Sr. Project Officer Environment and Natural Resources, ADB Lao resident Mission. Tel: (856-21)250444 Ext. 116. Email:sphanouvong@adb.org
CliPAD - Climate Protection through Avoided Deforestation	**BMZ** - German Federal Ministry for Economic Cooperation and Development **GIZ** - Deutsche Gesellschaft für Internationale Zusammenarbeit **KfW**- Kreditanstalt für Wiederaufbau (Development Bank)	MAF - Ministry of Agriculture and Forestry ; MoNRE - Ministry of Natural Resources and Environment	Dr. Jens Kallabinski Climate Protection through Avoided Deforestation Project (CliPAD) Project Director, GIZ. Tel: (856-21) 254082 E: jens.kallabinski@giz.de Thavivanh Phanakhone Coordinator, KFW E: thavivanh.phanakhone@kfw.de
HNN – Integrated Nature Conservation and Sustainable Resource Management in the Hin Nam No Region	**GIZ** - Deutsche Gesellschaft für Internationale Zusammenarbeit	MoNRE - Ministry of Natural Resources and Environment	Mirjam de Koning (PhD) Project Director, Integrated Nature Conservation & Sustainable Resource Management in the Hin Nam No Region, GIZ T + 856 (0) 20 59973025 E: mirjam.dekoning@giz.de

LENS2- Second Lao Environment and Social Project	**World Bank**	EPF- Environment Protection Fund	
	IWMI – International Water Management Institute	**NAFRI –** National Agriculture and Forestry Research Institute **NUoL –** National University of Lao PDR	Matthew McCartney E: M.McCartney@cgiar.org
ProCEED – Promotion of Climate-related Environmental. Education in Laos	**GIZ** - Deutsche Gesellschaft für Internationale Zusammenarbeit **BMZ** - German Federal Ministry for Economic Cooperation and Development	Department of Environmental Quality Promotion, MoNRE	Dr. Michael Trockenbrodt *Project Director, GIZ* **E:**michael.trockenbrodt@giz.de
ProFLEGT – Support to the Lao EU-FLEGT Process	**GIZ** - Deutsche Gesellschaft für Internationale Zusammenarbeit	MAF - Ministry of Agriculture and Forestry ; MIC - Ministry of Industry and Commerce; MoNRE - Ministry of Natural Resources and Environment	**Marc Gross** E: marc.gross@giz.de
Project Anoulak – Dedicated to wildlife conservation in Laos			Camile Coudrat camillecoudrat@conservationlaos.com
TABI – The Agro-Biodiversity Initiative	**SDC** - Swiss Agency for Development and Cooperation	MAF - Ministry of Agriculture and Forestry	Chris Flint CTA/Team Leader, TABI - the AgroBiodiversity Initiative E: chris.flint@tabi.la
SUMALOM - Sustainable Management Of Watersheds In The Lower Mekong Basin Project Nam Ton	**GIZ** - Deutsche Gesellschaft für Internationale Zusammenarbeit **KfW** - Kreditanstalt für Wiederaufbau (Development Bank)	LNMC- Lao National Mekong Committee. MRC - Mekong River Commission	Ms. Thavivanh Phanakhone Coordinator, KFW E: thavivanh.phanakhone@kfw.de T: (856-21) 353605-152

ANNEX 05: NATIONAL CONTRIBUTIONS PER AICHI TARGET.

Aichi Target 1. Awareness

- The Dongdok Nature Society (DNS), under the NUoL Faculty of Forestry, has undertaken awareness campaigns in nature conservation (From Research & Education Group)
- Awareness raising activities have been conducted in schools within the Nakai-Nam Theun National Protected Area (Project Anoulak)
- Training has been conducted on the importance of biodiversity and forest ecosystem services as part of all Project activities (BCC Project – ADB)
- Videos have been shown on National TV highlighting subprojects and promoting ABD in the rural development process (TABI-MAF)
- An Agro-Biodiversity Calendar has been produced and distributed, promoting the value of ABD to livelihoods and environment (TABI)
- In collaboration with LWU and LFNC, 70 villages in Houaphan Province (Houameuang district and Xam Neua district) participated in an FPIC process related to climate change and the role of forests in mitigating climate change (GIZ CliPAD)
- Ministry of Education has developed curriculum that focus on environment. Students have studied this subject from primary school until university. (From Research & Education Group)
- Provincial officers have been provided with training on the importance of plant biodiversity. (From MoST)
- A botanical, biodiversity, and conservation curriculum is offered to students at the Faculty of Science, NUoL (Education group)
- Local curriculum has been developed and used based around ABD and biodiversity (TAB-DoE Xieng Khouang)
- Capacity building in the area of environmental education and awareness has been implemented for DEQP/MoNRE, for semi-state actors (Mobile Conservation Unit, Faculty of Forestry, National University of Laos) and non-state actors (Civil Society Organisation, Volunteers) (ProCEEd, MoNRE/DEQP)
- The Ministry of Education and Sports (MoES) has developed curriculum with an environmental focus Targeted at students from primary school level until university (From Research & Education Group)
- Specific teaching modules on environmental issues have been adapted from Indonesia and are currently being tested in pilot schools (MoNRE/DEQP, NRIES/MoES, Hans Seidel Foundation)
- Capacity Building for LWU and LFNC at national, provincial, and district level has been implemented to enable them to act as facilitators regarding climate change and forestry topics at the village level as part of an FPIC process (GIZ CliPAD)
- REDD related awareness/ training materials and a first training for provincial/ district staff was conducted and outreach activities in 14 villages near NEPL NPA were conducted (CliPAD- FC, DFRM /MoNRE)
- MICT, together with other relevant sectors have undertaken awareness activities regarding the positive and negative impacts of tourism, to provincial and district levels (From MICT)
- A herbicide awareness raising and management program has been implemented in 3 Provinces: Xieng Khouang, Houaphanh and Luang Prabang. (TABI-PAFO-MAF/DoA)
- Comprehensive environmental education and awareness tours covering topics of forest protection, biodiversity conservation, wildlife conservation and co-management of National Protected Areas have been regularly conducted in villages in the provinces of Khammouane, Houaphan, and Sayaboury. Methods used include theatre, puppetry, games, learning and discussion groups, as well as village cinema (ProCEEd, MoNRE/DEQP)
- Environmental Education and Awareness tours covering the topics of Forest Protection, Biodiversity Conservation, Wildlife Conservation and Co-Management of National Protected Areas are being regularly conducted to sensitize governmental authorities on how to promote environmental conservation and protection – particularly in the provinces of Khammouane, Houaphan, and Sayaboury (ProCEEd, MoNRE/DEQP)
- Environmental education and awareness raising events have been conducted in Vientiane Capital during national festivities – That Luang Festival and Boat Racing Festival (ProCEEd, MoNR/DEQP)
- Environmental and biodiversity photo competitions and exhibitions are frequently organized by several partners,

including ProCEEd, MoNRE/DEQP

- Flyers, brochures and posters on topics such as Forest Protection, Biodiversity Conservation, Wildlife Conservation and Co-Management of National Protected Areas have been disseminated (ProCEEd, MoNRE/DEQP)
- An inventory and e-repository of environmental education and awareness activities has been established (ProCEEd, MoNRE/DEQP)
- A biannual DEQP Environmental Newsletter and a ProCEEd newsletter has been written to inform relevant government authorities about environmental and environmental education and awareness activities of DEQP/MoNRE (ProCEEd, MoNRE/DEQP)
- World Environment Day and Tree Planting Day are annually celebrated by DEQP/MoNRE and its local line agencies
- MAF distributed 18 sets (total 640) of environmental awareness posters related to agriculture, fisheries and forestry to government agencies within two provinces (ABP project)
- International Biodiversity Day (2015) was celebrated by holding a press conference with speeches from heads of MoNRE (DRFM), UNDP, FAO, and IUCN (ABP project)
- Awareness and training related to village forestry, alternative livelihoods, agriculture/ livestock were provided to district authorities in 70 target villages (training for district staff and awareness to target villages provided related to livestock, low carbon and marketing of NTFP provided in no. 70 of 70 villages. 2 study tours related to livestock for district staff/ farmers conducted) (CliPAD- FC, DFRM /MoNRE)
- In 2015, the National Strategy on Environmental Education and Awareness of Lao PDR and the corresponding Action Plan have been revised and updated. (Promotion of Climate related Environmental Education – ProCEEd, MoNRE/DEQP)
- DEQP/MoNRE acts as the focal point for Environmental Education and, together with the Ministry of Education and Sports. represented Lao PDR in the ASEAN Working Group on Environmental Education yearly meetings
- The Lao PDR hosted the ASEAN Working Group on Environmental Education meeting in 2013
- Training on environmental journalism has been conducted for print, radio and TV journalists (ProCEEd, MoNRE/DEQP)
- Lao National TV, Lao National Radio, and Khammouane Provincial Radio have been supported in the production of environmental magazines to encourage more frequent, accurate, and effective reporting of biodiversity issues (ProCEEd. MoNRE/DEQP)
- National newspapers are provided with information and articles on topics like Forest Protection, Biodiversity Conservation, Wildlife Conservation, and Co-Management of National Protected Areas (ProCEEd, MoNRE/DEQP)
- One month long training workshops on production methods for documentaries on environmental and biodiversity issues have been conducted for young filmmakers (ProCEEd. MoNRE/DEQP)
-

Aichi Target 2. Mainstreaming

- Improved relevance sector strategy, policy and legislation mainly national land policy, land law, forest law, water resource law, national land use master plan, decree on land survey, decree on land allocation and use, and law on disaster and climate change and an update of the decree on compensation and resettlement;
- Environmental conservation law, and Land law have been developed (MoNRE group)
- "Tourism Law" has been revised to promote, develop and extend cultural, historical, and nature-based tourism in sustainable ways (From MICT)
- Fishery Law has been developed (NRE Working Group -Sector Report for 2015)
- A national strategy on environmental and climate change education and awareness 2016-2030 has been revised (From MoNRE group)
- Review of the division of labour between central and local level on natural resource and environment management, focusing on human resource and budget allocation in accordance with the government policy on Sam Sang – building the province as a strategic unit, the district as a competent management unit and the village as the development focal area (NRE Working Group -Sector Report for 2015);
- Legislations, technical guidelines and checklists related to EIA process has been developed and improved, and the

Government has applied the process for environmental and social impact assessment to all investment projects (NRE Working Group -Sector Report for 2015)

- The decree on strategic environment assessment (SEA) has been launched (NRE Working Group -Sector Report for 2015)
- Environmental monitoring and management units have been completed in 17 districts
- Environmental Compliance Certificates have been established which approve EIA reports to ensure that project owners fully and adequately comply with environmental and social obligations (NRE Working Group -Sector Report for 2015)
- Sustainable environmental city criteria has been developed and promoted, mainly in Vientiane capital, Huaphan province, and Luangprabang province (NRE Working Group -Sector Report for 2015);
- National Land-Use planning has been developed (from MoNRE) and 7 provinces have prepared Integrated Spatial Planning, based on the developed guidelines (NRE Working Group -Sector Report for 2015)
- The development and implementation of National Master Land Use Plan and Integrated Land Allocation have been completed in 18 provinces and 91 districts, including 3,492 villages across the country with the participation of districts and villages (NRE Working Group -Sector Report for 2015);
- Provincial regulations on biodiversity conservation corridors in Attapeu, Champasak, and Sekong have been issued (BCC Project – ADB)
- Participatory and ABD friendly "Forest and Land Use Planning, Allocation and Management (FALUPAM)" have been developed and used in 9 Provinces (TABI).
- Agro-Biodiversity has been integrated into the Uplands Development Strategy (TABI-NUDP, MAF)
- Agro-Biodiversity has been integrated into Strategies and 5 year plans of PAFOS, and DAFOs in Luang Prabang, Xieng Khouang, and Houaphanh provinces (TABI-PAFOs)
- Agro-biodiversity Progamme II (2015-25) (status, threats, opportunities and plans) has been prepared by NAFRI and reported to media (NAFRI/FAO and ABP project);
- Biodiversity and environment monitoring has been supported and a draft concept for an environmental safeguard approach, including bio-monitoring, has been submitted. (CliPAD – FC, DFRM/MoNRE)

Aichi Target 3. Incentives

- Decree no96/PM on Commercial Plantation and Environmental conservation is under revision and it is expected that this decree will be presented during the Government meeting in March 2016 (MAF)
- Agreement no 0116/DF; regulation on Village forest conservation no 0535/DF; and agreement on timber measurement and quality for internal and export are under revision which it is expected to be finished in 2016 (MAF)
- Payment for Environmental Services (PES) programmes are being implemented (WCS)
- 110 trained village rangers have been compensated for participating in regular biodiversity monitoring and the collection of data on wildlife and threats in Hin Nam No NPA by PoNRE Khammouane Province and HNN
- Reducing Emissions from Deforestation and Forest Degradation in developing countries, and the role of conservation, sustainable management of forests, and enhancement of forest carbon stocks (REDD+) has been introduced in Lao PDR and Institutions have been established at national and (some) sub-national level
- Lao PDR has been accepted into the World Bank's FCPF Carbon Fund (six provinces in northern Laos, namely Houaphan, Luang Prabang, Oudomxay, Sayabouri, Bokeo, and Luang Namtha)
- REDD+ Action Plans in line with PSEDP are being developed and planned to be complete within the next 2 years (GIZ CliPAD, JICA and others, DFRM, DoF)
- Village Forest Management Planning (VFMP) guidelines have been officially endorsed in Houaphan province and recognized at the national level (GIZ CliPAD, PAFO, PONRE, DAFO, DONRE)
- 3 (out of 70) villages signed a Village Forest Management Agreement to sustainably manage their village forests linked to financial incentives to implement village forest management activities (GIZ CliPAD, PAFO, PONRE, DAFO, DONRE)
- REDD+ has been integrated into the provincial forest strategy and action plan in Houaphan province (GIZ CliPAD, PAFO, PONRE)

- 35 village tourism service providers have earned an additional income by offering eco-tourism services in the Hin Nam No NPA, supported by PoNRE Khammouane and HNN
- Co-management agreements for guardian villages to manage the Hin Nam No NPA have been officially endorsed by the District Governor in Bualapha District and benefit sharing arrangements are part of the co-management agreements which are supported by PoNRE Khammouane and HNN
- A park entrance fee system is being piloted in Hin Nam No NPA in which benefits are shared between the PA authorities, the guardian villages, and other stakeholders involved
- Specific Action Plans and targets have been included in BPSAPs for Xieng Khouang and Attapeu provinces to improve Urban Biodiversity (Xieng Khouang Province and ABP project)
- Forestry and Tree Crop Plantation Development/ afforestation has taken place in the Nam Ton watershed (involving repayment to villagers) (SUMALOM Project, DWR/ MoNRE)
- A carbon commercialization strategy has been formulated for Houaphan province (CliPAD FC- , DFRM, MoNRE)
- A project fund based REDD benefit distribution mechanism has been designed and established (CliPAD FC- , DFRM, MoNRE)
- Incentives have been implemented for local inspection teams in Phou Inthin Protected Area , SUMALOM Project, DWR/ MoNRE

Aichi Target 4.Use of Natural Resources

- National organics standards have been developed (DoA, MAF) and a national organic label has been developed
- An application manual has been created to advise producers and entrepreneurs interested in applying for certification of organic agriculture
- The Lao Certification Body has been established, as well as organic farmer's markets (Promotion of Organic Farming and Marketing in Lao PDR – PROFIL-HELVETAS)
- The government of Lao and the European Union have worked together on Voluntary Partnership Agreement (VPA) under forest law enforcement, government and trade in June 2015 and established National Steering Committee for forest law enforcement, government and trade processes in August 2015;
- Mining legislation and mining licensing systems have been improved by the establishment of regulations, checklist and guidelines focusing on sustainable mining
- Systems of villager generated Quotas for NTFP extraction have been developed and used in two provinces (TABI-PAFO/DAFO)
- Detailed assessments of aquifer recharge (along with other aquifer properties) is being carried out in the Nam Ngum basin and in less detail at the national scale (IWMI)

Aichi Target 5. Habitat Loss

- Village forestry working groups have been established under the Forest Sub-Sector Working Group and work has taken place on regulations for village forest management
- Consultation meetings to exchange experiences on village forest management have been organized, and awareness campaigns on village forest management have been promoted
- Manuals and guideline books for training and field monitoring on forest planning management and village forest conservation have been created (MAF)
- 15 out of 24 National Protected Areas have management plans and seven villages have forest management and planning measures at the village level
- The three forest management categories have been reviewed and re-delineation (ie, state forest land) has commenced, with a pilot in Luang Prabang, and the method for re-delineation is being developed
- MAF has provided training to provincial, district, and community levels regarding village forest planning and management
- The GoL had designated the country's first two wetlands of national significance- the Xe Champhone and Beung Kiat Ngong Wetlands in 2010 (IUCN)
- Decree no96/PM on Commercial Plantation and Environmental conservation has been being revised and is expected to be presented in the Government meeting in March 2016(MAF)

- Agreement no 0116/DF; regulation on Village forest conservation no 0535/DF; and agreement on timber measurement and quality for internal and export have been edited and expected to be complete by the end of the 1st quarter of 2016 (MAF)
- Prime minister Decree on Conservation Forest was approved and issued in May 2015
- The national forestry strategy has been implemented, focusing on forest allocation and propose for adoption: 49 protection forest areas and 24 conservation forest areas
- A Plants and Wildlife survey in Lao PDR has been written, comprising of 25 chapters which have been published in the international journeys (Education group)
- A study on surface water – groundwater interactions is underway in the Beung Khiat Ngong wetland area which may be useful for improved wetland management (IWMI-NUOL-FE)
- Forest management committees have been established in 67 villages in Attapeu, Champasak, and Sekong provinces (BCC Project – ADB)
- Forest management plans have been prepared and implemented for 67 villages (BCC Project – ADB)
- The information has been collected for the village forest planning and management for 30 villages in 2 provinces for testing the forest management system (MAF)
- Community-based patrolling of community forests has been organised in 67 villages (BCC Project – ADB)
- An improved "participatory Forest and Land Use Planning, Allocation and Planning Process" has been developed and implemented which stabilises upland land use, prevents habitat loss, rejuvenates lost habitat and Agro-biodiversity (TABI-DALAM)
- Community forestry programs have been promoted which target forest fire control, management of NTFP extraction, FALUPAM, conservation forest management, and NTFP processing and marketing (TABI-PAFO/DAFO)
- Community forests have been recognized through land use title (BCC Project – ADB)
- Government Office approved start of negotiations between GoL and EU on Voluntary Partnership Agreement (VPA) under FLEGT (Forest Law Enforcement Governance and Trade) in June 2015 and established National Steering Committee for FLEGT process in August 2015 (ProFLEGT project-DOFI-MAF)
- The development of Timber Legality Definitions and Timber Legality Assurance Systems have advanced under FLEGT VPA negotiations (ProFLEGT project-DOFI-MAF)
- The GoL has issued total export bans for logs and sawn timber since August 2015
- Village Forestry has been introduced in Houaphan province, including VFMP Guidelines (GIZ CliPAD, PAFO, PONRE, DAFO, DONRE) and is on-going in 2 districts in Houaphan provinces (70 villages)
- Participatory Land Use Planning has been conducted in 58 out of 70 villages in Houameuang and Xam Neua districts in Houaphan province (CliPAD FC, DoF, DALAM)
- A Provincial Law Enforcement Action Plan has been officially endorsed (CliPAD FC, WCS, DOFI, POFI)
- Districts have agreed to an afforestation target of 100 ha for each of the districts, in total 200 ha to be achieved the villages where Participatory Water Land Use Planning was carried out (SUMALOM- NamTon Project – KfW)

Aichi Target 6. Sustainable Fisheries

- An Aquatic Resources Law has been published (MoNRE group)
- Research projects on fish species in the Mekong, in cooperation with NAGAO Japan, are on-going (From education group)
- Research has been conducted which has informed management and legislation related to fisheries management: Merging biology with hydrology to prevent fisheries declines in the Lower Mekong Region (From education group)
- Surveys have been undertaken and designs have been developed to build fish passages across irrigation weirs and the ADB has been lobbied to include fish passages for all future irrigation weir designs (TABI, PAFOs)
- Conducting of fish surveys has been supported (TABI)
- Research has been conducted into the creation of wetlands on reservoir drawdown areas to provide fish refuges and breeding habitat and thereby promote reservoir fisheries (IWMI-ICEM-NUOL-NAFRI-THPC).
- Work with DWR, MoNRE on Water Quality Monitoring in Nam Ton watershed – SUMALOM Project – KfW

- Freshwater protected areas, known as Fish Conservation Zones (FCZs), have been established (IUCN, WWF, Oxfam, GIZ, and ABP)
- Fish Conservation Zones have been established an/or improved in 66 villages in Luang Prabang, 18 villages in Xieng Khouang, and 113 village in HouaPhanh province (under survey) (TABI-PAFOs, LNFC)
- GoL/MAF Fishery stations have been supported to breed and distribute native fish species (in Houaphanh and Xieng Khouang provinces)
- Fourteen Fish Conservation Zone regulations, including the installation of signboards on-site, have been completed in 13 villages and were signed and stamped by the District head (SUMALOM Project – KfW)
- Farmers have been supported to use appropriate farming systems along the Nam Ton watershed (SUMALOM Project – KfW)
- Local authorities and villagers' ability to sustainably manage their freshwater resources has been strengthened

Aichi Target 7. Areas under Sustainable Management

- 51 of 51 Production Forest Areas now have detailed management plans;
- Forestry Strategy 2020 (FS 2020) is developed to provide the guidance on the sustainable management and development of the forest sector in line with national policies (MAF)
- Clean Agriculture Development Centre (CADC) has been established. (DOA, MAF)
- Integrated Pest Management has been carried out and farmer Field Schools in rice and vegetables in six provinces has been conducted with the view to optimize the use of local biodiversity including natural pest enemies, organic fertilizers, and bio-insecticides (several projects under FAO and ABP)
- About 100 students in each year have been provided the lecture on the forest categories and the important of forest (Education group)
- NAFRI and NUoL have worked and researched timber and NTFPs for making income and community sustainable development (Education group)
- Faculty of Forestry, NUoL, has studied/worked on the timber's value for the sustainable using (Education group)
- Approximately 400,000 hectares of land (or which about 240,000 is forest land) are now under active, sustainable management, via the FALUPAM program, mainly in 3 Provinces of Luang Prabang, Houaphanh, and Xiang Khouang

Aichi Target 8. Pollution

- Integrated water resources management plans (IWRMP) in the 10 priority river basins (Nam Ngum, Nam Theun, Nam Kading, Xe Bang Fai, Xe Bang Hieng, Nam Ou, Sekong, Nam Ngiep, Nam Sam, XE Don, Nam Ma) and other potential sub-river basins have been developed and implemented
- Completion of development and implementation of the scope for research on the hydrologic, physical, chemical and biological characteristics of water bodies and classification of water bodies, watersheds and aquifer recharge areas to ensure balanced and sustainable water allocations and protection of valuable ecosystems with completion of water quality assessment report on the general assessment of ground water condition in priority river basins and other potential sub-basins.
- Completion of development and implementation of a centralized pollution database covering solid waste, hazardous material, soil pollution, air and noise emission, and wastewater in the 6 targeted cities located along the Mekong river
- A study on the risks and impacts of pesticide use associated with banana plantations in northern Laos is being developed (NAFRI, IWMI, NUOL-FS)
- Completion of development and implementation of revision and approval of the Water Law and Decree on River Basin Committee to ensure the minimum negative socio-economic and environmental impact at local, national and regional levels
- Awareness raising activities in the Nam Ton watershed on improved ownership and water quality have been conducted (DWR/MoNRE – KfW)

Aichi Target 9. Invasive Alien Species

- Improved regulations are enforced and capacities improved to protect crops and livestock in priority areas from alien species invasion
- The Biotechnology Safety Law was adopted and enforced in 2014 which provided an opportunity to train approximately 40 regulators from concerned government agencies such as MAF, MOH and MONRE
- The Biotechnology Safety Law has been developed and this law also addresses Biosafety and Genetic Modified Organisms (GMOs) (From MoST)
- Alien species are managed under the Department of Agriculture, MAF
- Alien invasive fish species (that have travelled upstream from Vietnam) were identified during fish surveys (TABI-PAFO)
- The National Agricultural Biodiversity Programme (NABP)II provides an update of plant and animal alien species and proposed control activities (NAFRI, ABP Project)

Aichi Target 10. Vulnerable Ecosystems (Coral Reefs)

Considered as Non Applicable

Aichi Target 11. Protected Areas

- Training has been conducted to build knowledge and capacity for management and conservation the sustainable of forest. (NUoL together with WCS - From education group)
- NUoL, together with the University of Khon-Khaen and University of Sonh-kha-Na-Kra-Lin in Thailand, have worked together on groundwater surveys (From education group)
- Capacity building of co-management committees has taken place at village, village cluster, and district levels in Hin Nam No NPA by HNN
- A technical working group on National Protected Areas and Conservation meets every two months
- Law enforcement and priority sites zoning consultation planning meetings, as well as SMART system training for Nakai-Nam Theun National Protected Area has been conducted (Project Anoulak)
- Forest management committees have been established in 67 villages along the buffer zones of three protected areas (Dong Hua Sao, Xepian and Xexap) (BCC Project – ADB)
- Regulations of biodiversity conservation corridors have been issued for three provinces: Attapeu, Champasak and Sekong (BCC Project – ADB)
- Forest management plans have been prepared and implemented for 67 villages (BCC Project – ADB)
- Community-based patrolling of community forests in 67 villages have been organized (BCC Project – ADB)
- State forest lands (3 forest categories) are being reviewed and re deliniated to ensure that the gazetted Protected Areas are actually manageable, and thus able to be protected. Included in this review and remapping is ensuring that representative biodiversity and landscapes are included, (TABI, SUFORD, WB, with DFRM)
- Co-management agreements for 18 guardian villages to manage the Hin Nam No NPA have been officially endorsed by the District Governor in Bualapha District and benefit sharing arrangement are part of the co-management agreements which are supported by PoNRE Khammouane and HNN
- A strategic and operational co-management plan for Hin Nam No NPA Area 2016-2020 has been established with the support of HNN and endorsed by DFRM/MoNRE
- A SMART system has been implemented in Hin Nam No NPA
- Annual management effectiveness assessments have been carried out in Hin Nam No NPA and the piloted co-management model supported by HNN has resulted in a substantial increase in management effectiveness over the past 2 years
- HNN NPA has supported the drafting of the tentative listing document for the Hin Nam No NPA to become a Natural World Heritage Site and this document has been approved by MoNRE

Aichi Target 12. Preventing Extinctions

- Survey and on-going discovery of species have revealed that extinction at the global level and near extinction in Laos for certain species, such as: *Glyptostrobus pisilis* (Education group)
- Together with Critical Ecosystem Partnership Fund (CEPF), the plant species in the Southeast Asia Redlist have been evaluated (From Education group)

- Together with the Critical Ecosystem Partnership Fund (CEPF), the plant species in the Southeast Asia redlist have been evaluated (From Education group)
- Wildlife species information relevant to the Lao PDR's IUCN redlist has been gathered (From Education group)
- Counter measures against timber and wildlife illegal trade are improving with enhanced capacity and better coordination between government agencies, attributable to the Wildlife Enforcement Network , and other projects, as well as the adoption of new technologies and approaches
- A National Ivory Action Plan for Lao PDR, 2015-2016 was adopted by the CITES secretariat (From MoST)
- MoST is the national scientific author of CITES and provides support for the CITES Management Authority-MONRE
- Ex-situ conservation of several botanical families are deposited at BEI nurseries (including Araceae, Begonia, Bryophytes, Dalbergia, Fabaceae, Ochidaceae and Zingiberaceae) and some of them have been collected as dry specimens (for example, there are 65 specimens of orchids and 138 specimens which have been received from Pha Tad Ke) (From MoST)
- Wildlife surveys and population status assessments for primates (red-shanked doucs, white-cheeked gibbons) abd small carnivores (otters) focussing in Nakai-Nam Theun NPA have been conducted (Project Anoulak)
- Law enforcement strategies and priority site zoning for patrolling system have been improved and made more efficient in Nakai-Nam THeun NPA in collaboration with local authorities (Project Anoulak and Watershed Management and Protection Authority)
- PBSAPs for Xieng Khouang and Attapeau Provinces have included critical species for conservation/sustainable use, including *Dacydium elatum, Fokienia hodginsii, Tricholoma fulvocastaneum* (IUCN/ABP project)

Aichi Target 13. Genetic Diversity

- The Biotechnology Safety Law was approved in 2014 (From MoST)
- The National Policy on Rice Production for Food Security has been drafted
- The Ecology and Biotechnology Service Centre has been established as a place where research results can be delivered to the public.
- A study on Micro-organism Diversity has been implemented by the Faculty of Science, National University of Laos. (From MoST)
- Ex-situ conservation (e.g. seed banks) has been strengthened, with more than 120 orchid species and 140 edible plants collected in the system at BEI, including 15 plant and 26 animal species identified in CITES and a total of 5,101 species stored within the herbarium of the institute for educational and preservation (From MoST)
- The 1st technical meeting on Agricultural Sciences, technology and development was organized on 9-10/12/2015 (From Education group)
- A research project on conservation of bananas, medicinal orchids and pine mushroom byusing tissue culture techniques has implemented with support from the S&T fund between 2013 to 2015
- Some threatened species of Orchidaceae such as Anoectochilus (nha bai lai), Paphiopedilum, Dendrobium, Rhynchostylis and Anoectochilus have been included at BEI's ex-situ collection. (From MoST)
- Studies and surveys on medicinal plants have been conducted, with about 360 documented species (From MoST)
- By a combination of (a) baseline surveys of Ago-Biodiversity, by (b) forest and land use planning which promotes the value and role of ABD in multi-functional landscapes, and (c) by the implementation of activities (via subProjects) that develop and promote the role of sustainable ABD management and use in livelihoods, the genetic diversity of cultivated plants is pro-actively maintained (TABI), providing a strategy to safeguard these genetic resource. Species groups include bananas, citrus, tea, mushrooms, a wide range of vegetables and crops found in healthy upland fields and bush fallows, orchids and medicinal plants, fish conservation zones, etc. (TABI with PAFOS and DAFOs).
- A field study on plant and animal species collected by farmers during a 3-month period in their upland paddy rice eco-system showed a total of 95 species used for consumption and/or sales (3 villages in Xieng Khouang Province, ABP project)
- Ongoing surveys in Xieng Khouang Province on wild mushrooms resulted in some 1,000 dried samples including more than 50 species used for consumption or for medicinal purposes (MoST, MAF and ABP project)

- A fungarium at BEI (MoST) has been established (DARWIN INITIATIVE project)
- Baseline surveys in Kham (Laung Prabang) and Ngum (Xieng Khouang Province) rivers resulted in villagers listing a total of 185 fish species (ABP project)
- An inventory study of 223 ha upland forest area (Donglong-Dongsouth, Xieng Khouang Province) listed 241 medicinal species of which one (*Bistorta balaecceum*) is a new record for Laos (ITM, ABP project)
- The NABP II document provides an updated overview of Lao Agro-biodiversity, including latest accessions to gene banks (ABP Project)
- A demonstration garden of medicinal plants has been established in Xieng Khouang Province (ITM, ABP project)
- Ethno-botanical plots have been established at Pha Tad Ke Botanical Garden in Luang Prabang (ABP project)

Aichi Target 14. Essential Ecosystem Services

- Approximately 400,000 hectares of land (or which about 240,000 is forest land) have gone through the FALUPAM program, mainly in the three provinces of Luang Prabang, Houaphanh, and Xiang Khouang, which aims specifically to 'recognize' and manage ecosystems which are important for livelihoods, such as):
  - Upland 'multi-cropped' fields rotated with a diverse range of bush fallows
  - Forest of various types, with a wide range of products
  - Grasslands
  - Stream and riverine ecosystems, and wet rice fields ecosystems

  (TABI-MAF)
- Herbicide awareness and management programs, focussed on reducing the impact of agricultural chemicals on ecosystems has been implemented in Xiang Khouang, Houaphanh and Luang Prabang provinces (TABI)
- Aquatic ecosystems have been protected via the fish conservation zones program in Xiang Khouang, Houaphanh and Luang Prabang provinces (TABI) (to be noted that Aquatic ecosystems protected, partly, by the "river weed collection and processing" – linking a livelihood activity to ecosystems health – but only partly successful, as hydropower dams are still built)

Aichi Target 15. Restoration & Resilience

- Efforts have been made to restore 444 ha of forests, with another 1,000 ha of forest to be restored by 2019 (BCC Project – ADB)
- The accepted Carbon Fund Emission Reduction Program Idea Note for the six northern provinces (HP, LPB, OUD, BO, SAY, LNT) mentioned regeneration as one of the main REDD+ activities to be implemented (DFRM, DoF)

Aichi Target 16. Nagoya Protocol

- The Lao PDR ratified the Nagoya Protocol in September 2012 and the MoST plays the role as the National Focal Point of Cartagena Protocol on Biosafety and Nagoya Protocol on ABS (From MoST)
- Lao legislation has been enacted to harmonize with the international treaty of Access and Benefit Sharing (ABS) from the use of genetic resources is in place and implementation is piloted in at least 3 selected areas
- An ABS Framework has been formulated
- Public awareness, information sharing, and collaboration at the national and regional levels has been promoted for the Nagoya Protocol and National ABS Framework (From MoST)
- Capacity among key stakeholders has been built to implement the provision of the Nagoya Protocol and national ABS framework
- Awareness raising materials such as local ABS "Simply Explained" Video have been published;
- Lessons learned of ABS framework formulation have been published (From MoST)
- The national ABS policy assessment report has been developed

Aichi Target 17. NBSAP Implementation

- A Stakeholder Mapping & Capacity Assessment on Reporting of the Convention of Biological Diversity (CBD) & Implementation of the National Biodiversity Strategy and Action Plan (NBSAP) has been prepared in 2010
- An Assessment of Lao PDR's 1st National Biodiversity Strategy to 2020 and Action Plan to 2010 has been undertaken in 2012

- The Lao PDR is in the process of finalizing a 2nd NBSAP
- A series of Technical Groups has been established to monitor and report on the NBSAP related activities
- A National Steering Group responding of the CBD is in place
- Two Provincial Strategy and Action Plans have been prepared (IUCN/ABP project)
- A Sub-Sector Working Group on Agro-biodiversity has been developed with a multi-sectoral approach and with recommendations brought to the attention of top level government through the GoL-DP round table process (MAF & others)

Aichi Target 18. Traditional Knowledge

- The Ministry of Science and Technology (MoST) issued an Intellectual Property Law in 2007 and amended the law in December 2011, while also implementing regulations on Geographical Indication – for promotion of local and traditional products - consistent with WTO procedures (From MoST)
- The FALUPAM (forest and land use planning process) incorporates traditional knowledge and management of upland landscapes which have been accepted by partner districts and provinces, reflecting respect for local communities' customary use of natural resources (TABI-CDE)
- In one Province (Xieng Khouang) the Department of Education developed a curriculum based on local ABD and biodiversity knowledge and use, and this curriculum has been approved by the Ministry of Education (TABI-POE)
- SubProjects based on local management of ABD resources are appreciated by both local communities and also GoL institutions, in Xieng Khouang, Luang Prabang and Houaphanh provinces, demonstrating respect for the same (TABI-PAFOs/DAFOs)
- The MAF journal now contains regular articles on local community's sustainable use of biodiversity, while the MAF Vision and Strategy also contains the same (TABI-MAF)
- The Hin Nam No NPA has been divided into management blocks based on customary rights from 18 guardian villages and the villagers of these 18 villages have management responsibilities, and access and use rights which are captured in endorsed co-management agreements (co-management by-law)
- In Hin Nam No NPA, co-management committees have been established and endorsed on village, village cluster and district level and these committees allow for local people to be involved in participatory planning and reporting with regard to the Hin Nam No
- Village and District Conservation Areas have been established for NTFPs, including wild tea, melientha and medicinal plants (ABP)
- The Medical and Traditional Medicine Institute has built 11 gardens in communities to promote plant conservation for sustainable use (Education group)

Aichi Target19. Biodiversity Knowledge

- The Lao Information Sharing and Biosafety Clearing House (BCH) has been created (http://la.biosafetyclearinghouse.net/); with BEI as the main focal point (From MoST)
- Biodiversity assessments have been conducted in Attapeu, Champasak, and Sekong to prioritize protection and restoration interventions (BCC Project – ADB)
- Biodiversity monitoring via camera-trapping techniques have been established in Attapeu and Sekong provinces (BCC Project – ADB)
- Geographical Indications (GI) have been established for coffee and tea, as well as other crops (MoST, MAF)
- The capacity of national users from concerned agencies has been strengthened across the country on BCH (From MoST)
- Several awareness products on biosafety have been prepared to promote Biosafety Law, including brochures and newsletters, DVD and videos on RA/RM training, as well as training handbooks (from MoST)

Aichi Target20.Resource Mobilization

- Schemes of various payment for forest environmental services have been included in the draft Forestry Law and Prime Minister Decrees on Conservation Forest and Protection Forest;
- The Environment Protection Fund (EPF) is emerging as an important financier for capacity building and field management of Protection and Conservation Forest complementing well the Forest and Forest Resource

Development Fund;

- The World Bank has mobilized 60 million US$ to (a) improve the financing capacity of the Environment Protection Fund (EPF), (b) support capacity building of national, provincial, and district institutions to implement the Lao legislation on environment and social impact, particularly the capacity to manage NPAs and protect wildlife against threats from infrastructure development and illegal use or trade of natural resources (c) strengthening the university environment and social curriculum, (d) broadening project support to forested upper-watersheds of rivers important to hydropower, agriculture irrigation, and flood prevention, (LENS2 Project-EPF)
- MONRE, Department of Planning and Cooperation has developed a list of priority projects to be financed;
- DEQP has successfully mobilized GEF resources for biodiversity conservation; i.e. the 2015 approved *Sustainable Forest and Land Management in the Dry Dipterocarp Forest Ecosystems of Southern Lao PDR*
- Ecotourism in Laos has become a successful financing approach to protect nature, while at the same time generating revenue for local people (e.g. the Nam Nern Night Safari in Nam Et Phou Louey NPA)

ANNEX 06: GLOBALLY THREATENED SPECIES IN LAO PDR

	Species	Globally Threatened
	AMPHIBIANS	
1	*Hylarana attigua*	VU
2	*Kurixalus baliogaster* (belly-spotted frog)	VU
3	*Laotriton laoensis* (Laos warty newt)	EN
4	*Leptobrahium banae*	VU
5	*Leptobrachium xamthops*	EN
6	*Rhacophorus exechopygus*	VU
7	*Rhacophorus kio*	VU
8	*Rhacophorus spelaeus*	VU
9	*Tylototriton notialis*	VU
	BIRDS	
1	*Aceros nipalensis* (Rufous-necked Hornbill)	VU
2	*Acrocephalus tangorum* (Manchurian Reed-warbler)	VU
3	*Anser cygnoid* (Swan Goose)	VU
4	*Antigone antigone* (Sarus Crane)	VU
5	*Aquila heliaca* (Eastern Imperial Eagle	VU
6	*Asarcornis scutulata* (White-winged Duck)	EN
7	*Ciconia episcopus* (Asian Woollyneck)	VU
8	*Clanga clanga* (Greater Spotted Eagle)	VU
9	*Columba punicea* (Pale-capped Pigeon)	VU
10	*Emberiza aureola* (Yellow-breasted Bunting)	EN
11	*Gallinago nemoricola* (Wood Snipe)	VU
12	*Gyps bengalensis* (White-rumped Vulture)	CR
13	*Gyps tenuirostris* (Slender-billed Vulture)	CR
14	*Heliopais personatus* (Masked Finfoot	EN
15	*Leptoptilos dubius* (Greater Adjutant)	EN
16	*Leptoptilos javanicus* (Lesser Adjutant)	VU
17	*Mulleripicus pulverulentus* (Great Slaty Woodpecker)	VU
18	*Pavo muticus* (Green Peafowl)	EN
19	*Pseudibis davisoni* (White-shouldered Ibis)	CR
20	*Rynchops albicollis* (Indian Skimmer)	VU
21	*Sarcogyps calvus* (Red-headed Vulture)	CR
22	*Sitta formosa* (Beautiful Nuthatch)	VU
23	*Sterna acuticauda* (Black-bellied Tern)	EN
24	*Thaumatibis gigantea* (Giant Ibis)	CR
25	*Turdus feae* (Grey-sided Thrush)	VU
	MAMMALS	
1	*Aonyx cinereus* (Asian Small-clawed Otter)	VU
2	*Arctictis binturong* (Binturong)	VU
3	*Axis porcinus* (Hog Deer)	EN
4	*Bos gaurus* (Gaur)	VU
5	*Bos javanicus* (Banteng)	EN

6	*Bos sauveli* (Kouprey)	CR
7	*Bubalus arnee* (Wild Water Buffalo)	EN
8	*Chrotogale owstoni* (Owston's Civet)	VU
9	*Cuon alpinus* (Dhole)	EN
10	*Dicerorhinus sumatrensis* (Sumatran Rhinoceros)	CR
11	*Elephas maximus* (Asian Elephant)	EN
12	*Hapalomys delacouri* (Lesser Marmoset Rat)	VU
13	*Helarctos malayanus* (Sun Bear)	VU
14	*Hipposideros khaokhouayensis (Phou Khao Khouay Leaf-nosed Bat)*	VU
15	*Hipposideros scutinares* (Shield-nosed Leaf-nosed Bat)	VU
16	*Hylobates lar* (Lar Gibbon)	EN
17	*Hylobates pileatus (Pileated Gibbon)*	EN
18	*Laonastes aenigmamus (Laotian Rock Rat)*	EN
19	*Lutrogale perspicillata* (Smooth-coated Otter)	VU
20	*Macaca arctoides* (Stump-tailed Macaque)	VU
21	*Macaca leonina* (Northern Pig-tailed Macaque)	VU
22	*Manis javanica* (Sunda Pangolin)	CR
23	*Manis pentadactyla (Chinese Pangolin)*	CR
24	*Muntiacus vuquangensis* (Large-antlered Muntjac)	EN
25	*Neofelis nebulosa* (Clouded Leopard)	VU
26	*Nomascus concolor* (Black Crested Gibbon)	CR
27	*Nomascus gabriellae* (Red-cheeked Gibbon)	EN
28	*Nomascus leucogenys* (Northern White-cheeked Gibbon)	CR
29	*Nomascus siki* (Southern White-cheeked Gibbon)	EN
30	*Nycticebus bengalensis* (Bengal Slow Loris)	VU
31	*Nycticebus pygmaeus* (Pygmy Slow Loris)	VU
32	*Orcaella brevirostris* (Irrawaddy Dolphin)	VU
33	*Panthera tigris* (Tiger)	EN
34	*Prionailurus viverrinus* (Fishing Cat)	EN
35	*Pseudoryx nghetinhensis* (Saola)	CR
36	*Pygathrix nemaeus* (Red-shanked Douc Langur)	EN
37	*Rhinoceros sondaicus* (Javan Rhinoceros)	CR
38	*Rucervus eldii* (Eld's Deer)	EN
39	*Rusa unicolor* (Sambar)	VU
40	*Trachypithecus germaini* (Indochinese Lutung)	EN
41	*Trachypithecus hatinhensis* (Hatinh Langur)	EN
42	*Trachypithecus laotum* (Laotian Langur)	VU
43	*Trachypithecus phayrei* (Phayre's Leaf-monkey)	EN
44	*Ursus thibetanus* (Asiatic Black Bear)	VU
45	*Viverra megaspila* (Large-spotted Civet)	VU
	REPTILES	
1	*Amyda cartilaginea* (Southeast Asian Softshell Turtle)	VU
2	*Crocodylus siamensis* (Siamese Crocodile)	CR
3	*Cuora galbinifrons* (Indochinese Box Turtle)	CR
4	*Cuora mouhotii* (Jagged-shelled Turtle)	EN
5	*Cuora trifasciata* (Chinese Three-striped Box Turtle	CR

6	*Heosemys grandis* (Giant Asian Pond Turtle)	VU
7	*Indotestudo elongata* (Yellow-headed Tortoise)	EN
8	*Malayemys subtrijuga*	VU
9	*Manouria impressa* (Impressed Tortoise)	VU
10	*Naja atra* (Chinese Cobra)	VU
11	*Naja siamensis* (Black And White Spitting Cobra)	VU
12	*Ophiophagus hannah* (King Cobra)	VU
13	*Pelochelys cantorii* (Frog-faced Softshell Turtle)	EN
14	*Platysternon megacephalum* (Big-headed Turtle)	EN
15	*Protobothrops sieversorum* (Three Horned-scaled Pitviper)	EN
16	*Python bivittatus* (Burmese Python)	VU
17	*Sacalia quadriocellata* (Four-eyed Turtle)	EN
PLANTS		
1	*Afzelia xylocarpa*	EN
2	*Amentotaxus yunnanensis* (Yunnan Catkin Yew)	VU
3	*Amomum calcaratum*	VU
4	*Amomum celsum*	EN
5	*Amomum odontocarpum*	VU
6	*Amomum petaloideum*	VU
7	*Amomum stephanocoleum*	EN
8	*Aquilaria crassna* (Eagle Wood)	CR
9	*Cephalotaxus mannii* (Mann's Yew Plum)	VU
10	*Cunninghamia konishii*	EN
11	*Curcuma rhabdota* (Candy Cane)	VU
12	*Cycas micholitzii*	VU
13	*Cycas pectinata*	VU
14	*Dalbergia bariensis* (Burmese Rosewood)	EN
15	*Dalbergia cochinchinensis* (Siamese Rosewood)	VU
16	*Diospyros mun* (Ebony)	CR
17	*Dipterocarpus costatus*	EN
18	*Dipterocarpus turbinatus*	CR
19	*Fokienia hodginsii* (Fujian Cypress)	VU
20	*Glyptostrobus pensilis* (Chinese Swamp Cypress	CR
21	*Hopea odorata*	VU
22	*Hopea recopei*	EN
23	*Hopea thorelii*	CR
24	*Hydnocarpus annamensis*	VU
25	*Impatiens angustisepala*	CR
26	*Keteleeria evelyniana*	VU
27	*Knema tonkinensis*	VU
28	*Magnolia odora* (Tsong's Tree)	VU
29	*Paphiopedilum appletonianum* (Appleton's Paphiopedilum)	EN
30	*Paphiopedilum appletonianum* (Appleton's Paphiopedilum)	EN
31	*Paphiopedilum callosum* (Callus Paphiopedilum)	EN
32	*Paphiopedilum concolor* (One Colored Paphiopedilum)	EN
33	*Paphiopedilum dianthum* (Double Flowered Paphiopedilum)	EN
34	*Paphiopedilum gratrixianum* (Gratix's Paphiopedilum)	CR
35	*Paphiopedilum malipoens*e (Malipo Paphiopedilum)	EN

36	*Paphiopedilum parishii* (Parish's Paphiopedilum)	EN
37	*Paphiopedilum villosum* (Villose Paphiopedilum)	VU
38	*Platanus kerrii*	VU
39	*Shorea henryana* (White Meranti)	EN
40	*Shorea roxburghii* (White Meranti)	EN
41	*Shorea thorelii*	CR

Note: CR – Critically Endangered EN – Endangered; VU – Vulnerable.

Source: The IUCN Red List of Threatened Species. www.iucnredlist.org. Download on January 2016.