

United Nations Development Programme

Country: Lao People's Democratic Republic

PROJECT DOCUMENT



Project Title: Mainstreaming Biodiversity in Lao PDR's Agricultural and Land Management Policies, Plans and Programmes

UNDAF Outcome: UNDAF Outcome 1: By 2011, the livelihoods of poor, vulnerable and food insecure populations are enhanced through sustainable development (within the MDG framework)

UNDP Strategic Plan Environment and Sustainable Development Primary Outcome: Mainstreaming Environment and Energy

UNDP Strategic Plan Secondary Outcome: Expanding Access to Environmental and Energy Services to the Poor

Expected CP Outcome(s): Outcome 1: Improved and equitable access to land, markets and social and economic services, environmentally sustainable utilization of natural resources


Expected CPAP Output (s) Output 1.2: The role of biodiversity, agro-biodiversity, land management and environment in general in the livelihoods improvements and poverty reduction strengthened through enhanced knowledge and management capacity; Output 1.3: Enhanced management capacity of the Government in meeting its international environmental obligations through strengthened implementation of multi-lateral environmental agreements and related national policies and legislation.

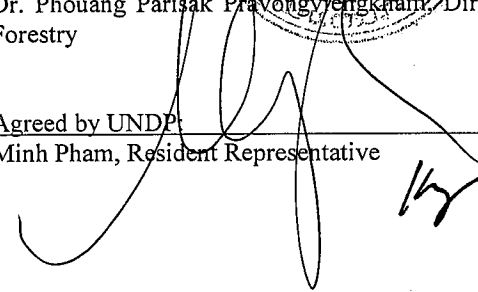
Executing Entity/Implementing Partner: Ministry of Agriculture and Forestry

Implementing Entity/Responsible Partners: UNDP

Lao PDR encompasses the species rich Mekong Valley and the Annamite mountain range, and has an extensive protected areas network. Agriculture plays a significant role in Lao PDR and many rural people rely on wild species, particularly aquatic species, for a large part of their diet. Farming intensification and the conversion of land for mono-crop plantations is reducing crop, livestock and wild species diversity. Lao PDR is a globally important centre of diversity of rice, with estimates of over 3,000 local varieties, and at least three species of wild rice. Many local varieties of rice and other crops have been displaced by improved varieties with higher yields and greater needs for agrochemicals. Wild relatives of rice may be at risk from changes in land use, including wetland drainage. Lao PDR has a rich diversity of wild species but there are concerns that numbers and distribution are being reduced rapidly. Significantly, many globally threatened species make use of agro-ecosystems. The project will work strategically with government, agribusiness, farmers, donors active in rural development, and the general public, to make biodiversity a key consideration in routine day to day decision making. Agro-biodiversity management will be used to promote benefits in both global biodiversity and in food security and quality of life.

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		• FAO (in kind)	US\$ 345,772
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Agreed by Government:  Day/Month/Year: 11 APR 2011
 Dr. Phouang Parisak Pravongyengkham, Director general, Department of Planning, Ministry of Agriculture and Forestry

Agreed by UNDP:  Day/Month/Year: 19, 11
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Acronyms and Abbreviations

ADB	Asian Development Bank
AMSL	Above Mean Sea Level
APR	Annual Project Review
ARN	Agriculture and Natural Resources
ASEAN	Association of Southeast Asian Nations
AVRDC	The World Vegetable Center
BCCI	Biological Corridors Conservation Initiative
BD	Biodiversity
CBD	Convention on Biological Diversity
CPAP	Country Strategy and Action Plan
CPD	Country Programme Document
CTA	Chief Technical Adviser
DAFO	District Agriculture and Forestry Office (MAF)
DED	German Development Service
DG	Director General
DLF	Department of Livestock and Fisheries (MAF)
DoA	Department of Agriculture (MAF)
DoE	Department of Environment (WREA)
DoS	Department of Statistics (MPI)
DoFI	Department of Forestry Inspection (MAF)
DoL	Department of Land (NLMA)
DoLUPaD	Department of Land Use Planning and Development (NLMA)
DoP	Department of Planning (MAF)
DoWR	Department of Water Resources (WREA)
DPA	District Project Assistant
DPI	Provincial Department of Planning and Investment
ERC	Evaluation Office Evaluation Resource Center
ESIA	Environmental Social Impact Assessment
FAO	Food and Agriculture Organization of the United Nations
FNPP	FAO Netherlands Partnership Program
GDP	Gross Domestic Product
GPAR	Governance and Public Administration Reform
GPAR	Public Administration Reform
IBA	Important Bird Area
IFAD	International Fund for Agricultural Development
INGO	International Non Government Organizations
IP	Implementing Partner
IRRI	International Rice Research Institute
IUCN	World Conservation Union
IWRM	Integrated Water Resource Management
LAO PDR	Lao People's Democratic Republic
LNMC	Lao National Mekong Committee (WREA)

LPLUID	Land Policy and Land Use Inspection Department (NLMA)
LUP/LA	Land Use Planning and Land Allocation Law
M&E	Monitoring and Evaluation
MAF	Ministry of Agriculture and Forestry
MDG	Millennium Development Goals
MEA	Multilateral Environmental Agreements
MPI	Ministry of Planning and Investment
MRC	Mekong River Commission
NABP	National Agricultural Biodiversity Programme
NAFES	National Agriculture and Forestry Extension Service (MAF)
NAFRI	National Agriculture and Forestry Research Institute (MAF)
NAPA	National Action Plan for Climate Change Adaptation
NBCA	National Biodiversity Conservation Area
NBSAP	National Biodiversity Strategy and Action Plan
NEPL	Nam Et/Phou Louey Protected Area
NGPES	National Growth and Poverty Eradication Strategy
NIM	National Implementation Modality
NLMA	National Land Management Authority
NPA	National Project Assistant
NSC	National Science Council
NSDS	National Sustainable Development Strategy
NSEDP	National Socioeconomic Development Plan
NT	Near-Threatened
NTFP	Non-timber forest product
ODA	Overseas Development Assistance
PA	Protected Area
PAFO	Provincial Agriculture and Forestry Office (MAF)
PIR	Project Implementation Review
PIR	Project Implementation Report
PLUP	Participatory Land Use Planning
PM	Project Manager
PMO	Prime Minister Office
POPS	Persistent Organic Pollutants
PPR	Project Progress Reports
QPR	Quarterly Progress Report
RCU	Regional Coordination Unit
RECOFTC	Regional Community Forestry Training Centre
REDD	Reduced Emissions from Deforestation and Degradation
SDC	Swiss Agency for Development and Cooperation
SEDP	Socio-economic Development Plan
SELNA	Support for an Effective Lao PDR National Assembly
SNV	Netherlands Development Organization
SO	Strategic Objective
SP	Strategic Priority

SUFORD	Sustainable Forestry and Rural Development Project
TABI	The Agro-biodiversity Initiative
TPR	Tripartite Review
UNCCD	United Nations Convention on the Control of Desertification
UNDP CO	UNDP Country Office
UXO	Unexploded Ordinance
WAAA	Wildlife and Aquatic Animals
WCS	Wildlife Conservation Society
WERI	Water and Environment Research Institute
WREA	Water Resources and Environment Administration
WWF	Worldwide Fund for Nature

EXECUTIVE SUMMARY

Lao Peoples' Democratic Republic (Lao PDR) lies in the centre of the Indochinese peninsula surrounded by Thailand, Vietnam, China, Myanmar and Cambodia. Lao PDR has a population of 6.67 million people, and the overall population density is low¹ at 24 people per km². As a result of its relatively wide ranges of latitude and altitude, its rich water resources and tropical climate, Lao hosts globally significant tropical ecosystems.

Within these ecosystems are diverse agro-ecosystems ranging from the slash and burn swidden agriculture of the uplands, through long-standing agro-forests in the middle lands, to paddy fields, household or community managed wetlands in the lower-lying lands of the Mekong Plain. These ecosystems contain a huge number of globally and locally significant species of plants, animals, fungi and other organisms.

Agro-ecosystems in Lao PDR are very important for global biodiversity. They are important habitats for some globally important species of wildlife, and have their own importance in terms of agricultural biodiversity: wild relatives of crops, diverse varieties of crop and domestic animals and other crop associated biodiversity.

The richness and as such global significance of Lao PDR's agro-biodiversity² is attributable to several factors: location between two major bio-geographical zones – the temperate north and the tropical south, high ethnic diversity, and different climatic and altitudinal zones. Lao PDR is thought to be at the centre of domestication for Asian rice and the centre of origin for Job's Tears. Other potentially globally significant agro-biodiversity include cultivated local and indigenous varieties of maize; sugar cane varieties such as oy hok and oy pa used in confectionaries; bushy peas including indigenous varieties currently being studied at NAFRI; livestock; and crop associated biodiversity such as wild crop relatives; and pollinators and other insects.

The Government of Lao PDR has developed and implemented a wide-range of policies that directly or indirectly impact on the use, development and conservation of biodiversity. The main overall development goals reflect international commitments and focus on poverty reduction, economic growth and social development, advancement of infrastructure and investment in hydropower and mining, but also protecting the environment. They also acknowledge that future economic growth continues to rely on the sustainable use of the natural resource base and the conservation of forests and biodiversity. At the national level, *main responsibility* for the management and conservation of biodiversity in agricultural landscapes are with The Ministry of Agriculture and Forestry (MAF), especially after the responsibility to implement CBD related commitments has been recently transferred to the Department of Planning at MAF.

The long term solution that the project aims to contribute to is that **Lao PDR's biodiversity, including agro-biodiversity, is maintained, protected and sustainably used as a key to poverty alleviation and adaptation to climate change impact**². Within this solution the **overall goal** is conservation and sustainable use of biodiversity resources in agro-ecosystems in Lao PDR for the attainment of food security and sustainable economic development, however several barriers exist. To achieve productivity and food security at the household level, the multiple values of conserving Lao PDR's biodiversity endowment have to be mainstreamed into government policies. There are inadequate incentives and capacities to mainstream biodiversity, especially agro-biodiversity, at the community, District Province and National level.

¹ Total human population in 2008 estimated at 6,677,534 <http://www.unohrills.org/en/orphan/97/>

² In Lao PDR, agricultural biodiversity (agro-biodiversity) is used to denote all components of biological diversity of relevance to food and agriculture, and all components of biodiversity that constitute agro-ecosystems: variety and variability of animals, plants and micro-organisms, at genetic, species and ecosystem levels, necessary to sustain key functions of the agro-ecosystem, its structure and processes.

Loss of crop and domestic animal diversity, crop-associated biodiversity and other biodiversity within agro-ecosystems and degradation of ecosystems are being caused through a number of direct and indirect threats. Land use practices are placing greater pressures on biodiversity and agro-biodiversity, and affecting the ecological functioning of these agro-ecosystems. The changes to agro-ecosystems may have significant impacts: reduced resilience, a loss of ecosystem services and reduced adaptive capacity for agriculture. This is of further concern in consideration of global climate changes.

Agriculture, including crops, plantations and livestock, plays a significant role in the Gross Domestic Product for Lao PDR, and even more significant role in providing food and livelihoods for a majority of the population. In spite of the significance of this sector policy and management mechanisms have been somewhat ad-hoc and there needs to be greater attention placed on the management of agro-ecosystems and agro-biodiversity.

A major consideration in the selection of the pilot sites has been the linkage with relevant activities. As requested by the Government the proposed sites for GEF actions are within the current MAF/SDC: The Agro-Biodiversity Initiative target area. The two project target areas are: Luang Prabang Province, Phonxay District and Xieng Khouang Province, Phoukout District.

The objective of this project is: **to provide farmers with the necessary incentives, capabilities and supporting institutional framework to conserve agricultural biodiversity within farming systems of Lao PDR.** To achieve this, the multiple values of conserving Lao PDR's biodiversity endowment have to be mainstreamed into government policies, and sustainable productivity and food security at the household level must be improved whilst simultaneously securing the conservation of important agro-biodiversity. There are inadequate capacities and incentives to mainstream biodiversity, especially agro-biodiversity, at the Provincial, District and community level. The project is split into two overarching components, the first having a more national policy focus and the second having a more village level action focus. Within these components the following section identifies the project outputs and indicative activities to fulfil these outputs.

Outcome/Component 1. National policy and institutional frameworks for sustainable use, and *in-situ* conservation of biodiversity in agro-ecosystems.

This component will involve the mainstreaming of agro-biodiversity considerations into national legislation, including the development and promotion of policies that encourage and support the active conservation and sustainable use of agro-biodiversity in agricultural landscapes. In support of this outcome four outputs will be pursued focused on key thematic areas: 1) Integrating agro-biodiversity into policies, 2) Promoting coordination on agro-biodiversity, 3) Enhancing institutional capacity for agro-biodiversity, and 4) Increased understanding among key stakeholders of agro-biodiversity and its significance.

Outcome/Component 2. Capacities and incentives to mainstream biodiversity, especially agro-biodiversity, at the Provincial, District and community levels

This component will involve the development of incentives and capacity for the conservation and sustainable use of agro-biodiversity with a focus on Community, District and Provincial levels. In support of this outcome six outputs will be pursued focused on key thematic areas: 1) Strengthening the capacity of PAFO and DAFO to act on agro-biodiversity management and to adapt extension packages and services, including diversifying the seed supply system, 2) Conducting Participatory Land Use Planning including the development and implementation of Participatory Natural Resources Management plans at village level in order to be able to identify products for sustainable use and niche marketing (in Outcome

2), 3) Establishing in-situ³ conservation areas for agro-biodiversity in order to be able to protect local biodiversity hotspots (in Outcome 2), 4) Promotion of biodiversity-friendly farming approaches in two pilot sites such as organic farming and a reduction in pesticide and fertilizer use, 5) Identification and development of market incentives for agro-biodiversity for farmers and agribusiness, and 6) Linking with the private and public sector through agro-biodiversity planning agreements.

GEF investment in this project will lead to strengthened policy, a coordinated and strategic investment in biodiversity conservation in agro-ecosystems with long-term national capacity building in Lao PDR. Mainstreaming increases awareness, ensures agro-biodiversity is considered across different sectors and builds capacity for management and sustainable use. Alternatives of creating protected agricultural landscapes, or developing regulations and incentives for agro-biodiversity would be ineffective without the underpinning of a wide appreciation of these values. The project is well timed to strengthen and support improvements in relation for capacity and market incentives for the conservation and sustainable use of agro-biodiversity.

The GEF funds will be provided as a grant. Government of Lao PDR will contribute in staff time, meeting room and office hire, and transport to an estimated value of 556,200 USD. UNDP co-finance is split – 213,000 USD in cash to fund activities, and 321,900 USD in-kind contribution of staff time for senior and junior management and intern (UN Volunteer). FAO co-financing (in-kind) consists of staff time for both technical input and project management (345,772 USD). Significant parallel finance (3,000,000 USD) will also be in kind, mainly from SDC/TABI.

Activities to mainstream agricultural biodiversity into national policy and planning should achieve results that are one-off. Mainstreaming agricultural biodiversity into national policy is important to have a national-level impact, however the implementation of such policy will be essential for positive long-term impacts. The farmer to farmer approaches bring the farmers to the centre of the project and as such promote avenues for direct and indirect replication. As farmers see incentives for agro-biodiversity approaches they will be attracted to replicating these approaches, especially when there is support through Government extension programmes and materials. The project will build the capacity of the MAF, PAFO and DAFO staff that will be directly engaged in replicating the approaches to other villages, districts and ultimately Provinces.

Outcome 3: Effective Project Management

The project will be implemented under UNDP's National Implementation Modality (NIM), which for GEF corresponds to national execution of the project by the Government. Specifically MAF will act as the Implementing Partner (IP). MAF has been selected as the IP given its formal role as lead institution in the biodiversity sector for Lao PDR. The project is co-financed and as such will also include major participation from FAO and SDC. The GEF Project Board will be merged with the TABI National Steering Committee into an overall Agro-Biodiversity Steering Committee chaired by the Vice Minister of MAF. This programmatic approach will promote technical collaboration and will allow UNDP, FAO and SDC to provide integrated managerial support to both projects. UNDP and SDC will provide project assurance support to their respective parts of the government's Agro-biodiversity "programme".

The purpose of this outcome is to ensure that the project is implemented in a timely manner and is cost effective. The main concern is that the project should be managed according to the principles of adaptive management, whereby lessons learnt during its implementation as well as lessons from other relevant initiatives are fed into refining project implementation. An additional issue here is that since Lao PDR has generally weak capacities for project/ programme implementation, this should also be considered as a part of overall national capacity building. There is only Output under this component will be: Improved capacity of IP for integrated planning, management, monitoring and evaluation of programmes.

³ In agriculture, in-situ includes in-nature and on-farm.

1. SITUATION ANALYSIS

1. Lao Peoples' Democratic Republic (Lao PDR) lies at the centre of the Indochinese peninsula surrounded by Thailand, Vietnam, China, Myanmar and Cambodia. The country has an area of 236,800 km², three quarters of which is rugged, mountainous terrain with narrow, steep-sided river valleys. The highest mountains, up to 2,816 m Above Mean Sea Level (AMSL) are in the northern uplands, and the Annamites extend south from there along the Vietnamese border. The only extensive flat areas lie along the east bank of the Mekong River at around 100-200 m (AMSL), to the west of the Annamites.



Map 1: Lao PDR

2. The agricultural zones of Lao PDR are divided into lowlands and uplands, where the lowlands have historically had the greatest agricultural activity and population. According to available statistics, “permanent” agriculture area covers about 5% of the country, of which about 4% is rice paddy land and 1% is agricultural plantations and other agricultural lands⁴. However, typically, rural communities use a wider area of “agro-ecosystem” encompassing “managed” or “semi managed” communal forests, grasslands and wetlands. The complex interweaving of culture and biodiversity both wild and selected through agricultural lifestyles forms part of the global significance of Laos’ biodiversity. Rural people in Laos still rely substantially on plants, animals and fungi collected from the wild for everyday subsistence. Lao also has a rich cultural and ethnic diversity. In terms of biodiversity and specifically agro-biodiversity there is a wealth of Traditional Ecological Knowledge held by communities in Lao, especially those that are more remote and as such more reliant on natural biodiversity resources.

1.1 General Biodiversity Context

3. Lao PDR lies at a convergence of three mega-diversity centres – India, China and South-East Asia and is at the centre of the Indomalayan bio-geographical zone. As a result of its relatively wide ranges of latitude and altitude, its rich water resources and tropical climate, Lao hosts globally significant tropical ecosystems: such as the evergreen forests of the Annamite Mountains and their foothills, the

⁴ <ftp://ftp.fao.org/docrep/fao/012/i1067e/i1067e01.pdf>

limestone karst of central Indochina, the wetlands and dipterocarp forests of the Mekong Plain, and the Mekong River itself. Within these ecosystems are diverse agro-ecosystems ranging from the slash and burn swidden agriculture of the uplands, through long-standing agro-forests in the middle lands, to paddy fields, household or community managed wetlands in the lower-lying lands of the Mekong Plain. Laos' rich biodiversity is still being discovered with even quite large species being discovered in the region recently. The numbers of wild species of major groups are constantly being revised upwards, so statistics⁵ are soon out of date.

4. Lao PDR covers parts of four WWF 200 Global Ecoregions⁶, and there are 27 Important Bird Areas⁷ (IBA) distributed over the country and one Endemic Bird Area⁸. Of the 27 IBAs, eight are fully outside the protected area system, including those in the Mekong midstream.
5. The floristic diversity of Lao is poorly known and only a fraction of its species has been recorded. The first Checklist of the Vascular Plants of Lao PDR, published in March 2007⁹ lists 4,800 species of plants in 232 families, yet it is thought that this represents less than half of the total number of species in the country. Species new to Laos, and even new to science, are being discovered in recent years, not just in relatively undisturbed forests but also in fallow patches in the agricultural landscape. Three confirmed new species of plant for the world and a further 16 possible new species, were recorded for Lao PDR, between 2004 and 2007. Orchidaceae species were estimated at 340, however within 4 weeks of a specific orchid project (Orchis¹⁰) commencing, they had discovered ca. 150 new orchid species to Laos. It is anticipated that a focus on many other areas of plant diversity would also yield significant new findings for Lao and potentially the world.
6. Among the animal species there have been some startling discoveries. The tropical forests of the Annamite Mountains east of the Mekong River (along the border between Laos and Vietnam) are home to species that have persisted through the last ice age. They were, until recently, some of the least explored places on earth, made even more inaccessible by political instability and war. As the country has opened up and as biologists have begun to explore more, a host of fascinating plants and animals have "emerged", most known to the local people but not to science. Many of the animals were discovered in food markets or hanging on display on the walls of village houses. They include 15 mammals, 89 frogs, 279 fish, 46 lizards, 22 snakes, four birds, four turtles and two salamander species.
7. Among the new mammals was the Laotian Rock Rat (*Laonastes aenigmamus*) whose closest relatives were thought to have been extinct for some 11 million years, the Annamite Striped Rabbit (*Nesolagus timminsi*) whose closest relative is a critically endangered species in Sumatra, two species of deer - the Large-antlered Muntjac (*Muntiacus vuquangensis*) and the Dark Annamite Muntjac (*M. truongsongensis*), and the extraordinary Bare-faced Bulbul (*Pycnonotus hualon*), a (probably) endemic songbird with a pink, almost featherless head, that even the local residents had not noticed. The Saola (*Pseudoryx nghetinhensis*), an oryx-like antelope discovered in 1992 in Vietnam also occurs in Lao PDR. There are many other newly discovered species in Laos including a remarkable new salamander (*Paramesotriton laoensis*), several frogs, and steadily increasing numbers of new species of fish, some of them endemic to specific stretches of river (Kottelat, 2009). In addition to the newly discovered species, over 125 Globally Threatened species¹¹ on the IUCN Red List are found in Lao PDR (see Table 1), and an additional 51 Globally Near-Threatened (NT) species. Many of these

⁵ Duckworth, JW, RE Salter and K Khounbolin (1999) Wildlife in Lao Status Report. IUCN, WCS, DoF

⁶ Annamite Range Moist Forests; Indochina Dry Forests; Northern Indochina Sub-tropical Moist Forests; Mekong River and its catchment

⁷ Internationally Significant Bird Areas – Birdlife International

⁸ Annamese Lowlands, Fan Si Pan and N Laos (SA), Southern Laos (SA) (although this includes two secondary areas (SA) that are probably not valid any more).

⁹ <http://www.rbge.org.uk/science/tropical-diversity/inventory-research-in-threatened-areas/laos>

¹⁰ Orchis (2009) The Open (Re)source for Commerce in Horticulture aided by species Identification Systems.

¹¹ www.iucnredlist.org

species make use of parts of the agricultural landscape, particularly near protected areas, and there are several wetland and aquatic species that are vulnerable to pollution from agriculture.

Table 1: Globally threatened species in Lao PDR

	Critically Endangered (CE)	Endangered (EN)	Vulnerable (VU)	Total
Amphibians	0	0	5	5
Birds	5	4	12	21
Fishes	3	3	15	21
Mammals	6	19	21	46
Plants	5	7	9	21
Reptiles	2	5	4	11
TOTALS	21	38	66	125

8. Much of Lao PDR's biodiversity is conserved under 20 National Protected Areas, covering almost 3.5 million hectares or more than 13% of the country's land area. Additionally, another 8 million hectares have been designated as Protection or Conservation Forest at the provincial and district levels, bringing the total land area under some kind of protection to more than 21%. The management strategy of the overall Lao Protected Area system is based on an integrated conservation and development approach, which seeks to alleviate poverty while minimizing degradation of the area's biodiversity¹². While the percentage is very significant, dual management of these areas means they do not conform to norms for international protected areas. The allowance for villages and associated agriculture within the protected areas provides some de-facto protection for agro-biodiversity, however there are no explicit in-situ conservation areas set aside for agro-biodiversity. Some accessions of potential genetic resources, especially rice and vegetables, have been collected for ex-situ conservation, but this represents a fraction of the in-situ agro-biodiversity and crop associated biodiversity that would be conserved in-situ.

1.2 Biodiversity related to agro-ecosystems

9. Agro-ecosystems in Lao PDR are very important for global biodiversity. The richness and as such global significance of Lao PDR's agro-biodiversity¹³ is attributable to several factors: location between two major biogeographical zones – the temperate north and the tropical south, high ethnic diversity, and different climatic and altitudinal zones.
10. Laos lies in the heart of the Siam – Malaya – Java Vavilov sub centre of origin and domestication for domestic crops, which falls under the Vavilov Indo-Malayan ("Hindustan Centre"). This sub-region is considered to be centre of domestication for cereals and legumes such as Job's tears, velvet bean, several fruit species including pomelo, banana, breadfruit and mangosteen as well as other plant such as sugarcane, clove, nutmeg, black pepper, and manila hemp. The Indo-Malayan centre is also noted as domestication centre of origin and domestication of rice, chickpea, pigeon pea, eggplant, taro, sugar cane, sesame, oriental cotton, and bamboo (amongst other species) and a high diversity of these crops have been reported from Lao PDR as well.
11. Lao PDR lies within the centre of the domestication of **Asian rice** (*Oryza sativa* L.). Moreover, the centre of origin of the glutinous rice types is recognised to be within the Lao PDR and northern Thailand. It is thought to have the greatest number of rice cultivars in the Mekong region. Rice is a globally important crop species and Lao PDR probably has the highest number of accessions of any country of a similar size in the world. There are now over 15,000 accessions (specimens) of rice

¹² WCS (2004). Integrated Ecosystem and Wildlife Management in Bolikhamxay Province.

¹³ In Lao PDR, agricultural biodiversity (agro-biodiversity) is used to denote all components of biological diversity of relevance to food and agriculture, and all components of biodiversity that constitute agro-ecosystems: variety and variability of animals, plants and micro-organisms, at genetic, species and ecosystem levels, necessary to sustain key functions of the agro-ecosystem, its structure and processes.

cultivars and wild relatives (ca 300) in the gene banks of the International Rice Research Institute (Manila) and MAF (Vientiane). Estimates from names and morphological characteristics are that there are about 3,000 genotypes, but this yet to be confirmed through DNA analysis. At least three wild relatives of Asian cultivated rice are found in Lao PDR: *Oryza rufipogon*, *Oryza officinalis*, and *O. granulata*. A fourth variety, *O. nivara*, is lumped by some taxonomists with *O. rufipogon* as there is no taxonomic agreement on whether this is another variety. The most significant variety from the point of view of rice breeding is *O. rufipogon*, but as there is constant hybridization with cultivated rice most populations are very heterogeneous. The results of such hybridization are often called weedy rice (*O. sativa f. spontanea*). *O. rufipogon* is found throughout tropical Asia and is particularly abundant in Vientiane plain wetlands. *O. granulata* and *O. officinalis* are found in the north and south of the country respectively. Out of the 7000 accessions of upland rice stored at IRRI gene banks, two upland varieties have been identified through a participatory process: Khao Nok (Bird Rice) and Khao Mak Hin Soung (Stone Rice), which could provide 0.3 to 0.5 tonnes/hectare higher yields compared to other local varieties.

12. Information on Lao's overall agrobiodiversity importance is only recently being analyzed. Laos is thought to be the centre of origin for Job's Tears (*Coix lachryma-jobi*). Over 2,000 accessions of vegetables of varieties naturally occurring in Laos are held in a medium-term gene bank at the Haddokkeo Horticultural Research Centre in Vientiane, waiting to be analyzed. There is huge morphological and genetic diversity too in various other crops, including fruits and vegetables, aubergine (*Solanum melongena*), banana (*Musa* spp.) and mango (*Mangifera indica*). Several indigenous taro varieties have also been recorded in the Lao PDR including: trunk taro, lo taro, aromatic taro, chin taro, ordinary taro, big taro, small taro, banana taro, louk hong taro, China taro, and the black taro. Out of these varieties aromatic taro is the most commonly cultivated. The diversity of cassava found in the Lao PDR includes ordinary cassava, red cassava, yolk cassava, mottled cassava, and the animal feed cassava. Bushy peas mainly consist of indigenous varieties which are presently being studied at the Agriculture Research Centre include the black pea, the brown pea, the red pea, the Nok Kho pea, and the black-eyed pea. Other native varieties yet to be collected which are currently being cultivated consist of the Nang pea, the thong pea, the kheem pea and the striped pea. Indigenous sugar cane varieties presently being grown by farmers which have not yet been collected and studied include: oy pa, oy laou, oy xang, oy nou, oy guiam, oy deng, oy siam, oy dam, and others. Cotton is an important industrial crop with a high commercial value and is traded both in domestic and export markets. Indigenous cotton varieties include Faimui, Fainoi, Fainiai, and Fainia KT. Farmers grow these indigenous varieties in upland areas mainly for household use, and particularly the provinces situated along the Lao-Thai border export a certain quantity.
13. Five physically discernable ecosystems are found in the agro-ecosystem in Lao PDR, encompassing both agricultural area as well as natural and semi-natural ecosystems:
- Water ecosystems (including rivers, streams, ditches, ponds and wetlands and rice fields)
 - Field borders (including roadsides)
 - Trees and forest areas (including small parcels of forests within cultivated areas, individual trees, and groves)
 - The homestead
 - Cultivated and fallow fields (including annual and perennial crops)¹⁴
14. They are important habitats for some globally important species of wildlife, and have their own importance in terms of agricultural biodiversity: wild relatives of crops, diverse varieties of crop and domestic animals and other crop associated biodiversity. Agricultural land provides one of the main habitats for six¹⁵ (including three Critically Endangered vultures) of the 21 Globally Threatened birds,

¹⁴ cmsdata.iucn.org/.../agrobiodiversity_handbook___eng_vers_2.pdf

¹⁵ White Rumped Vulture (*Gyps bengalensis*) (CR); Slender-billed Vulture (*Gyps tenuirostris*) (CR), Red-headed Vulture (*Sarcogyps calvus*) (CR), Greater Spotted Eagle (*Aquila clanga*) (VU), Yellow-breasted Bunting (*Emberiza aureola*) (VU) and Lesser Kestrel (*Falco naumanni*) (VU)

and a secondary habitat for a further ten. The migratory Yellow-breasted Bunting (VU) (*Emberiza aureola*) feeds on rice-stubble as part of winter feeding grounds on return from breeding in Siberia. Globally near-threatened aquatic species including the Oriental Darter (*Anhinga melanogaster*) and the Painted Stork (*Mycteria leucocephala*) are beginning to appear on wetlands associated with agriculture. Globally threatened species of mammals that use agricultural land as a main habitat include the Fishing Cat (*Prionailurus viverrinus*), the Small-clawed Otter (*Aonyx cinereus*) and the Smooth-coated Otter (*Lutrogale perspicillata*).

15. There is limited knowledge on **crop-associated biodiversity** in Lao PDR. The diversity of the upland agricultural systems both in terms of the ecosystems and diversity of crops used support crop-associated biodiversity and healthy upland ecosystems. The combination of still low pesticide use due to the lack of cash buffers farmers need for their purchase combined with a high and fragmented, even if degraded, forest cover encourages high diversity and numbers of arthropods, including many insects and arachnids beneficial as pest predators. Native parasitoids of the Rice Gall Midge for example, provide natural checks on gall midge infestation¹⁶. Research by the Mekong River Commission on the role of aquatic resources, and by FAO on the role of insects in food security, will add to our understanding of crop-associated biodiversity and its importance.
16. Many studies have shown that local communities are highly dependent on plants, bamboo shoots, fish, frogs and other resources from such areas for their nutrition and for their livelihoods¹⁷. In terms of defining agro-ecosystems in Lao PDR, considering the swidden and NTFP practices, the area is probably thrice as large as the “permanent” agricultural lands – i.e. more than 15% of the total surface area.

1.3 Socioeconomic Context

17. Lao PDR has a population of 6.67 million people, and the overall population density is low¹⁸ at 24 people per square km. This is low compared with neighbouring Vietnam (232), Thailand (127) and Cambodia (78). However, about 78% of the population work mainly in agriculture and population density on agricultural land is close to the regional mean. One of the key contributors to the agrobiodiversity in Lao PDR is its ethnic diversity. There are at least 49 main groups that fall into four ethno-linguistic families: Tai-Kadai, Mon-Khmer, Hmong-Mien, and Tibeto-Burman. Each group, in turn, is further subdivided into branches and subgroups, encompassing over 230 ethno-linguistic groups. Of the four regions, Northern Lao has the highest proportion of distinct ethnic groups; they account for 87% of the region’s population.
18. Lao PDR is one of 49 Least Developed Countries¹⁹, and has a UN Human Development Index of 0.619²⁰, which ranks it 133rd of the 182 countries with data. Thirty-four percent of people live below the poverty line²¹ (down from 46% during the early 1990’s) with huge variations over the country. The national literacy rate (2005) for those over 15 years of age was 72.7% and there was wide variation across the country, from less than 20% literacy in rural mountain areas in Phongsaly, Luang Namtha, Khammuane and Savannakhet provinces to more than 80% in major urban areas and provincial capitals²². Life expectancy at birth is 64.6 years. Health facilities are poorly developed, and maternal mortality (405 deaths per 100,000 live births) and first year mortality (70 deaths per

¹⁶ Kobayashi M (1996) Natural enemies of the rice gall midge (*Orseolia oryzae*) (Wood Mason). Proceedings of the Workshop on Rice Gall Midge Management. Vientiane, Laos 28-30 October, 1996

¹⁷ <http://www.undplao.org/newsroom/factsheets/publication/Biodiversitycountryreport.pdf>

¹⁸ Total human population in 2008 estimated at 6,677,534 <http://www.unohrls.org/en/orphan/97/>

¹⁹ <http://www.unohrls.org/en/ldc/related/62/>

²⁰ 2007 figure in 2009 UN Human Development Report

²¹ The “overall poverty line” calculated by the Department of Statistics uses the criteria of the amount of money required to purchase 2,100 Kcals of food per day plus a non-food allowance.

²² Socioeconomic Atlas of Lao PDR

1000 live births) are particularly high. There is a high incidence of chronic malnutrition, linked in part to low fat intake (WFP²³, 2006), and 40% of children under 5 are reported as underweight.

19. In 2000, agriculture contributed just over half of GDP. About 85% of the population is dependent upon agriculture, fisheries and other biodiversity for their primary livelihood. The sector is dominated by subsistence production, especially of rice, although there has been some growth in the cultivation of cash crops, especially coffee, over recent years. In most areas of subsistence agriculture, production is insufficient to provide for daily food needs, and the harvesting of wild species is intricately woven into the agricultural lifestyle and is often considered as part of farming. There is a large non-cash, subsistence, element in rural livelihoods, including a high reliance on aquatic and terrestrial biodiversity and wild food sources.
20. Households supplement farmed produce with a wide variety of wild plants, animals and fungi. Rice and a range of vegetables and fruits supply the farmers with food for subsistence, and some income through sale of cash crops such as maize (*Zea mays*), Job's tears (*Coix lachryma-jobi*), coffee (mainly Robusta – *Coffea canephora* - but also some Liberica and Arabica), cassava (*Manihot esculenta*), peanuts (*Arachis hypogaea*), paper mulberry (*Broussonetia papyrifera*), tea (*Camellia sinensis*) and sugar-cane (*Saccharum officinarum*). Aquatic species, including fish, amphibians, reptiles, crustaceans, molluscs, and insects, are particularly important in many rural Laotian diets, although the lower consumption of terrestrial species may be simply because those species have been reduced to such low population levels. Over 200 species of animals are consumed and this dietary component could supply most of the vitamins A and B, calcium, iron, sulphur, essential fatty acids and amino acids needed by the villagers. Recent data indicate that although some aquatic species are under pressure from pollution, and others from overharvesting, it is sometimes people's particular food habits and cultural choices, rather than low absolute food availability that are contributing to malnutrition. FAO is currently compiling data on the significance of insects in food security for Lao PDR.

1.4 Policy and Legislative Context

21. The Government of Lao PDR has developed and implemented a wide-range of policies that directly or indirectly impact on the use, development and conservation of biodiversity. The main overall development goals reflect international commitments and focus on poverty reduction, economic growth and social development, advancement of infrastructure and investment in hydropower and mining, but also protecting the environment. They also acknowledge that future economic growth continues to rely on the sustainable use of the natural resource base and the conservation of forests and biodiversity. Development in the Agriculture and Natural Resources sector focuses on commodity oriented agricultural production, stabilization of shifting cultivation and enhanced productivity. This is being done through crop and livestock development, enhanced use of living aquatic resources, and cash crops including industrial tree plantations.
22. The most important policies and policy documents for the conservation and sustainable management of biodiversity in agricultural landscapes are briefly described below:
 - The *National Growth and Poverty Eradication Strategy* (NGPES) provides strategic guidance for secure future economic growth and to achieve poverty eradication in a holistic and comprehensive manner. The Strategy is an operational guide toward for enhancing growth and development and reducing poverty, with the goal to eradicate poverty by 2020. One of the priorities is most relevant to agricultural biodiversity as it is related to improved environmental conservation and natural resources management. Priorities in the Agriculture and Natural Resources (ANR) sector include village based natural resource use, land use planning, improve agricultural productivity, conserving aquatic resources and controlling NTFP use.

²³ Comprehensive Food Security and Vulnerability Analysis (CFSVA 2007)

□ The *National Sustainable Development Strategy* (NSDS) embodies the country's strategic planning process to address the full integration of economic, social and environmental objectives across sectors, territories and generations and sector-wide mainstreaming of sustainable development principles and poverty-environment linkages. It will also address other key elements not considered in other existing plans and strategies, such as: indicators to evaluate the overall status of national sustainable development; institutionalized mechanism for public participation; linking the short-term plans to medium and long-term plans addressing inter-generational equity; and coordinating different sectors and territories.

□ The *6th National Socioeconomic Development Plan 2006 – 2010* (stresses poverty reduction²⁴, strengthening economic growth and social development, improving the food security situation²⁵, the protection and sustainable management of natural resources. There is a strong focus on continuing robust economic growth and on further development of the agriculture sector, especially the transformation from subsistence and semi-subsistence to commercial production to meet growing domestic requirements for agricultural products, and rapidly expanding agricultural exports. It also emphasizes the diversification of rural economies and farming methods, as well as infrastructure development.

□ The GoL '*Strategic Vision for the Agriculture and Forestry Sector*' (1999) guided the development in these sectors during the past decade and included the following key themes: participatory planning; lowland transformation (transformation of farming systems – market oriented cash crop production/ modern farming technologies) to help to expand the production of export commodities; sustainable development of sloping lands (protection of NPA's, regulate harvest of NTFPs, community based approach to land management); stabilization of shifting cultivation; expansion of irrigation (more effectively, expansion of area); human resource development (focus on agricultural staff at district level, improve participatory planning/ extension techniques); enabling environment for business development.

□ In response to the CBD and related commitments, the Government developed the *National Biodiversity Strategy and Action Plan* (NBSAP) was elaborated and approved in 2004 with the objective to "maintain the diverse biodiversity as one key to poverty alleviation and protect the current asset base of the poor". This objective emphasizes the importance of agro-biodiversity not only for the conservation of biodiversity, but also for securing the livelihood of the rural population and contributes to achieve important MDGs such as poverty reduction. This is further manifested in some of the strategic principles²⁶. Other objectives include improve the biodiversity data base, management and monitoring, capacity building and awareness creation, adjust legislation and regulations in line with MEA's. Especially the goals 3²⁷, 4²⁸, 5²⁹, 8³⁰, 9³¹, 10³² are especially relevant for the conservation and sustainable use of biodiversity in agricultural landscapes.

□ With the assistance of FAO, the *National Agricultural Biodiversity Programme* (NABP) was prepared and endorsed by the Government of Lao PDR in 2004, which provides a long-term strategy to sustainably manage, develop and conserve agro-biodiversity in the country. Its aim is to support two of the main development priorities for Lao PDR to achieve food security and improve the livelihoods of the rural communities; and to enhance the Government's capacity to ensure the sustainable use and conservation of natural resources. It addresses the following thematic issues: crop

²⁴ Reduce the ratio of poor families to below 25 % in 2010.

²⁵ Completely abolish seasonal scarcities of rice.

²⁶ E.g. "cultivated areas should remain diverse and productivity should be increased, through protection, conservation and the sustainable use of land resources".

²⁷ Promote the conservation of genetic diversity.

²⁸ Promote sustainable use and consumption.

²⁹ Pressures from habitat loss, land use change and degradation, and unsustainable water use, reduced.

³⁰ Maintain capacity of ecosystems to deliver goods and services and support livelihoods.

³¹ Maintain socio-cultural diversity of indigenous and local communities.

³² Ensure the fair and equitable sharing of benefits arising out of the use of genetic resources.

associated biodiversity, livestock management, NTFP's, sustainable use and conservation of aquatic biodiversity and integrated agricultural production systems (FAO/ MAF, 2007). The Program is implemented since 2005 by the Government in cooperation with international partners, such as FAO (e.g. through the FAO/Netherlands Partnership Program (FNPP)), IUCN and WWF. TABI also contributes to the implementation of this program through their Component 1.

□ The *Forestry Strategy to the Year 2020* is of central importance for the forestry sector as it provides strategic guidance to develop in line with national strategies for socio-economic development and environmental conservation. Priority actions to be undertaken until 2020 include among others to maintain a healthy and extensive forest cover, to avoid deforestation and forest degradation and to preserve species and unique habitats of national and global importance. It promotes village-based natural resource management, sustainable participatory management and processing of NTFPs, as well as biodiversity conservation through law enforcement, capacity building and assisted participation of villagers in forest management (MAF, 04).

□ Under the most recent policies of MAF, the '*4 Goals and 13 Measures*', four development targets are identified: ensuring food security, commercialization of agriculture production, shifting cultivation stabilization for poverty reduction, and sustainable forest management³³.

□ The *National Nutrition Policy*³⁴ (2008) was developed with the support from FAO and adopted by the Government to respond to the MDG 1/ target 2³⁵. This policy clearly states that achieving such a goal requires effective cooperation between concerned sectors in particular health, education, agriculture, environment, industry/ trade and others. The National Nutrition Policy assigns the National Science Council (NSC) to assist in enhancing the current coordination mechanism on nutrition and food security including relevant line ministries, committees and mass organizations.

23. Some of the most relevant and available³⁶ legislations are briefly described below:

□ The new *Fishery and Aquaculture Law* was approved by the National Assembly in June 2009. It was drafted through a partnership between the Department of Livestock and Fisheries, FAO, WWF and MRC based on a nationwide stakeholder consultation process. It aims to ensure an effective and sustainable management of fish and aquatic resources and reflects international fishery instruments and commitments (FAO, 2009).

□ The *Wildlife and Aquatic Animals (WAAA) Law* was adopted by the National Assembly in 2007. The WAAA is administered by MAF Department of Forestry Inspection. The objective of the WAAA is to set out the principles, rules and measures relating to the management, preservation, protection, utilization, propagation and rearing of wildlife and aquatic animals with a view to minimizing impacts on habitat and ecosystems.

□ Based on the overall policy directions various legislations were established subsequently. Related to land management the promulgation of the *Land Law* in 1997 was an important milestone³⁷. It was amended in 2003 and facilitates together with PM Decree 88 effective and efficient management of land. Criteria for individual and collective or communal land titles are provided in the recent *Ministerial Instruction No 564* issued by the NLMA. This instruction includes a new aspect in contrast to previous legislations as it provides for the issuance of land titles for collectively or communally managed lands.

³³ Whereby biodiversity conservation in agricultural landscapes is considered under the 1st and 4th of these targets.

³⁴ Prime Minister Decree No. 248, 01.12.2008

³⁵ 'to reduce hunger and malnutrition by half in the year 2015'.

³⁶ Especially the most recent ones are not yet available in English.

³⁷ It superseded the Decree on Land (No 99/ PM), which had been in effect since 1992.

□ The PM *Decree No 135 on State Land Lease or Concession* approved in May 2009 determines principles, procedures and measures regarding granting of state land for lease or concession, to promote the development of state land ('to turn land into capital') including the investment into cash crop production to generate income for the state budget. Different Articles specify conditions related to land concession for agricultural business such as for cash crops/ NTFP's and industrial tree plantation. Art. 26 defines where such investment can take place.

□ The *Forestry Law* (2007)³⁸ provides principles, regulations and standards for the use of forestland and resources. It defines the responsibilities and roles of authorities on various levels for forest management, control and inspection. Primary responsibility over forest resources is handed over to MAF and its line agencies at provincial and district level, but also to village organisations. Many of the weaknesses of the old one, especially related to the selection of land for investment have been addressed³⁹.

□ The *PM Decree 59 on Sustainable Forest Management of Production Forest Areas* issued in 2002 provides provisions for the delineation of production forests, management planning and regulates the participation of villages in production forest management. It also provides for timber and NTFPs harvesting by villagers for commercial purposes in designated production forests.

□ The *PM Decree 164 for the Establishment of National Biodiversity Conservation Areas (NBCAs)* in 1993 was a direct response to the results from the Rio Summit in 1992 and prove the GoL's commitment to conserve biological diversity in large forested areas and to maintain their environmental and ecological functions. At that time 20 NBCAs were declared covering approximately 3,3 million ha of natural forests that equalled 12% of the total land area at that time.

□ The *MAF Regulation 524 on the Management of NBCAs, Wildlife and Aquatic Animals* from 2001 outlines the procedures for establishing and managing NBCAs⁴⁰, related rights and responsibilities, and sets rules that ensure their protection. According to the categories in the Forestry Law, NBCA's are conservation forests. They are divided into a core and buffer zone, whereby there is no access without prior authorization to the latter. The buffer zone should protect the core zone from outside development pressure and limited activities according to regulations are allowed⁴¹.

□ The *Agriculture Law* dates back to 1998 and determine principles, rules, and measures regarding the organization and activities of agricultural production as the basis for economic development. It covers aspects such as the management and preservation of agricultural practices, promote agricultural production⁴², to create favourable conditions to expand agro-industrial processing and to avoid negative impacts on the environment. It also regulates the application of fertilizers and pesticides.

24. At **sub-national level** such as provinces and districts the main strategic documents include the 5 Year SEDP's. For the different sectors, the 5 year sector plans and related annual plans provide guidance to achieve set development goals. Beside this no other strategic documents exist⁴³, except provincial Environmental Strategies in a few provinces as the result of donor support initiatives⁴⁴. Existing

³⁸ First issued in 1996, and amended in 2005.

³⁹ However some inconsistencies and unclear formulations related to definitions (e.g. article 3 – definition of degraded forest/ degraded forest land and barren forest land).

⁴⁰ Since recently called National Protected Areas (NPA).

⁴¹ Various livelihood development measures, agriculture and forestry related activities, limited infrastructure development.

⁴² To secure food supply and commodity production.

⁴³ Based on investigations in Luang Prabang.

⁴⁴ In this case the support from the Sustainable Environment Management (SEM II) project at WREA.

policy implementation tools developed at national level including ESIA and PLUP procedures, as well as technical guidelines are applied as provided.

25. The 5 Year SEDP's are strategic documents, which provide medium-term social and economic targets and goals for the provinces and districts. They outline sector strategies for achieving those targets. Plans integrate national development and sector policies with the needs and priorities of the province and the districts. Provincial plans take the five-year development plans for districts within the province into consideration. The Provincial Department of Planning and Investment (DPI) is responsible for the finalization of this plan in coordination with provincial sector departments, the private sector and mass organization representatives⁴⁵. The plan is approved by the Provincial Governor (Funke, 2009).

1.5 Institutional Context

26. At the national level, *main responsibility* for the management and conservation of biodiversity in agricultural landscapes are with Ministry of Agriculture and Forestry (MAF), especially after the responsibility to implement CBD related commitments has been recently transferred to the Department of Planning at MAF. Beside this other technical line ministries, such NLMA, WREA and MPI are important, especially if mainstreaming of the conservation and sustainable use of biodiversity into agricultural landscapes is concerned.

□ *MAF* is responsible for all aspects related to agriculture and forestry. It is for example in charge of managing different categories of forests and agricultural land, developing regulations for their management, protection, development and use including environmental protection. MAF was reorganized between 1999 and 2001, resulting in the creation of the National Agriculture and Forestry Research Institute (NAFRI), the National Agriculture and Forestry Extension Service (NAFES), the Department of Agriculture (DoA) and the Department of Livestock and Fisheries (DLF). In 2008 the Department of Forestry Inspection (DoFI) was additionally established. Almost all of its departments⁴⁶ are relevant to the conservation and sustainable use of biodiversity in agricultural landscapes. However, so far NAFRI was mainly responsible to implement the NABP in cooperation with others and the Department of Forestry (DoF)⁴⁷ was in charge of managing the NPA's. Its Department of Planning (DoP) has the overall responsibility for the elaboration of ANR sector plans (e.g. in the context of NSEDP's) and policies, based on the contributions from the different technical departments⁴⁸.

□ The *National Land Management Authority* (NLMA) was set up within the Prime Minister's Office (PMO) since 2003⁴⁹. Its main functions include the coordination of land management across sectors, land management and administration tasks - including land registration and land valuation, carry out land surveys, land allocation, land zoning, land classification and land use planning, granting of land lease and concession, issuing of Land Survey Certificate and Land Title; collecting statistical data on land, and inspecting land use. The most important departments in this context are the Department of Land (DoL)⁵⁰, the Department of Land Use Planning and Development (DoLUPaD)⁵¹ and the Land Policy and Land Use Inspection Department (LPLUID)⁵².

⁴⁵ The Lao Front for National Construction (LFNC) and the constituency offices of the National Assembly (NA) are also involved.

⁴⁶ 7 departments: Department of Planning, Department of Inspection, Department of Agriculture, Department of Livestock and Fisheries, Department of Forestry, Department of Irrigation, Department of Forestry Inspection), NAFES and NAFRI.

⁴⁷ Especially its Division of Forest Conservation.

⁴⁸ Beside this they are responsible to develop/ suggest sector specific legislation, to implement/ monitor sectoral plans and relevant initiatives.

⁴⁹ In accordance to Articles 9 and 10 of the Land Law.

⁵⁰ Is responsible for land registration – including private, communal and state land.

⁵¹ Is in charge of land use master planning from national down to the district level.

⁵² Has the primary mandate to develop land policies, inspect land uses and related development and land conflict investigation and resolution.

□ The *Water Resources and Environment Administration* (WREA) was created in 2007 and has the overall responsibility of implementing government policy related to water resources and environment⁵³. Its two main departments are the Department of Environment (DoE)⁵⁴ and the Department of Water Resources (DoWR), which includes the Lao National Mekong Committee (LNMC). The Biodiversity Centre under its Water and Environment Research Institute (WERI) was responsible until recently to fulfill the commitments of Lao PDR related to the CBD. The DoE is responsible for environmental management including ESIA, issuing environmental compliance certificates for projects, environmental awareness creation⁵⁵ and related research. It also includes the Climate Change Office, which deals with all climate related issues. The DG of WREA is member of the Governing Board of the ASEAN Centre for Biodiversity⁵⁶.

□ The *Ministry of Planning and Investment* (MPI) and especially its Department of Planning (DoP) is responsible for the elaboration of 5-year NSEDP's at all administrative levels. MPI is assigned to coordinate with ministries, other sectors and local authorities in monitoring socio-economic development and preparing periodic reports including the NSEDP and the Public Investment Programs. MPI's tasks include measures to improve processes of government policy formulation, coordination, monitoring, evaluation and refinement.

27. Beside this *high level government organizations* such as the National Science Council and the National Leading Committee on Rural Development and Poverty Reduction under the Prime Minister's Office (PMO), as well as the Lao National Front of Construction and relevant *mass organization* (such as the Lao Women Union) are of interest in this context. There are also a number of *International Non Government Organizations* (INGO's)⁵⁷, local *user groups*, as well as *private local and foreign investors* that have a stake in agro-biodiversity – in a direct or indirect way.
28. Lao PDR is split administratively into one municipality and sixteen provinces, which are further divided into 140 districts, under which there are about 10,300 villages. Villages have been assigned to *kumban* or village clusters for purposes of land-use planning but *kumbans* are not part of the legally established administrative structure. At the local level, the Provinces and Municipalities are the main decision makers on agriculture and natural resources' management. There has been a history of decentralization in Lao, with Provincial Governors, although being centrally appointed, they have significant autonomy, and as they appoint the heads of the District offices there may be a lack of accountability⁵⁸. UNDP has been supporting the Lao civil service and specifically pilot provinces to more effectively deliver services to citizens through the Governance and Public Administration Reform (GPAR).

1.6 Threats to biodiversity in agro ecosystems and Impacts

29. The global biodiversity values of Lao PDR's agro-ecosystems are under threat from a number of anthropogenic actions. These include the following:
30. ***Replacement of traditional varieties by high yielding and commercial varieties:*** Farming households are replacing traditional crop varieties with high yielding 'modern' varieties and mono-cropping. This has resulted in a decrease in the proportion of rice production in Lao PDR made up of indigenous varieties, with possible losses in some indigenous varieties, as improved cultivars and introduced

⁵³ Its creation merges the environment functions of the former Science Technology and Environment Agency (STEA), the Water Resources Coordination Committee (WRCC) and the Lao National Mekong Committee Secretariat (LNMCS).

⁵⁵ in cooperation with mass-organizations and the Ministry of Information and Culture.

⁵⁶ As such Lao PDR participates in a number of ASEAN-wide initiatives on biodiversity conservation, including policy development and capacity building activities.

⁵⁷ Local NGO's are still scarce, but the new Association Decree now provides a legal basis for such, their number may increase and they may gain more importance in the future.

⁵⁸ Martinez-Vasquez, (2008). Reigning in Provincial Fiscal 'Owners': Decentralization in Lao PDR

varieties have become more common and have been promoted by agricultural extension agencies and donor projects. This has been particularly true for lowland farming areas along the Mekong River, and fewer lowland local rice varieties are used. In 1993, it was estimated that less than a tenth of rain-fed lowland area was growing improved varieties. By 2000 more than 70% of the area in some provinces along the Mekong River Valley was planted with improved varieties⁵⁹, and all of the dry season irrigated rice was composed of introduced or improved varieties. Large areas have been impacted - it is estimated that most of the local varieties of Savannakhet Province are now only available in ex-situ seed banks. Most cash crops such as maize or sugar cane are grown from materials originating from abroad⁶⁰. The share of indigenous vegetables being grown is diminishing and is increasingly restricted to home consumption and local market. Fruit trees from Thailand are being introduced to respond to consumer preferences⁶¹. Indigenous livestock are being crossbred with hybrid varieties from Thailand and Vietnam. There are programmes that are introducing livestock varieties, such as a Brahmin-Thai, and there is local demand for such hybrids⁶².

31. ***The intensification of agriculture is also linked to increased inputs and stabilization of swidden agriculture:*** The culturally and ethnically diverse Lao population has been actively engaged in crop domestication and hybridization efforts to suit local tastes, preferred grain quality attributes, harvest characteristics, and to deal with the varieties of climate and geo-physical conditions, for hundreds of years. Traditional knowledge of these agro-biodiversity systems remains scattered with farmers in different localities, and cultivation practices are strongly related to the cultures of different ethnic groups. With changes in culture and land use much of this knowledge is currently being lost. Use of new approaches, higher yielding crop varieties and establishment of plantations often require increased resource inputs such as agrochemicals and larger plots of land. Pesticide and chemical fertilizer use is now increasing as agricultural practices change. Agrochemical use is estimated to still be lower than most other countries in the region, but there are signs that they are having some impacts on aquatic environment. Bio-monitoring surveys of the lower Mekong and selected tributaries has highlighted a negative trend in ecological health of these aquatic systems due to human disturbance, degradation of habitats and reduced water quality⁶³. The government policies to stop swidden agriculture and to promote sedentary or shorter-rotation farming cycle in a limited allocated land area, is expected to reduce crop variety. Traditional farming practices in the uplands are based on swidden cultivation with a ten to 15 year rotation cycle between fallow and cultivation. In some instances, shortening of the swidden cycle is leading to increased pressure on the soil biodiversity, reduced crop yields and greater use by farmers of non-timber forest products.
32. ***Overharvesting of products from natural habitats that are within the wider agro-ecosystem landscapes:*** Local communities widely use biological resources in and around the agricultural landscapes for their own food, fuel and shelter and this is a fundamental part of the livelihood strategies of most rural people. Farmers benefit greatly from utilization of wild species both on their farms, mainly aquatic species, and in the surrounding landscape, and have up to now tended to harvest wild species without adequate management measures: “mining” them in effect. Over-exploitation is especially marked where there is a commercial market, but is apparent even when the harvest is just for subsistence. Population densities of small birds and mammals used for food, in areas surrounding farms are much lower than the carrying capacity of these areas. Additionally, for some species, exploitation is often done by outside contractors or entrepreneurs who may pay local farmers to collect. For example, orchids of several species were harvested so heavily in Phonexay District of Luang Prabang Province for export in 2008 (64 tonnes reported, and this is probably an under-estimate), that orchids have disappeared from many areas and regeneration is considered unlikely. Shortly after the salamander *Paramesotriton laoensis* was discovered in Laos it was

⁵⁹ ADB (2009b)

⁶⁰ The indigenous variety of sugar cane (with a dark cane) is mostly confined to home gardens for its medicinal properties.

⁶¹ Conversation with staff at Had Dokkeo Horticultural Research from NAFRI.

⁶² Millar & Phoakoun (2008) Livestock development and poverty alleviation: revolution or evolution in Lao PDR

⁶³ MRC (2010) Report on the 2008 biomonitoring survey of the lower Mekong and selected tributaries. MRC Technical Paper 27.

fetching good prices in the Japanese pet trade and continues to be collected in large and potentially unsustainable quantities. Commercial markets and increased access to markets have led to massive declines in much sought after wild species such as pangolins (*Manis pentadactyla*) and there has been an escalation in the number of non-timber forest products traded commercially.

33. **Conversion from natural ecosystems to less diverse agro-ecosystems:** Between 1990 and 2005 6.8 percent of the country's forests were converted to other land uses. The rest was reported to be cultivated swidden fields or “hai” (2.2%), permanently farmed land (5.0%), grassland (2.4%) and urban areas (0.6%). The percentage of agriculture of all land uses increased from 7.5% of land area in 1992 to 11% in 2002. So far there is still lack of clear statistical data concerning land conversion and no studies in Laos of the causes behind conversion of land from one use to another⁶⁴. It is clear though that there has been significant change at an ecosystems level, including specific conversion from natural to agro-ecosystems. This rapid conversion from natural to agricultural systems has significant implications for biodiversity loss and represents a direct loss of ecosystem diversity, which implies specific threat to biodiversity that relied on those ecosystem habitats. Conversion of natural habitats, including forest and long-abandoned fallow⁶⁵, to agriculture can lead to replacement of many species with few species (a mono-culture rubber plantation is an extreme example), disruption of energy, nutrient and water storage and cycling, fragmentation of habitats, and disruption of fire and flood regimes. Some such conversion takes place when farmers are denied access to traditional swidden land following the establishment of plantations. Land clearance, or conversion, is in general a greater threat to biodiversity than that of intensification, but some forms of intensification can be particularly damaging to biodiversity both on-site and off-site, and they can have severe negative feed-back on agriculture itself.
34. **Vulnerability to invasive alien species and climate change impacts:** With the increased disturbance to the ecosystems, from intensive and extensive agriculture combined with more roads and transport, there is an increased vulnerability of the systems to be impacted by invasive alien species. There are measures in policy to control deliberate import, but implementation is weak. Exotic rice varieties are being introduced, including one from Brazil. There are existing management problems concerning alien invasive species such as the Argentine Golden Apple Snail (*Pomacea canaliculata*), Water Hyacinth (*Eichhornia crassipes*) and other plants, including *Fusarium fujikoroii*, *Echinochloa colonum* (Graminae), *Echinochloa crus-galli* (Graminae), *Minisa invisia* (Leguminosae), and *Mimosa pigra* (Leguminosae). Poisoning of the Apple Snail pollutes water and creates health risks. Any increase in invasive alien species poses a direct threat to in-situ conservation and as such needs to be considered in any agro-biodiversity management. The economic impacts of introduced species can be significant and where possible prevention is far more effective than cure. It is expected that global climate change related to increased greenhouse gases in the atmosphere will also affect Lao PDR's agro-ecosystems.

1.7 Long-term solution and barriers to achieving the solution

35. The long term solution that the project will contribute to is “**conservation and sustainable use of biodiversity resources in agro-ecosystems in Lao PDR for the attainment of food security and sustainable economic development and adaptation to climate change impacts**”.
36. To achieve this long term solution, the multiple values of conserving Lao PDR's biodiversity endowment have to be mainstreamed into government policies and incentives and capacities in order

⁶⁴ Lund, C. (2010). Study on Urbanization and Land Conversion in Vientiane, Lao PDR. Land policy study 14 under LMRP. Roskilde University, March 2010.

⁶⁵ In Laos much of the secondary forest has been cultivated in the past and it still provides habitat for many native species and basic ecological processes are still intact. Such land is regarded as natural habitat when considering the impacts of conversion to intensive agriculture, including tree crop plantations.

to mainstream biodiversity, especially agro-biodiversity, successfully at the community, District, Provincial and National levels.

37. Loss of crop and domestic animal diversity, crop-associated biodiversity and other biodiversity within agro-ecosystems and degradation of ecosystems are being caused through a number of direct and indirect threats, which are discussed below. Land use practices are placing greater pressures on biodiversity and agro-biodiversity, and affecting the ecological functioning of these agro-ecosystems. The changes to agro-ecosystems may have significant impacts: reduced resilience, a loss of ecosystem services and reduced adaptive capacity for agriculture. This is of further concern in consideration of global climate changes. Key barriers to achieving the long term solutions include:
- Biodiversity considerations not properly integrated into national policy and institutional frameworks related to agriculture, land management
 - Weak capacities and incentives to mainstream biodiversity, especially agro-biodiversity, at the Provincial, District and community levels
38. These are discussed in detail below.
39. Biodiversity considerations not properly integrated into national policy and institutional frameworks related to agriculture, land management: These can be further classified into policy and legal weaknesses, low institutional capacities to promote conservation into agro-ecosystems,
40. *Policy and legal weaknesses*: As noted earlier in the document, government agricultural policies in Lao PDR are geared towards the reduction of poverty, and linked into the National Growth and Poverty Eradication Strategy (NGPES). To date, the concept of agro-biodiversity has not been integrated into policy documents. Even the National Biodiversity Strategy and Action Plan (NBSAP) does not detail any action plan for agro-biodiversity conservation. In December 2004, MAF endorsed the Lao PDR NABP, as a framework for the use, development and conservation of agro-biodiversity, and in 2006, Lao PDR acceded to the International Treaty on Plant Genetic Resources for Food and Agriculture. The 6th (2005-2010) and draft 7th (2011-2015) National Socio-economic Development Plans (NSEDPP) for the Lao PDR however are largely focused on increasing levels of agricultural productivity, rather than the conservation and sustainable use of agro-biodiversity. The Agriculture Law is also out of date and does not have a strong emphasis on biodiversity, including agro-biodiversity. Furthermore with rapidly increasing commercial land-use, biodiversity related criteria needs to be integrated into Environmental Social Impact Assessment (ESIA) guidelines – particularly in their relevance to foreign investment into commercial farms and plantations. This process had been initiated during the FAO/FNPP implementation of the NABP.
41. One key area of poor biodiversity conservation is in the Land Use Planning and Land Allocation Law (LUP/LA, 2003), which was instituted by the Lao government to encourage farmers to protect land and use it more effectively through delineating land-use areas and village boundaries. The law, however, has not been effectively implemented or enforced in a majority of villages. One aspect of the law, which stipulates that land left fallow for more than three years reverts to community ownership, has resulted in farmers planting rubber on the land, whether it is suitable or not, simply to retain the land-use rights. No substantive controls have been placed on the areas under rubber cultivation. In general the distribution of the benefits, which are created in these commercial arrangements is not clear, and this also applies to the long-term implications for poverty reduction, sustainability of farming practices, and incentives for planters, farmers and labourers alike to consider biodiversity in their decision-making. This is further compounded by the lack of resources to support agro-biodiversity management: understanding incentives and motivators for agro-biodiversity management, education, training, extension services based on such knowledge. There is a severe lack of capacity to support the development of agricultural systems that are agro-biodiversity “friendly”.

Although the small-scale and subsistence agriculture that characterizes much of Lao PDR depends to a large extent on agro-biodiversity and wild plants, the national extension service currently lacks the capacity to provide practical support to farmers to maintain or improve productivity in agro-biodiversity rich farming systems as an alternative to external-input dependant agriculture. National policies and training and development programmes instead focus on the “modernization” and “transformation” of the agricultural sector. The potential impact of this situation is all the greater when considered in the light of climate change and homogenization of crops. Both trends increase the vulnerability of farmers to crop failure, which affects not only food security at a local level, but also the economic productivity of the sector.

42. *Low institutional capacities to mainstream biodiversity into sectoral policies and plans and to coordinate actions related to planning, monitoring and implementing actions related to biodiversity conservation in agro-ecosystems:* The key institution with the mandate to promote effective agro ecosystem management is the Ministry of Agriculture and Forestry. This institution does not have the requisite skills to mainstream biodiversity conservation into its plans and policies as well as to influence other sectoral plans and policies that impact on biodiversity on agro-ecosystems. The National Capacity Self Assessment (NCSA) has identified a number of weaknesses in the implementation of CBD, which are also directly relevant to agro-biodiversity and mainstreaming biodiversity into the agriculture sector. These include, at the national level- lack of clear direction and effective plan to mobilise support and proceed with the implementation of the NBSAP; policies, strategies and action plans on research, study and public awareness on biodiversity conservation and sustainable use are not well defined and their implementation is not effective. At institutional level, key issues include limited staff numbers, especially those with technical knowledge, capacity and experience on mainstreaming biodiversity or managing agro-biodiversity, insufficient resources to a) train staff in PA management techniques and b) work with local communities to promote sustainable use of biodiversity; and ineffective mechanisms to coordinate training issues and needs between key sectors – and between centre and provincial levels. Responsibility for CBD implementation was recently passed from WREA to the Department of Forestry in MAF. The CBD requires Lao PDR to act to conserve its biodiversity. Preliminary discussions on UNDP Capacity Scorecard has also indicated that MAF has shown that mainstreaming biodiversity into its plans and actions have not been strongly championed within the organization, and that the institution does not have adequate skills for planning and management related to agro-biodiversity conservation. Furthermore, there are insufficient internal mechanisms for monitoring, evaluation, reporting and learning.
43. *Limited available tools support decision-making and to enhance incorporation of agro biodiversity into stakeholder actions:* Existing use of training, extension, communication and mapping are not geared towards promoting conservation of biodiversity in agroecosystems and they are not widely available for use by wider stakeholder groups such as senior policy makers, NGOs or local communities to raise awareness or capacities to enable them to mainstream biodiversity into their work. Information to assist in strategically planning land use for allocation of commercial land to areas of lower biodiversity, including agro-biodiversity, is not available. There is a current lack of environmental indicators, which in turn impacts available data for decision-making. In regards to the Millennium Development Goals for Lao PDR, the 2008 MDG progress report specifically refers to the lack of biodiversity indicators. Although specific strategies to increase forest cover exist and could be used as indicators for biodiversity, the definitions of forest cover include plantations and as such might distort the data. At provincial and district levels there is also a lack of indicators not just for biodiversity but also the implementation of many other policies. This is considered as a considerable threat: so long as there is a lack of clear indicators for biodiversity there is less responsibility and accountability in managing biodiversity and mitigating the loss of biodiversity.
44. *Weak capacities and incentives to mainstream biodiversity, especially agro-biodiversity, at the Provincial, District and community levels*

45. *Low capacities and incentives to mainstream biodiversity, especially agro-biodiversity, at the Provincial, District and community levels:* Translation of national policies and laws to local plans and actions has been weak in Lao PDR, primarily as capacities at local levels have been extremely weak. Provincial and district agriculture plans and programmes have no focus on agro-biodiversity or promoting biodiverse agro-ecosystems. There are limited direct incentives for provincial and district agriculture staff to promote any mainstreaming of biodiversity in their actions, no ongoing formal capacity building actions or mechanisms to monitor and reward good work. The focus on economic growth and agricultural productivity increases alone makes conservation friendly farming or maintenance of agro biodiversity in-situ less attractive to local agencies to promote.
46. *Weak community involvement in land use decision making:* One of the constraining influences on long term planning by local communities is some farmers' lack of confidence that the land they live on and the resources they are interested in will remain under their control for long enough for them to benefit from their management of resources, and from any management measures they invest in. This is particularly the case when people find themselves not fully informed or consulted about development proposals. Decisions on land-use, both conversion and intensification, affect biodiversity but the costs of the loss of biodiversity are not always borne by those deciding whether or not to conserve as well as to use it sustainably. Hence, local officials and individual farmers often have insufficient incentives to take these costs into account when making their land-use decisions. The result is that both farmers themselves and government programmes systematically undervalue the benefits of biodiversity conservation and sustainable use, and the costs of the unsustainable extraction and loss of biodiversity. The issue of limited community participation is hampered by multiple languages and traditional practices, in policy development and existing gender inequality. In particular women in Lao, including ethnic minorities, are typically assigned key tasks related to food production, but they are less engaged in decisions, especially policies, that impact food production. The lack of community natural resource management and insecurity over land tenure directly contributes to increased exploitation and reduced management.
47. *Limited direct incentives to maintain agro-biodiversity:* Maintenance of diversity of habitats, species and varieties in the agricultural landscape protects against disease, pests, climatic variations, and facilitates pollination and maintenance of soil fertility, and also safeguards vital resources for local livelihoods. However, even though a portion of these benefits will accrue back to an individual farmer, the incentive to change practices is often insufficient unless there is a framework of cooperation to support it. Benefits that accrue to downstream communities as a result of land-use changes undertaken at some cost by individual farmers, are even harder for them to "internalize" into their decision-making. Agro-biodiversity is an impure public good that has both public (e.g. genetic base) and private (e.g. farmer utility) characteristics. It therefore follows that strong policy with financial and operational support is required to ensure its conservation. This includes the need for an explicit recognition of the important role of both farmer and wild varieties in national food security and economic growth, accompanied by the development of farmer extension services that are capable of providing practical support to farmers to maintain or improve the productivity of agro-biodiversity as a complement to modern external input-dependent agriculture. While agricultural intensification is being promoted there is a lack of incentives for the maintenance of agro-biodiversity.
48. *Market failure in valuing agro-biodiversity:* Agro-biodiversity resources in Lao PDR are particularly important in food security and household nutrition and furthermore provide many options for the agricultural sector. These important values are not easily monetized and are typically not included in conventional economic cost-benefit analysis they are often termed as externalities. There is a general market failure. The market does not capture financial returns associated with the benefits of maintaining the agro-biodiversity of Lao PDR, be these benefits accrued at an international or local level. However, there are severe capacity constraints to overcome market failures for promotion of

agro-biodiversity conservation through market mechanisms. Already many local varieties have disappeared from in situ cultivation, and farmers will find it hard to refuse the improved (high yield) varieties that are likely to be developed in the near future for use in the uplands. This is occurring despite the knowledge that biodiversity-rich farming systems can be high-yielding and sustainable and that the adoption of farming practices that utilize and conserve biodiversity contribute positively to both environmental quality and household nutrition.

49. *Poor involvement of private sector in promoting conservation friendly farming:* Government and donor-funded development projects in Lao PDR have started to increase consideration on biodiversity conservation in their policy and projects, though it is far from adequate currently. In addition, a growing number of companies are taking measures for biodiversity conservation and using it for marketing purposes, taking advantage of consumers growing interest in “natural products”. Organic Agriculture, Fair Trade, Ecotourism, Domestication of NTFPs and Home gardens have been discussed as market opportunities to mainstreaming biodiversity in farm landscapes as well as providing improved income for the farmers. They have demonstrated their ability/capability to not only produce commodities but also to “produce” biodiversity at all levels. However, activities are still small-scale and not particularly well understood, coordinated or known. They are not yet integrated into a huge portion of all agricultural practices in Lao PDR. These market-based opportunities should be considered as a starting point: providing an introduction to the topic, to generate discussions, and to inspire to further research about biodiversity in the farmlands of Lao PDR.
50. There is currently a strong market demand for rubber and the Government of Lao PDR has been promoting rubber and other cash crops as alternatives to shifting cultivation. In addition private investors from Vietnam, China, and Thailand have been provided large-scale concessions in all areas of the country (in some southern provinces more than 25,000ha) with long-term leases. For the most part, areas designated for rubber planting are degraded forest area and fallow land, however, in the North, the greatest amount of biodiversity is found in these same upland fallows, and, in most instances, such areas play a vital role in villagers’ food security. The rising number and diversity of contract and concession farming schemes in recent years requires new ‘modes of operation’ and engagement with a multitude of private and public sector stakeholders⁶⁶. Infrastructure (e.g. roads, irrigation, housing, shops) built to support large scale agricultural production efforts also affect biodiversity directly and indirectly. Simply opening up an area with a road can have far reaching impacts on the surrounding land and its biodiversity. As evidenced through study of aerial photographs over time, it is very significant how the establishment of roads is a precursor to land conversion⁶⁷. These commercial and infrastructure activities could be made to be more biodiversity friendly through better biodiversity understanding, mapping, land use planning, incentives and legislation⁶⁸.

1.8 Stakeholder Analysis

51. At the national level, *main responsibility* for the management and conservation of biodiversity in agricultural landscapes are with MAF, especially after the responsibility to implement CBD related commitments has been recently transferred to the Department of Planning at MAF. Beside this a range of other technical line ministries, institutions and organisations, are concerned with mainstreaming of the conservation and sustainable use of biodiversity into agricultural landscapes. The following Table 2 identifies some of the key stakeholders:

⁶⁶ FAO-IPM (2010) Lao National IPM Programme

⁶⁷ Lund, C. (2010). Study on Urbanization and Land Conversion in Vientiane, Lao PDR. Land policy study 14 under LMRP. Roskilde University, March 2010.

⁶⁸ Gambling on Laos –draft (2010). BBC Earth Report documentary.

Table 2: Key project stakeholders

Stakeholders	Role in biodiversity/ agro biodiversity conservation	Involvement in project
Ministry of Agriculture and Forestry (MAF)	MAF is responsible for all aspects related to agriculture and forestry. Almost all of its departments ⁶⁹ are relevant to the conservation and sustainable use of biodiversity in agricultural landscapes. MAF is also responsible to fulfill commitments under the CBD.	MAF is directly responsible for project implementation. They are the executive of the project board and will assign staff to be the National Project Director to guide and support project implementation.
MAF–Department of Planning (DoP)	Has the overall responsibility for the elaboration of ANR sector plans (e.g. in the context of NSEDP's) and policies, based on the contributions from the different technical departments ⁷⁰ .	Take the overall lead role in guiding, coordinating and implementing the project, especially policy level work under Component 1.
MAF–Department of Forestry Inspection (DoFI)	Has overall responsibility for forestry and includes management of the Nature Conservation areas. Forestry is directly responsible to fulfill commitments under the CBD.	Contribute to Component 1 policy development and provide guidance for Component 2. implementation. Management and monitoring of biodiversity and support agro-ecosystem planning in and adjacent to protected areas. Assistance in developing in-situ conservation of agro-biodiversity.
MAF–National Agriculture and Forestry Research Institute (NAFRI)	NAFRI has four main functions including: carrying out adaptive research, developing methods, tools and information packages, providing policy feedback, and coordinating and managing research. They have mainly been responsible to implement the National Agricultural Biodiversity Programme developed in cooperation with FAO.	Contribute to Component 1 policy development and provide guidance for Component 2. Will take a lead role in Agro-biodiversity related research for policy development and to guide management considerations such as in-situ and on-farm conservation.
MAF–National Agriculture and Forestry Extension Service (NAFES)	Government Extension services organize training and provides advice on a wide range of subjects: crops, livestock, soils, forestry and irrigation. The staff at District level are generalists who support the Village Extension System (VES) and are supported by specialists at the Provincial level.	Contribute to Component 1 policy development and provide guidance for Component 2. Direct involvement through the development of agro-biodiversity extension materials, services and packages and use of these materials by PAFO and DAFO in the pilot sites. Linkages with Lao Extension in Agriculture Project.
MAF–Department of Agriculture (DoA)	Control, inspect and develop national plant protection activities including their harmonization with those of neighbouring countries. Create and develop relevant	Contribute to Component 1 policy development and provide guidance for Component 2. Direct involvement through the

⁶⁹ 7 departments: Department of Planning, Department of Inspection, Department of Agriculture, Department of Livestock and Fisheries, Department of Forestry, Department of Irrigation, Department of Forestry Inspection), NAFES and NAFRI.

⁷⁰ Beside this they are responsible to develop/ suggest sector specific legislation, to implement/ monitor sectoral plans and relevant initiatives.

	information systems on agriculture and propagate and deliver these systematically at the village and village cluster level, provide capacity building and training for technical officials in the agriculture sector and cooperate with national and international agencies to develop best practices in agriculture.	development of biodiversity friendly agriculture, the development of value chains for agricultural products.
MAF-Department of Livestock and Fisheries (DLF)	DLF's mandate is "Developing and implementing policies, strategies, work plans concerning livestock and fisheries management and related to veterinary medicine, producing information material, provide monitorin and evaluation, evaluate and implement regulations, decrees, instructions and technical advice concerning livestock and fisheries as well as veterinary medicine."	Contribute to Component 1 policy development and provide guidance for Component 2. Direct involvement in assessment and management of animal genetic resources.
MAF-Provincial Agriculture & Forestry Office and the District Agriculture & Forestry Office (PAFO and DAFO)	Implementation of MAF activities at Provincial and District levels. This includes staff assigned to agriculture, forestry, extension and protected areas.	Direct involvement through training and engagement of staff to conduct agro-biodiversity related activities in the field, including monitoring, extension and planning.
Pilot Communities	Strong interrelation between biodiversity and quality of life, many in subsistence situations relying on collection of natural resources and may be engaged in enhancing or losing agro-biodiversity based on decisions.	Direct involvement through training and engagement of community members to conduct agro-biodiversity related activities in the field, including monitoring, extension, planning and demonstration.
The National Land Management Authority (NLMA/ PMO)	Main functions include the coordination of land management across sectors, land management and administration tasks for land – including registration, valuation, survey, allocation, zoning, land use planning, lease and concession, issuing of Land Survey Certificate and Land Title; collecting statistical data on land and inspecting land use.	Involvement in mainstreaming biodiversity into planning and assistance with participatory land use planning process and implementation.
Ministry of Planning and Investment (MPI)	Responsible for the elaboration of 5-year NSEDP's at all administrative levels. MPI is assigned to coordinate with ministries, other sectors and local authorities in monitoring socio-economic development and preparing periodic reports including the NSEDP and the Public Investment Programs.	Making linkages between agro-biodiversity and the NSEDP. Seeking opportunities to incorporate agro-biodiversity into public investment programs.
The Water Resources and Environment	Overall responsibility of implementing	Making linkages between agro-

Authority (WREA)	government policy related to water resources and environment ⁷¹ . Its two main departments are the Department of Environment (DoE) ⁷² , and the Department of Water Resources (DoWR), which includes the Lao National Mekong Committee (LNMC).	biodiversity and policies related to water resources (watershed and water quality) and environment (ESIA and climate change adaptation). Assist in the development of indicators for agro-biodiversity.
The Ministry of Education (MoE)	Direct influence to students based on the information they share about biodiversity and agro-biodiversity conservation.	Potential linkages to extension and public information campaigns
Universities and training institutions	Direct influence to students based on the information they share about biodiversity and agro-biodiversity conservation.	Potential linkages through the extension and public information campaigns. Potential direct linkage with agro-biodiversity curricula for the Luang Prabang Agriculture and Forestry College.
ODA and NGO's	Direct influence to through the activities they choose and the level to which biodiversity and agro-biodiversity conservation considerations are incorporated.	Many potential linkages throughout the proposed project activities, specifically through coordination and mainstreaming of agro-biodiversity
Mass Media	Direct influence to general public and decision-makers based on the news they share about biodiversity and agro-biodiversity conservation.	Linkages to public information campaign. Press releases and potentially journalist training.
Private sector	Direct involvement in commodification of biodiversity and agro-biodiversity and could mitigate or exaggerate biodiversity loss based on their decisions and planning.	Potential to integrate agro-biodiversity into private sector plans. Potential market links with private sector through value chains for community agro-biodiversity products.

1.9 Baseline Analysis

52. The currently limited work on agro-biodiversity conservation and sustainable use focuses on species of primarily national as opposed to global values. Work on agro-biodiversity conservation focuses on locations that are more accessible and not necessarily on locations of global importance. Furthermore, there is no adequate focus on conservation of other globally important wild species that occur in agro-ecosystems. The importance of agricultural landscapes to provide both biodiversity refuges from wider development pressures, and corridors between areas of high global biodiversity significance should not be underestimated.
53. Under the baseline, the Government's work on refining policies, laws and other legal instruments will not provide adequate importance to mainstreaming biodiversity, and specifically agro-biodiversity, into its agriculture, land use or into ESIA guidelines. Without this project's support, there may well be very little urgency to update these to respond to existing urgent challenges and to anticipate future challenges to agro-biodiversity.

⁷¹ Its creation merges the environment functions of the former Science Technology and Environment Agency (STEA), the Water Resources Coordination Committee (WRCC) and the Lao National Mekong Committee Secretariat (LNMCS).

⁷² The department also acts as the secretariat to the coordinating National Environment Committee (NEC) and climate change.

54. Any refinement or updating of such policies, laws and legal instruments will not be built on global best practices and there may be low stakeholder consultation and “pre-testing” of such policies on the ground to make them really workable and effective. Moreover, the challenges of translating national policies, plans and laws to effective implementation at provincial to local levels will remain. This may mean that whilst national policies and plans mainstream biodiversity (including agro-biodiversity), the provincial plans and programmes may not provide equal emphasis – thereby leading to low impacts on the ground.
55. With national interest on conservation and sustainable use of agro-biodiversity in Lao PDR, there is support from many agencies for agro-biodiversity work. Although envisaged in the National Agricultural Biodiversity Programme, activities remain poorly coordinated and with no significant policy or capacity building impacts. The cross-sectoral “buy in” on the importance of biodiversity will remain weak and there will be very weak linkages to current ongoing initiatives around the country to inform related policy and legal reforms. The government’s field promotion of participatory village land use planning will continue without strong incorporation of biodiversity conservation agenda. Under the baseline situation, poor coordination between different government agencies whose actions impact on biodiversity in agro-ecosystems will continue, thereby hampering conservation outcomes. In addition, any good work being done by government agencies, local communities and others may be undermined unwittingly by another agency that maybe promoting programmes that negatively affect local biodiversity.
56. The government agency responsible for agriculture and forestry (MAF) will continue to have low capacities to promote biodiversity (and specifically agro-biodiversity) through their own programmes and to effectively engage as an agency to further mainstream these agenda in other government agencies’ plans and programmes as well as in local government actions. They will not have the tools and information available to them to identify priority areas, agro-biodiversity species and to identify and promote innovative actions on the ground to wider geographical areas. Furthermore, this will not lead to effective prioritization and targeting of thematic and geographic locations for external support that maybe forthcoming for biodiversity (and agro-biodiversity) conservation.
57. Market forces and unsustainable agricultural “development” threatens such biodiversity occurring in agro-ecosystems and globally significant genetic resources of crops and their wild relatives risk being lost. Local community involvement in promoting agro-biodiversity and general biodiversity conservation will remain low. Opportunities for local communities to safeguard their agro-biodiversity in face of increased globalization and economic pressures will remain and they may not be able to realize effective benefits of their interests for maintaining a diverse agro-ecosystem. This in turn, may make them more vulnerable to any seasonal or long-term climate change impacts that affect their crop production.
58. In the absence of positive market forces the Government will need to consider guidelines to assist the private sector in mitigating their impacts, but at present this role is not functioning. The private sector’s involvement in ensuring better environmental outcomes of their actions will remain weak and they will not be encouraged to have environmentally and socially responsible and sustainable actions.

2. PROJECT STRATEGY

2.1 Project Rationale

59. 58. Agriculture, including crops, plantations and livestock, plays a significant role in the Gross Domestic Product for Lao PDR, and even more significant role in providing food and livelihoods for a majority of the population. In spite of the significance of this sector policy and management

mechanisms have been somewhat ad-hoc and there has been a lack of attention placed on the management of agro-ecosystems and agro-biodiversity.

60. GEF under this project will add global biodiversity benefits to ongoing national efforts, which is providing mainly focused on poverty alleviation and conservation of agro-biodiversity for food security and sustainable economic development. It will address impacts of agriculture on biodiversity both on-site and off-site, with an emphasis on species of global significance, and will consider biodiversity at the wider landscape scale within agro-ecosystems.
61. The aforementioned barriers to achieving the solution can be broadly grouped under capacity and incentives. The rationale of this project is to respond to these barriers. Supporting capacity to not only mainstream agro-biodiversity into policy but the coordination, skills, understanding and tools to support good policies and strong implementation from the national levels, through the provinces and districts to the community. This will further be supported through incentives for agro-biodiversity from increased understanding, agro-biodiversity extension, participation of communities in land use planning, marketing agro-biodiversity products and working with the public and private sector.
62. GEF investment in this project will lead to strengthened policy, a coordinated and strategic investment in biodiversity conservation in agro-ecosystems with long-term national capacity building in Lao PDR. Mainstreaming increases wider awareness and support to ensure agro-biodiversity is considered across different sectors and builds capacity for management and sustainable use. Alternatives of creating protected agricultural landscapes, or developing regulations and incentives for agro-biodiversity would be ineffective without underpinning by a wide appreciation of these values. The project is well timed to strengthen and support improvements in relation for capacity and incentives for agro-biodiversity.

2.2 Policy conformity

63. The project strategy is consistent with Lao PDR's five-year National Socio-Economic Development Plan (NSED) for 2006-2010, which integrates the National Growth and Poverty Eradication Strategy (NGPES) and the National Biodiversity Strategy and Action Plan (NBSAP), the Strategic Vision for Agriculture Sector (2000-2020). Lao PDR acceded to the Convention on Biological Diversity in 1995, and the NBSAP was approved in 2004 with the objective to "maintain the diverse biodiversity as one key to poverty alleviation and protect the current asset base of the poor". One of its strategic principles is that "cultivated areas should remain diverse and productivity should be increased, through protection, conservation and the sustainable use of land resources".
64. In 2004, with the assistance of FAO and UNDP, the National Agricultural Biodiversity Programme in Lao PDR (NABP) was prepared to provide a long-term strategy for implementing a coordinated approach to better using, developing and conserving agricultural biodiversity in the country. The NABP aims to support two main development priorities for Lao PDR: i) achieve food security for improving the livelihoods of the rural communities; and ii) enhance the Government's capacity to ensure the sustainable use of natural resources. Under the most recent policies of the Ministry of Agriculture and Forestry, four targets are identified – i) Ensuring food security, ii) Commercialization of agriculture production, iii) Shifting cultivation stabilization for poverty reduction, iv) Sustainable forest management. Because of the importance of biodiversity in agricultural landscapes for food and nutrition of rural people, the conservation and sustainable use of agricultural biodiversity would be considered under the first and fourth of these targets. 13 measures to achieve these targets have been identified including improving planning and land use surveying methods, establishing technical support at the village cluster level, and capacity building.

65. As outlined at the cover page of this project document, this project is also consistent with UNDP's global and national strategic plans. The relevant Lao PDR's UNDAF Outcome is UNDAF Outcome 1: By 2011, the livelihoods of poor, vulnerable and food insecure populations are enhanced through sustainable development (within the MDG framework).
66. Lao PDR ratified the Convention on Biological Diversity on 9/20/96, and submitted its first Biodiversity Country Report (BCR) in 2004 and thus is eligible for GEF funding for biodiversity conservation. The focus of the project is in conformity with the GEF Biodiversity Focal Area Strategic Objective 2 "To mainstream biodiversity in production landscapes/seascapes and sectors" and Strategic Program 4 "Strengthening the policy and regulatory framework for mainstreaming biodiversity". The expected Outcome is "Policy and regulatory frameworks governing sectors outside the environment sector incorporate measures to conserve biodiversity", and the Indicator is "The degree to which policies and regulations governing sectoral activities include measures to conserve and sustainably use biodiversity as measured through GEF tracking tool." As per SP 4, the project will "remove critical knowledge barriers, develop institutional capacities, and establish the policies, and the legislative and regulatory frameworks required to integrate biodiversity conservation and sustainable use objectives into the actions of the production sectors" – focusing on agricultural and land use planning sectors.
67. Holistically this project will also contribute toward the Climate Change and Land Degradation Focal areas. The project is also consistent with the Climate Change Focal Area Strategy, in particular Strategic Priority: Piloting an Operational Approach to Adaptation. Specifically, "to support pilot and demonstration projects that both address local adaptation needs and generate global environmental benefits in the focal areas in which the GEF works: biodiversity, climate change, international waters, land degradation, and persistent organic pollutants (POPS)." Agro-biodiversity should also be a key consideration in the National Action Plan for Climate Change Adaptation (NAPA), as the maintenance of agro-biodiversity assists adaptive capacity for agriculture. The recent strategic report on Climate Change⁷³ also links to agro-biodiversity, promoting the need for policies and practices to mainstream climate change into the agriculture sector, enhancing conservation agriculture and in-situ and ex-situ gene pool conservation.
68. Under the Land Degradation Focal Area, it will contribute: "To develop an enabling environment that will place Sustainable Land Management in the mainstream of development policy and practices at the regional, national and local levels" and also to "To upscale Sustainable Land Management investments that generate mutual benefits for the global environment and local livelihoods".

2.3 Country Ownership & Drivers

69. The project concept was identified as a priority for Lao PDR with the GEF and the government submitted an endorsement letter through its Operational Focal Point national to the GEF in support of this project as per GEF policy. As noted in the section above, the project is highly relevant to national priorities and was developed through extensive stakeholders' consultations including two national stakeholders' workshops and several informal meetings.
70. Furthermore, the project document was reviewed by a formal Local Project Appraisal Committee (LPAC) consisting of government representatives, implementing agencies and other stakeholders to ensure country ownership and strong coordination amongst existing initiatives. The minutes of the meeting are attached as Annex 1. The Government of Lao PDR has also provided co-financing for this project as an indication of their support to the project and national ownership.

⁷³ Strategy on Climate Change of the Lao PDR (2010)

71. To further ensure strong national ownership, this project will be nationally implemented under UNDP's National Implementation Modality (NIM). While there will be international support, the project will be locally driven by a national team. The focal team for this national implementation is to be done through the Ministry of Agriculture and Forestry and specifically the newly established Department of Planning. The national implementation of the project promotes more responsiveness and integration of project activities with Lao PDR directions.
72. There have been clear requests from government for support in coordination of donor assistance in the conservation and sustainable use of biodiversity. Donor coordination in the ANR sector is done through the overarching Agriculture and Natural Resource Sector Working Group including a number of sub-sector working groups. Donor coordination in the Biodiversity sector will most probably be addressed through the creation of a new sub-sector working group or by enlarging the mandate of the existing Forestry sub-sector working group. The NBSAP will be the key GoL's strategy for the coordination of development partner support in terms of agro-biodiversity conservation and sustainable use. The effort at alignment and harmonization will include the forestry, agriculture, environment and land sectors.

2.4 Design principles and strategic considerations

73. In addition to conformity with national priorities, GEF strategy, UN's work globally and in Lao PDR and national ownership, a number of other strategic considerations have played a role in this project's formulation. These include gender equity, coordination with relevant initiatives, UNDP's and FAO's comparative advantages, and balance between national policy and local actions which are discussed below. The additional considerations for cost effectiveness, sustainability and replicability are discussed later in the document.

Gender considerations

74. Swiss Agency for Development and Cooperation (SDC) research in 2007 focused on Agro-biodiversity and Local Knowledge Issues for Luang Prabang and Xieng Khouang Provinces, has noted that "women are playing more significant roles on house work such as cooking, weaving, cleaning and babysitting while men are mainly perceived to be responsible for demanding physical labour such as construction of the home, building weaving equipment, rearing livestock and hunting for exotic foods." Women are typically given key responsibility for food security in the family and as such are intrinsically linked to resource choices for family consumption. However, there is a noted bias toward men in decision-making positions in Lao PDR, so specific measures are required to encourage and support the engagement of women in decision-making related to land use planning as well as in equitable benefit sharing from land use decisions. Additionally, women farmer's voice must also be promoted in affecting policy changes envisaged under this project. As this project will seek to show a link between agro-biodiversity and food security women will be key stakeholders. Significantly, there is no simple tool to integrate gender considerations across the country. The most important consideration is that each community should be seen as being unique and that the project will need to orient activities in a way that promotes gender equity while acknowledging and respecting the cultural-ethnic roles of gender.

Strong coordination and partnerships with relevant initiatives

75. One of the main strategies of the project is to take advantage of the considerable body of work completed and in progress in agricultural development on many sites throughout Lao PDR, and to feed these results back to policy making and agricultural development with biodiversity concerns robustly and effectively taken into account. The GEF project will also form partnerships with a number of other agencies, projects and programmes active in the fields of agricultural development and the conservation and sustainable use of biodiversity.

76. Strong partnerships with TABI, district and provincial government agencies, the private sector and local communities will lead to significant contributions to agro-biodiversity conservation and sustainable use; this would be a more cost-effective and sustainable approach than a solely government, bilateral, or GEF-funded programme. With effective national and ground level actions to conserve agro-biodiversity and other globally important biodiversity, occurring in agro-ecosystems, expensive remedial future actions to conserve biodiversity will be avoided.
77. Potential partners identified so far include the Poverty and Environment Initiative (UNDP), Support for an Effective Lao PDR National Assembly (SELNA), Sustainable Forestry and Rural Development Project (SUFORD), Pha Tad Ke Botanic Garden⁷⁴, Sustainable Natural Resources Management and Productivity Enhancement Project, IUCN, WCS, WWF, and the Lao Biodiversity Association. There will be partnerships with GEF too, through the Climate Change in Agriculture in Lao PDR project, the GEF Small Grants Programme, and the WB/GEF/GoL project⁷⁵ Lao PDR: Protected Area Management Models for Lao PDR: Learning and Disseminating Lessons from Nam Et-Phou Louey. Additionally, the project will also benefit from coordination and learning from other projects such as the on-going experience in the Bolovene Plateau (South of Laos) where locally and organically-grown mountain coffee is promoted by Geographical Indications (a label promoting the origin of the production) and Fair Trade with French cooperation support and even with follow up activities involving skills training, of the trans-national project BMZ NAREN (Sustainable management of resources in agriculture: Agro-biodiversity).
78. The project will ensure strong coordination and collaboration with important actors in the biodiversity conservation and agriculture sectors in Lao PDR e.g. collaborating especially with the SDC funded agro-biodiversity projects and with other organisations e.g. ADB, World Bank, IUCN, MRC, SNV, Helvetas, DED, IRRI, WWF and AVRDC. NAFRI has been working with IRRI to ensure that indigenous rice biodiversity and associated farmer knowledge are conserved, documented and better used. Extensive collections of rice samples have been stored in the country, with duplicates kept in the IRRI gene bank in Manila. Other organisations such as SNV, IUCN and WWF have NTFP-oriented programmes, which involve sustainable use and domestication. The project will also ensure strong coordination and cooperation with the World Bank-GEF project Protected Area Management Models for Lao PDR: Learning and Disseminating Lessons from Nam Et-Phou Louey. The project's implementation structure has been set up to promote such partnerships and coordinated actions.

Building on UNDP's comparative advantages as lead UN agency for this project

79. UNDP's strengths come from its mandate to manage environment for sustainable development and achievement of the Millennium Development Goals, and from its strong country presence in the Lao PDR. It emphasizes mainstreaming of environment concerns into national development strategies and plans. Its biodiversity and ecosystem services have a wide portfolio for mainstreaming biodiversity into national and global policies, and for developing the capacity of local governments, communities and indigenous groups to conserve and use biodiversity sustainably. UNDP Lao was responsible for developing the NBSAP, for the Mekong Wetlands Biodiversity Programme and for strengthening government capacity for MEAs, including the CBD. It has an ongoing environment portfolio managed by a dedicated unit in partnership with UNEP, and it is working with the Government on the Poverty-Environment Initiative (UNDP-UNEP), NSEDP and the donor round-table process, giving it a unique position to mainstream key issues in national policies, strategies and plans. UNDP's current work to strengthen local governance and service delivery offer other opportunities to

⁷⁴ <http://www.pha-tad-ke.com/english/downloads/Pha-tad-ke-pressfile.pdf>

⁷⁵ Medium Sized Project PIF approved MSP under preparation

promote key issues at provincial and district levels. UNDP will be the lead agency as GEF Implementing Agency for this project.

2.5 Project objective, outcomes, outputs/activities

80. The objective of this project is: to provide farmers with the necessary incentives, capabilities and supporting institutional framework to conserve agricultural biodiversity within farming systems of Lao PDR. To achieve this, the multiple values of conserving Lao PDR's biodiversity endowment have to be mainstreamed into government policies, and productivity and food security at the household level must be improved whilst simultaneously securing the conservation of important agro-biodiversity. There are inadequate capacities and incentives to mainstream biodiversity, especially agro-biodiversity, at the Provincial, District and community level. The project is split into two overarching components, the first having a more national policy focus and the second having a more provincial, district and village level action focus. Within these components the following section identifies the project outputs and indicative activities to fulfil these outputs. The project will work very closely with TABI using the Phonexay, Phoukout (and subsequently additional) field sites to test the implications of the pilot demonstrations for policy and vice-versa. GEF will also fund long term mentoring of the District Agriculture and Forestry staff in Phonexay and Phoukout with project staff in daily contact with villagers. TABI has a permanent presence at Provincial level (PAFO): the GEF project will complement the TABI structure by supporting DAFOs through District Project Assistants.
81. Component 1 in collaboration with Outcomes 1 and 5 of TABI will have a nationwide focus, with its aim of creating a nationwide enabling environment for mainstreaming; however staff working on this component will also carry out activities specific to the two pilot provinces, particularly in relation to the coordination of activities and the development of tools to support agro-biodiversity through extension, training and awareness. Significantly the project staff will be based in MAF offices and where possible specifically with the TABI team so as to facilitate coordination.
82. At the field level the proposed GEF project will evaluate the likely impacts of market and policy incentives through close work on the various sustainable farming approaches to be piloted. By working closely with TABI, and sharing information, collaboration arrangements and project sites, both TABI and the UNDP-GEF project will maximize impacts and avoid redundant duplication. This UNDP-GEF project will bring complimentary biodiversity expertise to the partnership, strengthening attention to on-site and off-site impacts of development options and to globally significant aspects of biodiversity, with TABI sharing information, and providing their expertise, as well as already established avenues to policy making through its extensive network of sector focal points. This is a particularly cost-effective approach.
83. The project's Outcomes and Outputs are described below.

Outcome/Component 1. National policy and institutional frameworks for sustainable use and *in-situ* conservation of biodiversity in agro-ecosystems.

84. This component will involve the mainstreaming of agro-biodiversity considerations into national legislation, including the development and promotion of policies, incentives and capacities that encourage and support the active *in situ* conservation of agro-biodiversity in agricultural landscapes. In support of this outcome four outputs will be pursued focused on key thematic areas: 1) Integrating agro-biodiversity into policies, 2) Promoting the coordination of the plans, policies and people's actions that affect the sustainable use and conservation of agro-biodiversity, 3) Enhancing institutional capacity for agro-biodiversity, and 4) Increased understanding among key stakeholders of agro-biodiversity and its significance.

Output 1.1: Biodiversity conservation, including agro-biodiversity, incorporated into Government policies, laws and other legal instruments.

85. By the end of the project in-situ biodiversity conservation and sustainable use, including agro-biodiversity, will be incorporated into key government policies. There are proposed to be specific inputs on policy through dialogues and resource materials obtained through research activities through this project and its partners, and the coordination process will be supported by and linked to the institutional coordination mechanisms (Output 1.2). Policy relevant research will be undertaken by national and international experts, and there may be opportunities for decision-makers to visit relevant demonstration sites in Lao PDR and field test policy ideas through relevant existing government and/or partner programs. National workshops will be conducted to share recommendations and gather feedback on policies both at national and sub-national levels. The sub-national feedback on proposed changes in policies will be coordinated through other relevant initiatives. An assessment of key policies, laws and legal instruments that need to be updated during the project preparation phase has identified the needs as:

- 8th NSEDP (2016-2020) and MAF master plan and budget allocations
- National biodiversity strategy and action plan itself needs stronger focus on agro-biodiversity and conservation of biodiversity in agro-ecosystems
- Land use policies also require strong incorporation of biodiversity concerns into them
- The agriculture law needs revisions
- Social and Environmental Impacts Assessment tools need strong incorporation of biodiversity (including agro-biodiversity).

86. The project will also build on the work being undertaken through the UNEP-UNDP partnership entitled “Poverty and Environment Initiative”, where both organizations are working with the Ministry of Planning and Investment (MPI) to ensure that there are policies, incentives and procedures in place to ensure environmentally sustainable and pro-poor investment in the country by foreign investors.

Output 1.2: Institutional coordination of agro-biodiversity enhanced at national level.

87. Institutional coordination will be enhanced through project activities. A specific agro-biodiversity technical working group will be established and support will be provided to its functioning. Terms of reference will be developed for the working group including: specific involvement, key responsibilities, sharing lessons, identify linkages with policy development and suggest collective actions. Resources will be made available for the technical working group to follow up on priority areas, funding research or actions on gap areas. Resources will also be available in support of cross-cutting themes such as gender and climate change. Interrelated institutional capacity issues such as climate change adaptation related to agro-biodiversity will be identified and efforts made to coordinate. Relationships will be developed and lessons shared through provincial field visits to sites demonstrating positive agro-biodiversity initiatives.

Output 1.3: Institutional capacity of MAF to plan for, implement and effectively communicate on agro-biodiversity enhanced at national level.

88. The project will result in improvements in the institutional capacities of MAF to plan for, implement and effectively communicate on in-situ conservation of biodiversity in agro ecosystems, and especially *in situ* conservation of agro-biodiversity. The capacity activities will focus on coordinating Department of Planning, Department of Forestry Investigation, NAFRI and NAFES in efforts toward agro-biodiversity management. Activities for mainstreaming agro-biodiversity into farming systems

and land use planning will be designed and integrated into the national agricultural extension system⁷⁶. Information systems to monitor activities related to agro-biodiversity around the country will be developed and integrated into MAF reporting. Linkages with national systems such as the proposed Agricultural census will be investigated and engaged with to integrate agro-biodiversity considerations. A public information and involvement campaign will be designed with MAF to be conducted on agro-biodiversity understanding for a wider audience. Significantly national and provincial workshops will be held to identify, discuss and develop strategies for scaling-up project lessons on agro-biodiversity nationally and promoting linkages with cross-cutting issues such as gender and climate change.

89. Agricultural extension is a key strategy to achieve Agriculture and Natural Resource development objectives. The aim of this strategy is to have better qualified extension workers who are better enabled to provide adequate services to farmers⁷⁷. The reform aims to produce graduates that have better social, marketing, economic and micro-enterprise development skills. Main providers of qualified staff for extension are five agricultural colleges under MAF⁷⁸ and the overall objective is to 'develop skilled human resources for market-based development in the agricultural sector' through improving the quality of teaching and learning in the technical education at these colleges. Key components include: linking training to the extension system and the labor market; linking training to agro-enterprise development; skills-based curriculum building; training of teachers; improve educational management; upgrade infrastructure. The project will strengthen this as a part of its project actions. A key action of capacity building of MAF will relate to improving its understanding and analysis on the role of incentives – economic and others – to mainstreaming biodiversity into the actions of provincial governments, local communities and the private sector.

Output 1.4: Key stakeholders understanding and capacity to respond to agro-biodiversity enhanced.

90. Empowering the public with information is an essential aspect of mainstreaming. Facilitation of dialogue, and finding novel and effective ways for the target groups themselves to pass on the message within their own ranks is more important than one way information dissemination. This output will build upon and complement TABI's component 5 focusing on information and knowledge gathering and sharing.
91. Diverse approaches will be used to enhance key stakeholder understanding of and capacity for agro-biodiversity mainstreaming across other sectors. Research will be conducted to identify incentives & motivators of priority audiences for agro-biodiversity conservation and sustainable use. The results of this research will be utilised in the development of specific resources for key stakeholders. Learning dialogues on agro-biodiversity will be conducted with, related ministries and projects, members of the National Assembly, Lao Women's Union, Lao Youth Organization, the Lao Patriotic Front for Reconstruction, Non-Government Organisations and International Organisations. Teaching resources will be developed on agro-biodiversity with the Luang Prabang Agriculture & Forestry College and replicated to other agricultural colleges. An agro-biodiversity resource and information pack will be developed for journalists and stakeholders. Display materials on agro-biodiversity relevant issues will be developed with the soon to be opened Luang Prabang Botanical Garden. Particular emphasis will be given to work with private sector actors and their networks to better understand what incentives

⁷⁶ These activities include diversifying the seed supply system and using the agricultural censuses in assessing threats to local biodiversity, potentially with a global significance, as well as identifying niche products for export, activities which will be performed under outputs 2.2 and 2.3.

⁷⁷ Having more appropriate technical and social skills, also including participation and facilitation.

⁷⁸ Including: Luang Prabang Agriculture and Forestry College, Pak Seuang; Thangone Irrigation College, VTE; Bolikhamxay Agriculture and Forestry College, Meuang Mai; Savannakhet Agriculture and Forestry College, Na Kae; Champasack Agriculture and Forestry College, Km 7 Pakse.

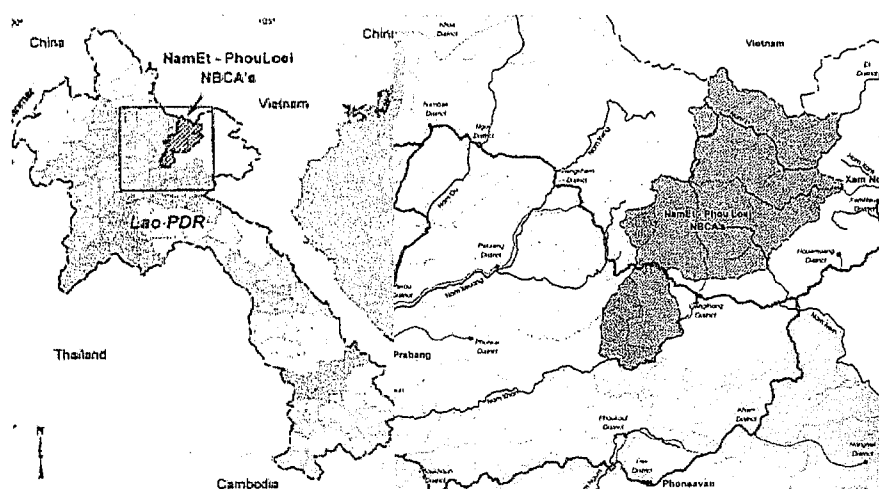
would be appropriate for them to mainstream environmental concerns – and especially biodiversity concerns into their actions.

Outcome/Component 2. Capacities and incentives to mainstream biodiversity, especially agro-biodiversity, at the Provincial, District and community levels

92. Lao PDR is split administratively into one Municipality and sixteen Provinces, which in turn are divided into 140 districts. The two proposed provinces that component 2 will focus on are Luang Prabang Province and Xieng Khouang Province. The country is commonly divided into three administrative regions, with Luang Prabang falling in the Northern Region and Xieng Khouang in the Central Region, no pilot site has been proposed for the Southern Region at this time but ongoing consideration should be given to this. Of the 17 Provinces (including Vientiane), provincial poverty estimates, where one is the poorest, rated Luang Prabang as number six and Xieng Khouang as number ten⁷⁹.
93. Luang Prabang province covers an area of 16,875 km² and in 2004 the population was estimated at 408,800. Luang Prabang is a historical point of significance and as such has higher population. Luang Prabang's capital, has been granted World Heritage Status as a site of cultural significance and specifically for its architecture and living heritage. This status has drawn significant tourism and in turn the population of Luang Prabang city has grown. Within Luang Prabang Province, there are eleven districts and the project will focus on Phonxay District, which has a population of over 35,000 across 62 villages. Only five of the villages have formal land forest allocation. The approximated land area for Phonxay is 1,500 km².
94. The population of Xieng Khouang was estimated at over 260,000 in 2004, across an area of 15,880 km². Xieng Khouang has a significant history in Lao PDR from the civil war. An ongoing issue from the Vietnam/American War is Unexploded Ordnance (UXOs), and is a serious and ongoing problem for the local populations. Historically there has been opium poppy cultivation in the area and government and donor projects, such as the IFAD Agricultural Development Project, have been involved in providing alternative livelihoods. Within the Xieng Khouang Province, there are eight districts and the project will focus on Phoukout District. The approximated land area for Phoukout is 2,000 km².
95. These districts have some poverty issues and significant ethnic diversity. Some of the villages are quite remote and quite poor by economic standards. Many wild species are found in the area but larger animals or globally significant species seem hard to find near villages. Their main activities are upland rice, livestock and cropping. NTFPs are significant as sources of income, food, medicine and materials for local families and poor people. Although much wild meat is consumed within the villages or district, there is also an illegal trade of live animals and animal parts into neighboring countries. As wildlife populations decline the value of wild products is increasing.
96. A major consideration in the selection of the pilot sites has been the linkage with relevant activities. As requested by the Government the proposed sites for GEF actions are within the current MAF/SDC: The Agro-Biodiversity Initiative target area. TABI has conducted an Agro-Ecosystems Analysis identifying 4 distinct agro-ecosystem zones. In order to compliment the TABI approach there will be ongoing discussion about which zones to work in. Initial discussions have focused on what has been designated as Zone 4, which borders the Nam Et/Phou Louey (NEPL) National Biodiversity Conservation Areas.
97. Aside from TABI several other activities have been conducted in the area including:

⁷⁹ The Geography of Poverty and Inequality in Lao PDR. (2008). NCCR, IFPRI

- The UNDP Governance and Public Administration Reform (GPAR) has been piloting activities in both of the proposed provinces.
- In Xieng Khouang Province the Department of Information and Culture, with support from UNDP has established Laos' first community radio station: Khoun Community Radio for Development. The station has been on air since October 2007, and is community-led, and operated by volunteers.
- FAO has conducted Livestock improvement programs and IPM in Luang Prabang and is currently conducting IPM in Xieng Khouang.
- FAO has recently undertaken preparatory work on performing an Agricultural Census in Laos together with MAF and the Department of Statistics at (DoS) of MPI.
- The swidden agriculture systems have also been researched by organizations such as the Regional Community Forestry Training Centre (RECOFTC).
- Other programs are also in planning
- The proposed districts are also chosen for their proximity to the NEPL National Biodiversity Conservation Areas (or National Protected Areas).



Map 2: NEPL National Biodiversity Conservation Areas

98. NEPL was included as part of an assessment of the protected areas of Lao PDR conducted by IUCN⁸⁰, which highlighted the following information about the communities living around the protected area:

- Hilly mountainous area
- Mixed ecosystems including: old growth and secondary mixed deciduous forest, mountainous evergreen forest, bamboo and shrub land
- Highest faunal biodiversity of any protected area in Lao PDR
- Cash crop limitations – market access, quality and profit
- Significant non-rice crops – mostly maize but also including: peanuts, soybeans, sesame, vegetables, tree crops and fruits, including mango, tamarind, plums and bananas;
- Livestock importance – poultry, pigs, buffalo and cattle.

99. This component will involve the development of incentives and capacity for agro-biodiversity with a focus on Community, District and Provincial levels. In support of this outcome six outputs will be pursued focused on key thematic areas: 1) Strengthening the capacity of PAFO and DAFO to promote

⁸⁰ IUCN, 2002. Nam Et-Phou Loai NBCA: A case study of economic and development linkages.

sustainable agro-biodiversity management and to adapt extension packages and services, 2) Conducting Participatory Land Use Planning including the development and implementation of Participatory Natural Resources Management plans at village level, 3) Establishing in-situ conservation areas for agro-biodiversity, 4) Promotion of biodiversity-friendly farming approaches in two pilot sites, 5) Identification and development of market incentives for agro-biodiversity, and 6) Linking with the private and public sector through agro-biodiversity planning agreements.

Output 2.1: Capacity and accountability of Provincial and District Government to mainstream biodiversity into agriculture increased for two pilot sites.

100. The project will result in improvements in the institutional capacities of PAFO and DAFO to mainstream biodiversity into agriculture, facilitating the role of biodiversity in enhancing livelihoods at village, district and provincial levels in Luang Prabang and Xieng Khouang Provinces. An initial Capacity Needs Assessment, including capacity scorecard, will be conducted with PAFO and DAFO staff to provide capacity priorities and a baseline for improvement. Training supported by practical learning by doing activities with the pilot villages will be used to support capacity development of PAFO/DAFO on land use planning and Participatory Natural Resource Management. PAFO and DAFO staff will be actively involved in the design of national extension materials, packages and services and will provide direct support to this process by pre-testing and use of them in the field. Indicators will be established with PAFO and DAFO to monitor and enforce policies related to agro-biodiversity in the pilot provinces. Long-term strategies and institutional capacity for agro-biodiversity will be mainstreamed into policies and plans at provincial level, including 8th SEDP (provincial and district level) and corresponding agricultural planning and budget addressing agro-biodiversity conservation and sustainable use at two pilot sites.

Output 2.2: Participatory land use plans integrating agro-biodiversity developed in two pilot sites.

101. In order for communities to be able to manage and conserve their lands in a sustainable manner, it is necessary for them to enjoy security of tenure and use rights and as such there will be a focus on implementing land registration for these rights. At the local level the project will conduct Participatory Land Use Planning (PLUP), which integrates agro-biodiversity considerations into local planning and Participatory Natural Resource Management for at least two pilot sites. The PLUP preparation process will be linked to the extension materials and potentially community visits to demonstration sites for agro-biodiversity positive activities. Data collection will focus on participatory processes. Mapping of different land uses and the development and implementation of corresponding village Natural Resource Management will link community land use plans, with provincial district and village level zoning plans, digitizing the community maps so that they can be integrated into the formal land use mapping. Resources and support will also be provided for implementation of the PLUP, including support for actions, development of monitoring indicators & simple reporting formats for evaluation.

Output 2.3: *In-situ* conservation for important agro-biodiversity established over 100,000 ha.

102. There will be establishment of systems for and an increase in *in-situ* conservation for important agro-biodiversity sites in Lao PDR. Simple methods to rapidly identify areas of agro-biodiversity significance will be developed with PAFO and DAFO, with strategic links to the agricultural census. Delineation of new *in-situ* conservation areas will be developed under a variety of protected area frameworks, including nature conservation areas, provincial, district and village level protected areas through the participation of farmers, taking into special consideration the special role of women and the ethnic mosaic. The agricultural censuses performed by FAO in conjunction with the DoS of MPI will be used in assessing threats to biodiversity at village level. By the end of the project at least 100,000ha of significant agro-biodiversity will be under *in-situ* conservation management. Efforts

will also be made to integrate *in-situ* agro-biodiversity considerations into non-formal areas of protection such as Pagodas, spirit forests, city open spaces, botanical gardens and even home gardens. Of particular focus of conservation in the sites will be rice varieties, bananas, beans, and job's tears – whose centre of origin and domestication includes Lao PDR and these are currently cultivated *in-situ* by farmers. Additionally, bamboo and other natural products from agro-ecosystems will also be identified for conservation and sustainable use.

Output 2.4: Farmers in two pilot sites with the skills, knowledge and incentives necessary to undertake biodiversity-friendly farming

103. The project will promote skills development and incentives for biodiversity-friendly farming at the two pilot sites. Farmers' groups will be established to promote and share traditional knowledge on agro-biodiversity and biodiversity-friendly farming approaches. Extension materials and tools will be utilized to develop biodiversity-friendly livelihoods. Farmers' field schools will be supported to link theory to practice and special attention will be given to women farmers.
104. One of the key incentives for biodiversity friendly farming will be through the promotion of organic farming. The project will promote local products that can receive premium as organic products through marketing of such products through formation of farmers' groups – such as organic rice, and vegetables. The project will support organization of exhibitions and participation of organic producers in them to collectively market their biodiversity-friendly products. As the two demonstration sites are close to the famous tourist city of Luang Prabang, products will be especially targeted to tourism related businesses.
105. In Lao PDR, some products are organic by default: as inorganic pesticide and fertilizer usages remain low nationally. Many farmers are also adopting organic farming, as organic products have some price advantages over non-organic products – particularly for rice and vegetables. Work by local companies such as Lao Arrowny Co. Ltd. shows that organic farmers are able to sell their rice at 20% higher prices than conventional farmers. According to the company, benefits from organic production are not limited to price incentives, but also include higher yields. Yield increases are probably due to higher efficiency of organic production, where farmers have better access to seeds, organic fertilizers and technical assistance. Additionally, a study by the Economic Policy Research Unit of the Agriculture and Forestry Policy Research Centre of NAFR shows that some organic vegetable growers obtain higher returns than inorganic ones. The project will build on existing initiatives and links will also be fostered between such farmer groups and private sector / NGOs that are helping to market organic products. For example, Center for Human Ecology Study of Highlands (CHESH LAO – an NGO) is promoting certification and marketing of vegetables in Luang Prabang area and the Sustainable Agriculture & Environment Development Association is promoting organic vegetables in Xiengkhouang Province. There are also a number of fair trade organizations promoting organic rice production – such as LFP-Bapro operating in Laos.

Output 2.5: Value-chain research used to identify, process, pack and market agro-biodiversity products

106. The project will build on the strategy proposed by the International Food Policy Research Institute (IFPRI) for successful commercialization of underutilized species through the expansion of demand; improved efficiency of production and special marketing channels and supply control mechanisms. The main objectives of this will be to strengthen local farmers' incomes from local farmer varieties and landraces to act as incentives for their maintenance *in-situ*. This strategy is concerned with efficiency gains and equity considerations for the distribution of revenues / income / 'rent' across actors and time. The project will seek to support farmers to maintain and increase area under local traditional varieties; establish entrepreneurship; develop strong and fair partnerships

between producers, dealers, consumers and other stakeholders in the production to consumption chain through a participatory integrated learning approach by all partners. It will also build on the Market Analysis and Development approach⁸¹, which is a participatory methodology designed to assist local people in developing income-generating enterprises, while conserving tree and forest resources.

107. A key characteristic of the communities that depend on agro biodiversity is their high levels of poverty and their inability to access credit or technical support. As in other parts of the world, smallholder farmers in rural Lao PDR do not have capacities for effective production, processing and marketing to promote their products locally, nationally or internationally nor to influence equitable distribution of profit margins. The project will tackle these problems through the formation of farmer groups, which will be used to institutionalize market operations. These groups will be formed based on local needs and opportunities – and may include farmers from a number of nearby villages in one group. In addition, specific product-oriented groups will be formed for harvesting, processing and marketing of selected products. Farmer groups will provide the institutional set up required to access financial institutions, and to ensure timely payback. The groups' capacities will be built based on capacity needs assessment. On production, the project will adopt two distinct strategies: i) skills and technologies promotion for improved cultivar selection, and for i) improved agronomic practices. A gender analysis will also be undertaken to ensure that farmers groups include women farmers and that there is fair participation in decision making and in distribution of benefits between the youth, men and women. Linkages with the private sector, local markets and newly developing certification systems at the local and national levels will also be promoted.
108. Based on the assessment undertaken during the project preparation phase, a number of important crops (which have origins and domestication centre in Lao PDR) have already been shown to have good marketing potentials. Jobs' tears continue to expand rapidly in the North and north-central Laos. Demand for this crop is primarily from Thailand, where it is processed and exported to Taiwan. Similarly, cassava is mostly cultivated for export (Vietnam), with some used locally for animal feed. Some communities are also capitalizing on niche markets – such as of wild tea, such as “400 years old wild tea” from Phongsaly is favoured by Chinese tea connoisseurs. There are also strong community interests to promote sesame and native pig farming. The project will build on such interests and successful cases to ensure that there are increased local benefits. Additionally, a survey done by Forest Research Center of NAFRI in 2008 recorded 11 items as cultivation NTFPs in Lao PDR. At the project demonstration sites, at least two species are known to be important. They include paper mulberry (*Broussonetia papyrifera*) and broom grass (*Thysanolaema maxima*). The project will work to support their processing and marketing with the farmers' groups as well.

Output 2.6: Private and public sector agreements to mainstream agro-biodiversity into their plans

109. Engagement of the private and public sector in mainstreaming agro-biodiversity will be enhanced through formal and/or informal agreements. Project stakeholders will be involved in the identification of potential partnerships with the private and public sector. Linkages will be made with partners through value chains for community agro-biodiversity products. Case studies and potential partners will be offered opportunities to discuss, observe and learn about positive private and public sector planning that is underway. Provincial level workshops will be used to bring together private and public sector with other stakeholders to discuss opportunities for mainstreaming agro-biodiversity in their plans. Agreements will be developed with willing private and public sector partners to mainstream agro-biodiversity in their plans.

⁸¹ <http://www.fao.org/forestry/enterprises/25492/en/>

Outcome 3: Effective Project Management

110. The purpose of this outcome is to ensure that the project is implemented in a timely manner and is cost effective. The main concern is that the project should be managed according to the principles of adaptive management, whereby lessons learnt during its implementation as well as lessons from other relevant initiatives are fed into refining project implementation. An additional issue here is that since Lao PDR has generally weak capacities for project/ programme implementation, this should also be considered as a part of overall national capacity building. There is only one Output under this component, which is described below.

Output 3.1: Improved capacity of IP for integrated planning, management, monitoring and evaluation of programmes

111. Under this, systems will be put in place for effective planning, management and monitoring and evaluation of the project through the recruitment of qualified staff as well as through the involvement of government staff assigned by the Government to the project. There will be ongoing mentoring and coaching provided by implementing agency UNDP on required systems for financial management, project management as well as on reporting. Cross-learning from other projects and programmes will also be encouraged. The project will utilize independent external evaluations at midterm to strengthen its adaptive management.

2.6 Key Indicators, risks and assumptions

112. The Box below shows how the project seeks to meet the project objective through indicators, which are linked to the outcomes. This highlights some basic variables that are designed to indicate the impacts of the project. It will be impossible to attribute all changes in these “indicators” to the GEF project but it will be feasible to demonstrate some causality.

Long Term Solution:
Lao PDR's biodiversity, including agro biodiversity, is maintained and protected as a key to poverty alleviation

Project Objective:
to provide farmers with the necessary incentives, capabilities and supporting institutional framework to conserve agro-biodiversity within the farming systems of Lao PDR

<p style="text-align: center;">Outcome 1: National Level</p> <p style="text-align: center;">National policy and institutional frameworks for sustainable use, and <i>in-situ</i> conservation of biodiversity in agro-ecosystems</p> <p>National policies, laws, and guidelines incorporating biodiversity, and especially agro-biodiversity—especially in the following</p> <ol style="list-style-type: none"> 1. Land use policy 2. Biodiversity strategy and action plan 3. Agriculture Law 4. ESA guidelines <p>Key stakeholders understanding and capacity to respond to agro-biodiversity enhanced.</p> <p>Biodiversity conservation, including agro-biodiversity, incorporated into Government policies.</p> <p>Institutional coordination of agro-biodiversity enhanced at national level.</p> <p>Institutional capacity of MAF to plan for, implement and effectively communicate on agro-biodiversity enhanced at national level.</p>	<p style="text-align: center;">Outcome 2: Capacities and incentives to mainstream biodiversity, especially agro-biodiversity, at the Provincial, District and community levels</p> <div style="display: flex; flex-wrap: wrap;"> <div style="width: 50%; padding: 5px;"> <p>Capacity and accountability of Provincial and District Government to mainstream biodiversity into agriculture increased to two pilot sites.</p> </div> <div style="width: 50%; padding: 5px;"> <p>Participatory land use plans integrating agro-biodiversity developed in two pilot sites.</p> </div> <div style="width: 50%; padding: 5px;"> <p>Private and public sector agreements to mainstream agro-biodiversity into their plans.</p> </div> <div style="width: 50%; padding: 5px;"> <p><i>In-situ</i> conservation for important agro-diversity established over 100,000 ha.</p> </div> <div style="width: 50%; padding: 5px;"> <p>Value-chain research used to identify, process, pack and market agro-biodiversity and biodiversity friendly community products.</p> </div> <div style="width: 50%; padding: 5px;"> <p>Farmers in two pilot sites with the skills, knowledge and incentives necessary to undertake biodiversity friendly farming.</p> </div> </div>
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110. Key risks and mitigation measures for them are tabulated below.

Table 3: Risks, ratings and mitigation strategies

Risk	Risk rating	Risk Mitigation Strategy
Senior government policy makers of Lao PDR do not see agro-biodiversity as making a significant contribution to the primary objective of poverty reduction and national development and partners pursue narrow institutional targets rather than working together	Medium	<p>The project will demonstrate the importance and value of agro-biodiversity through practical demonstrations, socio-economic valuations and the development of guidance to show how the conservation and sustainable use of agro-biodiversity can be managed effectively. A communications strategy will be put in place to ensure such messages reach the appropriate audiences.</p> <p>Senior policy makers have been identified as key target groups for communication under Outcome 1 (Output 1.4), including members of the National Assembly, ministries and other stakeholders.</p> <p>The project's strong focus on institutional coordination and partnerships are expected to lead to better involvement, support and contributions of other government institutions and projects in mainstreaming biodiversity into agriculture related and land use related plans and policies.</p>
Land ownership and access rights will continue to be unclear and land allocation will be slow.	Low	Though the formal mechanism of land allocation in Lao PDR started in last decade, informally there has been a strong local tenure system in place. The project is supporting the

		implementation of participatory land planning and land allocation in pilot sites under Outcome 2 to ensure strong local tenure over their resources.
Sustainable use of agro-biodiversity does not lead to sufficient economic gains or incentives for households at the project site to make them economically attractive compared to other high yielding varieties	High	<p>The project will address this risk by developing new products and developing markets for these products under Outcome 2. The focus will be to develop a whole new “value-chain”- from producers to marketing to retailers and buyers for these products so that there will be enough benefits to poor farmers. Lao PDR has experience in developing such chains for traditional handicrafts and this experience will be used for the promotion of traditional crop varieties. Since focus on only one commodity or approach may not bring about significant economic gains, the project will support diversified approaches.</p> <p>However, despite some economic and cultural benefits from cultivation of diverse local crop varieties, some farmers may still opt to replace traditional farmer varieties with high yielding varieties because of a number of factors – such as higher yield per unit of land or effort.</p>
Commercial farmers and the private sector companies promoting such farming will not be interested in implementing biodiversity friendly practices.	Low to Medium	<p>The potential for export from smallholder agriculture is large, since only 40% of Lao farms are currently producing for the market and less than 50% for exports. The cost of many raw materials in Lao PDR is lower than in competing countries, which may be attractive to commercial farmers and the private sector. There is a need to find niches products, which have high potential for export to neighbouring countries, EU, Japan, and elsewhere.</p> <p>The project will support both formal measures (legal – under Component 1) to ensure that private sector is responsible in its commercial farming activities and will also foster other informal agreements (under Outcome 2) to encourage responsible behaviour.</p>
Developers do not have “carrots or sticks” to identify and mitigate agro-biodiversity losses resulting from large land use change	Medium	The project will work with the regulatory authorities to bring agro-biodiversity requirements into EIAs and EMPs, and show how to mitigate losses in agro-biodiversity from land use changes.

2.7 Expected global benefits

113. Proposed new policies, regulations and institutional mechanisms provide tools and lessons to enable policy makers and land users to incorporate conservation into agriculture and land use policies and practices. Demonstration work will lead to valuable lessons for national and international replication of work. Globally significant biodiversity at the at least two demonstration sites over 10000 ha impacted directly and the whole nation indirectly. The principal global benefits would be derived from in-situ conservation of globally important crop genetic diversity in the centre of origin and domestication such as rice, mangos, banana, bread fruit and legumes. Maintaining crop genetic diversity in the centre of origin and domestication *in-situ* will be important in terms of agricultural sector adaptation under conditions of climate change (the maintenance of more resilient genetic stock that can be used in agriculture) and hence provide additional global benefits.

114. The second direct benefits from the project would be through the conservation of threatened species that rely on diverse agro ecosystems for their survival. Amongst the globally important species, of the 18 critically endangered species found in Lao PDR, 5 are found in agro-ecosystems and 7 species are threatened by agriculture related activities. Of 26 endangered species found in Lao,

1 is found in agro-ecosystems and 6 are threatened by agriculture related activities; and of 54 vulnerable species found, 8 occur in agro-ecosystems and 26 are threatened by agriculture related activities⁸².

115. The proposed demonstration sites were also two of the three sites where endemic salamander (*Paramesotriton laoensis*) was first described as a new species to science in 2002. The proposed districts are also chosen for their proximity to the NEPL National Biodiversity Conservation Areas. NEPL provide a wide range of birds, mammals and reptiles, many of which are threatened or have special conservation significance⁸³. With high conservation value, it is considered to harbor among the highest faunal biodiversity of any protected area in northern Lao PDR, including tigers and 17 other significant mammal species⁸⁴. Particularly interesting is the occurrence of sizeable numbers of ruminants including Gaur (*Bos gaurus*), Banteng (*Bos javanicus*), and a black goat-like new species of muntjac. The area also supports a population of tigers and medium size cats such as Golden cat (*Catopuma temmincki*) and Clouded Leopard (*Neofelis nebulosa*). Significant species of bears, primates and bats have also been recorded from the park area. Nearly 300 bird species have been recorded, 35 of which are key species of conservation concern. It is expected that the conservation awareness raised amongst the local stakeholders will help in promoting biodiversity friendly landuse practices and livelihood practices in areas adjacent to the National Biodiversity Conservation Areas will also help in the maintenance of global biodiversity values of the protected area.

2.8 Financial modality

116. The GEF funds will be provided as a grant. Government of Lao PDR will contribute in staff time, meeting room and office hire, and transport to an estimated value of 556,200 USD. UNDP co-finance is split – 213,000 USD in cash to fund activities, and 321,900 USD in-kind contribution of staff time for senior and junior management and intern (UN Volunteer). FAO co-financing (in-kind) consists of staff time for both technical input and project management (345,772 USD). Significant co-finance (3,000,000 USD) will be provided from SDC through TABI.

2.9 Cost effectiveness

117. The project approach of mainstreaming biodiversity into agriculture and land use policies and plans to conserve globally significant biodiversity in agro ecosystems *in-situ* is considered more cost-effective than the alternative approach of *ex-situ* conservation. Ex-situ conservation of the vast repository of Lao PDR's agro-biodiversity would require higher government and international investment compared to in-situ conservation that is based largely on farmers' interests and their investment. Secondly, ex-situ conservation will not be able to allow crops to develop adaptation characteristics to changing climate in a complex context and mimicking such a context in-situ would be very expensive. The project is also considered cost effective because its strong role in coordinating agro-biodiversity related investment in Lao PDR minimizes duplication of efforts and encourages lesson-learning and this avoids unnecessary expenses. Strong partnerships with local government, private sector and local communities will lead to significant contributions to agro-biodiversity conservation; this would be a more cost-effective and sustainable approach than a solely government or GEF-funded programme. With effective national and ground level actions to conserve agro-biodiversity and other globally important biodiversity, occurring in agro-ecosystems, expensive remedial future actions to conserve biodiversity will be avoided.

⁸² www.redlist.org

⁸³ ICEM, 2003. Lao PDR National Report on Protected Areas and Development.

⁸⁴ MAF and IUCN 1998, WCS 1998.

118. One of the key approaches of the project to work closely with TABI has led to considerable cost-effectiveness. This will allow international expertise to be incorporated into project plans and implementation at a reasonable cost in relation to the total budget. This is also expected to contribute to project supported actions' sustainability.

2.10 Sustainability

119. The project's strong focus on building institutional capacities and systems are expected to lead to both strong sustainability and replicability of project supported actions. Whilst specific policy development will be one-off support by the project, capacity building of MAF to lead this post-project policy reform process has been built strongly into the project. Key elements of sustainability built into this project include the following:

- The project was identified as a national priority and fits with national policies and plans
- Strong partnership and coordination has been built into the project - especially with TABI
- There is a strong focus on formulating enabling policy and legal environment, encouraging institutional coordination and capacity building of stakeholders, which are essential for sustaining activities during project implementation period and beyond.
- Establishing partnerships between public-private-local communities thereby focusing on sustaining project activities.

120. Institutional sustainability: The project builds upon existing institutional structures of the government and the only new mechanism proposed – a working group – is not expected to be costly to maintain in the long run.

121. Financial sustainability: The project's actions on raising awareness amongst senior policy makers is expected to strengthen the support for biodiversity conservation – with possible increased allocation of government resources in the medium and long run. The project's capacity building will also include fund raising for any extra funds that may be required. The work project will support on value chains promotion at community level are expected to lead to increased financial flows to communities and are expected to be sustainable.

122. Social sustainability: The capacity building activities, networking and continuous field-level presence by the management agencies (state, private and civil society) will help achieve social sustainability of the project. The build up of trust through dialogues and stakeholder consultations and stakeholder mobilization done through capacity building by the project will assist in achieving this long-term objective. The strong focus on building on local knowledge, capacities and incentives – as well as strong project focus on ensuring gender equity through its work are expected to lead to social sustainability.

123. Environmental Sustainability: The project's focus on better conservation outcomes for agro biodiversity as well as on other biodiversity within agro ecosystems are expected to lead to better environmental sustainability. However, the project will also ensure that better conservation efforts within agroecosystems do not lead to displacement of threats to biodiversity outside the agroecosystems managed by communities or the private sector.

2.11 Replicability

124. The project's work, especially the demonstration work under Outcome 2, are designed to be replicable. The project's work on capacity building of DAFO/PAFO staff can be replicated easily through government's own work. Much of the replication will also be promoted through national policy, legal and institutional strengthening under Outcome 1. The project will build the capacity of

the MAF, PAFO and DAFO staff that will be directly engaged in replicating the approaches to other villages, districts and ultimately Provinces.

125. The farmer to farmer approaches under Outcome2 will bring the farmers to the centre of the project and as such promote avenues for direct and indirect replication. As farmers see incentives for agro-biodiversity approaches they will be attracted to replicating these approaches, especially when there is support through Government extension materials. Public decision-making and action in the TABI field sites can be replicated elsewhere under TABI. This has been already planned under the TABI approach to be included in future activities.